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Annette Köhler · Kai-Uwe Marten · Reiner Quick
Klaus Ruhnke · Matthias Wolz *Hrsg.*

RESEARCH

Kristina Yankova

The Influence of Information Order Effects and Trait Professional Skepticism on Auditors' Belief Revisions

A Theoretical and Empirical Analysis

Springer Gabler

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Foreword by Prof. Dr. Annette Köhler

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Kristina Yankova
Duisburg, Germany

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Foreword

In the aftermath of the numerous accounting scandals and unfavorable audit inspection results of the last years, professional skepticism has evolved to one of the most intensively and controversially discussed topics in auditing. While auditing regulators and society tend to consider professional skepticism as a universal panacea for problems related to insufficient audit quality and increasingly demand from auditors to raise the bar with regard to the application and maintenance of professional skepticism, auditing standards involve a rather neutral view, recognizing that extremely high levels of professional skepticism can jeopardize audit efficiency (cost and timeliness), while not necessarily improving audit effectiveness (quality). Acknowledging the fundamental importance of profession skepticism to auditing, academic research has exerted considerable effort in exploring the nature, determinants and implications of professional skepticism in auditing. However, despite of the great academic and normative interest, professional skepticism is a concept which due to its complexity and latency still involves more questions than answers.

In the present work, Kristina Yankova addresses the question of whether professional skepticism can prevent cognitive biases like information order effects from distorting the quality of auditors' judgments. She makes a significant contribution to the existing auditing literature by providing a profound theoretical and empirical analysis on the role and behavioral consequences of professional skepticism in generic audit settings. The present piece of research impresses by its conceptual finesse, scientific rigor and high academic standard, but also by its enormous relevance to current debates in auditing. The thesis of Kristina Yankova is a must read for auditing researchers, standard setters and regulators as well as readers interested in current topics in auditing.

I thank Kristina Yankova very much for her excellent support in teaching and research during her research assistance activities at my chair and wish the work the deserved positive resonance.

Prof. Dr. Annette G. Köhler

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Kristina Yankova

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List of Abbreviations

ACCA	Association of Chartered Certified Accountants
ACRA	Accounting and Corporate Regulatory Authority
AD	Anno Domini
AG	Aktiengesellschaft
AGM	Alchourrón, Gärdenfors and Makinson
AICPA	American Institute of Certified Public Accountants
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
AOS	Accounting, Organizations and Society
APAK	Abschlussprüferaufsichtskommission
APB	Auditing Practices Board
ASIC	Australian Securities & Investments Commission
AU	Interim Auditing Standard
AUASB	Auditing and Assurance Standards Board
BCE	Before the Common Era
BGBl.	Bundesgesetzblatt
ca.	circa
CAQ	Center for Audit Quality
CICA	Canadian Institute of Chartered Accountants
Co.	Company
c.p.	ceteris paribus
CPA	Certified Public Accountant
CPAB	Canadian Public Accountability Board
df	degrees of freedom
Dipl.-Kff.	Diplom-Kauffrau

Dr.	Doctor
EARNet	European Auditing Research Network
ed(s).	editor(s)
e.g.	exempli gratia
EoS	End-of-Sequence
et al.	et alii
etc.	et cetera
EU	European Union
EUR	Euro
e.V.	eingetragener Verein
f.	following
fMRI	functional magnetic resonance imaging
FRC	Financial Reporting Council
GmbH & Co. KG	Gesellschaft mit beschränkter Haftung & Compagnie Kommandit-gesellschaft
GRE	Graduate Record Examination
H_1	Hypothesis 1
H_2	Hypothesis 2
HGB	Handelsgesetzbuch
http	hypertext transfer protocol
IAASB	International Auditing and Assurance Standards Board
IBM	International Business Machines
ICFAI	Institute of Chartered Financial Analysts of India
IDW	Institut der Wirtschaftsprüfer in Deutschland e.V.
i.e.	id est

IEE	Institute of Electrical and Electronics Engineers
IES	International Education Standard
IESBA	International Ethics Standards Board for Accountants
IFAC	International Federation of Accountants
IFIAR	International Forum of Independent Audit Regulators
i.H.v.	in Höhe von
INFE	International Network on Financial Education
IQ	Intelligence Quotient
ISA	International Standard on Auditing
IT	Information Technology
JDM	Judgment and Decision Making
Jr.	Junior
KfW	Kreditanstalt für Wiederaufbau
KPMG	Klynveld Peat Marvick Goerdeler
LLP	Limited Liability Partnership
MEUR	Million Euros
Mio.	Million
MIT	Massachusetts Institute of Technology
No.	Number
NZAuASB	New Zealand Auditing and Assurance Standards Board
OECD	Organisation for Economic Co-operation and Development
OR	Operations Research
p.	page

PCAOB	Public Company Accounting Oversight Board
PhD	philosophiae doctor
Prof.	Professor
ProMES	Productivity Measurement and Enhancement System
PS	Prüfungsstandard
PSA	Philosophy of Science Association
QHIP	Quantifying Human Information Processing
rd.	rund
S.	Seite
SAS	Statement of Auditing Standard
SAT	Scholastic Assessment Test
sbr	Schmalenbach Business Review
SbS	Step-by-Step
SD	Standard Deviation
SE	Standard Error
SEC	Securities and Exchange Commission
sic	sic erat scriptum
SOX	Sarbanes-Oxley Act
SPSS	Statistical Package for the Social Sciences
Sr.	Senior
SSRN	Social Science Research Network
StB	Steuerberater
STPI	State-Trait Personality Inventory
TEUR	Tausend Euro
TSBI	Texas Social Behavior Inventory
TV	Television

UK	United Kingdom of Great Britain and Northern Ireland
URL	Uniform Resource Locator
US	United States
USA	United States of America
vs.	versus
WiPrPrüfV	Wirtschaftsprüferprüfungsverordnung
WP	Wirtschaftsprüfer
WPK	Wirtschaftsprüferkammer
WPO	Wirtschaftsprüferordnung
www	world wide web

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List of Symbols

%	percent
&	and
§	paragraph
*	significance at a 5%-level
**	significance at a 1%-level
***	significance at a 0.1%-level
˜	complement
|	conditional on
∩	conjunction
×	interaction
$++--$	information presentation order where two positive items are followed by two negative items
$--++$	information presentation order where two negative items are followed by two positive items
α	sensitivity to negative evidence
β	sensitivity to positive evidence
βi	regression coefficient of the parameter *i*
ε	error term
$\eta 2$	eta-squared (effect size)
F	*F*-statistic
N	number of subjects / observations
p	probability / significance value
R	reference point / coefficient of determinations
r	Pearson product-moment correlation coefficient
r_s	Spearman rank correlation coefficient
S_k	degree of belief in a hypothesis after evaluating *k* pieces of evidence
S_0	initial strength of belief
S_{k-1}	anchor (prior belief)
$s(x_k)$	subjective evaluation of the *k*th piece of evidence
t	*t*-statistic
w_k	adjustment weight for the *k*th piece of evidence
z	standardized value

ACT	auditor certification
AGE	age
BELREV	belief revision
CERTAIN	certainty in the own assessment
CONC	concentration
FINBEL	final belief
GEN	gender
GEXP	general audit experience
IEXP	industry-specific experience
IMPC1	assessments of the importance of the additional piece of information concerning the rejection of state funding
IMPC2	assessments of the importance of the additional piece of information concerning the insolvency of a major supplier
IMPC3	assessments of the importance of the additional piece of information concerning the favorable external report and banks' willingness to negotiate
IMPC4	assessments of the importance of the additional piece of information concerning the announcement of a cash capital increase
INFORD	information order
INTBEL	initial belief
INTENS	intensity of thought
POS	position in the firm hierarchy
PS	professional skepticism
SUFINF	sufficiency of information
TEXP	task-specific experience

1 Introduction

1.1 Motivation and Objectives

The aim of an external audit is to express an independent professional opinion (i.e., a *judgment*) on the compliance of financial statements[1] with relevant generally accepted accounting principles.[2] In forming an overall opinion, auditors evaluate a wealth of facts and circumstances that relate to what is accurate, true, fair, material, and sufficient.[3] Judgment pervades practically every facet of auditing.[4] The fundamental importance of judgment in auditing is evident not only in the frequent use of the term in national and international auditing standards,[5] but also in the substantial academic interest and research endeavor dedicated to this topic in the last decades. Overall, this research has evolved around the notion that it is essential to profoundly understand the foundations, determinants, and complex processes that underlie auditor judgment[6] in order to improve judgment quality.[7]

An important feature of the judgment process in auditing is its sequential nature. In particular, in arriving at a judgment, auditors generally proceed gradually by starting with an initial position (i.e., *belief*) and successively adjusting it in light of newly incoming evidence rather than by obtaining complete information en bloc and integrating it all within a single overall belief update.[8] Psychological theory, however, suggests that sequential information processing bears the potential for systematic biases in judgment, the so-called "information order effects", which refer to the dependence of an individual's response on the order in which new information is presented and processed. Order effects imply that the very same informational stimuli can induce a fairly different response contingent on the order of presentation of the stimuli.[9] Under a normative viewpoint, individuals' responses shall be based on information

---

1 For a definition of the term "financial statements" and its constituent parts, see ISA 200.13(f). For a brief historical overview of the origins of modern auditing dating back to the manorial households from the fourteenth century, see *FRC* (2012): 9-11. For a very broad definition of auditing as a certification practice, see *Francis* (2011b): 318.

2 See *Anderson/Koonce/Marchant* (1991): 46; *Bazerman/Morgan/Loewenstein* (1997): 91; *Quick/Warming-Rasmussen* (2007): 1008.

3 See *Boylan* (2008): 230.

4 See *KPMG* (2011): 1; *Solomon/Shields* (1995): 139; *Trotman* (1998): 115.

5 See *Trotman/Tan/Ang* (2011): 279.

6 Note that a precise delimitation of the terms "auditor judgment" and "audit judgment" is missing in the relevant auditing literature where both terms have frequently been used interchangeably. For an instance of the parallel use of both terms, see the meta-analytical paper of *Trotman* (1998). The present work attempts to use the terms "audit judgment" and "auditor judgment" as unambiguously and uniformly as possible. Nevertheless, in some situations, a clear-cut distinction between both terms appears not possible. In addition, it should be noted that the terms "auditor judgment" and "auditors' judgment" are used synonymously herein.

7 See *Anderson/Koonce/Marchant* (1991): 44; *Libby* (1981): 121; *Libby/Lewis* (1977): 245; *Trotman* (1998): 118. For a discussion of judgment quality, see Section 2.4.1.

8 See *Gibbins* (1984): 110.

9 See *Anderson* (1981): 144; *Hogarth/Einhorn* (1992): 1f.

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content (e.g., diagnosticity, relevance, reliability), not on the *order* in which the information happens to be received and evaluated.[10]

Although information order effects are not an audit-specific phenomenon, their importance and relevance to auditing is fundamental for several reasons. First, auditing standards do not provide any practical guidance on how individual pieces of evidence shall be aggregated into an overall opinion. Second, order effects can have serious implications for audit efficiency and effectiveness. Specifically, the order of information presentation can influence auditors' search for additional evidence and the amount of audit testing considered necessary to corroborate the own opinion, thereby potentially resulting in over- or underauditing.[11] Third, as indicated above, order effects can yield not substantively justified beliefs and judgments, thereby jeopardizing the quality of auditor judgments.[12] Fourth, auditors frequently obtain information and data from the client who determines the order and sequence of information presentation, and thus has the opportunity to unduly influence auditors' views and judgments.

The existing auditing literature has broadly recognized information order effects as a serious threat to the quality of auditor judgments and has dedicated considerable research endeavor to exploring this cognitive phenomenon in auditing settings and identifying mechanisms for mitigating order effects. Overall, although prior research on information order effects has provided valuable insights into the roots and determinants of order effects, the current knowledge of the influence of personal dispositions on the susceptibility to and magnitude of information order effects in auditor judgments is still very limited.

Similarly, although the concept of professional skepticism is fundamental to auditing,[13] the knowledge of what skepticism essentially is, how it manifests itself, how it affects the way in which auditors process information, and how it interacts with other relevant variables is still fairly restricted.[14] Until very recently, research on professional skepticism has been conducted in an *ad hoc* manner, without the benefit of a unifying framework, a thorough conceptualization, or an explicit measure. With the publication of the influential conceptual works of *Nelson* (2009) and *Hurtt* (2010), first important steps toward overcoming these deficiencies and developing a deeper understanding of the nature of professional skepticism in auditing have been made.

In his theoretical analysis of the antecedents of professional skepticism in auditing, *Nelson* (2009) recognizes that cognitive biases like information order effects can systematically undermine auditors' professional skepticism.[15] This contention is echoed by *Glover and Prawitt*

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[10] This aspect is further discussed in Section 2.4.2.1.4 as well as in Section 3.3.

[11] See *Ashton/Ashton* (1988): 638; *Krull/Reckers/Wong-On-Wing* (1993): 144; *Messier/Tubbs* (1994): 58; *Tubbs/Messier/Knechel* (1990): 459. This aspect is also addressed within Section 3.3.

[12] See *Schreiber* (2000): 170; *Schwind* (2011): 73.

[13] See *Chekushina/Loth* (2014): 87; *Hurtt* (2010): 149.

[14] See *Hammersley* (2011): 108; *Harding/Trotman* (2011): 8.

[15] See *Nelson* (2009): 13f. For a detailed discussion of the Nelson model of professional skepticism, see Section 4.3.

(2013).[16] In a similar vein, the American Institute of of Certified Public Accountants (AICPA) acknowledges the potential for cognitive traps to compromise professional skepticism and calls for future research on the cognitive and behavioral aspects underlying skepticism.[17] The present work responds to this call by investigating the interrelation between auditors' professional skepticism and their susceptibility to information order effects in belief updating and judgment formation.

Building on the seminar work of *Hurtt* (2010), herein professional skepticism is viewed as an *innate characteristic* of an auditor. By conceptualizing professional skepticism as a personal disposition (i.e., a *trait*), the present study offers some important insights into the role of individual characteristics in the context of information order effects. In addition, the study provides valuable insights into the behavioral manifestations of trait professional skepticism in a context that involves high complexity, uncertainty, limitedly available information, and no skepticism-inducing conditions such as irregularities, fraud, or high environmental risk.

Overall, the objectives of the present work are two-fold: first, to provide additional experimental evidence on the influence of information order effects on auditors' judgments, and second, to explore whether auditors exhibiting measurably different degrees of trait professional skepticism adjust their beliefs in a different manner and are to a different extent subject to information order effects. In addressing these objectives, a *positive* scientific approach has been adopted in the present study. This approach essentially aims at drawing causal inferences.[18] In investigating the interplay between information order effects and professional skepticism, the present work builds on psychological and auditing models and theories to derive the relevant research hypotheses and questions, which are then subjected to experimental testing. Hence, the procedure adopted herein can be classified as *deductive*.[19]

As the ultimate aim of judgment and decision making research in auditing is to enhance the quality of auditors' judgments and decisions,[20] the insights gained from the inquiry into the relationship between information order effects and professional skepticism are used to derive *suggestions* on how order effects can be reduced and the normative ideal of unbiased information processing and judgment[21] approached. Basically, this part of the study involves a *normative* focus.[22] However, it is important to note that in light of the current state of incom-

16 See *Glover/Prawitt* (2013): 8-11.

17 See *AICPA* (2010): 2.

18 See *Kornmeier* (2007): 28.

19 See *Ghauri/Grønhaug* (2005): 15; *Wilson* (2014): 13. The *deductive* approach has also been referred to as a "theory then research" approach and has generally been affiliated with the *quantitative* type of research. An alternative scientific approach relates to *induction*, or *qualitative* research, which proceeds from data collection and observation of findings toward the development of theory. This approach has also been referred to as "research then theory". See *Ghauri/Grønhaug* (2005): 15; *Peecher/Solomon* (2001): 194.

20 See *Belkaoui* (1989): xi; *Kotchetova/Salterio* (2007): 557; *Peecher/Solomon* (2001): 194; *Trotman* (1998): 118.

21 See *Stahl* (2012): 135.

22 See *Chmielewicz* (1994): 14; *Fülbier* (2004): 267f.; *Kornmeier* (2007): 28.

plete knowledge and understanding of the complex causal interrelations underlying auditors' judgment and behavior, the derivation of *prescriptions* does not appear tenable.[23]

1.2 Organization of the Thesis

The reminder of this thesis proceeds as follows: In *Section 2*, the broad theoretical background is outlined. At the outset of this section, the need for an adoption of a psychological lens in behavioral research is discussed (Section 2.1), followed by a consideration of the structure of human cognition (Section 2.2) and the information processing approach (Section 2.3). Building on this broad psychological foundation, the central features and determinants of auditor judgment are discussed (Section 2.4).

Section 3 sheds light on the first major pillar of the present work, the cognitive phenomenon of information order effects in belief updating. At the beginning of this section, some general remarks on the nature of beliefs are made (Section 3.1) as a prelude to the detailed discussion of the psychological model predicting the emergence of information order effects, the belief-adjustment model developed by *Hogarth and Einhorn* (1992) (Section 3.2). The section proceeds with a consideration of the fundamentality of the process of belief updating to auditing (Section 3.3) and concludes with a review of the relevant auditing literature (Section 3.4).

The second major pillar of the present work, the fundamental concept of professional skepticism in auditing, is discussed in *Section 4*. After some general introductory remarks are provided (Section 4.1), an inquiry into the meaning and nuances attached to the term "skepticism" in the social sciences as well as in auditing is presented (Section 4.2). Building on this broad terminological foundation, the conceptual model of determinants of professional skepticism in auditing developed by *Nelson* (2009) is presented and underpinned with relevant research findings (Section 4.3). The section proceeds with a detailed discussion of *Hurtt's* (2010) notion of professional skepticism as an innate personal disposition (Section 4.4). The in-depth theoretical consideration of professional skepticism in auditing concludes with a synthesis of the key insights concerning the influence of trait professional skepticism on auditors' belief revisions in light of information order effects (Section 4.5).

Building on these broad interdisciplinary theoretical considerations, the empirical analysis is presented in *Section 5*. After a general description of the research method (Section 5.1) and the experimental design employed (Section 5.2), the research instrument utilized to capture auditors' belief revisions and their degrees of innate skepticism is outlined (Section 5.3). These methodological considerations are followed by a description of the participants in the experimental study (Section 5.4). At the end of this section, the results of a number of analytical procedures and statistical tests conducted to examine the research hypotheses and to provide additional explorative findings are presented (Section 5.5).

[23] See *Peecher/Solomon* (2001): 194. Note that in contrast to the German literature on scientific approaches and theories, in the relevant English literature, the *prescriptive* rather than the *normative* focus of research is viewed as the last stage of scientific understanding and advance. See *Peecher/Solomon* (2001): 194.

The conclusion is contained in *Section 6*. The section provides a summary and discussion of the basic insights and implications of the present work (Section 6.1) as well as an overview of the limitations of the study and the potential directions for future research (Section 6.2).

2 Broad Theoretical Background

This section deals with some foundational psychological notions which provide valuable insights into the cognitive foundations of human judgment as a prelude to the inquiry into the central features and determinants of auditor judgment. It should be noted that the considerations within this section are of general nature and are not intended to be all-encompassing.[24] Rather, they aim to provide a broad theoretical basis for the study of information order effects and professional skepticism in the context of auditors' belief revisions.

2.1 Need for Adoption of a Psychological Lens in Behavioral Research

2.1.1 Normative Economic Theory and Its Behavioral Limitations

Economics, the queen of social sciences, is built upon the fundamental notion of rationality, which serves as the central behavioral assumption in explaining economic phenomena.[25] According to expected utility theory[26], which is the core formal account of rationality, human behavior can be viewed as a choice from a set of alternatives, each of which is characterized by a designated value as well as a probability of occurrence. The economic agent effortlessly and thoroughly processes the vast amounts of information[27], assesses all available options in terms of their likelihood and expected value, and eventually chooses the alternative that promises the maximal expected utility, i.e., goal achievement.[28] As new information arrives, the rational economic man is assumed to revise his previously held probabilistic positions in strict accordance with logical rules. The core normative principle typically applied for updating probabilities in light of new evidence is Bayes' theorem, which represents a rigorous combi-

[24] As claimed by *Kaufman* (1999): 363, the relevant literature in economics and psychology is immense. Hence, it is barely possible to provide an overview that does more than merely scratch the surface. The same applies to the voluminous auditing literature on judgment and decision making.

[25] See, e.g., *Hogarth/Reder* (1986): 2. Overall, the rationality concept has been viewed as one of the most important achievements of the social sciences ever. See *Simon* (1980): 75. For an excellent and very insightful review of the varieties of economic rationality from *Adam Smith* (1723-1790) to the present, refer to *Zouboulakis* (2014): 5-139.

[26] The origins of expected utility can be traced back to 1738 and the famous St. Petersburg essay of *Daniel Bernoulli* (1700-1782). However, the real prominence of the notion of expected utility came only two centuries later with the publication of the seminal work of *von Neumann/Morgenstern* (1944). See *Abdellaoui* (2004): 15f; *Kahneman* (2003a): 164. For a discussion of the central aspects of expected utility theory, including its violations, the most prominent of which are known as the *Allais* (1953) paradox and the *Ellsberg* (1961) paradox, refer to *Abdellaoui* (2004): 15-30.

[27] Information can be broadly defined as "*zweckorientiertes Wissen*" (*Wittmann* (1959): 14), i.e., a source of knowledge for purposeful judgment and decision making. Information is an immaterial good with unique characteristics, including relevance, validity, reliability, trustworthiness, availability, source, topicality, and acquisition costs. See *Ballwieser/Berger* (1985): 1; *Gemünden* (1993): 847.

[28] See *Baron* (2007): 24; *Sontheimer* (2006): 238. Essentially, goals can be viewed as criteria by which states of affairs are evaluated. See *Baron* (2007): 23.

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nation of contingent probabilities.[29] Stated formally, the theorem runs along the following lines: [30]

$$(1) \qquad p(H|D) = \frac{p(D|H)\cdot p(H)}{p(D|H)\cdot p(H)+p(D|\bar{H})\cdot p(\bar{H})}$$

where

$p(H)$ = *a priori* probability of event H;

$p(\bar{H})$ = *a priori* probability of the complement of event H;

$p(D|H)$ = probability of D given H;

$p(D|\bar{H})$ = probability of D given the complement of H; and

$p(H|D)$ = probability of H given D (*a posteriori* probability of H).

Overall, the rationality concept and its major formal and logical pillars (e.g., the expected utility paradigm and Bayes' theorem) provide a reasonable and stringent account of human behavior in that they reflect its purposefulness and goal-orientation.[31] However, the unlimited rationality assumed in economic theory does not reflect the manner in which individuals actually process information, update beliefs, form judgments, and arrive at decisions. As prominently argued by *Herbert Simon*, as a consequence of the limited availability of information as well as the restrictions of cognitive resources and computational abilities, human behavior in the real world is "*intendedly* rational, but only *boundedly* so."[32]

The concept of bounded rationality coined by *Simon* highlights the discrepancy between the limitless human rationality that is at the heart of normative economic theory and the reality of human behavior.[33] The bounded rationality paradigm is built upon the notion that the capacity of human cognition (involving both knowledge and computational ability) is not sufficient to achieve the optimal outcomes posited in economic theory, especially under conditions of high

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[29] See *Birnberg* (1964): 108f.; *Karni* (2013): 5; *Tisdell* (1975): 266. As will be shown in Section 3.1, Bayes' theorem represents the relevant normative benchmark for the process of belief revision in light of newly incoming evidence. Therefore, it is considered in more detail in the present section. Note in passing that the theorem is named after Reverend *Thomas Bayes* (1702-1761) whose outrageous propositions and groundbreaking ideas summarized in a work labeled "An Essay towards solving a Problem in the Doctrine of Chances" were discovered post mortem by his friend *Richard Price* (1723-1791) and published in 1763.

[30] See, e.g., *Baron* (2007): 32. For an extensive review of the Bayesian theory and a number of interdisciplinary practical application of the Bayes' rule, consult *Damien et al.* (2013).

[31] See *Simon* (1980): 75.

[32] *Simon* (2013): 88, italics in original. Similar arguments and quotes can also be found in his earlier publications (see, e.g., *Simon* (1955): 101; *Simon* (1957a): xxiv). It is instructive to note that the subsequent consideration of the boundaries of human cognition does not aim to discard the fundamental normative models. Rather, the main goal is to stress the importance of relaxing the utopic behavioral assumptions regarding global rationality, thereby extending the descriptive and empirical validity of mainstream economics. See *Fromlet* (2001): 64.

[33] See *Simon* (1992): 3. For a concise consideration of the fundamental notion of bounded rationality, see *Simon* (1997): 291-294. For critical remarks on this concept, see *Marris* (1992): 194-221.

complexity.[34] Accordingly, in the real world, optimization is replaced by satisficing, i.e., a search for a good and feasible solution rather than an optimal one.[35]

Importantly, the notion of bounded rationality does not imply that humans are consciously and intentionally irrational, but merely that they possess limited cognitive capacities.[36] To cope with cognitive resource constraints, people usually take mental shortcuts, i.e., they adopt heuristics[37] which simplify complex problems and provide rapid solutions at low cognitive cost.[38] The use of simplifying heuristics procedures typically results in intuitively reasonable and acceptable solutions. However, in some cases, heuristics can also lead to systematic errors in judgment and decision making, the so-called "biases".[39] In essence, biases represent deviations from the normative standards of rationality.[40]

Overall, by assuming unlimited rationality, economic theory places severe demands on the economic agent, while considering his/her internal structures and mental properties as a black box.[41] As aptly put by *Simon*, to explain real-world human behavior performed under conditions of considerable complexity and dynamics of the environment, normative economic theory has to describe the economic agent "*as something more than a featureless, adaptive organism; it must incorporate at least some description of the processes and mechanisms through which the adaptation takes place*."[42] In contrast to normative economic theory that *prescribes* how individuals *ought* to behave under the orthodox assumption of perfect rationality, psychology *describes* how people *actually* behave in the real world.[43] The following section outlines the fundamental importance of the discipline of cognitive psychology for the understanding and exploration of human judgment and behavior.

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[34] See *Simon* (1957b): 198. In a similar vein, *Gigerenzer* (2007): 62f. argues that even for well-structured problems such as chess, the optimal solution and methods for achieving it are unknown. This uncertainty applies all the more to less well-defined problems such as what stocks to invest in or whom to marry.

[35] See *Simon* (1955): 108; *Simon* (1959): 262-264, 277; *Simon* (1997): 295-298.

[36] See *Simon* (1992): 3.

[37] For a broader discussion of the term "heuristic", refer to *Keren/Teigen* (2007): 92f. For a general psychological and accounting-related discussion of some central heuristics, including representativeness, availability as well as anchoring and adjustment, see *Belkaoui* (1989): 203-231.

[38] See *Fiske/Taylor* (2008): 12f., 197.

[39] See *Tversky/Kahneman* (1974): 1124.

[40] See *Kahneman* (2003b): 1449.

[41] See *Kaufman* (1999): 363f.; *Simon* (1955): 103.

[42] *Simon* (1959): 256. Henceforth, for the sake of readability, direct quotes are highlighted by italics. The instances where italics were used in the original quotation are marked accordingly.

[43] See *March/Simon* (1958): 138; *McKenna* (2000): 219; *Over* (2007): 3. It might be remarked that economists have put considerable effort in defending the rationality paradigm and categorically distancing economic theory from psychology. For a review of this issue, see *Bruni/Sugden* (2007): 146-171. Generally, economists criticize psychological research for its manner of generating lists of cognitive fallacies, while being unable to provide a coherent alternative to normative models of rational human behavior and thought. Indeed, cognitive psychological theories cannot achieve the coherence, elegance, and the formal precision of normative models of rational judgment and choice. However, these qualities of the normative models are at the expense of behavioral reality and descriptive validity. In contrast, psychology offers integrative models with considerable descriptive power that can be applied to a wide range of behavioral phenomena in different domains. See *Kahneman* (2003b): 1449.

2.1.2 Cognitive Psychology and its Contribution to Explaining Human Behavior

The term "psychology" stems from the Greed words "*psyche*" which means "mind", "soul", "spirit", and "*logos*" which means "knowledge", "study". Semantically, then, psychology is the study of the human mind.[44] Psychology can generally be divided into the subfields of applied and theoretical psychology. While the former focuses on the practical use of psychology by individuals and society, and includes the subfields of clinical, counselling, environmental, and educational psychology, the latter deals with the basic principles and mechanisms of how the mind controls human behavior[45]. Theoretical psychology encompasses a wide array of subfields, including perception, learning and memory, thinking, psycholinguistics as well as cognitive, physiological, comparative, developmental, social, and personality psychology.[46]

The focus within this work is on cognitive psychology. The term "cognition" comes from the Latin verb "*cognoscere*" which means "to become acquainted", "to get to know".[47] Hence, cognition refers to all the processes by which humans come to know the surrounding world.[48] It encompasses virtually all human intellectual activities and mental processes, including sensation, perception, attention, learning, memory, problem solving, thinking, imagining, and language, among others.[49] Consequently, as argued by *Neisser* (1967), "*cognition is involved in everything a human being might possibly do*" and essentially, "*every psychological phenomena* [sic!] *is a cognitive phenomena* [sic!]."[50]

Even though cognition is now widely recognized as a central and integral part of psychology, the cognitive approach has not always been that prominent and non-contentious.[51] Specifically, for nearly five decades (from ca. 1913 to ca. 1960) psychology was dominated by the behavioristic stream. The latter considered the behavior (i.e., the physical movements) of organisms as the only real and scientifically justified subject of psychological study; Mental processes, in contrast, were viewed as illusory, and the study of the human mind was considered unworthy.[52] During the 1960s, however, cognition re-emerged as a scientifically legitimate focus for psychological theory. This development is commonly referred to as the "cognitive revolution" in psychology and was reinforced by important developments in the fields of artificial intelligence, computer science, and human problem solving.[53]

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44 See *Gross* (2009): 127.

45 Due to the inseparable relationship between mind and behavior, psychology has been typically referred to as the science of human mind and behavior. See, e.g., the correspondingly titled works by *Blair-Broeker/Ernst* (2007), *Gross* (2012) and *Passer/Smith* (2010).

46 See *Wickelgren* (1979): 3. For a concise historical overview of psychology as a science, see *Wärneryd* (1999): 7-10.

47 See *Anshakov/Gergely* (2010): 1.

48 See *Gross* (2009): 128; *Neisser* (1967): 4; *Neisser* (1976): 1.

49 See *Edelmann/Wittmann* (2012): 109; *Gross* (2009): 128; *Solso/MacLin/MacLin* (2008): 10.

50 *Neisser* (1967): 4.

51 See *Fiske/Taylor* (2008): 21.

52 See *Baars* (1986): 4f., 9; *Miller* (2003): 141.

53 See *Fiske/Taylor* (2008): 9; *Miller* (2003): 142. For a thorough discussion of the cognitive revolution in psychology, refer to *Baars* (1986).

In the last few decades, the cognitive approach has revolutionized and considerably advanced the field of psychology and is nowadays an indispensable and essential part of theoretical psychology. As will be demonstrated throughout the present work, the influence of the cognitive approach reaches far beyond the field of psychology and has marked a number of other scientific disciplines, among which is also the field of auditing.

In conclusion, it should be noted that both economics and cognitive psychology provide valuable insights into and explanations for auditing phenomena, so that the adoption of an interdisciplinary approach in auditing research appears inevitable for advancing the state of knowledge and cognizance in this field. As argued by *Libby* (1991), it is important to bear in mind that the majority of auditing phenomena explored by academic research are essentially economic phenomena. Consequently, neglecting the economic foundation of individual, group, and institutional behavior will yield a fairly fragmentary picture. Not less important is to recognize, however, that auditing involves human decision-makers.[54] Consequently, it is crucial to consider individual factors in the study of judgment and decision making in auditing parallel to the economic motives driving auditors' behavior. With other words, through the combination of the normative rigor of economic theory and the descriptive validity of psychological models and concepts, a more complete picture of auditing phenomena and auditors' behavior can be achieved.

Building on the insight of the essential importance of cognitive aspects for the study of human behavior, subsequently, the basic structure of the human cognition is outlined.[55]

2.2 The Architecture of Cognition

The most essential feature of the human mental system is its modularity.[56] There is a wide spectrum of notions of modularity.[57] In the present work, modularity is understood in the sense that the human mind is constructed of distinct modules or subsystems, each of which fulfils a specific function within the operation of the whole system.[58] Overall, the mind has been conceptualized as consisting of multiple parts, including cognition and emotion, reason and intuition, consciousness and unconsciousness, automaticity and control, ego and id, just to

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54 See *Libby* (1991): 19f.

55 Note that the following discussion involves more general features of the cognitive structure, particularly the two prevalent types of cognitive processing. For an extensive neurological review of cognition, consult *Koziol/Budding* (2009).

56 See *Fodor* (1983); *Garfield* (1991): 1; *Gazzaniga* (1985): 74, 77-80; *Gilbert* (1991): 109; *Smith* (2003): 108.

57 For a discussion of the range of notions on modularity, see *Carruthers* (2003): 67-71; *Carruthers* (2006): 1-3.

58 See *Carruthers* (2006): 2. It might be remarked that this view is in line with the massive modularity hypothesis advocated by *Carruthers* (2003): 68; *Pinker* (1994): 420; *Pinker* (1997): 27-31; *Sperber* (1996): 123-129 and *Tooby/Cosmides* (1992): 94, 113, among others. According to this hypothesis, the entire cognitive apparatus can be viewed as modular. That is, both lower-level and higher-level mental processes possess a modular structure. See *Visala* (2011): 35. This notion contradicts the modularity view set forth by *Fodor* (1983) according to which only the peripheral sensory and perceptual systems of the human mind are modular, while the higher-order cognitive systems are conceived as central and holistic. See *Fodor* (1983): 47-119.

name a few. Consequently, a deeper understanding of mental phenomena is only possible by considering the structure and interaction of the multiple parts of the mind rather than by an isolated analysis of the individual components.[59]

The present work builds on recent developments[60] in psychology which have proposed the so-called "dual-system" or "dual-process" view on human cognition.[61] This view highlights the distinction between two general constituent blocs of the cognitive system (categories of cognitive processing): intuition and reasoning. In general terms, intuition involves automatic, effortless, quick, and reflexive processing. Intuitive impulses and associations normally come to mind without conscious search or computation. In contrast, reasoning involves deliberate, effortful, slow, and analytic processing.[62]

The characteristics of the two grand categories of cognitive operations are schematically summarized in Figure 1. Following *Stanovich* (1999) and *Kahneman and Frederick* (2005), the generic labels "System 1" and "System 2" are employed to reflect intuitive and deliberate reasoning, respectively, and the term "system" is used to refer to a bunch of cognitive processes (subsystems) that can be categorized by their speed, their deliberateness and the contents on which they operate.[63] As the classification criteria depicted in Figure 1 are all continua, the placement of strict border lines between the systems is not possible.[64]

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59 See *Gilbert* (1999): 4.

60 Note that the idea of fragmenting the human mind and cognition into active (deliberate) and passive (automatic) domains is not a new one. It can be traced back to the influential work of the famous French philosopher and mathematician *René Descartes* (1596-1650). See *Gilbert* (1991): 108. In the last decade, this notion was revived in psychological research and is now a fairly prominent and topical branch of the contemporary psychological literature. Overall, a variety of differently nuanced dual process theories have been established in psychology in the last years. Although different in focus and detail, these theories share the idea of separating quick and associative cognitive operations from slow and controlled ones. See *Evans* (2008): 270; *Kahneman/Frederick* (2005): 267.

61 For an excellent overview of dual-process theories of higher-order cognition, i.e., thinking, reasoning, judgment and decision making, see *Evans* (2008): 256-271. The consideration of lower-order cognition, i.e., perception, attention, development of motor skills, etc., is beyond the scope of Evan's review as well as the present work. For a critical consideration of dual-system theories, refer to *Keren/Schul* (2009).

62 See *Kahneman* (2003b): 1450; *Kahneman/Frederick* (2002): 51.

63 See *Kahneman/Frederick* (2005): 267; *Stanovich* (1999): 126. Note that the numeration of the two systems follows their evolutionary development. See *Weldon/Corbin/Reyna* (2013): 52. Recently, dual-process theorists increasingly highlight the need to replace the somewhat ambiguous "System 1"-"System 2"- terminology with a new one which should be plural or more neutrally formulated to make clear that there is not a single automatic and a single controlled system, but rather a set of subsystems and processes in the brain. For such claims and a number of relevant references along these lines, see *Stanovich* (2011): 18f. For a list of alternative labels used throughout the relevant dual-process theory literature to refer to System 1 and System 2 processing, including "on-line thinking" versus "off-line thinking"; "heuristic processing" versus "analytic processing"; "associative system" versus "rule-based system"; "reflexive processing" versus "reflective processing"; "stimulus bound processing" versus "higher order processing", see *Evans* (2008): 257; *Stanovich* (2004): 35.

64 See *Kahneman/Frederick* (2005): 288.

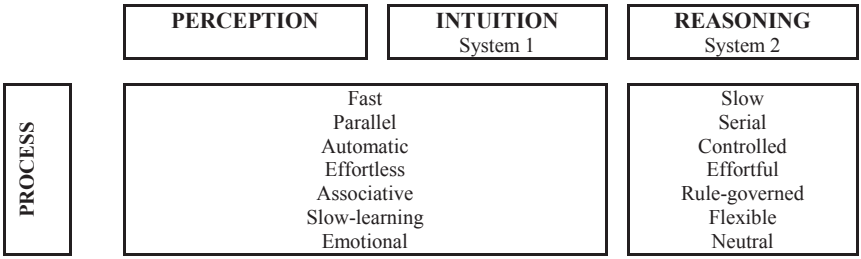

Figure 1: Cognitive Systems (Source: *Kahneman* (2003b): 1451)

As illustrated in Figure 1, System 1 involves fast, spontaneous, effortless, associative, and emotionally charged processing. The operations of this system are often habit-based and thus difficult to control or adjust. In fact, automaticity has been considered as the distinctive characteristic of System 1 processing. Automaticity implies the mandatory activation of System 1 operations in light of pertinent triggering stimuli.[65] System 1 is typically associated with heuristic processing and the generation of impressions and perceptions, which are not necessarily conscious and (verbally) explicit.[66] Overall, System 1 processing is viewed as cognitively simplistic, computationally inexpensive, and largely independent of general (analytical) intelligence[67] or working (i.e., short-term) memory[68] capacity. From an evolutionary perspective, System 1 is considered to be the older and more primitive processing apparatus and to possess considerable similarity with animal cognition.[69]

System 2, or the system of reasoning, on the other hand, involves slow, serial, analytic, effortful, and controlled (i.e., non-automatic) processing. The operations of System 2 are more flexible than those of System 1 and are also potentially governed by the rules of logic.[70] Overall, System 2 processing is considered cognitively demanding, related to general intelligence, and

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65 See *Stanovich* (2011): 19. For instance, individuals cannot help themselves but understand simple words and phrases in their native language, nor can they refrain from knowing that 2+2=4. For such claims and a list of further examples for System 1 processing, see *Kahneman* (2011): 21f.

66 See *Kahneman* (2003b): 1451f.; *Stanovich* (1999): 126; *Stanovich/West* (2000): 659.

67 As identified by *Stanovich* (1999): 126f., in contrast to System 2, which is considered to relate to *analytic* intelligence, i.e., the kind of intelligence measured via psychometric test like IQ or SAT, System 1 rather relates to *interactional* intelligence, i.e., intelligence in terms of utilizing a set of computational heuristic strategies, tactics, and meta-rules. See also *Prevignano/Thibault* (2003): 158. For a discussion of the concept of intelligence and a critical note on the use of IQ tests to measure intelligence, see *Sternberg* (1988). For a brilliant discussion of the common misconception of intelligence as a proxy for rationality, see *Stanovich* (2009). In this context, he uses the term "disrationalia" to refer to the phenomenon of irrationality despite adequate intelligence. See *Stanovich* (2009): 7.

68 As indicated by *Schneider/Shiffrin* (1977): 2f., automatic processing generally utilizes the nearly limitless long-term memory store, while controlled processing claims the limited short-term memory store. For a detailed discussion of human memory, refer to *Baddeley* (1997) and *Loftus/Loftus* (1976). The distinction between short- and long-term memory is also touched upon in Section 2.4.2.3.1.

69 See *Evans* (2008): 257; *Evans* (2013a): 116f.; *Stanovich* (2009): 78. Importantly, this finding does not necessarily imply that System 1 is less capable than (or inferior to) System 2. See *Kahneman/Frederick* (2002): 51.

70 See *Kahneman/Frederick* (2002): 51; *Stanovich* (1999): 126f.; *Stanovich* (2011): 20. For a list of instances of typical System 2 operations, see *Kahneman* (2011): 22.

restricted by working memory capacity. Evolutionarily, System 2 is the more recent cognitive system and is conceived to be either a uniquely human property or at least particularly developed in the humankind.[71]

As to the role of consciousness, it is generally assumed that System 2 processing is typically conscious and requires a great deal of attention[72], while System 1 processing can be either conscious or unconscious.[73] With regard to the error proneness of the two systems, it is important to note that even though System 1 typically makes use of heuristic strategies, cognitive biases are equally attributed to the intuitive operations of System 1 as well as the analytic processing of System 2. With other words, the greater deliberation and cognitive effort germane to System 2 processing does not necessarily guarantee bias-free responses.[74] This is also evident in light of the interplay between the two cognitive systems. Specifically, as a particular stimulus or problem is encountered, System 1 typically generates intuitive responses – impressions, associations, stereotypes, and tendencies – which are transmitted and suggested to System 2. The latter has a monitoring and corrective function, and it can endorse, amend, or abolish the input from System 1.[75] However, as empirical research has shown, this function does not always detect and correct potential flaws in the input from System 1. In fact, System 2 processing is typically found to endorse the intuitive stimuli generated by System 1.[76] As argued by *Stanovich* (2009), in order to override responses generated by System 1, System 2 must be capable of suppressing the System 1 stimulus *and* generating a superior (i.e., bias-free) response for replacing the potentially flawed input.[77] Consequently, the judgments that people make and the pertinent mistakes that they commit largely depend on the input from System 1 as well as on the functionality and effectiveness of the corrective mechanisms of System 2.[78] A second important insight emerging from the consideration of the interplay between the dual cognitive systems is that the majority of higher-order cognitive tasks (e.g., problem-solving, judgment, decision making) normally involve a combination of automatic and controlled processing.[79]

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71 See *Evans* (2008): 257; *Evans* (2013a): 116f.

72 For a general discussion of attention, including the origins of the concept, different forms of attention (selective vs. intensive), attention bottlenecks, and pertinent capacity models, refer to *Kahneman* (1973): 1-12.

73 See *Chen/Chaiken* (1999): 86. *Moskowitz/Skurnik/Galinsky* (1999): 33 argue, however, that even intent, will, and control can operate beyond conscious awareness. Hence, System 2 processing may also be sometimes unconscious.

74 See, e.g., *Evans* (2008): 267; *Evans* (2013a): 126f.; *Evans* (2013b): 113; *Moskowitz/Skurnik/Galinsky* (1999): 13; *Van Boven et al.* (2013): 395f.

75 See *Kahneman/Frederick* (2002): 51. For a brief consideration of the interaction between System 1 and System 2, see *Kahneman* (2011): 24f.

76 See *Kahneman/Frederick* (2002): 58f.

77 See *Stanovich* (2009): 23. *Schneider/Shiffrin* (1977): 2 argue that automatically generated responses are relatively difficult to ignore, suppress, or modify.

78 See *Kahneman* (2003b): 1467. Impending factors for the quality of both automatic and controlled processing include, among others, time pressure, stress, and distraction, i.e., the parallel computation of different cognitive tasks. See *Finucane et al.* (2000): 5, 8; *Gilbert* (1991): 110; *Kahneman/Frederick* (2002): 57f.

79 See *Bargh* (1989): 4-7.

Finally, it is important to note that System 1 and System 2 have been theorized to operate concurrently.[80] As argued by *Wilson* (2002), the unique architecture of the human mind allows for a plethora of cognitive tasks to be accomplished simultaneously by performing subconscious processing of a substantial part of the informational stimuli, while consciously working on other issues.[81] Research on the two systems of human cognition indicates that System 1 processing is prevalent in the real world. This observation can largely be attributed to the cognitive economy and efficiency associated with System 1 processing.[82]

Overall, the system of human cognition can be viewed as a remarkable computational device that is fairly efficient and adaptive to changes in its environment. However, this impressive system differs significantly from the standard of rationality assumed in economic theory.[83] Drawing on the dual-system terminology, the rational economic agent can be described as possessing a single cognitive system (rather than a modular one) that has the analytical and computational ability of a flawless System 2 and the high speed and low effort of System 1.[84] In reality, the human mental system has limited perceptual[85], processing, and computational capabilities and operates under conditions of uncertainty and sparse cognitive resources which have to be distributed across a number of competing tasks and problems.[86] In consequence, distortions in both intuitive and analytic cognitive processing are bound to arise.[87]

The preceding considerations and arguments highlight the critical importance of taking into account the structure and limitations of human cognition in order to attain a better understanding of human behavior and thought. The general psychological foundations of the present work are rounded off with a glance at the information processing approach. This approach has proved particularly influential and prominent in cognitive psychology and has found a broad application in auditing research in the last few decades.[88]

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80 See *Chen/Chaiken* (1999): 76; *Evans* (2013a): 121; *Kahneman/Frederick* (2002): 51; *Stanovich* (2009): 22. In this context, *Moskowitz/Skurnik/Galinsky* (1999): 33 emphasize that automatic and analytic processes are conceptualized as "dual" rather than "dueling".

81 See *Wilson* (2002): 5, 8-10.

82 See *Chen/Chaiken* (1999): 74; *Moskowitz/Skurnik/Galinsky* (1999): 28; *Stanovich* (2009): 22; *Wilson* (2002): 4f. It has long been recognized that in order to cope with limited cognitive resources and the overwhelming complexity of the decision environment, individuals typically follow "the principle of least effort". That is, people process information, reason, and act in pursuit of their goals with the least amount of cognitive effort and work possible. See *Allport* (1954): 173f.; *Moskowitz/Skurnik/Galinsky* (1999): 28. Individual behavior is further guided by a desire to achieve a reasonable balance between cognitive effort exerted and the satisfaction of the pertinent motivational constraints. See *Chen/Chaiken* (1999): 74.

83 See *Kahneman* (2003b): 1454.

84 See *Kahneman* (2003b): 1469.

85 The notion of perceptual limitations is vividly illustrated by *Simon* (1959): 273. He argues that every single second, the surrounding environment produces millions of bits of new information, while the human perceptual system hardly manages to capture a thousand bits per second.

86 See *Gilbert* (1991): 109; *Kahneman/Frederick* (2005): 268.

87 See *Simon* (1959): 272.

88 See *Galotti et al.* (2009): 23; *Morrow/Fiore* (2013): 204.

2.3 Information Processing Approach

Broadly speaking, information processing relates to the cognitive operations through which information is attained, attended to, interpreted, evaluated, aggregated, and used to draw inferences, judge, and act. In this sense, information processing can be characterized as "*not just a passive response to stimuli but also an active process of constructing reality*."[89]

The psychological information processing approach utilizes a computer metaphor to the study of human cognition. Specifically, it draws a parallel between the operations of human cognition and the serial manner in which computers process information. Essential to the information processing approach is the notion that human cognition can be conceived as information passing through a complex computational system, i.e., the human brain.[90]

In their simplest form, information processing models consist of an *input* (sensory[91] information), a *process* (perception, System 1 and System 2 processing), and an *output* (judgment or decision).[92] This basic structure is illustrated in Figure 2.

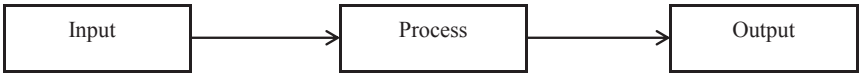

Figure 2: Simple Information Processing Model

At each stage, there are several factors which may impact information processing.[93] Specifically, *input*-related factors concern task and information set characteristics which influence the way in which individuals absorb, weight, and integrate information. Instances for such factors include, among others, task complexity, presentation sequence, presentation format, aggregation level of data, type of task, and response mode.[94] Some of these factors are discussed within Section 2.4.2.1. Of particular relevance to the present work are the task characteristics of complexity, presentation sequence, and response mode which are discussed in detail in Section 3.2.1.1 and Section 3.2.1.2.

Process-related factors, on the other hand, encompass both characteristics of the information processing style (e.g., heuristic (System 1) versus analytic (System 2)) as well as features of the information processor (e.g., ability, personality, cognitive structure, experience, involvement, demographics).[95] Generally, the use of a particular processing mode (analytic versus heuristic) has been theorized to result from an analysis – sometimes explicit and sometime

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89 *Vertzberger* (1990): 9.

90 See *Fiske/Taylor* (2008): 8; *Galotti et al.* (2009): 23; *Sternberg* (2009): 329. For a concise overview of the brain processes and systems involved in information processing, refer to *Eysenck/Keane* (2010): 473-477.

91 Generally, there are five grand modalities of the sensory apparatus: vision (sight), audition (hearing), olfaction (smell), somesthesis (touch) and gustation (taste). See *Cardello* (1996): 5; *Noyes/Garland/Bruneau* (2004): 38. For a detailed discussion of these modalities, see *May* (2009): 11-77.

92 See *Eysenck/Keane* (2010): 2; *Libby/Lewis* (1977): 246; *Noyes/Garland/Bruneau* (2004): 36f.

93 See *Libby/Lewis* (1977): 247.

94 See *Libby/Lewis* (1977): 246f.

95 See *Libby/Lewis* (1977): 246f.

preconscious – of the costs associated with its use (e.g., cognitive effort[96]) and the expected benefits (e.g., promise of the strategy to yield a "correct" outcome, speed of arriving at an outcome, and justifiability of the result).[97] Consequently, all else being equal, with increasing task complexity and ambiguity, individuals are hypothesized to revert to heuristic processing as the costs of deliberative processing do not compensate for the expected benefits. The adaptive manner in which subjects adjust their beliefs in light of new information can be described as a heuristic procedure employed to ease cognitive strain and promote efficiency. The cognitive mechanisms underlying the process of belief updating are discussed in Section 3.2.1.3. As indicated above, cognitive processing is also considerably determined by the characteristics of the information processor. A general review of the most relevant personal factors is provided in Section 2.4.2.3. Of main interest in the present study is the personality characteristic of skepticism which is discussed in detail in Section 4.4.

Finally, *output*-related factors concern characteristics of the information processing outcome (judgment or decision) which are typically employed to ex post evaluate the quality of the underlying process. Instances of such factors include accuracy, speed, consistency, (lack of) biases, and predictability.[98] The central judgment quality criteria are discussed in Section 2.4.1. The present work focuses on auditors' susceptibility to information order effects in the context of belief updating and judgment formation. Accordingly, the quality of auditor judgment (processes) is evaluated herein in terms of presence or lack of cognitive biases.

Following these basic psychological considerations, the broad theoretical fundament of the present study is completed by a discussion of the central features of auditor judgment and a concise review of the relevant literature on this topic.

2.4 Auditor Judgment

> "*Judgment is the most important factor in the making of any audit, but in many situations it is practically impossible to write out in specific language how the auditor applies judgment.*" *AICPA* (1955: 8)

2.4.1 Preliminaries

Judgment is a higher-order cognitive activity which is not unique to auditing settings, yet its importance in auditing cannot be overemphasized. Indeed, judgment permeates the entire pro-

[96] Following *Libby/Lipe* (1992): 252, cognitive effort is defined herein as an "*input of energy to mental activities*."

[97] See *Beach/Mitchell* (1978): 448; *Payne* (1982): 382f. It should be noted that in the computer science and problem-solving domains, heuristics are viewed as explicit deliberate strategies, whereas in the classical psychological heuristics and biases approach, they are rather considered to be automatic and unconsciously operating mechanisms. See *Keren/Teigen* (2007): 93.

[98] See *Libby/Lewis* (1977): 246f.

cess of auditing and plays a fundamental role every step of the way.[99] Notwithstanding its crucial importance and the tremendous academic research on auditor judgment conducted in the last decades,[100] AICPA's statement depicted above still appears valid today.[101] With other words, there is still some unease regarding the description, capture, and operationalization of auditor judgment.[102] The subsequent considerations lean upon the meta-analytical work of *Sarah Bonner* to shed light on some of the central features of auditor judgment as a prelude to the exploration of the interplay of information order effects and professional skepticism in auditors' belief revisions.

In consistency with *Bonner* (1999), herein judgment is broadly defined as the formation of "*an idea, opinion, or estimate about an object, an event, a state, or another type of phenomenon.*"[103] Closely related to and typically discussed in conjunction with judgment is the cognitive activity of decision making. The latter relates to "*making up one's mind about the issue at hand and taking a course of action.*"[104] *Bonner* (1999) argues that "*[d]ecisions typically follow judgments and involve a choice among various alternatives based on judgments about those alternatives and, possibly, preferences for factors such as risk and money.*" Consequently, an important distinction between judgment and decision consists in the fact that "*judgments reflect one's belief, and decisions may reflect both belief and preferences.*"[105] Following this line of thought, there are two main alternative explanations for erroneous audit outcomes: Flawed outcomes can result from intentional inconsistencies with one's underlying judgments. For instance, an unqualified opinion may be issued in spite of identified material misstatements. Alternatively, audit deficiencies can result from reasonable and diligent, yet

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99 See *Bernstein* (1967): 90; *Solomon/Shields* (1995): 139; *Trotman* (1998): 115; *Trotman/Tan/Ang* (2011): 279. For a fundamental contemplation on the nature of auditing, its normative frame, basic objectives, stages, and techniques, refer to *Marten/Quick/Ruhnke* (2011) and *Krommes* (2011).

100 It is worth noting that *Trotman/Tan/Ang* (2011): 278 identified a total of 5,745 papers on judgment and decision making in accounting and auditing published in four major (high-impact) journals in the last five decades. Hence, it is far beyond the scope of the subsequent section to provide a comprehensive literature review of the vast amount of judgment and decision making research in auditing. For such (monographic) reviews, refer to *Bonner* (2008) and *Schreiber* (2000).

101 As will be demonstrated in Section 4, this statement likewise applies to professional skepticism.

102 See *Anderson/Koonce/Marchant* (1991): 44; *Dennis* (2013): 3; *Libby/Lewis* (1977): 245; *Mason/Gibbins* (1991): 21. For a thorough review of the diverse meanings and dimensions attached to the term "judgment" in auditing standards and professional guidance, academic research, and audit practice, see *Dennis* (2013): 3-13.

103 *Bonner* (1999): 385. For a critical discussion of *Bonner*'s definition of the term "judgment", see *Dennis* (2013): 6.

104 *Bonner* (1999): 385. For a critical discussion of *Bonner*'s definition of the term "decision", see *Dennis* (2013): 7.

105 *Bonner* (1999): 385. This distinction between judgment and action is also essential to the Nelson model and will be discussed in more detail in Section 4.3. Note, however, that a distinction between the terms "judgment" and "decision" is not invariably evident in the relevant literature. Rather, these terms are frequently used interchangeably. See *Gibbins* (1984): 106; *Trotman/Tan/Ang* (2011): 279. As a striking instance for this contention, consider the definition of "judgment" provided by *Wedemeyer* (2010) 321, who employs "the term 'auditor *judgment*' to describe any *decision* or evaluation made by an auditor, which influences or governs the process and outcome of an audit of financial statements" (italics added). Overall, judgment and decision making have been acknowledged to go hand in hand. See, e.g., *Dennis* (2013): 10 as well as the definition of professional judgment provided in ISA 200.13(k).

unconsciously biased judgments.[106] *Bazerman, Loewenstein and Moore* (2002) argue that the latter seems to be the ultimate problem with auditing. They further suggest that unlike intentional misjudgments of the auditor, subconscious flaws cannot be mitigated by conditions of high litigation and strong normative environment. Consequently, it is crucial to recognize the possibility of bias, analyze its roots, and deliberately battle it.[107] These considerations underline the need to raise awareness of cognitive traps and judgment biases in audit practice and to further explore this issue in auditing research.

The branch of research concerned with the study of judgment and decision making in an auditing setting and the illumination of the cognitive processes, determinants, and constraints underlying auditors' judgments and choices is labeled "behavioral auditing" or "judgment and decision making research in auditing".[108] In general terms, this stream of research aims at providing a profound understanding, and based on that an improvement, of individual and group judgments and decisions in an auditing setting.[109] During the last few decades, substantial behavioral research in auditing has been conducted. A brief overview over the central insights and findings of this research is presented in the following section.

Before turning to the review of the relevant literature, some important issues need to be addressed, and several clarifications have to be made. To begin with, the audit process can generally be viewed from two different perspectives. At the macro level, auditing is considered as an ongoing process encompassing the following sequential stages: audit engagement acceptance, planning, preliminary review, fieldwork (substantive audit procedures), and reporting.[110] At the micro level, individual auditors' ongoing judgment and decision making processes are considered. Apparently, the micro- and the macro-dimension are closely interrelated: Each separate stage of an audit builds on a number of individual auditors' judgments and decisions and makes a great deal of information processing necessary. This thesis focuses on the psychologically-based micro-processual level of auditing. The present work has evolved around the notion that cognitive processes and individual characteristics are not to be treated as a black box but deserve an explicit and thorough consideration as significant determinants of auditors' behavior.[111]

The second general remark concerns the fact that auditors typically make judgments and decisions under conditions of considerable complexity, ambiguity, uncertainty, and time pressure.[112] Given the vast amount of frequently ambiguous and usually not perfectly diagnostic

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106 See *Boylan* (2008): 230.

107 See *Bazerman/Loewenstein/Moore* (2002): 97.

108 See *Libby/Luft* (1993): 425; *Trotman/Tan/Ang* (2011): 280. In consistency with prior research, these terms are used interchangeably within this work.

109 See *Ashton* (1974): 143; *Nelson/Tan* (2005): 41; *Trotman* (1998): 116-118; *Trotman/Tan/Ang* (2011): 279.

110 For a more differentiated decomposition of the audit process, see *Bonner/Pennington* (1991): 2-12. More particularly, the authors separate the overall audit process into 28 single steps and provide an excellent overview of the cognitive processes, problem representations, and knowledge requirements pertinent to each stage.

111 See *Schreiber* (2000): 10f.; *Schwind* (2011): 6; *Tsui/Gul* (1996): 41.

112 See *Anderson/Koonce/Marchant* (1991): 44; *Einhorn* (1976): 200; *Schreiber* (2000): 3. For a discussion of the influence of pressure in the context of auditing, see Section 2.4.2.2.5.

information underlying auditors' judgments, the tight deadlines for performing an audit, and auditors' limited cognitive capacities, the sophisticated optimizing strategies prescribed by normative economic theory appear utopic in audit reality. Instead of applying comprehensive ideal-typical optimization procedures, auditors are expected to use satisficing strategies that yield efficient and reasonable but not necessarily optimal outcomes due to the presence of a number of cognitive biases and judgment traps pertinent to complex problem solving.[113] With other words, when it comes to cognitive constrains, auditors make no exception of the general human tendency to succumb to bias.[114]

A further point that needs to be addressed concerns the general focus of the present work. More particularly, in consistency with the research emphasis in the relevant behavioral auditing literature, the current study focuses on judgment rather than decision making in auditing.[115] There are several reasons for proceeding so: As touched upon above, judgments typically serve as the basis for decisions, i.e., judgments can be conceived as "*a prelude to taking action*".[116] Hence, it is essential to explore and understand the processes and determinants underlying judgment before focusing on the next (decisional) stage. In addition, although judgment generally aids decision by diminishing the uncertainty via processes of deliberative reasoning and information processing, as indicated above, it is not necessarily sufficient for taking an action. Indeed, when it comes to choice, even strong beliefs and judgments may be suppressed and disregarded, for instance because of the implications associated with a particular (critical) choice.[117] That is, various factors can, and do, influence the connection between judgment and choice. The resulting interrelations are quite complex and hard to disentangle and control for in an experimental analysis. Hence, auditor judgment constitutes the research focus of the present study.

The final point that needs to be addressed herein concerns the issue of evaluating the quality of auditor judgment. As the latter is neither a directly observable nor an easily definable construct,[118] it needs to be approximated in a reasonable manner. Judgment quality is typically evaluated based on a comparison to an objective standard or reference point. In psychology, judgment quality is frequently measured in terms of *accuracy*. However, in the context of auditing, accuracy is not a widely applicable measure, as there rarely is an unambiguous cor-

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113 For such claims in a more general context (that of the social perceiver), see *Fiske/Taylor* (2008): 164. The bias-proneness due to time and other pressures as well as limited cognitive capacity and computational ability is also acknowledged by audit practitioners. See, e.g., *KPMG* (2011): 5.

114 For a review of the relevant auditing literature, see *Koch/Wüstemann* (2009): 9-21.

115 See *Kotchetova/Salterio* (2007): 551.

116 See *Boylan* (2008): 230; *Solomon/Trotman* (2003): 396.

117 See *Ashton/Kennedy* (2002): 226; *Einhorn/Hogarth* (1981): 20. Indeed, *Ashton/Kennedy* (2002): 228 find that 29% of the participants in their study made choices which were inconsistent with the preceding judgments.

118 For an excellent, thorough discussion of judgment quality in accounting and auditing, refer to *Bonner* (2008): 23-51. Note that she dedicates a whole chapter of her book to the consideration and discussion of issues related to the various perspectives, definitions, operationalizations, and dimensions of judgment quality, which underscores the central importance of this topic and the ambiguity underlying the concept of judgment quality in accounting and auditing.

rect answer for an audit task.[119] As aptly put by *Joyce* (1976), "*[o]ne of the difficulties involved in studying the validity of auditors' judgments is the absence of a suitable criterion by which to distinguish correct from incorrect judgments. Because strict guidelines for information collection and evaluation do not exist, there are no clear-cut 'right' judgments available with which to compare individual professional judgments in most audit tasks*."[120] Given the difficulties regarding the use of accuracy as a quality standard, alternative measurement criteria (surrogates) have been employed in the relevant auditing literature. Specifically, the quality of auditor judgment has been measured in terms of consensus, consistency, and stability.[121] *Consensus* generally refers to agreement among individuals.[122] The rationale behind this notion is that ideally, when confronted with the same set of circumstances, every audit professional should choose the same audit tests and procedures and apply them equivalently in arriving at (a consistent) overall judgment.[123] *Consistency*, on the other hand, involves the comparison with some criterion or norm. There are three types of consistency: consistency with professional standards and regulations, logical consistency, and process consistency. The former type of consistency relates to the degree to which auditor judgment corresponds to auditing standards, rules of professional ethics, or other relevant regulations which can specify both correct answers and correct processes in a number of situations.[124] Logical consistency, on the other hand, relates to the compliance with the standards of a normative system, such as utility theory, probability theory, Bayes rule, logic, etc. Finally, process consistency refers to the consistent application of judgment rules and professional standards by an individual across time and/or across different problems and situations.[125] *Stability*, the third major judgment quality proxy, refers to the extent to which an individual makes analogical judgments for analogical conditions at two distinct points in time.[126] While the three precedingly discussed central judgment quality proxies (consensus, consistency, and stability) address

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119 See *Solomon/Shields* (1995): 151; *Trotman/Tan/Ang* (2011): 284.

120 *Joyce* (1976): 30.

121 See *Johnson/Kaplan* (1991): 99; *Libby/Lewis* (1982): 231; *Trotman* (1998): 117. The latter also explicitly lists the lack of cognitive bias in individual judgment as a further judgment quality criterion. However, this category appears redundant to the consistency and stability criteria, as a bias-free judgment is normally a one which is consistent with normative theories and/or stable over time.

122 See *Ashton* (1985): 173. She points out that consensus is necessary but not sufficient for accuracy. While lack of consensus might be indicative of inaccuracies in at least some of the responses, strong consensus does not automatically imply correctness. Furthermore, recent auditing and neuroscientific studies embrace an increasingly critical view on the use of consensus as a measure of judgment quality. For such claims and further references on this issue, see *Peecher/Solomon/Trotman* (2013): 604f. Overall, lack of consensus can be attributed to the fact that individuals think about a certain problem or task differently. That is, they use different mental models and cognitive processing modes (intuitive versus analytical), organize, combine, and weight information in distinct ways, and exhibit different variance in their judgments. See *Mumpower/Stewart* (1996): 194f., 205. All these factors give raise to differences in individual judgment (a dearth of interpersonal consensus) which are not necessarily to be equated with poor judgment quality.

123 See *Hicks* (1974): 40.

124 See *Bonner* (2008): 39-41. The role of standards and regulations in the context of auditor judgment is discussed in Section 2.4.2.2.6.

125 See *Kleinmuntz* (1990): 109.

126 See *Johnson/Kaplan* (1991): 99.

how well a particular judgment task is performed, i.e., relate to *effectiveness*[127], judgment *efficiency*[128], i.e., the amount of resources exerted to make a judgment at a specific effectiveness level, has also been suggested as a relevant quality dimension. Instances for efficiency-related judgment quality criteria include the time and cost to conduct a particular task.[129] However, as will be demonstrated subsequently, the existing auditing literature has predominantly focused on effectiveness-related judgment quality criteria (especially consistency) within the exploration and discussion of auditor judgment.

Building on these general considerations, subsequently, an overview of the relevant academic research on auditor judgment is provided.

2.4.2 Determinants

Following *Bonner* (2008), the subsequent literature review is organized in three major categories of factors determining auditor judgment: task characteristics, contextual factors, and individual characteristics of the auditor.[130] For the sake of clarity and systematization, the factors reviewed below are analyzed individually. It is important to note, however, that these factors are highly interdependent and essentially represent small mosaic pieces which only taken as a whole reveal a more complete picture of the complexity and multifacetedness underlying auditor judgment.

2.4.2.1 Task Factors

The notion that human information processing is highly contingent on general structural characteristics of the task is well established in psychology.[131] Overall, different tasks place different demands on an individual's cognitive resources, abilities, knowledge, and effort exertion, thereby impacting upon the information processing strategy utilized for performing the task.[132] In auditing research, task characteristics have likewise been recognized as important determinants of auditors' information processing and judgment performance. The task factors that have experienced the greatest research interest and validation in the auditing literature

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[127] In general terms, effectiveness refers to "*[e]nsuring that the output from any given activity is achieving the desired results*", *Glynn* (1985): 30. Thus, effectiveness concerns the relation of actual output to the desired objective. See *Higson* (1997): 206; *Higson* (2003): 101f.

[128] In general terms, efficiency can be defined as "*[s]eeking to ensure that the maximum output is obtained from the resources devoted (...), or alternatively, ensuing that only the minimum level resources are devoted to a given level of output*", *Glynn* (1985): 29. With other words, efficiency concerns the proportion of input and output. See *Higson* (1997): 206; *Higson* (2003): 101f.

[129] See *Bonner* (2008): 41; *Davis/Solomon* (1989): 152.

[130] See *Bonner* (2008): 23-255. For alternatively organized literature reviews of the topic of judgment and decision making in auditing, refer to *Libby/Lewis* (1977), *Libby/Lewis* (1982), *Libby/Luft* (1993), *Nelson/Tan* (2005), *Solomon/Shields* (1995), *Solomon/Trotman* (2003), and *Trotman/Tan/Ang* (2011).

[131] See, e.g., *Einhorn/Hogarth* (1981): 61; *Payne* (1982): 382; *Payne/Bettman/Johnson* (1993): 22.

[132] See *Libby/Luft* (1993): 427.

include task complexity, information relevance, framing, and information order.[133] These factors are briefly discussed and underpinned with relevant empirical findings and insights in the following subsections.

2.4.2.1.1 Task Complexity

There exist a variety of differently nuanced task complexity notions and conceptualizations in the psychological literature.[134] In auditing, task complexity has generally been conceptualized in terms of task difficulty or task structure. *Task difficulty* relates to the cognitive load associated with a particular task. Basically, cognitive load is an increasing function of the number of processing stages required by the task, the amount of information to be evaluated (i.e., information load), and the number of alternative hypotheses to be considered.[135] *Task structure*, on the other hand, relates to the degree of specification of the problem at hand, the relevant variables, and the range of possible solutions.[136] Overall, with growing task complexity, the level of effortful and analytic (System 2) cognitive processing required to arrive at a judgment is expected to increase. However, beyond some point, the substantial processing difficulties imposed by high task complexity are theorized to lead to the use of simplified, heuristic (System 1) processing.[137] Hence, beyond a particular level, task complexity generally has a negative impact on judgment quality. This negative effect can be attributed to the strains of short-term memory and computational capacity, the mismatch with an individual's knowledge structures and/or the increasing cognitive costs (but not necessarily benefits) associated with performing the task, which may induce individuals to deliberately alter their processing strategies to be less costly, i.e., less effortful and extensive.[138]

Auditing research generally provides support for the adverse effect of task complexity on auditors' information processing and judgment quality (accuracy and consistency). Instances of auditing studies documenting judgment quality detriments in light of high task complexity include *Chung and Monroe* (2001), *Simnett* (1996), *Tan, Ng and Mak* (2002), and *Wright* (1995).[139] Relatedly, *Tan and Kao* (1999) find that the adverse effect of complexity on judgment quality can only be mitigated under conditions of high accountability, knowledge, and problem-solving ability on the part of the auditor.[140]

As task complexity plays a central role in Hogarth and Einhorn's belief-adjustment model, this task characteristic will be further elaborated in Section 3.2.1.1.

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[133] See *Bonner* (2008): 157.

[134] See, e.g., *Handzic* (2004): 191-193.

[135] See *Bonner* (1994): 214; *Bonner* (2008): 159f. For an extensive theoretical overview of cognitive load, see *Sweller/Ayres/Kalyuga* (2011).

[136] See *Abdolmohammadi/Wright* (1987): 4; *Bonner* (1994): 214; *Bonner* (2008): 159; *Eysenck/Keane* (2010): 460; *Libby/Tan* (1994): 704.

[137] See *Payne* (1982): 386; *Trotman/Wright* (1996): 176.

[138] See *Bonner* (2008): 161f.; *Payne* (1976): 384.

[139] See *Chung/Monroe* (2001): 120f.; *Simnett* (1996): 712, 716; *Tan/Ng/Mak* (2002): 91; *Wright* (1995): 144.

[140] See *Tan/Kao* (1999): 219-221. For a discussion of accountability effects, see Section 2.4.2.2.2.

2.4.2.1.2 Information Relevance

Information relevance, i.e., the degree to which the information available is pertinent to and diagnostic for a particular judgment, is a further task-related factor that deserves consideration within the discussion of auditor judgment. Two important questions emerge with regard to information relevance in the context of auditing: (1) do auditors integrate all the information and audit evidence[141] relevant to the problem or task under consideration, and (2) do auditors manage to disregard all irrelevant information when forming a judgment? Given human information processing limitations and cognitive fallacies as well as the imperfect information auditors frequently encounter in reality, both questions are to negate.[142] In consistency with *Bonner* (2008) and prior auditing research, the considerations within this section focus on the second issue, particularly illuminating the phenomena of *anchoring* on irrelevant information and *dilution* by nondiagnostic information.[143]

Anchoring generally refers to the human tendency to rely too heavily (i.e., to anchor) on a particular salient but potentially irrelevant item of information, thereby insufficiently taking into account (i.e., adjusting for) subsequent evidence.[144] In auditing, evidence of anchoring has been reported in a variety of contexts. Specifically, instead of generating independent assessments and judgments, auditors have been found to anchor on client-provided unverified book values when conducting an analytical review or on management's classifications of internal control problems (e.g., *Biggs and Wild* (1985), *Earley, Hoffman and Joe* (2008), *Heintz and White* (1989), *Kinney and Uecker* (1982)).[145] Furthermore, auditors have been found to overrely on the recommendations of decision-supporting systems, thereby risking a too narrow view on a problem (e.g., *Kowalczyk and Wolfe* (1998)). *Wright* (1988a), on the other hand, reports results suggesting that consultation of prior year working papers does not yield a strong anchoring effect impairing audit effectiveness. However, he documents audit efficiency detriments due to participants' reliance on prior year working papers.[146]

Dilution refers to the phenomenon of irrelevant (nondiagnostic) information reducing the effect of relevant (diagnostic) information on human judgments.[147] Empirical evidence on the negative impact of the dilution effect on auditor judgment has been provided by *Hackenbrack*

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[141] According to ISA 200.13(b), the term "audit evidence" refers to the "*[i]nformation used by the auditor in arriving at the conclusions on which the auditor's opinion is based.*" There are two relevant dimensions of audit evidence: a quality dimension (appropriateness of evidence, i.e., relevance and reliability) as well as a quantity dimension (sufficiency of evidence). See ISA 200.13(b). *Mautz/Sharaf* (1961): 68 emphasize the importance of evidence in human reasoning stating that "*evidence gives us a rational basis for forming judgments.*" Throughout this work, when discussed in an auditing context, the terms "evidence" and "audit evidence" are used interchangeably.

[142] See *Bonner* (2008): 167; *Joyce/Biddle* (1981): 120.

[143] See *Bonner* (2008): 167f.

[144] See *Chapman/Johnson* (2002): 121; *Payne/Bettman/Johnson* (1993): 260; *Soltani* (2007): 297. For a thorough discussion of anchoring, refer to *Chapman/Johnson* (2002).

[145] See *Biggs/Wild* (1985): 629; *Earley/Hoffman/Joe* (2008): 1479; *Heintz/White* (1989): 35f.; *Kinney/Uecker* (1982): 61f.

[146] See *Kowalczyk/Wolfe* (1998): 165f.; *Wright* (1988a): 604.

[147] See *Nisbett/Zukier/Lemley* (1981): 248.

(1992), *Hoffman and Patton* (1997), and *Glover* (1997), with the latter two studies finding that accountability (i.e., an effort-enhancing and thus potentially debiasing mechanism) does not diminish the dilution effect of nondiagnostic information.[148] *Shelton* (1999), on the other hand, demonstrates that experience mitigates the dilution effect.[149]

Both anchoring and dilution effects represent a threat to the quality of auditor judgment. Specifically, these cognitive phenomena can lead to a lack of interpersonal agreement because auditors obtaining different normatively irrelevant anchors are likely to arrive at different judgments distorted in the direction of the anchor, and auditors encountering both relevant and irrelevant data are expected to make a different judgment than their counterparts facing only relevant information. In addition, anchoring and dilution effects can induce responses that do not correspond with normative and/or professional standards.[150]

2.4.2.1.3 Framing

A further task characteristic that can considerably affect (auditor) judgment is the framing of the judgment task. Broadly stated, framing effects refer to the phenomenon that different semantic descriptions (e.g., positive versus negative wording) of the very same problem induce different perceptions and responses on the part of the problem solvers.[151] Framing effects violate the normative principle of description invariance.[152] In addition, as subjects facing positively framed tasks tend to provide more positive judgments compared to subjects obtaining negatively framed tasks, framing effects also typically lead to a lack of interpersonal consensus in judgment.[153]

The relevance of framing effects to auditing is obvious: If differently framed but substantially identical audit tasks and issues are perceived and acted upon differently by auditors due to alternative assertion frames (e.g., "misstatement" versus "non-misstatement"; "viability" versus "failure"), this can put audit (judgment) quality at risk.[154] The results of auditing studies on framing effects are fairly mixed. Specifically, *Asare* (1992) and *Shields, Solomon and Waller* (1987) do not find a significant influence of alternative frames on auditors' judgments. *Ayers and Kaplan* (1993) and *Kida* (1984), on the other hand, demonstrate that subjects operating under positive (negative) frames consider positive (negative) cues as more relevant to the task under consideration. These framing-driven different cue weighting tendencies have

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[148] See *Glover* (1997): 222-224; *Hackenbrack* (1992): 135; *Hoffman/Patton* (1997): 235. Psychological research also supports the notion that accountability is not effective in reducing the dilution effect. In fact, just the opposite has been indicated, i.e., accountability has been found to act as a bias-amplifier. See, e.g., *Tetlock/Boettger* (1989): 396.

[149] See *Shelton* (1999): 223.

[150] See *Bonner* (2008): 169, 173.

[151] See *Keren* (2011): 4; *Tversky/Kahneman* (1981): 453. For a meta-analysis of research on framing effects, see *Kühberger* (1998): 23-48.

[152] See *Frisch* (1993): 401. For a detailed discussion and instances of the violation of the invariance principle by framing effects, see *Tversky/Kahneman* (1986): S253-S257.

[153] See *Bonner* (2008): 179f.

[154] See *Ayers/Kaplan* (1993): 113f. The concept of audit quality is touched upon in Section 4.2.2.

not been found to translate into auditors' final judgments though.[155] A recent study by *Fukukawa and Mock* (2011), however, provides evidence for strong framing effects in auditors' judgments. In addition, and more importantly, the authors also find that assertion framing is significantly related to the degree of professional skepticism exhibited by the participants, with auditors operating under a negative (positive) assertion frame displaying higher (lower) risk assessments.[156] Significant framing effects have also been reported by *Emby* (1994), *Mueller and Anderson* (2002), and *O'Clock and Devine* (1995).[157]

2.4.2.1.4 Information Order

The impact of information order on auditor judgment is among the most prominent and insightful areas of behavioral research in auditing.[158] Generally, information order effects refer to the phenomenon that the very same set of information items presented and processed in a different order yields different overall assessments and judgments of the issue under consideration.[159] Consequently, information order effects represent a threat to judgment quality viewed both in terms of interpersonal consensus and correspondence with normative theories. Particularly, as subjects encountering information in a certain order (A-B) are generally found to provide substantially different responses than subjects facing the same information presented in the opposite order (B-A), a lack of interpersonal agreement is bound to occur. Furthermore, order effects contradict the rationale of normative models such as Bayes' rule that judgments are updated solely on the basis of the diagnosticity and content of information, not its normatively irrelevant presentation order.[160]

Overall, psychological and auditing research provides extensive evidence in support of the notion that information order effects systematically, significantly, and adversely influence individuals' judgments and assessments. The comprehensive theoretical and empirical consideration of information order effects is presented in Section 3.

In summary, task characteristics can clearly influence the manner in which auditors perceive and process information and arrive at a judgment. In addition, given the growing complexity germane to a variety of auditing tasks as well as the possibility that the client uses some features of the task (e.g., the information presentation frame and/or order) strategically to steer

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[155] See *Asare* (1992): 388f.; *Ayers/Kaplan* (1993): 126-128; *Kida* (1984): 336f.; *Shields/Solomon/Waller* (1987): 384.

[156] See *Fukukawa/Mock* (2011): 16f. Note in passing that this understanding of professional skepticism is in line with the presumptive doubt view on skepticism which is discussed in detail in Section 4.2.3.2.

[157] See *Emby* (1994): 108-111; *Mueller/Anderson* (2002): 169f.; *O'Clock/Devine* (1995): 202-204. Interestingly, *O'Clock/Devine* (1995) find that the framing effect is majorly related to the responses of auditors from non-Big N audit firms.

[158] See *El-Masry/Hansen* (2008): 35.

[159] See *Anderson* (1981): 144; *Hogarth/Einhorn* (1992): 3.

[160] See *Bonner* (2008): 185 as well as Section 3.1.

auditors' judgment in the desired direction, task variables deserve profound consideration and attention in both audit practice and academic research.[161]

2.4.2.2 Environmental Factors

As audit tasks are not performed in a vacuum, the consideration of task characteristics is followed by a brief review of some of the central features of the environment which surrounds auditors and shapes the context in which they conduct the audit. Following *Bonner* (2008) and *Libby and Luft* (1993), the subsequent review entails the contextual factors of incentives, accountability, feedback, team work, pressure, professional standards and regulations, and audit technology.[162] Basically, environmental factors affect auditor judgment by altering auditors' motivation and cognitive effort[163], which in turn is expected to reflect on judgment quality.[164]

2.4.2.2.1 Incentives

Incentives are a central and powerful factor inherent in the audit environment. Generally, it can be distinguished between incentives which are directly tied to the current period performance (monetary incentives) and incentives which are more mediate, long-range, and primarily concern future periods (e.g., client retention, litigation, and reputation).[165] Overall, incentives influence auditors' behavior by imposing pressure, which can either improve or deteriorate judgment quality contingent on the extent of preexisting pressure as well as the demands of the judgment task under consideration.[166]

With regard to direct monetary incentives, auditing research indicates that the provision of financial rewards to participants motivates them to exert more cognitive effort (e.g., *Awasthi and Pratt* (1990), *Libby and Lipe* (1992)) and greater judgment accuracy (e.g., *Ashton* (1990)).[167] However, the majority of auditing studies explore the influence of indirect incentives on auditors' behavior. In a nutshell, prior auditing research generally finds that auditors' judgments and choices, particularly concerning controversial client reporting preferences, are determined by the balance of two opposing categories of incentives: incentives related to client retention (generally found to threat objectivity and audit quality) as well as incentives re-

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[161] See *Bonner* (2008): 197.

[162] See *Bonner* (2008): 198; *Libby/Luft* (1993): 435-444. *Trotman/Tan/Ang* (2011): 304 list a number of further (and more contemporary) environmental factors that potentially impact auditor judgment, including press coverage of a client company, multiple client audit environments, complex accounting information systems environment, external audit reliance on internal audit work, etc.

[163] Following *Libby/Lipe* (1992): 252, cognitive effort is defined herein as an "*input of energy to mental activities*."

[164] See *Bonner* (2008): 200; *Libby/Luft* (1993): 435. For a discussion of the role of motivation in auditing, see *Bonner* (2008): 84-89.

[165] See *Bonner* (2008): 202f.

[166] See *Ashton* (1990): 149. The effects of pressure on auditors' behavior and performance are discussed in Section 2.4.2.2.5.

[167] See *Ashton* (1990) 161, 173; *Awasthi/Pratt* (1990): 806; *Libby/Lipe* (1992): 251.

lated to avoidance of the risk of costly litigation and reputational damages (generally found to act as a disciplinary and quality-enhancing mechanism). Instances for studies along these lines include *Farmer, Rittenberg and Trompeter* (1987), *Hackenbrack and Nelson* (1996), and *Nelson and Kinney* (1997).[168]

The influence of (indirect) incentives on auditors' behavior is discussed in more detail and in a more differentiated manner in Section 4.3.2.3 within the consideration of the determinants of professional skepticism in auditing.

2.4.2.2.2 Accountability

Accountability is a further environmental factor of great importance in auditing. In general terms, accountability refers to the requirement to justify (i.e., provide arguments for) one's view and judgment to significant others (e.g., superiors within the audit firm, regulators, creditors, and clients). The influence of accountability on auditors' behavior results from the profound pressure that auditors face (and the strong incentives they have) to achieve and maintain a favorable image and reputation with each peer group.[169]

The effect of accountability on human reasoning and information processing is contingent on whether individuals are aware of (or can easily infer) the preferences and positions of the person to whom they are accountable. If this is the case, people are generally found to choose the path of least effort and resistance and to simply adopt (i.e., conform to) the position preferred by the superior. However, when the superior's view is unknown, subjects are expected to think in a more thorough, careful, and multidimensional way and to evaluate a number of arguments for and against a certain position in order to arrive at a justifiable conclusion.[170] Hence, accountability to a superior with unknown preferences is considered to increase the level of cognitive effort exerted in information processing and to positively influence the quality of auditor judgment. Accountability to an individual with known preferences, on the other hand, is only beneficial if the position of the superior is correct.[171]

These theoretical considerations have been broadly supported by auditing research. Specifically, a number of studies indicate that accountability to superiors with unknown preferences induces cognitive effort and thoroughness in information processing, thereby counteracting cognitive biases and improving judgment quality. Instances for such studies include *Ashton* (1990), *Gibbins and Newton* (1994), *Johnson and Kaplan* (1991), *Kennedy* (1993), *Koonce, Anderson and Marchant* (1995), *Messier and Quilliam* (1992), and *Tan and Kao* (1999).[172]

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[168] See *Farmer/Rittenberg/Trompeter* (1987): 8-10; *Hackenbrack/Nelson* (1996): 53f.; *Nelson/Kinney* (1997): 258. For a more detailed general discussion of the accounting and auditing judgment and decision making literature on incentives, see *Bonner* (2008): 202-213.

[169] See *DeZoort/Lord* (1997): 55; *Peecher* (1996): 126; *Tetlock* (1983): 74; *Turner* (2001): 684.

[170] See *Buchman/Tetlock/Reed* (1996): 381; *Lerner/Tetlock* (1999): 256f.; *Tetlock* (1983): 75; *Tetlock/Skitka/Boettger* (1989): 632f.

[171] See *Bonner* (2008): 215.

[172] See *Ashton* (1990): 167, 173; *Gibbins/Newton* (1994): 183; *Johnson/Kaplan* (1991): 105; *Kennedy* (1993): 243; *Koonce/Anderson/Marchant* (1995): 380f.; *Messier/Quilliam* (1992): 133-135; *Tan/Kao* (1999): 221.As

However, accountability does not appear to act as a universal remedy for all cognitive biases as indicated by the findings of *Glover* (1997) and *Hoffman and Patton* (1997) concerning the dilution effect as well as the results reported by *Kennedy* (1995) regarding the hindsight bias.[173] A further important implication of accountability in the context of auditing refers to the tendency of subjects under scrutiny to provide more conservative judgments, as conservative positions are generally viewed as more defensible when there are no clues regarding the superior's opinion and preferences. Empirical support for this tendency has been provided by *Hoffman and Patton* (1997), *Lord* (1992), and *Turner* (2001).[174] In contrast, when supervisors' preferences are known, empirical findings indicate that subordinates strategically align their responses to the supervisor-preferred conclusion regardless of its reasonableness and direction (e.g., *Buchman, Tetlock and Reed* (1996), *Peecher* (1996), *Turner* (2001), *Wilks* (2002)).[175]

2.4.2.2.3 Feedback

Feedback is a further environmental factor of great importance in auditing. In general terms, feedback refers to the *ex post* provision of information concerning the individual performance (e.g., accuracy, correctness, reasonableness of the performed work and the generated outcome) in a particular task. Beyond the informational function, feedback also serves as a motivating strategy, as it allows deficiencies in the current performance to be identified and improved in the future.[176] Generally, it can be distinguished between two major feedback types: outcome feedback and process feedback. *Outcome* feedback concerns information regarding the *output* of a particular activity and typically allows for identifying discrepancies between the observed result and a normative goal or standard. *Process* feedback, on the other hand, relates to information regarding the *cognitive process* involved in generating the end result. Hence, the latter type of feedback is more informative, as it allows for cognitive mechanisms to be analyzed, flaws to be recognized, and strategies to be identified to offset deficiencies and improve judgment.[177]

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a matter of precision, *Tan/Kao* (1999) indicate that even though accountability enhances motivation and cognitive effort, it does not improve performance per se. In fact, accountability exerts its positive influence on judgment quality when the requisite individual knowledge and problem-solving abilities match the characteristics of the task. See *Tan/Kao* (1999): 209f., 221.

[173] See *Glover* (1997): 222-224; *Hoffman/Patton* (1997): 233-236; *Kennedy* (1995): 257, 265. Hindsight bias, also known as "the curse of knowledge" phenomenon, refers to the general inability to ignore *a posteriori* knowledge of the outcome of a particular (uncertain) event when evaluating the *a priori* judgments of others. See *Fischhoff* (1975): 288; *Hawkins/Hastie* (1990). For an in-depth general review of the hindsight phenomenon, refer to *Pohl* (2004).

[174] See *Hoffman/Patton* (1997): 229f., 233-236; *Lord* (1992): 97f., 103; *Turner* (2001): 702f. This aspect is also addressed in Section 4.3.2.3.1.4.

[175] See *Buchman/Tetlock/Reed* (1996): 394; *Peecher* (1996): 126; *Turner* (2001): 702; *Wilks* (2002): 66.

[176] See *Earley et al.* (1990): 87.

[177] See *Earley et al.* (1990): 89; *Pritchard et al.* (2013): 241. For an excellent in-depth review of the behavioral determinants and implications of feedback in the context of accounting, refer to *Luckett/Eggleton* (1991).

Overall, psychological research has yielded a highly inconsistent picture regarding the influence of feedback on judgment quality. While the majority of studies indicate an overall improvement in performance following the provision of feedback due to increased attentiveness, motivation, and effort, a considerable number of research works report the contrary finding, i.e., a decline in judgment accuracy and overall performance after receiving feedback.[178] The latter phenomenon can be interpreted in terms of feedback inducing pressure on individuals, which is caused by the anticipation of the upcoming performance evaluation.[179]

In auditing, the empirical evidence consistently reveals a positive influence of feedback on judgment accuracy and performance, especially when the feedback is not merely restricted to the outcome, but is supplemented with information about the pertinent cognitive processes and task features (e.g., *Ashton* (1990), *Bonner and Pennington* (1991), *Bryant, Murthy and Wheeler* (2009), *Earley* (2001), *Earley* (2003), *Leung and Trotman* (2005)).[180] In addition, as demonstrated by *Massey and Thorne* (2006), the provision of feedback can promote higher ethical reasoning and stronger focus on the public's interest in audit conflict situations and moral dilemmas.[181]

Finally, psychological theory posits that under certain circumstances, feedback can activate learning processes and contribute to the acquisition of knowledge, as feedback can motivate subjects to expand cognitive elaboration, processing, and retention in order to improve or maintain their performance.[182] Support for this notion in an auditing setting is provided by *Bonner and Walker* (1994), *Earley* (2001), and *Leung and Trotman* (2005).[183]

2.4.2.2.4 Groups and Teams

A further relevant characteristic of the audit environment is its multi-person[184] nature, or the performance of audit work within interactive audit teams and groups. Generally, the term "team" refers to the collective of auditors who work together to plan and conduct the audit. Audit teams are usually composed of subjects at different rank levels in the firm hierarchy

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178 See *Kluger/DeNisi* (1996): 254f., 278; *Kluger/DeNisi* (1998): 67.

179 See *DeZoort/Lord* (1997): 36. The (adverse) effects of pressure on auditors' behavior and performance are discussed in Section 2.4.2.2.5.

180 See *Ashton* (1990): 167, 173; *Bonner/Pennington* (1991): 32f.; *Bryant/Murthy/Wheeler* (2009): 52-54; *Earley* (2001): 93f.; *Earley* (2003): 121f.; *Leung/Trotman* (2005): 550f.

181 See *Massey/Thorne* (2006): 112-114. For a general discussion of the concept of ethical reasoning and moral development, see Section 2.4.2.3.7. For a consideration of the role of these factors in the context of professional skepticism, see Section 4.3.2.2.2.

182 See, e.g., *Kluger/DeNisi* (1996): 263. For a general and skepticism-related discussion of knowledge, see Section 2.4.2.3.1 and Section 4.3.2.1, respectively.

183 See *Bonner/Walker* (1994): 173; *Earley* (2001): 90; *Leung/Trotman* (2005): 551.

184 Note that while the focus in the present work is clearly on individual judgment, the complementary consideration of multi-auditor judgment appears important not only because of the substantial research interest in this area, but also because of the insight that can be gained from contrasting individual to multi-person information processing and judgment. For a review of the psychological literature on individual versus group performance, refer to *Hill* (1982).

(i.e., staff, seniors, managers, and partners)[185] and are formed for longer periods of time. The term "group", on the other hand, is used to refer to a collective of auditors who collaborate to solve a particular problem (e.g., a complex auditing issue). Audit groups are typically composed of individuals at the same level in the firm hierarchy who work together for shorter time periods and on more specific and delimitable projects and tasks.[186] In consistency with prior research and general usage, the terms "teams" and "groups" are used interchangeably herein.

Overall, group interaction is conceived to facilitate the generation of new ideas, strategies, and solutions, to enable learning and knowledge exchange among the group members, and to contribute to the elimination of inconsistencies, random errors, and biases in individual judgment. In this sense, multi-person judgment is likely to outperform individual judgment. However, there are also several aspects diminishing the process gains of team interaction. Specifically, team members may feel less responsible and motivated to exert cognitive effort in problem solving (i.e., display social loafing[187]). In addition, subjects may anchor on the incorrect view of a team member or employ similar cognitive strategies resulting in biases that go in the same direction, and so remain uncorrected in the group.[188]

Auditing research corroborates the heterogeneous effect of team work on judgment quality. Specifically, a number of studies provide empirical support for the superiority of multi-person judgment performance as compared to individual judgment performance in terms of increased consensus, reduced judgment variability, and greater accuracy (e.g., *Ahlawat* (1999), *Carpenter* (2007), *Reckers and Schultz* (1993), *Schultz and Reckers* (1981), *Solomon* (1982), *Trotman* (1985), *Trotman and Yetton* (1985), *Trotman, Yetton and Zimmer* (1983)).[189] However, group-assisted judgments appear ineffective in offsetting persistent cognitive biases such as information order effects (e.g., *Johnson* (1995), *Reckers and Schultz* (1993)). Furthermore, as demonstrated by *Bedard, Biggs and Maroney* (1998), group work can result in inefficiencies and process losses leading to a failure to select an identified correct answer. Finally, as shown by *Johnson* (1995), audit teams appear to exhibit attitude shifts toward greater risk in judgment and choice.[190]

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[185] For a general description of the different positions at the audit firm, including a concise consideration of both the required knowledge and experience as well as the scope of tasks performed and responsibilities pertinent to the particular team hierarchy level, see *Cook/Winkle* (1988): 25-27.

[186] See *Rich/Solomon/Trotman* (1997a): 90; *Solomon* (1987): 2.

[187] "Social loafing" is a term coined by *Latané/Williams/Harkins* (1979): 823 as a reference to the phenomenon of declines in effort exhibited by individuals when working in a group as opposed to performing the task autonomously.

[188] See *Bonner* (2008): 235-239; *Hill* (1982): 531, 535.

[189] See *Ahlawat* (1999): 84f.; *Carpenter* (2007): 1136f.; *Reckers/Schultz* (1993): 139; *Schultz/Reckers* (1981): 498-500; *Solomon* (1982): 706; *Trotman* (1985): 751; *Trotman/Yetton* (1985): 264f.; *Trotman/Yetton/Zimmer* (1983): 289.

[190] See *Bedard/Biggs/Maroney* (1998): 226; *Johnson* (1995): 152; *Reckers/Schultz* (1993): 140. The finding of riskier choices made by groups in comparison to individuals is in line with psychological research on group judgment and decision making. See, e.g., *Hill* (1982): 531; *Stoner* (1968): 442f.

2.4.2.2.5 Pressure

A further environmental factor of critical importance to auditing is the pressure faced by auditors throughout the performance of the audit. In general terms, pressure can be described as a stimulus which impacts on an individual's perceptual and cognitive processes.[191] There is a great variety of pressures pertinent to auditing. *DeZoort and Lord* (1997) distinguish two major categories of pressure: *environmental* pressure (e.g., client-related pressure and litigation) as well as *organizational* pressure (e.g., workload, feedback, obedience to superiors, conformity pressure). In addition, they highlight accountability, competition, and time pressure as pressures that may come both from outside or within the audit firm.[192]

In a nutshell, pressure is theorized to influence auditors' attitudes and judgment performance in an "inverted-U" manner. Specifically, moderate levels of pressure are conceived to enhance attentiveness, focus, and effort in information processing, thereby improving efficiency and performance. However, beyond a certain point, pressure generally induces dysfunctional behavior and susceptibility to error, thus posing considerable threats to audit effectiveness and judgment quality operationalized in terms of accuracy and correspondence to normative theories and/or professional standards.[193] Overall, high pressure induces stress and increases the cognitive demands of the task, thereby causing individuals to resign and revert to simplifying heuristics in order to reduce complexity and cognitive load.[194] The deleterious influence of high pressure on auditors' cognitive processing has been highlighted by *Gibbins* (1984), who argues that the considerable pressure inherent in the audit environment renders the opportunities for a profound, perfectly conscious and self-reflected information processing and judgment relatively rare in the auditing domain.[195]

Overall, auditing research has provided substantial support for the theorized ambivalent impact of pressure[196] on the quality of auditor judgment. Specifically, while some studies indicate a (partially) positive effect of pressure on judgment and information processing performance under certain circumstances (e.g., *Glover* (1997), *McDaniel* (1990), *Spilker and Prawitt* (1997)), other studies report a variety of pressure-induced dysfunctional responses,

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[191] See *DeZoort/Lord* (1997): 31.

[192] See *DeZoort/Lord* (1997): 36. For an in-depth, systematical review of the individual pressure constructs outlined above, see *DeZoort/Lord* (1997): 36-71.

[193] See *Bowrin/King* (2010): 162; *Choo* (1986): 28; *Choo* (1995): 634f.; *DeZoort/Lord* (1997): 29, 35.

[194] See *DeZoort/Lord* (1997): 31; *Payne/Bettman/Johnson* (1993): 38, 135. Empirical evidence for the stress-inducing effect of increasing time pressure in auditing is provided by *Margheim/Kelley/Pattison* (2005): 30. For an excellent inquiry into the antecedents, moderators, and psychological symptoms of stress in the context of auditing, refer to *Haskins/Baglioni/Cooper* (1990). For a list of practical suggestions and strategies for coping with stress in the auditing profession, see *Gaertner/Ruhe* (1981): 73f.

[195] See *Gibbins* (1984): 120.

[196] It might be remarked that the majority of the subsequently cited studies concern the influence of time pressure on auditors' behavior. *DeZoort/Lord* (1997): 39 distinguish between two general types of time pressure: deadline pressure and time budget pressure. The former type of pressure is associated with deadlines, i.e., a specified point in time by which a task must be completed. The second type of pressure relates to the specification of a particular tight time frame in which to accomplish a job. For an extensive overview of the broad and very diverse pressure-related literature in auditing, refer to *DeZoort/Lord* (1997): 36-71. For a general review of the influence of time pressure on human information processing, see *Bronner* (1973): 1-47.

such as premature sign-offs (e.g., *Alderman and Deitrick* (1982), *Raghunathan* (1991)), underreporting of audit time (e.g., *Akers and Eaton* (2003), *Akers, Horngren and Eaton* (1998), *Kelley and Margheim* (1990), *Lightner, Adams and Lightner* (1982), *Lightner, Leisenring and Winters* (1983)), inappropriate obedience to superiors (e.g., *DeZoort and Lord* (1994), *Lord and DeZoort* (2001)), and last but not least, less professionally skeptical behavior (e.g., *Robinson* (2011)).[197] Collectively, these results indicate the pervasiveness and momentousness of pressure effects in auditing. Pressure effects are further considered in Section 4.3.2.3 in the context of the discussion of the determinants of professional skepticism in auditing.

2.4.2.2.6 Standards and Regulations

A further relevant aspect of the audit environment concerns the existence of a variety of professional norms and regulations issued to standardize audit procedures and codify appropriate behavior in a number of contexts.[198] As touched upon in Section 2.4.1, professional standards and regulations represent a benchmark for judgment quality and the adherence to them is critical to the auditing profession. In fact, violations of auditing standards and norms can have severe consequences, including legal litigation, irreversible reputation losses, and even auditing firm collapses, as evidenced by the spectacular Enron case, which has led to the demise of Arthur Andersen, one of the largest then Big 5 auditing firms.[199]

The behavioral auditing literature on rules and regulation has largely focused on the influence of the type of auditing standards (ambiguous versus well-specified) on the quality of auditor judgment. Overall, analytical, archival, and experimental auditing research on this topic yields a relative consistent and intuitively plausible picture: While well-specified auditing standards limit discretion, increment judgment consensus among auditors, and reduce auditors' susceptibility to client-imposed pressure (e.g., *Carcello, Vanstraelen and Willenborg* (2009), *Goldman and Barlev* (1974), *Knapp* (1985), *Magee and Tseng* (1990), *Nichols and Price* (1976), *Trompeter* (1994)), vague auditing standards allow for latitude in judgment and decision making in consistency with the individual, not necessarily norm-conform, incentives (e.g., *Hackenbrack and Nelson* (1996)).[200] However, empirical findings also reveal that even stringent professional standards cannot fully counteract the effect of strong incentives and

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[197] See *Akers/Eaton* (2003): 90-92; *Akers/Horngren/Eaton* (1998): 15f.; *Alderman/Deitrick* (1982): 60-63; *DeZoort/Lord* (1994): 21; *Glover* (1997): 222-224; *Kelley/Margheim* (1990): 37f.; *Lightner/Adams/Lightner* (1982): 8f.; *Lightner/Leisenring/Winters* (1983): 53-55; *Lord/DeZoort* (2001): 228-230; *McDaniel* (1990): 282f.; *Raghunathan* (1991): 73-75; *Robinson* (2011): 79-83; *Spilker/Prawitt* (1997): 172-174. Overall, only very few studies (e.g., *Bamber/Bylinski* (1987): 136f.) fail to indicate a significant influence of time pressure on judgment performance in auditing.

[198] See *Bonner* (2008): 251.

[199] For a discussion of the Enron-Andersen-gate, see *Benston/Hartgraves* (2002). For a theoretical and empirical analysis of its impact on the reputation of the auditing profession, see *Möller/Sigillo* (2010). The Enron scandal is also touched upon in Section 4.2.2 in the context of professional skepticism.

[200] See *Carcello/Vanstraelen/Willenborg* (2009): 1398, 1424f.; *Goldman/Barlev* (1974): 712, 714; *Hackenbrack/Nelson* (1996): 54f.; *Knapp* (1985): 203f., 208; *Magee/Tseng* (1990): 317; *Nichols/Price* (1976): 340f.; *Trompeter* (1994): 66.

self-interest which result in aggressive reporting and opportunistic behavior on the part of the auditor (e.g., *Cuccia, Hackenbrack and Nelson* (1995), *Libby and Kinney* (2000)).[201]

As to the behavioral implications of regulatory changes, *Hronsky and Houghton* (2001) demonstrate that even minor changes in the wording of auditing standards are recognized and apprehended by auditors to imply distinct meanings. In addition, and more importantly, auditors act upon these subtle differences in consistency with the direction intended by the regulators. Similarly, *Zimbelman* (1997) demonstrates that novel auditing standards can induce greater attention and effort in information processing, thereby potentially improving the quality of auditor judgment.[202] Overall, auditing standards and regulations represent a crucial determinant of auditors' judgment and decision making.

2.4.2.2.7 Audit Technology

A further noteworthy environmental factor in auditing concerns the implementation and use of technical and other guidance and support to aid and supervise auditors' information processing and judgment. Audit technology encompasses not only information technology (IT)[203], but also a wide range of formal and non-formal decision aids, practical guidance, firm policies, etc.[204] Overall, audit technology plays an increasingly important role in contemporary auditing.[205]

Broadly stated, audit technology imposes structure, automation, and standardization on the audit process, thereby reducing complexity and the time necessary for conducting the audit. It aims at mitigating individual deficiencies in cognitive capacity, computational and information processing ability, and ultimately at increasing judgment and decision making performance.[206] The performance-facilitating effect of decision aids has been generally confirmed by auditing research (e.g., *Ashton* (1990), *Butler* (1985), *Eining, Jones and Loebbecke* (1997), *Libby and Libby* (1989)).[207] *Kachelmeier and Messier* (1990), on the other hand, find that

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[201] See *Cuccia/Hackenbrack/Nelson* (1995): 228f.; *Libby/Kinney* (2000): 384f.

[202] See *Hronsky/Houghton* (2001): 135; *Zimbelman* (1997): 93f.

[203] A definition of the term "information technology" in an auditing context is provided in the footnote to SAS 109 (AU 314.15). According to this this definition, IT "*encompasses automated means of originating, processing, storing, and communicating information, and includes recording devices, communication systems, computer systems (…), and other electronic devices*." Instances for particularly frequently used IT audit applications include electronic working papers, analytical plausibility check techniques, statistical sampling procedures, audit report writing, and Internet search tools. See *Janvrin/Bierstaker/Lowe* (2008): 16.

[204] See *Libby/Luft* (1993): 436.

[205] For a review of the importance and implications of advancing information technologies for twenty-first century assurance, see *Elliott* (2002): 139-146. It is important to note that even though audit technology provides substantial support to the auditor throughout the conduct of the auditing procedures and is indispensable in contemporary auditing, it cannot perform the critical (cognitive) tasks of reasoning, judgment, and decision making, and thus cannot replace the auditor.

[206] See *Janvrin/Bierstaker/Lowe* (2008): 3; *Libby/Luft* (1993): 435f. It is worth noting that prior research has found that auditors' intuitive (i.e., unaided) assessments of audit risk are inconsistent with the audit risk model set forth in authoritative guidance. See, e.g., *Daniel* (1988): 179; *Jiambalvo/Waller* (1984): 86f.

[207] See *Ashton* (1990): 161-164; *Butler* (1985): 521; *Eining/Jones/Loebbecke* (1997): 15-17; *Libby/Libby* (1989): 741-743.

while reducing auditors' tendency to utilize too small sample sizes in analytical testing procedures, decision aids lead to greater variance and interpersonal inconsistency in judgment.[208] Furthermore, several studies indicate that audit technology may have an adverse effect on the quality of auditor judgment, as it may induce anchoring effects, limit effort, impede independent, controlled and analytical (System 2) reasoning, and inhibit the consideration of procedures and arguments other than those suggested by the audit information technology. The negative influence of decision-supporting systems and checklists on auditors' judgments has been both theoretically and empirically corroborated (e.g., *Bryant, Murthy and Wheeler* (2009), *Hogan et al.* (2008), *Kowalczyk and Wolfe* (1998)).[209]

In summary, the preceding review reveals that environmental factors can, and do, significantly affect auditor judgment both in a positive and an adverse way. Overall, some environmental variables (e.g., incentives to avoid litigation and reputation loss, accountability to superiors with unknown preferences) generally enhance subjects' motivation to pursue precise and justifiable conclusions, induce effort and deliberation in reasoning and information processing, and facilitate judgment performance. However, other environmental factors (e.g., client retention incentives, conformity, obedience, and time pressure) have a detrimental effect on auditor judgment. They motivate subjects to reason and act toward achieving a cognitively efficient, desired (client-favorable, authority-preferred) outcome, thereby pursuing conformity, social acceptance, and conflict avoidance rather than precision in judgment and choice.[210]

To recapitulate, the preceding sections show that it is critical to take into account that audit judgments are not made in a vacuum, but are considerably influenced by the features of the task and the characteristics of the audit environment. However, it is not less critical to bear in mind that audit judgments are made by humans who possess a unique combination of individual characteristics. The subsequent section sheds light on some of the key personal characteristics which significantly influence the manner in which auditors reason, process information, and form judgments.

2.4.2.3 Personal Factors

Personality can be generally defined as "*the interactive aggregate of personal characteristics that influence an individual's response to the environment*", or in short – an individual's "*unique pattern of traits*".[211] Broadly stated, traits signify "*any distinguishable, relatively en-*

[208] See *Kachelmeier/Messier* (1990): 223. Similarly mixed results regarding the influence of decision aids on subjects' judgments are reported by *Seow* (2009): 202f. in an accounting context.

[209] See *Bryant/Murthy/Wheeler* (2009): 39f.; *Hogan et al.* (2008): 246; *Kowalczyk/Wolfe* (1998): 165f.

[210] For similar claims, see *Bonner* (2008): 254f.

[211] *Guilford* (1959): 13. Note that there are a variety of different views and conceptualizations of personality in the relevant psychological literature. See, e.g., *Engler* (2014): 2f. Among the most prominent conceptual views of personality is the so-called "Five-Factor Model". This model posits that personality traits are structured in a hierarchical manner from broad and basic to more narrow and specific dispositions. The former, also referred to as "higher-order traits", include the five fundamental personality factors of neuroticism, extraversion, openness, agreeableness, and conscientiousness. Under these five major categories, a number of "lower-order traits" (e.g., anxiety, self-consciousness, assertiveness, trust, compliance, dutifulness, self-

during way in which one individual differs from others."[212] They represent "*endogenous basic tendencies*"[213] which encompass "*cognitive, interpersonal, motivational, and stylistic aspects, some adaptive, some pathological.*"[214] Personality traits have been generally found to influence an individual's personal and professional behavior,[215] and hence clearly deserve consideration in the context of auditing. It is important to note, however, that traits are essentially tendencies, i.e., they represent general dispositions rather than absolute determinants. With other words, there are a variety of other (task-specific and environmental) factors beyond personality traits which influence human judgment and behavior.[216]

The review of personal factors (both traits and other individual characteristics) presented subsequently encompasses the features that have been most frequently discussed in the relevant auditing literature and that have been found to possess the greatest capacity to influence auditors' information processing and judgment. These factors are knowledge and expertise, ability, risk attitude, confidence, tolerance for ambiguity, cognitive style, moral development, cultural background, and gender.[217]

2.4.2.3.1 Knowledge and Expertise

Knowledge is a key determinant of judgment performance.[218] In a broad sense, knowledge can be defined as information maintained in long-term memory.[219] In essence, knowledge is acquired through experience (both direct (i.e., gained through past performance) and indirect

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discipline, etc.) are organized. See *Costa/McCrae* (1992): 653f.; *Livesley/Jang/Vernon* (2003): 67; *McCrae/Costa* (1996): 72, 74. For a historical overview of the genesis of the Five-Factor Model, see *Digman* (1996): 1-16. For a general theoretical and empirical discussion of the model, refer to *McCrae/John* (1992): 175-207.

212 *Guilford* (1959): 6.

213 *McCrae/Costa* (1996): 72, italics in original.

214 *McCrae/Costa* (1996): 62. Note in passing that there is substantial evidence that personality traits are considerably heritable, i.e., genetically determined. See *Livesley/Jang/Vernon* (2003): 78; *McCrae/Costa* (1996): 72; *Tellegen et al.* (1988): 1035-1038. For a discussion of the biological determinants of personality (including cortical arousal, monoamines, hormones, and genetics), see *Zuckerman* (2003): 85-110.

215 See *Ajzen* (2005): 19f., 24; *Goffman* (1959), quoted in *Rose* (2007): 217; *Matthews/Deary/Whiteman* (2003): 6; *Wrightsman* (1974): 40.

216 See *McCrae/Costa* (1990): 23.

217 See *Bonner* (2008): 54. Note that *Bonner* (2008) does not include moral development in her discussion of determinants of judgment and decision making quality in the fields of accounting and auditing. However, as ethics and morality play a central role in the context of professional skepticism in auditing, the personal factor of moral development is theoretically and empirically reviewed in this section.

218 See *Bonner/Pennington* (1991): 1; *Libby/Luft* (1993): 426.

219 See *Bonner* (2008): 58. Most generally, long-term memory refers to the relatively stable and permanent memory system in which nearly unlimited amounts of data can be stored over very long periods of time. In contrast, short-term memory concerns the more dynamic memory system in which (a limited amount of) new data is contained for few (regularly between two and thirty) seconds and from which that data either is transferred to long-term memory (via rehearsal) or is forgotten. In addition, short-term memory also serves as a work space into which information is transferred back (i.e., retrieved) from long-term memory in the cases where its use is required. See *Kalat* (2012): 394f.; *Marschark* (1997):150; *Plotnik/Kouyoumdjian* (2013): 244f.

(i.e., obtained through education)).[220] As an internal mental construct, knowledge is not directly observable and has therefore been typically approximated via experience.[221] In auditing, experience has been broadly described as "*longevity in a particular position or in performing a particular task.*"[222] Experience basically provides structure and thus a guide to an individual's cognitive processes.[223] The comprehensiveness, organization, and content of the experientially formed knowledge structures determine what hypotheses are generated, what information is attended to, how this information is evaluated and integrated in an overall judgment, and thus ultimately the quality of the judgment.[224] Overall, knowledge is conceived to decrease the cognitive effort associated with performing the task and to enable subjects to more efficiently and accurately process and analyze information.[225]

A further concept usually discussed along with knowledge and experience is expertise. In general, expertise can be defined as "*highly skilled, competent performance in one or more task domains*"[226]. Like knowledge, expertise is not directly observable, and it has also been typically operationalized through experience.[227] Generally, experts have been theorized to exhibit more comprehensive knowledge, better memory organization, associativity, and problem-solving ability, and thus ultimately higher judgment quality in comparison with non-experts.[228]

Auditing research has largely corroborated the positive effect of knowledge and expertise on the quality of auditor judgment. Empirical evidence along these lines has been provided by *Bedard and Biggs* (1991a,b), *Libby and Frederick* (1990), *Low* (2004), and *Shelton* (1999), among many others.[229]

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[220] See *Bédard* (1989): 115; *Bonner/Lewis* (1990): 1; *Christ* (1993): 304. In addition to experience, *Libby/Luft* (1993): 433 recognize ability as a key determinant of knowledge. Consequently, ability influences judgment performance both directly (as will be discussed in Section 2.4.2.3.2) and indirectly (through knowledge effects).

[221] See *Libby/Luft* (1993): 430. Note that different types of experience have been used as proxies for knowledge in the relevant auditing literature: general audit experience, task-specific experience, and industry-specific experience, with the latter two categories being generally found to possess a greater explanatory power regarding individual judgment performance compared to general experience. See, e.g., *Bedard/Biggs* (1991b): 87f.; *Bonner/Lewis* (1990): 16.

[222] *Davis/Solomon* (1989): 151.

[223] See *Gibbins* (1984): 105; *Nisbett/Ross* (1980): 7.

[224] See *Bonner* (2008): 62; *Christ* (1993): 306; *Libby* (1985): 649. For a discussion of the dimensions of knowledge content and empirical evidence on their association with judgment performance, see *Choo* (1996): 341f., 351-353.

[225] See *Colbert* (1989): 137. For a general discussion of a number of moderators of the positive effect of knowledge on judgment quality, see *Bonner* (2008): 63-65, 71f.

[226] *Sternberg/Ben-Zeev* (2001): 365. As argued by *Bédard* (1989): 116, expertise is an elusive concept which lacks a universally accepted definition. For a number of alternative general-usage and technical definitions of expertise, see *Bédard* (1989): 114 and *Bédard/Chi* (1993): 21f.

[227] Note, however, that in some cases, experience might be an imprecise proxy for expertise. For instances of the mismatch between experience and expertise, see *Bédard* (1989): 114.

[228] See *Bédard* (1989): 115; *Bédard/Chi* (1993): 23; *Frederick* (1991): 244.

[229] See *Bedard/Biggs* (1991a): 636, *Bedard/Biggs* (1991b): 87f. *Libby/Frederick* (1990): 350, 362f.; *Low* (2004): 202, 214-216; *Shelton* (1999): 223. Note that the literature directly or indirectly exploring the influence of experience, expertise, and knowledge on auditors' behavior is tremendous and way too diverse to be captured even rudimentary within a single subsection. Detailed literature reviews on this topic are provided

Knowledge and expertise, however, might also involve some threats to the quality of auditor judgment – they might induce automatic processing and a tendency to premature judgments and decisions.[230] Specifically, with growing experience and familiarity, auditors may (subconsciously) utilize mental shortcuts, strategies, and inferences that have proven useful and adequate in past performance, but are not necessarily optimal to the present judgment task.[231] With other words, experience may induce auditors to underprocess current information and rush into conclusions retrieved from memory rather than embrace the present problem situation and search for novel solutions based on actual observations rather than solely on prior experience and expectations.[232] In addition, experience may lead to overconfidence in the correctness and reasonableness of the own responses.[233] This contention has been empirically corroborated by *Moeckel* (1990).[234]

Overall, although knowledge, experience, and expertise are critical and usually beneficial to the performance of high-quality audits, under a cognitive viewpoint, in some cases, they may also have detrimental effects on the quality of auditor judgment.[235] The influence of knowledge effects on auditors' behavior is further considered in Section 4.3.2.1 within the discussion of the key determinants of professional skepticism in auditing.

2.4.2.3.2 Ability

A further personal factor which deserves consideration within the discussion of the determinants of judgment (performance) in auditing concerns an individual's ability. In the context of human information processing, ability can be defined as "*the capacity to complete information encoding, retrieval and analysis*"[236]. The psychological literature distinguishes between three major categories of cognitive abilities: analytical, creative, and practical abilities, all of which are conceived as related to intelligence[237]. *Analytical abilities* generally relate to an individual's capacity to identify the existence of a particular problem, structure it, define its essence, and develop a strategy for solving the problem. Hence, analytical abilities repre-

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by *Bédard* (1989), *Bédard/Chi* (1993), *Bonner* (2008): 56-73, *Bonner/Pennington* (1991), *Colbert* (1989), *Schreiber* (2000): 183-314, and *Wright* (1988b).

230 See *Gibbins* (1984): 108; *Grenier* (2013): 6.

231 See *Fiske/Taylor* (2008): 165. Note that the use of mental shortcuts (heuristics) may depend on the mood and the current emotional state. The importance of mood, affect, and emotions in the context of auditors' judgment and decision making as well as the need for future research on this topic have been recognized by *Birnberg* (2011): 12 and *Nelson/Tan* (2005): 54. For an overview and discussion of psychological and auditing research on the influence of emotion on human judgment, refer to *Nolder* (2012): 81-88.

232 See *Moeckel* (1990): 382.

233 See *Einhorn* (1976): 204.

234 See *Moeckel* (1990): 382. For a discussion of auditing studies indicating further negative effects of knowledge, see *Bonner* (2008): 68f., 73.

235 It is worth noting that this research insight seems to have found its way into audit practice, as evidenced by KPMG's statement that when it comes to cognitive processing traps, experience might not always be "*the best teacher.*" *KPMG* (2011): 2.

236 *Libby/Luft* (1993): 428.

237 For an excellent in-depth overview and discussion of the different definitions, approaches, and theories of human intelligence, refer to *Sternberg/Kaufman* (1998): 480-498.

sent a crucial success factor in human information processing and problem solving. A further important determinant of problem-solving performance concerns the capacity to generate diverse and potentially unpopular problem-solving ideas and paths. This is where *creative abilities* are demanded. And finally, *practical abilities* are necessary to implement the generated ideas effectively.[238]

In auditing, the main focus of research has been on auditors' analytical ability which has been argued to be to some extent innate and to some extent formed through experience.[239] Overall, ability has been found to positively affect auditors' judgment performance (e.g., *Bierstaker and Wright* (2001), *Bonner and Lewis* (1990), *Libby and Tan* (1994)).[240]

2.4.2.3.3 Risk Attitude

The individual attitude toward risk has also been recognized as an important behavioral factor in auditing. Generally, the term "risk attitude" refers to a "*generic orientation (as a mind-set) towards taking or avoiding a risk when deciding how to proceed in situations with uncertain outcomes.*"[241] Basically, there are three categories of risk attitudes: *risk aversion*, i.e., an attitude which involves risk avoidance; *risk-seeking*, i.e., an attitude which involves risk preference; and *risk neutrality*, i.e., an attitude which involves risk indifference.[242] The importance of risk attitude in auditing arises from the fact that auditors typically make judgments and decisions under conditions of uncertainty. Overall, individual differences in risk attitude may lead to inconsistent judgments and actions among auditors.[243]

Empirical auditing research has not demonstrated much of interest in the study of the influence of risk attitude on auditors' judgments and behaviors. Hence, virtually nothing is known on whether and how different risk attitudes affect the quality of auditor judgment. Empirical evidence on the role of risk attitude in auditing is provided by *Chang and Hwang* (2003) and *Koch and Schunk* (2013). *Chang and Hwang* (2003) find that the auditors in their study are on average risk neutral and that their decisions regarding aggressive reporting practices are not significantly affected by individual risk attitudes. *Koch and Schunk* (2013), on the other hand, indicate that risk attitudes depend on situational factors such as liability regimes. The authors demonstrate that under conditions of unlimited liability, auditors are significantly more risk averse than in the case of limited liability.[244]

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238 See *Sternberg/Kaufman* (1998): 494.

239 See *Bonner/Lewis* (1990): 4.

240 See *Bierstaker/Wright* (2001): 58; *Bonner/Lewis* (1990): 1, 14-16; *Libby/Tan* (1994): 713.

241 *Rohrmann* (2005): 2.

242 See, e.g., *Chavas* (2004): 35; *Hirschey* (2009): 643.

243 See *Bonner* (2008): 98.

244 See *Chang/Hwang* (2003) 211, 214; *Koch/Schunk* (2013): 55.

2.4.2.3.4 Confidence

A further personal factor of central behavioral relevance in auditing is confidence.[245] Confidence generally relates to an individual's belief and trust in the own abilities.[246] As argued by *Bailey, Daily and Phillips* (2011), "*confidence is a two-edged sword*"[247]: It is essentially a natural and reasonable consequence of knowledge and expertise,[248] but in its extreme form, confidence has been viewed as one of the most critical issues in human judgment and decision making.[249] Extreme confidence, also referred to as "overconfidence", is a well-documented and pervasive phenomenon which generally involves an overestimation of and an unwarranted certainty in the accuracy of the own judgments, inferences, and predictions.[250] Overconfidence can lead to a premature abortion of the search for additional evidence that could yield a different conclusion and to confirmatory evidence evaluation. These effects are theorized to impair judgment quality.[251] Strikingly, psychological research generally indicates that overconfidence is more pronounced in light of difficult inference tasks as compared to more simple tasks.[252]

In auditing, overconfidence has been documented in the context of auditors' self-perceived technical knowledge (e.g., *Kennedy and Peecher* (1997)), abilities (e.g., *Owhoso and Weickgenannt* (2009)), memory accuracy (e.g., *Moeckel and Plumlee* (1989)), and judgment accuracy (e.g., *Pincus* (1991)). Furthermore, *Boatsman, Moeckel and Pei* (1997) indicate a positive relationship between auditors' confidence and their inclination to disregard decision aid clues in fraud risk assessment.[253] Note, however, that the aforementioned studies do not explicitly examine the influence of (over)confidence on the quality of auditor judgment. This issue deserves to be addressed by future research.[254]

2.4.2.3.5 Tolerance for Ambiguity

A further personal factor of central importance in the context of auditors' judgment and decision making concerns the individual tolerance for ambiguity. Tolerance for ambiguity generally refers to an individual's predisposition and attitude toward the ambiguity inherent in the environment. It is theorized to be a continuous concept, with intolerance for ambiguity at the

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245 See *Bonner* (2008): 93.

246 See *Walters* (2002): 181.

247 *Bailey/Daily/Phillips* (2011): 33.

248 For such claims and empirical evidence on the confidence-inflating role of industry-specific experience, see *Taylor* (2000): 700, 707f. *Gul* (1983): 87, in contrast, finds an inverse relationship between general experience and accountants' confidence.

249 See, e.g., *Plous* (1993): 217.

250 See *Fischhoff/Slovic/Lichtenstein* (1977): 552; *Griffin/Tversky* (1992): 411f.; *Hoffrage* (2004): 235.

251 See *Ahlawat* (1999): 76; *Block/Harper* (1991): 188; *Einhorn/Hogarth* (1978): 398-400; *Mahajan* (1992): 330; *Pincus* (1991): 39.

252 See *Hoffrage* (2004): 242.

253 See *Boatsman/Moeckel/Pei* (1997): 230; *Kennedy/Peecher* (1997): 286; *Moeckel/Plumlee* (1989): 665; *Owhoso/Weickgenannt* (2009): 14f.; *Pincus* (1991): 52.

254 See *Bonner* (2008): 97.

one end of the continuum and tolerance for ambiguity at the other end.[255] Overall, intolerance for ambiguity refers to the predisposition to perceive psychological discomfort (or even threat) in light of ill-defined, ambiguous problem situations characterized by uncertainty, complexity, vagueness, incompleteness, inconsistency, and lack of structure of the pertinent informational stimuli. This tendency is believed to affect the way in which information is evaluated and processed. Specifically, ambiguity-intolerant subjects are theorized to be concerned about the uncertainty and ambiguity underlying a particular judgment situation and to attempt to resolve this tension by gathering and evaluating a greater amount of information on which to found their judgments. In contrast, individuals exhibiting tolerance for ambiguity do not perceive cognitive strain and discomfort in light of high uncertainty and are not expected to feel the need to collect more evidence and to elaborate more on the information available in order to reduce ambiguity.[256]

Despite the evident relevance of the feature of tolerance for ambiguity to judgment and decision making in auditing, which is a field that naturally involves high uncertainty and complexity, studies exploring the influence of auditors' ambiguity aversion or tolerance on the their information processing attitudes have rarity value. Overall, the results of the relevant auditing studies generally support the theoretical contentions outlined above. Specifically, *Pincus* (1990) reports results showing that ambiguity-intolerant auditors are better able to recognize material misstatements in client accounts in comparison to ambiguity-tolerant subjects. Furthermore, *Pincus* (1991) finds that ambiguity-intolerant auditors exhibit less judgment confidence in situations involving high uncertainty, which is expected to trigger more informed and extensive inquiry and evidence collection. In addition, *Makkawi and Abdolmohammadi* (2004) demonstrate that ambiguity-intolerant auditors plan significantly more audit hours than their ambiguity-tolerant counterparts. Moreover, the individual degree of tolerance for ambiguity has been found to be strongly related to auditors' risk assessments. Specifically, *Makkawi and Rutledge* (2000) document that ambiguity-intolerant auditors provide significantly higher audit risk assessments than ambiguity-tolerant subjects. Similarly, the results obtained by *Majid and Pragasam* (1997) show that in the context of high contingent liability, ambiguity-intolerant auditors are less likely to issue an unqualified audit opinion in comparison with ambiguity-tolerant participants.[257]

2.4.2.3.6 Cognitive Style

A further personal factor recognized to influence human behavior in general and auditors' judgment and decision making in particular relates to an individual's cognitive style. There

[255] See *Budner* (1962): 29; *Dermer* (1973): 513; *Hartmann* (2005): 245; *Wee/Lim/Lee* (1994): 37.

[256] See *Benett/Herold/Ashford* (1990): 346f.; *Budner* (1962): 30; *Dermer* (1973): 512f.; *Hartmann* (2005): 246; *McGhee/Shields/Birnberg* (1978): 683; *Norton* (1975): 608; *Ylinen/Gullkvist* (2012): 401, 408f. As will be demonstrated in Section 4.4.2, the concept of tolerance for ambiguity is related to an individual's professional skepticism.

[257] See *Majid/Pragasam* (1997): 935, 940; *Makkawi/Abdolmohammadi* (2004): 147; *Makkawi/Rutledge* (2000): 69, 80; *Pincus* (1990): 158; *Pincus* (1991): 55. Similarly to *Pincus* (1991), *Gul* (1986): 104 also reports lower confidence levels for ambiguity-intolerant bankers compared to ambiguity-tolerant subjects.

exists a multitude of different definitions and notions of cognitive style in the psychological literature.[258] In the present work, cognitive style is viewed as encompassing an individual's enduring and consistent patterns of perception, gathering, storing, organizing, processing, evaluating, and retrieving information, reasoning, problem-solving, and other related cognitive operations.[259] Generally, the construct of cognitive style is characterized by the following essential features: First, it relates to the form and structure rather than the content and outcome of thought and cognition. Second, cognitive style is a pervasive construct which relates to human personality, not only cognition.[260] Third, as a dimension of human personality, an individual's cognitive style is relatively stable over time. Forth, cognitive style is a bipolar construct and each pole has a context-dependent adaptive value. This is an essential difference to the concept of intelligence and other ability categories which are generally classified as positive and desirable under all conditions.[261] Subsequently, the two basic cognitive styles of field dependence-independence and locus of control, which have elicited most attention within the auditing literature, are briefly discussed.

2.4.2.3.6.1 Field Dependence-Independence

The cognitive style of field dependence-independence relates to the individual propensity to differentiate issues and information items from their contextual background. Field independence generally involves the ability to abstract from the embedded judgment context and to process information in an *analytical*, structured, and articulated manner. Field dependence, on the other hand, reflects a *global*, less structured and differentiated manner of information processing and a high responsiveness to the salient but not necessarily relevant properties of the problem field.[262] Overall, psychological research suggests that under conditions of high complexity and cognitive load, field-independent individuals process information more efficiently and effectively than their field-dependent counterparts.[263] In addition, field-independent subjects have been found to exhibit less overconfidence in their own judgments as compared to field-dependent individuals.[264]

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[258] For an overview of some of the foundational definitions and angles of consideration of the concept of cognitive style, see *Dani* (1989): 17f.

[259] See *Hayes/Allinson* (1998): 850; *Messick* (1976): 4f.; *Pratt* (1980): 502. For a discussion of the nature and determinants of cognitive styles, see *Witkin* (1976): 38-47.

[260] Note that personality and cognitive styles, although significantly related, are basically considered distinct constructs. See *Pratt* (1980): 502.

[261] See *Witkin et al.* (1977): 15f.

[262] See *Bennink/Spoelstra* (1979): 480f.; *Colman* (2009): 282; *Messick* (1976): 5; *Witkin et al.* (1977): 7f., 10. For an overview of psychological research on field dependence-independence exploring the influence of gender, age, development, intelligence, creativity, learning capacity, etc. on an individual's field dependence or independence, see *Dani* (1989): 20-25.

[263] See, e.g., *Bennink/Spoelstra* (1979): 488; *Cochran/Davis* (1987): 206f.; *Robinson/Bennink* (1978): 439. For a list of further relevant psychological studies on individual performance differences on cognitive tasks between field-dependent and field-independent subjects, see *Cochran/Davis* (1987): 197f.

[264] See *Gul* (1984): 273; *Gul/Zaid* (1981): 949f.

With regard to auditing, it can be argued that field independence, i.e., the tendency to impose structure to complex and ambiguous problem settings as well as to abstract from the prevalent context and focus on the relevant information cues throughout the conduct of the audit, represents an important skill of an auditor.[265] The sparse auditing research on this cognitive characteristic provides only partial support for the superior judgment quality of field-independent auditors. Specifically, *Pincus* (1990) finds that field-independent auditors are better able to identify material misstatements in client accounts than field-dependent auditors. In addition, *Chan* (1995) reports that field-independent auditors are less sucpetible to information order effects than their field-dependent counterparts.[266] *Bernardi* (1994), on the other hand, does not indicate differences in the individual fraud detection ability between field-dependent and field-independent auditors.

2.4.2.3.6.2 Locus of Control

Locus of control, the second basic cognitive style characteristic, relates to the individual propensity to perceive a causal relationships between the own behaviors and their outcomes, with internal and external locus of control representing the two endpoints of the scale. Internal locus of control involves the propensity to believe that one has, at least to some extent, control over life events and the own fate. Subjects exhibiting this characteristic are labeled "internals". They generally see themselves in charge for the outcomes of their own behavior. External locus of control, in contrast, involves the tendency to believe that life events and the own destiny are determined by external forces. Individuals of this cognitive type are called "externals". They are reluctant to recognize the contingent relationship between their behaviors and the consequences thereof. Instead, they readily attribute the outcomes of their own actions to factors and circumstances extrinsic to themselves.[267] These general predispositions also determine the manner in which people reason, judge, and act. More particularly, by recognizing the responsibility for the own judgments and actions and by being aware of the dependence of the outcome on the resources exerted, internals are theorized to be more effortful, diligent, thorough, and self-reflected in information processing than externals, and thus ultimately to arrive at outcomes of higher quality.[268] Following this line of thought and transferring it to the field of auditing, it can be argued that externals, who rely on events and factors beyond the self and their own capabilities, are potentially less autonomous, self-reflected, and critical in their judgments and decision, identify less with the goals and responsibilities of the auditing profession, and exhibit lower professional skepticism than do internals, who are capable of rationalizing and controlling their own judgments and actions.[269]

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[265] See *Bernardi* (1994): 71.

[266] See *Bernardi* (1994): 76f.; *Chan* (1995): 26; *Pincus* (1990): 157.

[267] See *Findley/Cooper* (1983): 419; *Jennings/Zeithaml* (1983): 417; *Julian/Katz* (1968): 89; *Rotter* (1966): 1.

[268] See *Nasution/Östermark* (2012): 167; *Trevino* (1986): 610.

[269] *Quadackers* (2009): 28f. also identifies the importance of the cognitive style of locus of control in the context of auditors' professional skepticism. Moreover, as will be touched upon in Section 4.4.3, the Rotter Locus of Control Scale is among the psychometrical scales on which *Hurtt* (2010) has drawn her trait profes-

The theoretical contentions outlined above have been empirically supported by the results of *Tsui and Gul* (1996) who document a lower likelihood for internal-locus-of-control auditors to respond to management's demands in an audit conflict situation as compared with external-locus-of-control auditors. In addition, *Donnelly, Quirin and O'Bryan* (2003) find that internals exhibit lower acceptance of dysfunctional auditor behavior (e.g., premature sign-offs and underreporting of time) and higher degrees of organizational commitment than externals. Corroborating results regarding the relationship between locus of control and auditors' attitude toward dysfunctional behavior have been reported by *O'Bryan, Quirin and Donnelly* (2005). Furthermore, *Curtis and Taylor* (2009) obtain a higher likelihood for internals to "blow the whistle"[270] on observed misbehavior in comparison with externals.[271] In contrast, *Bernardi* (1994) does not obtain significant differences in the fraud detection rate between internal-locus-of-control and external-locus-of-control auditors. However, he reports that experienced auditors exhibiting internal locus of control and high degrees of moral development provide the highest and most accurate fraud detection rates. Similarly, even though *Nasution and Östermark* (2012) do not obtain significant locus-of-control-related differences in auditors' judgments made under conditions of high pressure, the authors indicate that internals are tendentially less inclined to sign-off on a doubtful account and exhibit higher responsibility for their judgments as compared with externals.[272] In contrast, *Quadackers* (2009) finds that internals exhibit lower fraud likelihood assessments than externals. Finally, *Hyatt and Prawitt* (2001) report that internals (externals) perform better at unstructured (structured) audit firms, thereby highlighting the unique interaction between personality features and contextual factors as determinants of job performance.[273]

2.4.2.3.7 Moral Development

Another personal characteristic recognized to significantly affect auditor behavior concerns the individual degree of moral development. In general terms, moral development refers to an individual's state of mind regarding matters of ethics and morality in the context of social interaction.[274] It frames a subject's reasoning and attitude toward rights and responsibilities,

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sional skepticism scale. The latter is the psychometrical instrument employed in the present study to measure auditors' degree of professional skepticism.

270 "Whistleblowing" is a term which is figuratively used to refer to the act of alerting about malefactions, fraud, or misstated information. See *Brabeck* (1984): 42. For a thorough discussion and analysis of whistleblowing in the context of auditing, see *Alleyne/Hudaib/Pike* (2013).

271 See *Curtis/Taylor* (2009): 206-210; *Donnelly/Quirin/O'Bryan* (2003): 102-104; *O'Bryan/Quirin/Donnelly* (2005): 12; *Tsui/Gul* (1996): 46-48. Evidence that individuals exhibiting internal locus of control reason and behave more ethically has also been provided by *Trevino/Youngblood* (1990): 384 in a non-auditing context.

272 See *Bernardi* (1994): 77; *Nasution/Östermark* (2012): 173, 175.

273 See *Hyatt/Prawitt* (2001): 268; *Quadackers* (2009): 48.

274 In consistency with the relevant psychological and auditing research (see, e.g., *Bobek/Hageman/Radtke* (2013c): 5 and *Colby/Kohlberg* (1987): 23), the terms "ethical" and "moral" are used interchangeably throughout the present work. Stated in very general terms, "*[e]thics is the study of right and wrong conduct*", *Bollom* (1988): 55. The assessment of auditors' adherence to the principles and standards of ethics is based on laws, professional standards and codes of conduct which encompass professional ethics issues as well as general (universal) ethical values and conventions. See *Bollom* (1988): 56.

justice and fairness. Overall, moral development determines how a person resolves conflicts, ethical dilemmas, and problems in everyday life.[275]

The theoretical frame for the study of an individual's morality-related attitudes and behaviors is constituted by the multi-stage model of moral development initially developed by *Kohlberg* (1958). The model distinguishes between three levels of moral development: pre-conventional, conventional, and post-conventional.[276] Basically, the three distinct levels can be envisioned as involving different types of relationships between the self and societal norms and expectations. At the *pre-conventional* level, rules and expectations are externally imposed to the self. Moral reasoning and behavior at this level are guided by the consequent immediate costs (punishment) or benefits (self-interest) at issue. At the *conventional* level, an individual defines the self through relations to significant others and compliance with societal prescriptions, conventions, and standards. The striving for approval, establishment of stable relationships, and obeying of established societal norms are the driving forces behind moral reasoning and action at this level. At the *post-conventional* level, an individual views established values and norms as alterable if deviations rest on higher (more idealistic and universal) moral grounds (e.g., common wealth and ultimate justice). At this level, ethical reasoning and behavior are guided by individual principles of conscience and idealism rather than de facto norms.[277] Over the life time, people proceed upwardly along these levels, but not every individual reaches the highest dimensions of moral development. With progressive development, the differentiation in moral reasoning and complexity of the concerns and arguments considered increases.[278]

Previous research in psychology has demonstrated that moral development significantly determines an individual's ethical reasoning and behavior. Overall, subjects at higher levels of moral development have been found to exhibit more ethically-oriented judgments and integer behavior (e.g., *Brabeck* (1984), *Thoma, Rest and Barnett* (1986), *Trevino and Youngblood* (1990)).[279]

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[275] For similar claims as well as a discussion of the concept of morality and moral judgments, refer to *Rest* (1979): 18-20. Note that the psychological treatment of morality and ethics differs from the philosophical one, with the latter focusing on the development and postulation of moral and ethical standards, norms, and ideals, see *Ponemon* (1990): 193. For a concise summary of the ten most influential and central ethical philosophies, see *Hosmer* (1994): 21f. For an application and discussion of *Hosmer*'s framework in the context of auditing, see *Satava/Caldwell/Richards* (2006): 275-279.

[276] Note that each of these three levels of morality contains two stages, resulting in a total of six distinct stages of moral development and ethical cognition. The six individual stages are as follows: (1) the morality of obedience; (2) the morality of instrumental egoism (self-interest); (3) the morality of interpersonal concordance (agreement); (4) the morality of law and duty to the social order; (5) the morality of societal consensus; and (6) the morality of non-arbitrary social cooperation. For a detailed discussion of each individual stage of the six-stage-model of moral development, refer to *Rest* (1979): 22-39.

[277] See *Kohlberg* (1984): 44, 624-639; *Ponemon* (1990): 194; *Rest et al.* (1999): 41; *Schatzberg et al.* (2005): 243.

[278] An important feature of the Kohlberg model is that it focuses on the *process* of moral reasoning rather than the *outcome* of this act. See *Ponemon* (1990): 194f.

[279] See *Brabeck* (1984): 52; *Thoma/Rest/Barnett* (1986): 133-148; *Trevino/Youngblood* (1990): 384. For an excellent in-depth review of empirical research on moral development and ethical behavior, see *Craft* (2013).

In auditing, the importance of morality and ethics has long been recognized.[280] Given the multi-person and interactive nature of auditing and the variety of interest groups involved (the client, the audit profession, the audit firm, and the public), colliding goals, conflicting interests, ethical issues, and moral dilemmas appear bound to arise.[281] From a cognitive perspective, auditors' ethical and moral dispositions determine the way in which they handle conflicts (of interest) and dilemmas in professional practice.[282]

There is a multitude of auditing studies focusing on diverse behavioral manifestations of auditors' moral dispositions, including the identification of an ethical dilemma (e.g., *Cohen, Pant and Sharp* (2001), *Douglas, Davidson and Schwartz* (2001), *Patterson* (2001), *Ponemon* (1993)), the formation of ethical judgments (e.g., *Ponemon* (1990), *Thorne* (2000), *Thorne, Massey and Magnan* (2003)), and the selection of ethical behaviors (e.g., *Falk et al.* (1999), *Ponemon* (1992a)).[283] Overall, the existing auditing research has predominantly documented a positive association between auditors' level of moral development and their propensity to moral judgments and behaviors in situations of ethical conflict. Auditors' ethical dispositions and moral development are further discussed and underpinned with empirical results in Section 4.3.2.2.2 within the consideration of the determinants of professional skepticism in auditing.

2.4.2.3.8 Culture

A further person-related factor identified to play an important role in auditing concerns the cultural background of the individual auditor. Overall, culture[284] has been broadly recognized to influence the personal and interpersonal values, ethical norms and attitudes in different nations, and hence to impact on auditors' mindsets, perceptions, judgments, and behaviors.[285]

Research dealing with the cultural aspects of human behavior builds on *Hofstede's* (1980, 2001) theory, according to which variations in individuals' attitudes across different cultures and nations can be attributed to the following five dimensions: power distance, uncertainty

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[280] A clear indication for the profound importance of ethics in auditing is the fact that in their famous work on the philosophy of auditing, *Mautz and Sharaf* (1961) dedicated an entire Chapter (Chapter 9) to this topic. See *Mautz/Sharaf* (1961): 280-289.

[281] Indeed, ethical dilemmas and moral conflicts are viewed as inherent to the nature of auditing, see, e.g., *Shaub/Finn/Munter* (1993): 146. As succinctly put by *Westra* (1986): 119, when thinking about ethics in auditing, one feels reminded of *Goldini's* comedy "Servo di due padroni" – serving two demanding masters, the client who hires and fires the auditor and the public to whom he/she is primarily responsible.

[282] See *Ponemon/Gabhart* (1994): 101f.

[283] For an overview of the main findings of these and a number of other relevant studies as well as an excellent in-depth discussion of empirical research on auditors' ethical reasoning, see *Jones/Massey/Thorne* (2003).

[284] Culture is yet another central but ambiguous and elusive concept in the social sciences. See *Patel/Psaros* (2000): 316. In this work, the definition by *Hofstede* (2001): 9f. is adopted according to which culture relates to "*the collective programming of the mind that distinguishes the members of one group or category of people from another*" and "*is to human collectivity what personality is to an individual.*" Accordingly, culture is a multifaceted concept which includes "*a whole range of components: knowledge, values, preferences, habits and customs, traditional practices and behavior, implements and artefacts*", *Child* (1981): 323.

[285] For a plethora of references in support of this notion, see *Cohen/Pant/Sharp* (1995): 38, *Jeffrey/Dilla/Weatherholt* (2004): 554 and *Patel/Harrison/McKinnon* (2002): 3.

avoidance, individualism versus collectivism, masculinity versus femininity, and long- versus short-term orientation. *Power distance* concerns dealing with issues of inequality in a society. High power distance countries (e.g., the Asian countries) exhibit a high acceptance for inequality, social stratification, and authoritative hierarchies. In contrast, low power distance countries (e.g., the Western countries) emphasize egalitarianism. *Uncertainty avoidance* relates to the extent of tolerance for ambiguity in a society. High uncertainty avoidance cultures (e.g., Japan) strive for standards and structure to cope with uncertainty, while low uncertainty avoidance countries (e.g., England) tolerate risk-taking to a greater extent. The *individualism* versus *collectivism* dimension reflects whether the focus within a nation is fixed on the self, individual development, autonomy, and internalization of ethical values (individualistic cultures, e.g., the USA, North Europe), or on group affiliation and cohesion, fitting in with social context, and values derived from the desire to "maintain face" (collectivistic cultures, e.g., Asia, Africa, Latin America). The *masculinity* versus *femininity* dimension concerns whether societal values point toward success and performance (masculine cultures, e.g., West Europe, Japan) or toward life quality, supportiveness, and relationships (feminine cultures, e.g., Portugal, Spain, Scandinavia). Finally, *long*- versus *short-term orientation* relates to the horizon of thinking and planning, with long-tern orientation cultures (e.g., Japan) focusing on the future, sustainability, and foresight, while short-term orientation cultures (e.g., Russia) rather focus on the present and immediateness of results.[286]

These cultural dimensions are also relevant to auditing.[287] Above all, the dimension of individualism versus collectivism is of particular importance, as it reflects culturally established values and philosophies and is thus strongly morally nuanced.[288] Individualism is fundamental to auditing as it underlies the cornerstone concepts of independence and objectivity.[289] Individualistic cultural values (typical for the Western countries) positively relate to auditors' autonomy, self-reliance in judgment formation, assertiveness, and propensity to scrutinize management assertions.[290] Related to this notion, and also involving ethical undertones, is the issue of power distance. In particular, low power distance (again, characteristic for the Western countries) is found to foster the application of high moral and ethical standards even in light of considerable pressure from the client.[291] Hence, individualism and low power distance are cultural attributes that generally involve high autonomy, self-determination, and morality.

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[286] For a general discussion of these dimensions, see *Hofstede* (2001): 79-84, 145-148, 209-214, 279-284, 351-355 and *Perera* (1989): 44-46. For a critical consideration of Hofstede's theory of cultural value dimensions and for a proposition of an alternative approach based on implicit theory of causality to explain cognitively conditioned cultural differences in ethical reasoning and moral judgment, see *Wong-On-Wing/Lui* (2013): 15-20.

[287] For an in-depth discussion of the role of culture in auditing with an emphasis of cross-cultural aspects likely to lead to inconsistent application of ISA requirements, refer to *Cowperthwaite* (2010).

[288] See *Cohen/Pant/Sharp* (1992): 691; *Hofstede* (1980): 213.

[289] See *Cohen/Pant/Sharp* (1992): 692; *Jeffrey/Dilla/Weatherholt* (2004): 559; *Patel/Psaros* (2000): 319. The concepts of independence and objectivity are touched upon in Section 4.

[290] See *Hughes et al.* (2009): 32; *Sim* (2010): 56.

[291] See *Cohen/Pant/Sharp* (1993): 8; *Tsui* (1996): 129.

In contrast, in collectivistic cultures where harmony, avoidance of confrontation, consensus, group cohesion, and respect for authorities are highly treasured values (typically the Asian countries), autonomy, self-determination, a questioning mindset, and willingness to challenge client claims and integrity may be a culturally uneasy issue.[292] Similarly, in high power distance cultures (again, typically the Asian countries), auditors may face difficulties to adopt universal ethical standards, maintain an independent mindset, and withstand pressures from authoritative and powerful clients or superiors.[293]

While the auditing literature has primarily focused on the cultural dimensions of individualism versus collectivism and power distance, the dimensions of uncertainty avoidance and long- versus short-term orientation appear not less relevant in the context of judgment and decision making in auditing. Specifically, it can be argued that in high uncertainty avoidance cultures, auditors will exhibit less tolerance for ambiguity and will generally require and search for more information on which to found their judgments than will be the case in low uncertainty avoidance cultures where subjects are expected to display high tolerance for ambiguity and to make more premature and facile judgments.[294] In addition, in long-term orientation cultures, auditors are expected to consider the long-term consequences of their behavior, thus making more conservative judgments and decisions than individuals from short-term orientation cultures. Generally, under a short-term perspective, auditors are more likely to concede to client preferences, thereby increasing the immediate benefits (e.g., client and fee retention) but disregarding the long-term consequences (e.g., litigation and reputation loss) of their behavior.

Finally, as to the last cultural dimension, masculine cultures have been argued to tolerate gender-based inequality in the workplace as well as auditors' aggressive, ethically questionable behavior (e.g., low balling[295]), particularly if it promises success. Feminine cultures, in contrast, value equality between the genders and are less tolerant of aggressive competitive strategies.[296]

The existing auditing research reports cross-cultural differences which generally corroborate the theoretical contentions outlined above in a number of different contexts, including ethical reasoning and perceptions (e.g., *Arnold et al.* (2007), *Tsui* (1996), *Tsui and Windsor* (2001)), disclosure judgments (e.g., *Tsakumis* (2007)), risk assessments (e.g., *O'Donnell and Prather-Kinsey* (2010)), whistle-blowing (e.g., *Patel* (2003)), and compliance with professional stand-

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[292] See *Bik* (2010): 111; *Cohen/Pant/Sharp* (1992): 696; *Endrawes/Monroe* (2012): 9-11; *McKinnon* (1984): 21-23; *Yamamura et al.* (1996): 349f.

[293] See *Cohen/Pant/Sharp* (1993): 8; *McKinnon* (1984): 21-23; *Patel/Harrison/McKinnon* (2002): 11f.

[294] See *Cowperthwaite* (2010): 182. For a general discussion of the tolerance for ambiguity construct and a review of the relevant auditing research on this topic, see Section 2.4.2.3.5.

[295] "Low balling" is a term coined by *DeAngelo* (1981a) to refer to the practice of offering audit services below total costs in the initial engagement period with the prospect of earning fee premiums (the so-called quasi-rents) in future periods. This practice can be viewed as resulting from the severe competition among audit firms for obtaining new clients. See *DeAngelo* (1981a): 113-115. Low balling is also touched upon in Section 4.3.2.3.2.1 within the consideration of factors potentially inhibiting auditors' professional skepticism.

[296] See *Cohen/Pant/Sharp* (1992): 697.

ards (e.g., *Abdolmohammadi and Sarens* (2011)).[297] Only very few studies (e.g., *Ho and Chang* (1994), *Hughes et al.* (2009)) fail to report culture-related differences in auditors' responses.[298] It is important to note, however, that culture-related research has a very serious drawback which needs to be taken into account when interpreting the results of this research: Essentially, culture is a compound of multiple different constructs, so that studies using culture as the (unidimensional) construct of interest potentially examine the influence of a number of completely confounded constructs and omitted variables.[299] The role of culture will be elaborated and underpinned with empirical results in Section 4.3.2.2.5 in the context of the discussion of the key personal factors influencing auditors' professional skepticism.

2.4.2.3.9 Gender

The final person-related behavioral determinant discussed herein is gender. In general terms, gender relates to an individual's femininity or masculinity.[300] Overall, a number of cognitive, attitudinal, and emotional differences have been recognized to exist between the genders. Specifically, men have been found to possess greater problem-solving, reasoning, and spatial cognitive abilities, whereas women possess greater verbal abilities and exhibit a more rapid access and retrieval of information.[301] In addition, women are tendentially more susceptible to both positive and negative affect, less (over)confident, and more risk averse than men. These gender-related differences have the potential to influence judgment quality.[302]

Prior research on gender effects in accounting and auditing generally indicates that female subjects exhibit higher ethical standards and moral development[303] (e.g., *Ameen, Guffey and McMillan* (1996), *Bernardi and Arnold* (2004), *Eynon et al.* (1996), *McManus and Subramaniam* (2009), *Shaub* (1994), *Sweeney and Roberts* (1997)), more comprehensive and profound information processing in complex judgment domains (e.g., *Chung and Monroe* (2001)), greater attendance to disconfirming evidence (e.g., *Chung and Monroe* (1998)), and

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297 See *Abdolmohammadi/Sarens* (2011): 384; *Arnold et al.* (2007): 335; *O'Donnell/Prather-Kinsey* (2010): 560f.; *Patel* (2003): 89; *Tsakumis* (2007): 43f.; *Tsui* (1996): 129; *Tsui/Windsor* (2001): 148.

298 See *Ho/Chang* (1994): 196, 203; *Hughes et al.* (2009): 40.

299 See *Bonner* (2008): 104, 106.

300 Note that gender is a socially founded category, and as such it is alterable in nature. In comparison, sex is a biologically founded (and generally definite) attribute. For such arguments as well as for a discussion of the biologically and environmentally conditioned differences between the genders, see *Breesch/Branson* (2009): 79-82. In the relevant psychological and auditing literature, a subject's sex is usually used as a measure of his/her gender. The implicit assumption underlying this procedure is that all men (women) are necessarily of male (female) gender. See *Bonner* (2008): 103. This assumption has also been adopted in the present work.

301 See *Halpern* (2013): 153f. For a broad discussion of gender-related differences in human cognition, refer to *Caplan et al.* (1997).

302 For such claims and a number of relevant references along these lines, see *Bonner* (2008): 104. In addition, men and women are typically found to differ in their social attitudes. For a discussion of gender differences in social behavior, refer to *Canary/Emmers-Sommer/Faulkner* (1997) and *Eagly* (1987).

303 For contrary evidence suggesting that male auditors exhibit higher ethical attitudes than female auditors, see *Marques/Azevedo-Pereira* (2009): 236. In addition, there are also numerous studies that do not identify a significant gender-related difference in auditors' ethical judgments and decisions. See, e.g., *Akers/Eaton* (2003): 87; *Ballantine/McCourt* (2011): 196; *Ponemon* (1990): 205f.; *Radtke* (2000): 306f.; *Stanga/Turpen* (1991): 746.

stronger risk aversion and conservatism in their judgments (e.g., *Gold, Hunton and Gomaa* (2009), *Hardies, Breesch and Branson* (2014)) as compared with male subjects.[304] Gender-related differences are further discussed in the context of auditors' professional skepticism (Section 4.3.2.2.6).

Overall, the preceding review highlights the theoretical and practical importance of personal characteristics as central determinants of auditors' judgment and behavior. In summary, auditor judgment is the results of a multitude of both automatic and elaborative cognitive processes which are influenced by the individual and interaction effects of task-specific, environmental, and personal factors.

Building on this broad theoretical foundation, the following section sheds light on a specific type of cognitive activity essential to auditing – the process of belief revision – as well as on the susceptibility of this cognitive activity to the pervasive influence of information order effects.

[304] See *Ameen/Guffey/McMillan* (1996): 595f.; *Bernardi/Arnold* (2004): 362; *Chung/Monroe* (1998): 276; *Chung/Monroe* (2001): 123; *Eynon et al.* (1996): 487; *Gold/Hunton/Gomaa* (2009): 3; *Hardies/Breesch/Branson* (2014): 28; *McManus/Subramaniam* (2009): 638; *Reheul et al.* (2013): 1, 6f.; *Shaub* (1994): 14; *Sweeney/Roberts* (1997): 345; *Weeks et al.* (1999): 307, 310.

3 Belief Revision and Information Order Effects

3.1 General Remarks

In a broad psychological sense, belief can be described as "*the mental state or function of cognizing reality*."[305] Belief has been acknowledged as a crucial and omnipresent component of human (intellectual) life. According to *Russell* (1921), believing is "*the most 'mental' thing*" people do and the exploration of the nature of belief is the focal point in the analysis of the human mind.[306] In a similar vein, *Hume* (1748) posits that a life without beliefs is impossible and that holding and updating beliefs is an inevitable part of human nature.[307]

As with all central notions and terms in the social sciences, there exists no universally accepted definition of the term "belief". Indeed, the word "belief" has been used in a quite heterogeneous, differently nuanced manner in both ordinary usage and the existing literature.[308] The multifacetedness and variety of meanings and nuances attached to the term "belief" is depicted in Figure 3 below.[309]

[305] *James* (1890): 198.

[306] See *Russell* (1921): 231.

[307] See *Hume* (1748), quoted in *Lammenranta* (2008): 29. The fundamentality of belief is further reflected in the fact that belief (or lack thereof) has been a central category and a subject of philosophical inquiry and reflection ever since the antiquity. See *Carnota/Rodrigues* (2010): 1.

[308] See *Parret* (1983): 1. Note that there exist two major scientific views on belief: the epistemological (philosophical) and the psychological view. The former uses the term "belief" in a more restrictive manner in the context of the impossibility of knowing and being certain about the reality of facts or the external world. The psychological view is wider in scope and does not consider belief and knowledge or certainty as mutually exclusive categories. Rather, beliefs represent the personal degree of conviction regarding a particular issue, with certainty representing the upper limit of an individual's belief. See *Ward* (1933): 347. For a discussion of the basic philosophical conceptions of belief, see *Villoro* (1998): 19-40.

[309] Note that this figure is philosophically founded, and it is not meant to be exhaustive. Its inclusion merely aims to demonstrate the variety and complexity of the concept of belief.

K. Yankova, *The Influence of Information Order Effects and Trait Professional Skepticism on Auditors' Belief Revisions,* Auditing and Accounting Studies,
DOI 10.1007/978-3-658-08871-2_3, © Springer Fachmedien Wiesbaden 2015

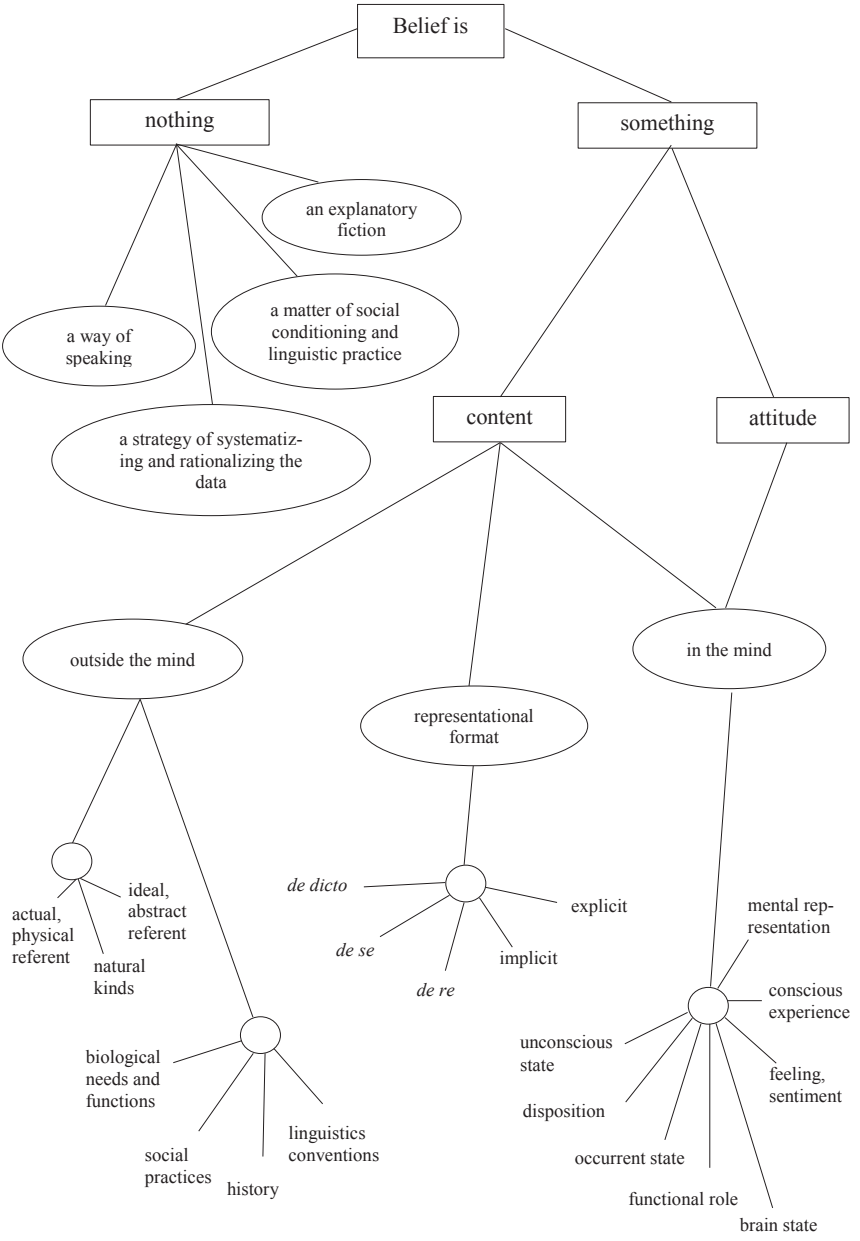

Figure 3: Systematization of Belief (Source: *Bogdan* (1986): 5)

Beliefs can be generally conceived as notions that people rely on and which serve as the basis for judgment and inference.[310] In the auditing literature, beliefs have been defined as "*states of mind about facts that can be uncertain and vary in regard to justifiability.*"[311] According to this definition, all audit expectations and assertions are genuinely beliefs.[312]

It has long been recognized that beliefs are cognitive constructs which are not fully entertained in consciousness.[313] Indeed, people often find themselves believing without even realizing how or why.[314] That is, people do not deliberately and consciously set (and adapt) their beliefs. Rather, one's beliefs are determined by complex psychological processes operating outside of full conscious awareness.[315]

Basically, the process of belief can be decomposed into the cognitive operations of *mental representation* and *assessment* of information. These operations are processed in different domains of the mind: while mental representation involves the automatic and effortless comprehension of ideas, objects, and the surrounding world (System 1 processing), the assessment of information in order to accept or reject an idea is effortful, active, and controlled (System 2 processing).[316] Generally, both belief sub-processes are susceptible to bias due to inherent cognitive capacity boundaries and information processing limitations. In particular, at the mental representation stage, bias can arise as a result of selective attention, disregarding of fundamental environmental stimuli, neglecting interactions among stimuli and/or flawed pooling of stimuli. At the assessment stage, bias can emerge as a result of anchoring on and reinforcing the potentially flawed mental representations. Even in the case of unbiased System 1 input, incremental biases can arise at this stage as a result of the utilization of mental shortcuts in evidence processing as a means of relieving cognitive strain and coping with complexity.[317] The interplay between System 1 and System 2 in the context of information order effects in belief updating will be elaborated in Section 3.2.3.

Bayes' theorem, the dominant *normative* model for evidential reasoning and belief updating in light of new information, posits that a person's final opinion is determined by the diagnosticity of evidence, not the order in which information is presented and processed.[318] In par-

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[310] See *Villoro* (1998): 34; *Williams* (2008): 91. It is instructive to note that the terms "belief" and "judgment" have frequently been used interchangeably in the relevant philosophical, psychological, and auditing literature. The reasonableness of this approach is best reflected in the following statement by *Stout* (1896): 97: "*Judgment is the Yes-No consciousness ; under it I include every mode and degree of affirmation and denial (...). I use the term Belief as a convenient variant for Judgment.*"

[311] *Bell/Peecher/Solomon* (2005): 21f., italics in original.

[312] See *Bell/Peecher/Solomon* (2005): 22.

[313] See *Hume* (1748), quoted in *Lammenranta* (2008): 29; *Quine/Ullian* (1978): 9f.; *Zalabardo* (2012): 1.

[314] See *James* (1912): 21.

[315] See *Meidan* (2004): 8.

[316] See *Gilbert* (1991): 107f. Note that this conceptualization of the process of belief is attributed to the famous French philosopher *René Descartes* (1596-1650), who partitioned the human mind into relatively passive (automatic) and active (controlled) domains. See *Gilbert* (1991): 108.

[317] For similar claims, see *Lagnado* (2011): 203. Note, however, that he discusses the cognitive operations of mental representation and assessment in a more general context and does not employ a dual-process view.

[318] See *Asare/Messier* (1991): 75; *Hogarth/Einhorn* (1992): 19; *Pennington/Hastie* (1986): 242. For a formal consideration of Bayes' theorem in the context of belief updating, see *Melnick/Everitt* (2008): 107-111. Note

ticular, in the case of a sequence of two pieces of evidence (X and Y), Bayes' theorem yields the following result regarding the probability of a hypothesis (H): $P(H \mid X \cap Y) = P(H \mid Y \cap X)$. With other words, the Bayesian approach does not differentiate between variable information orders.[319] However, comprehensive empirical evidence has shown that human information processing in real-world settings often diverges from the predictions of the Bayesian model.[320] The major reasons for this divergence are twofold: First, Bayesian inference requires the utilization of conditional probabilities and the application of sophisticated mathematical calculations. These criteria appear to considerably exceed human cognitive capacity and computational capability. Second, Bayes' theorem does not account for characteristics of the task such as complexity, response mode, or the order of information presentation, all which appear to be relevant to human belief revision.[321] A more *descriptive* approach to belief updating has been suggested by *Hogarth and Einhorn* (1992) in their belief-adjustment model which is presented and discussed in the subsequent section.[322]

3.2 The Belief-Adjustment Model

3.2.1 Foundations

Belief updating is an omnipresent and crucial aspect of human judgment and decision making.[323] The passage from one belief to another in light of new evidence reflects human ability to adapt to changing informational conditions. Thus, belief updating can be characterized as a constitutive activity of intelligence.[324]

A principle characteristic of the process of belief adjustment is its sequential nature. As aptly put by *Anderson* (1981), "*[i]n everyday life, information integration is a sequential process. Information is received a piece at a time and integrated into a continuously evolving impres-*

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that the Bayesian approach has found a broad application in auditing research on evidence evaluation and integration. Bayesian statistics was used in a number of older studies (e.g., *Abdolmohammadi* (1985, 1986, 1987), *Birnberg* (1964), *Corless* (1972), *Crosby* (1981), *Felix* (1974), *Kinney* (1975), *Knoblett* (1970), *Scott* (1973)) but also in some recent publications (e.g., *Kochetova-Kozloski/Messier/Eilifsen* (2011), *Laws/O'Hagan* (2002), *Meeden/Sargent* (2007), *Srivastava/Mock/Turner* (2009), *Stewart/Kinney* (2013)).

319 See *Trueblood/Busemeyer* (2010): 1166. For a more detailed formal consideration of the inability of normative probability theory and Bayesian inference to consider information order effects, see *Trueblood/Busemeyer* (2011): 1522.

320 See, e.g., *Holt/Smith* (2009): 125; *Lagnado* (2011): 219; *Lipe* (2008): 277f. For a comprehensive summary of studies on information order effects which discredit the descriptive validity of the Bayesian model, consult *Hogarth/Einhorn* (1992): 42-47.

321 See *Kahle/Pinsker/Pennington* (2005): 4; *Lagnado* (2011): 196.

322 For a more detailed discussion of the basic differences between the Bayesian approach and the *Hogarth and Einhorn* (1992) model, see *Krishnamoorthy/Mock/Washington* (1999): 110. They indicate that in contrast to normative (Bayesian) belief revision, the belief-adjustment model: (1) predicts that the order of information presentation and processing affects belief updating; (2) accounts for the individual sensitivity to evidence; (3) comprises an anchoring-and-adjustment mechanism which implies that the degree of belief adjustment is conditional on the prior belief; and (4) allows non-additivity in belief updating (i.e., change in the degree of support for a particular hypothesis without influencing support for its complement).

323 See *Hogarth/Einhorn* (1992): 2f.

324 See *Payne/Bettman/Johnson* (1993): 1; *Rott/Williams* (2001): 1.

sion. Each such impression (...) grows and changes over the course of time. At any point in time, therefore, the current impression looks both forward and back."[325]

Building on this notion as well as on the extensive psychological literature reviews on human information processing and inference by *Anderson* (1981), *Nisbett and Ross* (1980), and *Slovic and Lichtenstein* (1971), *Hogarth and Einhorn* (1992) synthesized and united the insights of sixty relevant studies in their descriptive model of belief adjustment.[326] The model explicitly accounts for task characteristics, evidential features, and cognitive mechanisms which remain neglected in normative theory of belief revision. Subsequently, the foundational components of the belief-adjustment model are outlined.

3.2.1.1 Task Characteristics

Hogarth and Einhorn (1992) recognize that task characteristics affect the manner in which people process and evaluate information in arriving at updated beliefs. The authors identify the following three basic task features particularly relevant to the process of belief revision: complexity, length of series, and response mode.

Hogarth and Einhorn (1992) posit that *task complexity* influences the cognitive strategies adopted in information processing and belief adjustment. In particular, as complexity grows, individuals are more likely to revert to heuristic processing in order to keep the task manageable and promote cognitive economy.[327] The authors conceptualize complexity as an increasing function of information load and lack of task familiarity. This view accounts for the normatively neglected inherent limitations in human information processing capacities and for the beneficial influence of expertise in the context of processing large amounts of information. Basically, complexity is assumed if voluminous information sets consisting of several hundreds of words *or* unfamiliar stimuli are involved.[328]

The second task variable discussed by *Hogarth and Einhorn* (1992), *length of series*, relates to the number of information items to be processed in belief updating. With a growing number of cues and information accumulation, fatigue is expected to incur, and beliefs are likely to become less influenced by new evidence (i.e., beliefs are expectedly primed toward the initially processed items). As a benchmark, *Hogarth and Einhorn* (1992) consider a series

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[325] *Anderson* (1981): 144.

[326] For a synopsis of the sixty psychological studies used as the basis for the derivation of the belief-adjustment model, refer to *Hogarth/Einhorn* (1992): 42-47. Note that beyond psychology, systematic research in human belief revision emerged in the late 1970s in several other disciplines, including philosophy, logic, computer science, and artificial intelligence. Influential non-psychological research works on belief revision include *Alchourrón/Gärdenfors/Makinson* (1985) (AGM Model), *Harper* (1976), *Levi* (1977), and *Levi* (1991). See *Rott/Williams* (2001): 1. For a concise review of interdisciplinary belief-revision research, see *Rott* (2008): 514-530.

[327] See *Payne* (1982): 386.

[328] See *Hogarth/Einhorn* (1992): 4-6. Note that there is a multitude of alternative ways to conceptualize complexity. For instance, *Abdolmohammadi/Wright* (1987): 3-5 view complexity as a function of task structure, with ill-structured tasks being more complex and demanding than well-structured tasks. *Payne* (1982): 386, on the other hand, views complexity as depending on the number of alternatives in the choice scenario, the dimensions of information, and time pressure.

consisting of between two and twelve cues as short and a series of above 17 cues as long.[329] As to the interrelation between complexity and length of series, it should be noted that a short series of items does not necessarily imply simplicity, as the latter depends on information load and/or familiarity with the task rather than solely on the number of cues. As a rule of thumb, a long series of information cues automatically implies complexity. In the case of a short series of cues, a supplemental consideration of information load and task familiarity is necessary in order to infer complexity. If a short series of items is heavily loaded, i.e., full of detail, and/or unfamiliar to the information processor, complexity is theorized to emerge. Otherwise, a short series involves simplicity.[330]

Response mode, the third and last task variable addressed by *Hogarth and Einhorn* (1992), relates to the manner in which beliefs and judgments are evoked. The researchers differentiate between the following two types of response mode: Step-by-Step (SbS) and End-of-Sequence (EoS). In the SbS mode, subjects disclose their beliefs after processing each evidence item in a particular sequence. In comparison, in the EoS mode, participants only reveal their beliefs after obtaining and processing all available information.[331]

3.2.1.2 Evidence Characteristics

The evidence characteristics relevant to belief updating involve direction, strength, type, and presentation order. These features are briefly considered below.[332]

The characteristic of evidence *direction* relates to the sign of evidence encountered in the course of belief revision. It can be distinguished between positive evidence, which typically induces an increase in belief in a certain hypothesis, and negative evidence, which normally leads to a decrease in belief in a hypothesis.[333]

A further evidential characteristic relevant to the process of belief revision concerns the *strength* of evidence, i.e., the degree of impact of a piece of evidence on an individual's beliefs. *Hogarth and Einhorn* (1992) distinguish between strong and weak evidence. Although

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329 See *Hogarth/Einhorn* (1992): 4, 6.

330 See *Kahle/Pinsker/Pennington* (2005): 5.

331 See *Hogarth/Einhorn* (1992): 4f.

332 The brevity of consideration is due to the somewhat trivial nature of these characteristics. In addition, the first three factors (direction, strength, and type) are also reflected in Bayesian inference, and thus do not represent an incremental contribution of the belief-adjustment model. See *Ashton/Ashton* (1988): 625.

333 See *Hogarth/Einhorn* (1992): 9. Note that this interpretation of evidence direction applies to evaluation type tasks which, as will be demonstrated subsequently, are theorized to prevail in auditing. Furthermore, it is instructive to note that *Hogarth/Einhorn* (1992) use the pairs of terms "positive"-"confirming" and "negative"-"disconfirming" interchangeably. In the context of their study, this intuitive procedure is appropriate because the authors always use the aforementioned terms in relation to the hypothesis under consideration. In the auditing literature, however, such a consistency and precision in use are lacking. This makes a distinction between the terms "positive" and "confirming" as well as "negative" and "disconfirming" necessary. Specifically, in auditing, *positive* evidence relates to information hinting at advantageous characteristics of a client or the client's financial statements. In contrast, *negative* evidence suggests adverse features. Importantly, either type of evidence can be *confirming* or *disconfirming* contingent on the direction of the hypothesis under consideration. See *Abou-Seada/Abdel-Kader* (2003): 13.

the authors do not provide explicit classification guidelines, the illustrative examples that they use suggest that strong evidence has an above-average influence on beliefs, while weak evidence affects one's position only modestly (below-average).[334]

By *type* of evidence, *Hogarth and Einhorn* (1992) refer to the composition of a set of evidence items. There are two alternative types of evidence: consistent evidence, i.e., an entirely positive or entirely negative set of evidence items, and mixed evidence, i.e., an evidence set consisting of both positive and negative items.[335] With regard to auditing, the obtainment of purely consistent evidential cues is rather exceptional. With other words, auditors typically encounter mixed and ambiguous information in the course of the audit. This notion is also manifested in the predominant use of experimental settings involving inconsistent information in auditing research.[336]

Finally, *Hogarth and Einhorn* (1992) take into account the evidential characteristic of *presentation order*. They distinguish between the following theoretical orders of evidence presentation: weak-strong versus strong-weak (used especially in the case of consistent evidence) and positive-negative versus negative-positive (used in the case of mixed evidence).[337] The latter sort of varying information order has been predominantly used in auditing research.

3.2.1.3 Cognitive Mechanisms

In addition to the task and evidence characteristics outlined above, the process of belief updating is influenced by three central cognitive mechanisms: encoding, processing, and adjustment. A consideration of the major aspects relating to these mechanisms is provided subsequently.

By *encoding*, *Hogarth and Einhorn* (1992) refer to the notion that information is evaluated against a reference point before beliefs are adjusted. Building on this insight, the researchers differentiate between evaluation and estimation modes. In the *evaluation* mode, evidence is viewed as bipolar (positive or negative) vis-à-vis a particular hypothesis regardless of the degree of current belief in the hypothesis. Thus, evidence encoded as confirming the hypothesis naturally leads to an increase in beliefs in the hypothesis, whereas information encoded as disconfirming results in a decrease in beliefs. In comparison, in the *estimation* mode, evidence is viewed as unipolar and is evaluated relative to the current position (degree of belief). Thus, the direction of belief revision depends on the relative position of the new information compared to the present belief. Overall, the evaluation mode involves information processing in an *additive* manner, whereas the estimation mode involves information processing in an *averaging* manner.[338]

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[334] See *Hogarth/Einhorn* (1992): 10.

[335] See *Hogarth/Einhorn* (1992): 16.

[336] For a review of the relevant empirical literature on auditors' belief updating, see Section 3.4.

[337] See *Hogarth/Einhorn* (1992): 21f.

[338] See *Hogarth/Einhorn* (1992): 9f. These contentions imply that the evaluation mode involves a constant reference point, i.e., the hypothesis under consideration, while the estimation mode entails a "moving" refer-

To illustrate the different implications of both modes in the context of auditing, consider the going concern task where auditors evaluate the appropriateness of the going concern assessment made by the entity's management. Auditors' current belief in the adequacy of the going concern assumption can be conceptualized as a value on the continuum between "false" (= 0) and "true" (= 1). In an evaluation mode scenario, evidence indicating the viability of the firm (positive information) will increase auditors' belief in the appropriateness of the going concern assumption, whereas evidence indicating entity's financial and liquidity problems (negative information) will decrease this belief irrespective of auditors' current opinion or evidence strength. In contrast, if an estimation mode is assumed, the direction of belief updating will depend on the relative position of new evidence to the current belief of the auditor. Hence, evidence indicating the viability of the firm only leads to an upward belief revision if it is to be located beyond the present state of belief. Otherwise, if the evidence is not strong enough to "outrage" current beliefs, it will lead to a downward belief adjustment regarding the appropriateness of the going concern assumption. To make this difference clearer, assume that the auditor begins with a neutral position (0.5) and obtains two pieces of evidence in support of the going concern assumption. These cues differ in strength and have values of, say, +0.7 and +0.3 if measured on the bipolar evaluation scale, and 0.9 and 0.6 if assessed on the unipolar estimation scale. Now consider the following alternative information processing orders: weak-strong and strong-weak. In the evaluation mode, both pieces of evidence will induce incremental upward belief adjustments irrespective of information order and evidence strength because both items are encoded as positive in relation to the going concern assumption. In the estimation mode, in contrast, auditors' final position (degree of belief in the reasonableness of the going concern assumption) depends on the order of information processing. In particular, if weak evidence is processed prior to strong evidence both information items will trigger upward belief updates because $0.6 > 0.5$ and $0.9 > 0.55$ (the average of 0.6 and 0.5). With the opposite information order, however, different results emerge. Specifically, an upward belief revision will follow the processing of the strong evidence cue because $0.9 > 0.5$. The weak evidence supporting the going concern assumption, however, will lead to a decrease in belief in the firm's viability because $0.6 < 0.7$ (the average of 0.9 and 0.5). Accordingly, even though both modes involve an anchoring-and-adjustment mechanism, they yield different adaptation patterns and results.[339]

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ence point, i.e., the changing prior opinion. *Hogarth/Einhorn* (1992) conceptualize the reference point (R) in evaluation scenarios as equal to zero and in estimation scenarios as equal to the prior belief or anchor (S_{k-1}). This distinction is important for the model specification presented in the next section. Furthermore, it is instructive to note that *Hogarth/Einhorn's* (1992) proposition that people integrate evidence cues in either an additive or an averaging manner into a judgment is consistent with the general tenor of empirical research on cue aggregation. The overall finding of this research is that professionals and non-professionals likewise tend to use simpler linear organizing principles (addition or averaging) rather than complex non-linear configural or patterning strategies. See *Arkes/Hammond* (1986): 10.

[339] This comparison follows the generic example provided by *Hogarth/Einhorn* (1992): 9f. With regard to the conceptual measurement scales used in both modes to encode evidence, the authors state that in evaluation tasks, evidence assessment is captured on a bipolar scale (range: from -1 to +1), but the influence of this (subjective) evidence evaluation on the current degree of belief is measured on a unipolar scale (range: from 0 to 1). In contrast, estimation involves two distinct unipolar scales (range: from 0 to 1 each): one for (subjective) evidence evaluation and one for the impact of this evaluation on subjects' degree of belief. See

As the foregoing example illustrates, the evaluation mode appears to better reflect the evidence evaluation process in auditing where a new information item is typically assessed as corroborating or refuting an audit assertion prior to belief adjustment. With other words, auditing generally involves directional interpretation of evidence. This contention is further supported by the fact that belief revision research in auditing has (almost) exclusively focused on the evaluation mode.[340]

Processing is a further cognitive mechanism relevant to belief updating. *Hogarth and Einhorn* (1992) distinguish between *sequential* (SbS) and *simultaneous* (EoS) processing. A SbS processing involves incremental belief adjustments following each new piece of information. In comparison, an EoS processing involves a single belief adjustment based on the cumulative impact of the entire information set. Importantly, both processing modes involve different cognitive demands. Specifically, the simultaneous processing and aggregation of multiple information cues before integrating them with the anchor in the EoS process is a mentally demanding issue. It involves the storage of large amounts of successive information in memory as well as the simultaneous evaluation and integration of multiple stimuli within a single overall assessment. In contrast, the gradual integration of each information item in the SbS process involves far less cognitive strain and information processing load.[341]

As the analogue terminology reveals, *processing* modes are closely related to the *response* mode categories outlined in Section 3.2.1.1. However, the manner in which evidence is processed does not solely depend on the response mode required. Similarly to task complexity, inferences on the processing mode can only be made after considering the cognitive load of the task. Specifically, *Hogarth and Einhorn* (1992) posit that while a SbS response mode naturally invokes SbS processing, an EoS response mode can induce either EoS or SbS processing, depending on task complexity and the mental resource demands involved. Completing a task which requires an EoS response in a SbS processing manner involves making piecemeal belief adjustments but explicitly disclosing only the final position. This constellation is theorized to occur when the memory and information processing load associated with evidence aggregation exceeds the cognitive capacities of the decision maker. Hence, with

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Hogarth/Einhorn (1992): 11. However, the authors do not elaborate on the transformation of an evaluation scale onto an estimation scale. Hence, the values used in their example and also in the going concern analogy outlined above appear to have been arbitrarily chosen rather than derived based on some formula or specific calculations and transformations.

340 See *Asare/Messier* (1991): 78; *Bamber/Ramsay/Tubbs* (1997): 252; *Kahle/Pinsker/Pennington* (2005): 6; *Messier/Tubbs* (1994): 60. As a matter of fact, auditing has even been explicitly defined as an evaluation process. See, e.g., *Schandl* (1978): 4. The only study that has employed an estimation (audit planning) task in addition to an evaluation (internal control assessment) task is the one conducted by *Kerr/Ward* (1994). They provide strong support for *Hogarth/Einhorn's* (1992) supposition that in evaluation tasks, the current position does not influence the encoding of a new evidence item, whereas in estimation tasks, encoding is derived on the basis of the difference between the current position and the new piece of information. The corresponding evidence integration rules (additive for evaluation-type tasks and averaging for estimation-type tasks) have also been confirmed. See *Kerr/Ward* (1994): 38-40.

341 See *Hogarth/Einhorn* (1992): 12f.

increasing complexity and amount of information, a sequential (SbS) processing is more likely to be used regardless of the response mode required in order to ease cognitive strain.[342]

The last essential cognitive mechanism underlying belief updating is *adjustment*, i.e., the process by which adaptation to new information is carried out. Two aspects are particularly relevant in the context of adjustment: The first one concerns the notion that the magnitude of adjustment depends on the degree of prior belief (anchor) in a manner consistent with a *contrast effect*[343]. The latter implies that strongly held positions (i.e., large anchors) are affected ("hurt") to a greater extent than weaker ones by the same piece of negative evidence. Analogously, weak initial beliefs (i.e., small anchors) are affected ("revalued") to a greater extent than are strong ones by the same piece of positive evidence. With other words, the contrast assumption implies that for negative evidence, belief revisions are proportional and for positive evidence inversely proportional to the present position (anchor). With regard to mixed information stimuli (positive and negative cues), the contrast assumption implicates that evidence will trigger a greater belief revision when it contrasts, i.e., is opposite in sign to, prior evidence. The contrast assumption is fundamental to the belief-adjustment model. It is the primary source for the model's predictions.[344] Importantly, the contrast effect essentially operates beyond conscious awareness.[345]

The second important aspect regarding the cognitive mechanism of adjustment concerns its dependence on the individual sensitivity to both positive (β) and negative (α) evidence. *Hogarth and Einhorn* (1992) acknowledge that the individual attitude toward evidence may be determined by both individual variables (e.g., personal dispositions) and contextual factors (e.g., level of commitment due to investments in a particular belief). Importantly, the authors do not conceptualize the individual sensitivities toward negative and positive information as complementary categories, i.e., an individual can be sensitive to both types of information (positive and negative), and a high sensitivity to negative evidence does not imply an insensi-

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342 See *Hogarth/Einhorn* (1992): 12f.

343 In the social sciences, contrast effects in individual judgment have been long recognized and are a well-documented phenomenon (e.g., *Fernberger* (1920): 145f., 149f.; *Manis* (1967): 326, 330, 332; *Preston* (1936b): 401; *Simpson/Ostrom* (1976): 625, 628; *White* (1964): 231). Their emergence and impact on judgment can be generally explained as follows: Contrasting stimuli are more salient, attract more attention, require more effortful information processing, and are more slowly and deeply encoded, which leads to impressions biased in the direction of the discrepant stimuli. See *Belmore* (1987): 481; *Maurer/Alexander* (1991): 3f., 7; *Messier/Tubbs* (1994): 59; *Preston* (1936a): 630.

344 See *Hogarth/Einhorn* (1992): 26, 38; *Messier/Tubbs* (1994): 59; *Pei/Reckers/Wyndelts* (1990): 123. In this context, it is worth noting that the pre-publication versions of the belief-adjustment model were labeled "contrast/surprise model" (see *Einhorn/Hogarth* (1985)) and "contrast-inertia model" (see *Einhorn/Hogarth* (1987)). In both cases, the contrast effect underlying the process of belief adjustment stands in the foreground. In addition, it should be noted that research on the belief-adjustment model which has been published prior to 1992 has actually employed the older versions of *Hogarth/Einhorn's* (1992) model. Despite some differences in terminology and variable labeling, the final model and the two preliminary versions are qualitatively similar and yield analogue order-effect predictions. For such claims, see also *Pei/Reckers/Wyndelts* (1992): 177.

345 See *Fernberger* (1920): 145f.

tivity to positive information and vice versa.[346] According to this conceptualization, the following categories of individual attitudes toward evidence can be outlined (Figure 4):[347]

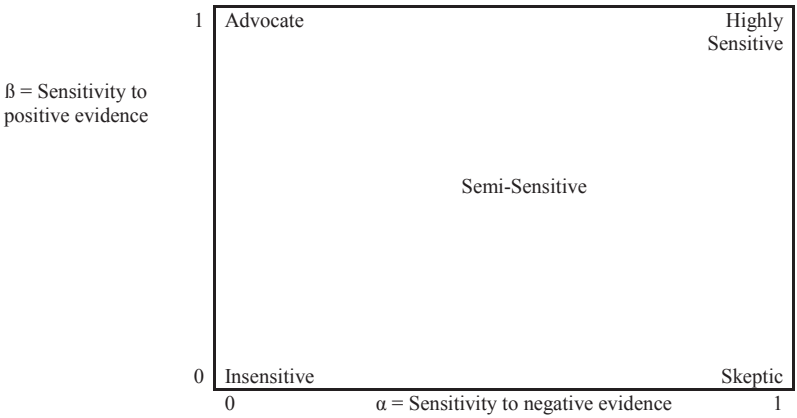

Figure 4: Systematization of Attitudes toward Evidence (Source: *Hogarth/Einhorn* (1992): 41)

The consideration of an individual's sensitivity to evidence is a fundamental distinguishing aspect of the belief-adjustment model. Of particular theoretical relevance to the present work is the conceptualization of skepticism as involving an extreme sensitivity to negative evidence, combined with an insensitivity to positive evidence ($\alpha = 1$, $\beta = 0$).[348] The opposite of skepticism according to *Hogarth and Einhorn* (1992) is advocacy, i.e., the tendency to strongly attend to positive information while ignoring negative evidence ($\alpha = 0$, $\beta = 1$). The other two extreme positions involve an attitude of complete insensitivity to evidence ($\alpha = 0$, $\beta = 0$) as well as an attitude of extreme sensitivity to evidence ($\alpha = 1$, $\beta = 1$).[349] Whether and to what extent do people exhibit such extreme attitudes toward evidence in the real world, is a largely open empirical question.[350] However, it is conceivable that in the real world, the adjustment to new information is determined by less extreme evidence-related tendencies.

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[346] See *Hogarth/Einhorn* (1992): 14f., 20.

[347] See *Hogarth/Einhorn* (1992): 40f. Note that in a recent study, *Bobek/Hageman/Radtke* (2013a) test whether advocacy as measured by the Modified Client Advocacy Scale by *Pinsker/Pennington/Schafer* (2009) and skepticism as measured by the Hurtt scale (Section 4.4) are indeed opposing constructs. They authors find that the two constructs are distinct from each other but cannot be viewed as the opposite ends of a continuum. See *Bobek/Hageman/Radtke* (2013a): 10-12. Note, however, that the operationalization of advocacy and skepticism chosen by the authors differs from *Hogarth/Einhorn's* (1992) notion of advocacy and skepticism. Hence, the findings of *Bobek/Hageman/Radtke* (2013a) do not call into question the validity of the advocacy-skepticism-continuum suggested by *Hogarth/Einhorn* (1992).

[348] The notion of skepticism set forth by *Hogarth and Einhorn* (1992) will also be touched upon in Section 4.2.3.2.

[349] See *Hogarth/Einhorn* (1992): 40.

[350] To the best of the author's knowledge, there exist only two (auditing) studies which provide direct evidence on participants' sensitivities to evidence: the study by *Bamber/Ramsay/Tubbs* (1997) as well as the study by *Guiral/Esteo* (2006). The results of these studies are discussed in Section 3.4.

The array of task, process, and evidence features relevant to the belief-adjustment model is summarized in Table 1.

	Types	Characteristics
Task		
Complexity	• Complex • Simple	• Unfamiliar / high information load • Familiar / low information load
Length of series	• Long • Short	• More than 17 cues • Between 2 and 12 cues
Response mode	• SbS • EoS	• Beliefs verbalized after each cue • Beliefs verbalized at the end of series
Evidence		
Direction	• Positive • Negative	• Upward belief revision • Downward belief revision
Strength	• Strong • Weak	• High impact on beliefs • Low impact on beliefs
Type	• Mixed • Consistent	• Positve and negative • All positive or all negative
Order	• Weak-strong / strong-weak • Positive-negative / negative-positive	• Typically used for consistent evidence • Used for mixed evidence only
Process		
Encoding	• Evaluation • Estimation	• Additive evidence integration • Averaging evidence integration
Processing	• Sequentially (SbS) • Simultaneously (EoS)	• Step-by-step belief update • All-at-once belief update
Adjustment	• Upward belief revision • Downward belief revision • No belief revision	• Drivers of adjustment: contrast effect and sensitivity to evidence

Table 1: Task, Evidence, Process Characteristics Reflected in the Belief-Adjustment Model

Based on these preliminaries, in the subsequent section, the belief-adjustment model is formally specified.

3.2.2 Model Specification

The belief-adjustment model is based on the notion that people process information in a manner of sequential anchoring and adjustment[351], in that a person's beliefs start from an initial

[351] As to the relation between the belief-adjustment model and the anchoring and adjustment heuristic set forth by *Tversky/Kahneman* (1974), there is some controversy in the literature. While some authors consider the Hogarth and Einhorn model as an application of this heuristic (see, e.g., *Pinsker* (2011): 163;

anchor and are adjusted sequentially upwards or downwards in light of new information.[352] Importantly, the cognitive process of anchoring and adjustment operates essentially *subconsciously*.[353]

Formally stated, the belief-adjustment model runs along the following lines:[354]

(2) $$S_k = S_{k-1} + w_k[s(x_k) - R]$$

where

S_k = degree of belief in some hypothesis after evaluating k pieces of evidence ($0 \leq S_k \leq 1$);

S_{k-1} = the anchor or prior opinion;

$s(x_k)$ = subjective evaluation of the kth piece of evidence;

R = the reference point against which the impact of the kth piece of evidence is evaluated; and

w_k = the adjustment weight for the kth piece of evidence ($0 \leq w_k \leq 1$).

As indicated in Section 3.2.1.3, the cognitive mechanism of evaluation which involves directional interpretation of audit evidence and additive evidence processing appears to be more realistic in auditing than estimation. Consequently, and in consistency with the prior auditing literature, the focus of consideration within this section is on the evaluation form of the belief-adjustment model.[355] This form implies a bipolar (positive versus negative) evaluation of evidence relative to the hypothesis under consideration such that $-1 \leq s(x_k) \leq +1$ and $R = 0$. Thus, equation (2) takes the following form:[356]

(3) $$S_k = S_{k-1} + w_k s(x_k)$$

The adjustment weight for the kth piece of evidence (w_k) has been further specified as:[357]

(4a) $w_k = \alpha S_{k-1}$ when $s(x_k) \leq 0$

and

(4b) $w_k = \beta(1 - S_{k-1})$ when $s(x_k) > 0$

Pinsker/Pennington/Schafer (2009): 93; *Trotman/Tan/Ang* (2011): 296), other researchers view the anchoring-and-adjustment strategy underlying the model and the heuristic as distinct and independent categories (see, e.g., *Ashton/Ashton* (1988): 625; *Pei/Reckers/Wyndelts* (1992): 190).

352 Note that this insight is hardly new. Specifically, *Weld/Roff* (1938) find that judicial judgments are not only influenced by the evidence obtained but are also strictly conditional on the preceding judgment. With other words, judgments are not formed in an absolute manner. Rather, they are built upon previous beliefs and judgments. See *Weld/Roff* (1938): 625f.

353 See *Abou-Seada/Abdel-Kader* (2003): 6.

354 See *Hogarth/Einhorn* (1992): 8.

355 For a formal consideration of the estimation form of the model as well as the corresponding order effect predictions, refer to *Hogarth/Einhorn* (1992): 9f., 15f., 48f.

356 See *Hogarth/Einhorn* (1992): 9.

357 See *Hogarth/Einhorn* (1992): 14.

where

α = sensitivity to negative evidence ($0 \leq \alpha \leq 1$);

β = sensitivity to positive evidence ($0 \leq \beta \leq 1$); and

α, β = constants.

Hence, by substitution of equations (4_a) and (4_b) into equation (3), the *SbS* process model can be mathematically represented as:[358]

(5a) $S_k = S_{k-1} + \alpha S_{k-1} s(x_k)$ for $s(x_k) \leq 0$

and

(5b) $S_k = S_{k-1} + \beta(1 - S_{k-1}) s(x_k)$ for $s(x_k) > 0$

Verbally stated, the SbS-evaluation form of the belief-adjustment model implies that when encountering a piece of new information, individuals mentally encode it as positive or negative vis-à-vis the hypothesis under consideration, subjectively evaluate the item according to its perceived strength, and subsequently integrate it in an additive manner with their current beliefs. The so updated belief then acts as the new anchor when a further information cue is obtained. This is an iterative process which is repeated until all pieces of information are processed and a final belief (position) is achieved.[359]

With regard to the *EoS* processing, the belief-adjustment model takes the following general form:[360]

(6) $S_k = S_0 + w_k s(x_1, \ldots, x_k)$

where

S_0 = initial strength of belief; and

$s(x_1, \ldots, x_k)$ = function, potentially weighted average, of the individual subjective evaluations of information cues following the initial belief.

Subsequently, the implications and predictions of the belief-adjustment model are presented and discussed.

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[358] See *Hogarth/Einhorn* (1992): 14.

[359] See *Lagnado* (2011): 205.

[360] See *Hogarth/Einhorn* (1992): 12. Note that the authors do not elaborate on the EoS processing – neither theoretically nor formally. It is conceivable that the substitution of equations (4a) and (4b) into equation (6) has not been conducted (in analogy to the SbS processing) because with EoS processing, only the average effect of all evidence items is considered, so that the individual evaluation of the single cues and subjects' sensitivities become irrelevant. Overall, *Hogarth/Einhorn* (1992) focus on SbS rather than EoS processing. This is also evident in the Appendix to their seminal publication where analytical and mathematical proofs for the order effect predictions are only provided for the SbS process.

3.2.3 Model Implications and Predictions

A major implication of the belief-adjustment model is that in a variety of situations and judgment domains, people are susceptible to information order effects which, as might be recalled from Section 2.4.2.1.4, relate to the dependence of an individual's assessments and judgments on the order in which evidence is encountered and processed.[361] In essence, order effects can be classified as *weighting biases*, i.e., biases which arise from the over- or underweighting of information items contingent on the presentation order of a series of evidence.[362] The specific order-effect predictions of the belief-adjustment model emerge from the interaction of the task characteristics, evidence features, and cognitive subprocesses outlined in the previous section.[363]

Overall, there are three possible outcomes: no information order effects, primacy effects, and recency effects. Within the first category, information order does not affect subjects' evidence evaluation, belief formation, and judgment responses. Primacy effects, on the other hand, imply an overweighting of information processed early in the sequence, while recency effects imply an overweighting of information processed later in the series, so that this information disproportionately affects a person's beliefs.[364] Prior research in psychology generally attributes primacy effects in long information series to a decrease in *attention* for late information due to fatigue and increasing cognitive load. In addition, initially presented information has been theorized to receive the greatest amount of attention and cognitive processing because it is utilized to form preliminary impressions.[365] Recency effects, on the other hand, have been attributed to an increase in attention for late information when it contrasts evidence faced earlier in the sequence. Hence, recency essentially results from the salience and deeper encoding of contrasting stimuli.[366] Viewed under a *memory* lens, primacy effects can be attributed to the fact that items presented early in the information set can be rehearsed to a larger extent and thus have a greater chance to be transferred into some more permanent memory storage. Recency effects, on the other hand, can be attributed to the fact that items processed later in the information series, particularly when they are contrasting, unexpected, and conspicuous, are perceived as more informative and are thus highly elaborated in working memory, which makes them more available to a search of long-term memory.[367]

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[361] See *Anderson* (1981): 144; *Hogarth/Einhorn* (1992): 3. Note that the influence of information order effects on human assessments, impressions, and belief formations has long been recognized in psychology. See, e.g., *Asch* (1946): 270-272; *Fernberger* (1920): 132f.

[362] See *Kahneman/Frederick* (2005): 270.

[363] See *Hogarth/Einhorn* (1992): 1.

[364] See *Hogarth/Einhorn* (1992): 1f.

[365] See *Belmore* (1987): 480, 486.

[366] See *Anderson* (1981): 183, 273; *Fiske* (1980): 903f.

[367] See *Hastie* (1980); *Plotnik/Kouyoumdjian* (2013): 245. For a list of further explanations for primacy and recency effects and relevant psychological evidence, see *Eagly/Chaiken* (1993): 265.

Under a *dual-process* perspective, information order effects can be conceived as the result of the joint failure of System 1 and System 2.[368] Specifically, due to the complexity inherent in the environment and the impossibility of human perception and cognition to fully and systematically apprehend and process all relevant stimuli and comprehend the complex interrelations among them, simplifying cognitive processing strategies are likely to be utilized. In particular, the generation of mental representations (System 1 processing) of the evidential stimuli encountered in a particular task is likely to involve selective attention to and focus on some salient but potentially normatively irrelevant aspects of the information set.[369] In the context of belief updating in light of newly incoming evidence, preconscious System 1 processing can yield mental representations of the strength and importance of evidence which are determined by the salience and serial position of information rather than by its substance only.[370] These intuitively disproportionately cued impressions are likely to be translated into subsequent assessments and judgments at System 2 level. This contention is in line with the prevailing opinion in the relevant dual-process literature which posits that human judgments and inferences are largely determined by System 1 automatically generated stimuli, with System 2 analytical processing doing nothing more than merely endorsing and translating the input from System 1 into explicit judgments.[371] Even though the disproportional mental representations of evidence weight generated by System 1 can theoretically be corrected at System 2 level, this scenario appears rather unlikely because in order to block impulses from System 1, System 2 has to actively engage in suppressing the input from System 1.[372] This requires a conscious awareness of the biasing influence of information order effects. However, as cognitive biases naturally operate subconsciously, the flawed impulses from System 1 are expected to be endorsed within the integration of the inconsistent pieces of evidence into a final judgment at System 2 level.[373]

Following this general consideration of the nature and cognitive roots of information order effects, the implications of the belief-adjustment model are considered in more detail subsequently. Before focusing on the particular order-effect predictions of the Hogarth and Einhorn model, some general clarifications regarding the implications of the different cognitive *processing* modes – sequential (SbS) and simultaneous (EoS) – are needed. Specifically, *sequential* processing is predicted to induce *no order* effects for consistent evidence. In the case of mixed evidence, however, the SbS processing mode is always theorized to lead to *recency* effects, unless an individual is completely insensitive to positive or negative evidence ($\alpha = 0$ or $\beta = 0$). In addition, the size of recency effects is predicted to be an increasing function of

368 This notion follows the argument of *Kahneman/Frederick* (2002): 52 that cognitive errors and biases typically arise when both cognitive systems fail.

369 For such contentions in a general context, see *Evans* (2013b): 138.

370 Evidence for the fact that the contrast effect, which – as might be recalled from Section 3.2.1.3 – is the primary source of the order-effect predictions of the belief-adjustment model, operates at the stage of mental representation has been provided by *Simpson/Ostrom* (1976): 628.

371 See, e.g., *Evans* (2013b): 138; *Kahneman/Frederick* (2002): 58f.

372 For such contentions in a general context, see *Evans* (2013b): 138.

373 For such contentions in a general context, see *Kahneman* (2011): 28.

both evidence strength and high general sensitivity to evidence.[374] In contrast, *simultaneous* processing is theorized to induce *primacy effects* in individuals' belief revisions irrespective of the nature of evidence (consistent or mixed).[375]

The order-effect predictions of the belief-adjustment model are summarized in Table 2[376].

Type of Evidence	Mixed		Consistent	
Response Mode	End-of-Sequence	Step-by-Step	End-of-Sequence	Step-by-Step
Short Series				
Simple	Primacy	Recency	Primacy	No effect
Complex	Recency	Recency	No effect	No effect
Long Series	Force toward primacy	Force toward primacy	Primacy	Primacy

Table 2: Predictions of the Belief-Adjustment Model (Source: *Hogarth/Einhorn* (1992): 17)

As shown in Table 2, the order-effect predictions of the belief-adjustment model result from the interaction of type of evidence (consistent versus mixed), complexity (simple versus complex), length of series (short versus long), and response mode (EoS versus SbS). With regard to the latter, is instructive to recall *Hogarth and Einhorn's* (1992) contention discussed in Section 3.2.1.3 that the SbS response mode exclusively induces SbS processing. In contrast, the EoS response mode will only invoke EoS processing when the task under consideration comprises short series of simple (i.e., cognitively less demanding) evidence. This scenario is depicted in the top row of Table 2. In contrast, in the case of short series of complex (cognitively demanding) evidence or long, naturally heavy loaded series of information, SbS processing is used in spite of EoS response mode task requirements. These conditions are reflected in the last two rows of Table 2.[377]

In brief, in the case of short series of simple evidence evaluated and processed in an EoS manner, the belief-adjustment mode exclusively predicts *primacy* effects. In contrast, *recency* effects are predicted for short series of simple, mixed evidence evaluated and processed in a SbS fashion. On the other hand, if the evidence encountered is consistently positive or consistently negative, *no order effects* are assumed to occur with SbS response (and processing) mode. These conditions are presented in the first row of Table 2.[378]

[374] See *Hogarth/Einhorn* (1992): 16. For a mathematical derivation of these predictions, refer to *Hogarth/Einhorn* (1992): 49f.

[375] See *Hogarth/Einhorn* (1992): 16.

[376] For clarity of exposition, and in consistency with the state of the art in auditing research on belief updating (see, e.g., *Kahle/Pinsker/Pennington* (2005): 8), merely the order-effect predictions for the *evaluation*-type model ($R = 0$) are presented in Table 2. Order-effect predictions for *all* kinds of evidence (mixed and consistent) under the *estimation* mode ($R = S_{k-1}$) are identical to the predictions for mixed evidence processed in evaluation manner (left-hand branch of predictions in Table 2).

[377] See *Hogarth/Einhorn* (1992): 18.

[378] See *Hogarth/Einhorn* (1992): 18.

In the constellations involving short series of complex, mixed evidence, the belief-adjustment model predicts *recency* effects regardless of the response mode. The rationale for this prediction is that under conditions of complexity and high cognitive load, SbS processing will be utilized even when the task explicitly requires an EoS response. For a short series of complex, consistent evidence, *no order* effects are expected. These conditions are reflected in the second row of Table 2.[379]

Finally, in the case of long series of evidence, the belief-adjustment model predicts (a tendency toward) *primacy* effects. That is, even though the SbS procedure used in processing large amounts of information normally invokes recency effects, with growing information accumulation, the individual sensitivity to new evidence (α, β) is assumed to decrease, thereby giving rise to primacy. Hence, *Hogarth and Einhorn* (1992) argue that while recency effects may theoretically occur in long information sets, this chance rapidly decreases with growing length of the series. These conditions are depicted in the third row of Table 2.[380]

The present study is situated within the context of a *short series* of *complex*, *mixed* evidence and *sequential* (SbS) responses to (and processing of) information. This approach is chosen because it appears to be most representative of the real-world audit process in general and the evaluation of the going concern assumption in particular. Specifically, in evaluating a firm's going concern ability, particularly in the context of economically turbulent conditions, an auditor rarely obtains exclusively consistent information regarding the entity's viability. Furthermore, auditing standards explicitly require that both conditions and events that cast potential doubt on the going concern assumption as well as mitigating factors are considered (ISA 570.A2; IDW PS 270.11; SAS 126, AU-C 570.9, A2-A3). In addition, human judgment in general and auditor judgment in particular naturally proceed incrementally rather than in one go (simultaneously).[381] Accordingly, a sequential obtaining and integration of evidence into an evolving impression of the firm's viability throughout the audit is more likely than the receipt of all the required information in a bundle or the postponement of preliminary assessment of the going concern assumption until all relevant data is available and can be evaluated in an aggregated manner.[382] With regard to the length of the series, it can be argued that auditors operate under conditions of immense time and deadline pressure, which renders the obtaining and processing of particularly lengthy sets of evidence (involving more than 17 pieces of information) rather unlikely.[383] In the context of going concern judgments, it has been recognized that even though the search for and evaluation of information relevant to the going concern assessment continues during the entire audit process, auditors generally obtain only a limited number of evidence items indicating firm's viability or the lack thereof.[384] Finally, the

[379] See *Hogarth/Einhorn* (1992): 18.

[380] See *Hogarth/Einhorn* (1992): 18.

[381] See *Ashton/Ashton* (1988): 624 (with a number of relevant psychological references along these lines); *Gibbins* (1984): 110.

[382] See *Asare* (1992): 381.

[383] See *Kahle/Pinsker/Pennington* (2005): 9f., *Trotman/Wright* (2000): 170.

[384] See *Asare* (1992): 381.

use of a short series of mixed evidence presented and processed in a sequential manner is in line with the great majority of the auditing studies using the belief-adjustment model.[385]

With regard to task complexity, the going concern case used in the present experimental investigation is classified as a *complex* task according to *Hogarth and Einhorn's* (1992) conceptualization of complexity because it involves heavy informational and cognitive load. Specifically, the case involves extensive background information (620 words general information plus balance sheet, income statement and cash flow data) and four additional pieces of information (ranging from 27 to 75 words with a mean of 47.5 words) which had to be processed within short time.[386] In addition, the going concern judgment has been broadly recognized as a highly complex and critical audit task.[387]

Collectively, the conditions of a short series of complex, inconsistent, and sequentially presented and processed information establish the occurrence of *recency effects* in auditors' belief revisions (Table 2, red-circled cell). With other words, in arriving at an assessment of the going concern ability of the firm under consideration, auditors are expected to overweight the most recently received information in the sequence. Overall, based on the predictions of the belief-adjustment model, the following hypothesis is stated:[388]

H_1: *Auditors who evaluate mitigating factors followed by contrary information will exhibit greater downward belief revision (or less upward belief revision) than those who evaluate the same information presented in the reverse order c.p.*

Before discussing the belief-adjustment model and its implications in the context of auditing, the subsequent section provides a review of the relevant general (non-auditing) research on Hogarth and Einhorn's belief-adjustment model. This review aims at demonstrating the validity of the model and the pervasiveness of recency effects in a number of judgment domains.

3.2.4 Model Testing and Validation

The belief-adjustment model has sparked considerable research interest in a number of different research fields. Interestingly, auditing research was the first field of research to use the model and to provide interdisciplinary corroboration for its validity. In particular, *Ashton and Ashton* (1988) was the very first study to independently[389] investigate and corroborate the

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385 See *Asare/Messier* (1991): 79; *Kahle/Pinsker/Pennington* (2005): 9.

386 In comparison, in their validating experiments, *Hogarth/Einhorn* (1992): 21 classified background information stems of averagely 88 words and additional pieces of evidence of averagely 52 words each as complex. Hence, as the information amount and load in the present study is way beyond the scenarios employed by *Hogarth/Einhorn* (1992), the classification of the going concern assessment as a complex task is also in line with the reference study.

387 See, e.g., *Ashton/Kennedy* (2002): 221f.; *Chow/McNamee/Plumlee* (1987): 128f.

388 Note that the focus on auditors' belief revisions rather than final assessments is methodologically driven. This issue is addressed in Section 5.2. This hypothesis formulation is based on *Asare* (1992): 383 and *Cushing/Ahlawat* (1996): 114.

389 Note that in their seminal paper, *Hogarth/Einhorn* (1992) not only present the belief-adjustment model and derive its predictions but also provide initial evidence in support of the model's validity. The authors par-

predictions of the belief-adjustment model with experienced professional auditors. The extensive research on auditors' belief updating conducted ever since the pioneer study by *Ashton and Ashton* (1988) is reviewed in Section 3.4. However, it can already be noted at this point that the great academic interest in the study of auditors' belief revision underpins the fundamentality of this cognitive process and the importance of the implications of the predicted information order effects in auditing.

Subsequently, a selection[390] of interdisciplinary belief-revision studies is presented, and the major findings of this research are briefly discussed. The review proceeds from general to accounting-specific research fields. The degree of detail of consideration is determined by the relevance of the individual research branches to auditing.

Overall, the majority of belief-revision studies reviewed herein have focused on settings involving short sequences of complex, mixed evidence. As discussed in the previous section, according to the belief-adjustment model, recency effects are theorized to emerge in this scenario. In consistency with this prediction, recency effects have been found in a number of judgment domains, including medical judgment (e.g., *Chapman, Bergus and Elstein* (1996)), legal judgment (e.g., *Costabile and Klein* (2005), *Kerstholt and Jackson* (1998)), personnel evaluations (e.g., *Highhouse and Gallo* (1997)), television picture quality evaluations (e.g., *Aldridge et al.* (1995), *Hands and Avons* (2001)), military judgments (e.g., *Adelman, Tolcott and Bresnick* (1993)), and even in the context of blind date choice (e.g., *Bruine de Bruin and Keren* (2003)).[391]

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ticularly focus on the predictions of the model with regard to short series of complex evidence as this condition has not been extensively explored in the past, and it is also the area where the Hogarth and Einhorn model makes novel predictions, i.e., the emergence of recency effects in the presence of mixed (positive and negative) evidence and the absence of order effects in the case of consistent evidence. In a series of five experiments using generic tasks which involved updating causal hypotheses by student participants, *Hogarth/Einhorn* (1992) obtain strong evidence corroborating the order effect predictions of the belief-adjustment model. For a detailed description of the procedures and concrete results of these five experiments, see *Hogarth/Einhorn* (1992): 20-33. *Dillard/Kauffman/Spires* (1991) replicated the four generic evaluation-type task experiments by *Hogarth/Einhorn* (1992). Their results provide support for the model's predictions as well as for the validity of the fundamental contrast assumption. See *Dillard/Kauffman/Spires* (1991): 623-630. A further replication study was conducted by *Tubbs et al.* (1993) who provide strong support for the occurrence of recency effects in the case of a short sequence of complex, mixed evidence. Interestingly, and contrary to the predictions of the model, the authors also report patterns consistent with recency even in light of consistent evidence. In addition, *Tubbs et al.* (1993) find that even when participants are given debiasing training, recency effects in their belief revisions still emerge. See *Tubbs et al.* (1993): 267f. Thus, the authors provide strong support for the prevalence and robustness of recency effects in subjects' belief revisions.

390 As the relevant research on belief updating which employs the belief-adjustment model is immense, the overview of research presented in this section does not make any claims to be comprehensive or complete. Rather, it intends to provide some insights into the broad field of application and the substantial support for the validity of the Hogarth and Einhorn model.

391 See *Adelman/Tolcott/Bresnick* (1993): 364; *Aldridge et al.* (1995): 154; *Bruine de Bruin/Keren* (2003): 100; *Chapman/Bergus/Elstein* (1996): 209f.; *Costabile/Klein* (2005): 50; *Hands/Avons* (2001): 644, 646f.; *Highhouse/Gallo* (1997): 42; *Kerstholt/Jackson* (1998): 452. Note that the studies by *Aldridge et al.* (1995) and *Costabile/Klein* (2005) do not explicitly use the belief-adjustment model as their theoretical foundation; however, as the results of these studies fit the model's predictions, they are also viewed as providing support for the validity of the model. In addition, it is noteworthy that while providing an overall support for the predictions of the belief-adjustment model, *Adelman/Tolcott/Bresnick* (1993) do not obtain results consistent with the contrast assumption. In addition, they find that order effects explain only a small portion of the total

The belief-adjustment model has also experienced broad application and empirical validation in the tax research domain. The pioneer studies in this area were conducted by *Pei, Reckers and Wyndelts* (1990, 1992) who document significant recency effects in experienced tax professionals' belief revisions, both with respect to *judgments* of tax treatment adequacy and client recommendations (i.e., *decisions*).[392] Consistently, *Gelardi* (2010) reports strong overall recency effects in tax students' assessments. He further finds that recency is magnified with increasing information load.[393] The robustness and validity of the belief-adjustment model has also been supported by *Hite and Stock* (1996). They demonstrate that the model's predictions hold even when subjects possess strong prior beliefs (anchors) regarding a particular tax position. Such beliefs are recognized by *Hogarth and Einhorn* (1992) to induce ceiling and floor effects, i.e., not to leave much room for upward (downward) belief adjustments in the case of strong positive (negative) initial beliefs.[394]

In contrast to the aforementioned studies, *Mayper, Anderson and Kilpatrick* (1999) do not find information order effects in participants' responses in a tax working paper review scenario. Rather, they obtain results suggesting that subjects anchor on the staff conclusion provided in the working papers and tend to confirm their own initial position.[395] While these results are at odds with the predictions of the belief-adjustment model, it is conceivable that the findings of the study are largely driven by the experimental design which provides participants with an anchor (staff conclusion) in which the previously depicted information is already processed (by another person) instead of allowing subjects to independently form beliefs. Hence, the review task may not allow for order and anchoring effects to be disentangled.[396]

Cuccia and Mc Gill (2000), on the other hand, find that recency effects in tax judgments are mitigated when tax professionals perform familiar tasks and have control over the order in which inconsistent evidence is processed. In unfamiliar tasks, however, which are per definition complex in nature, subjects were found to exhibit recency effects in their judgments regardless of the benefits of control over task structure and evidence evaluation sequence.[397]

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variance in subjects' responses ($R^2 < 0.10$). In later studies, *Adelman et al.* (1996): 258 surprisingly and contrary to the predictions of the belief-adjustment model find primacy effects instead of recency for a scenario involving the sequential presentation of simple, mixed data. In addition, in a study involving a long series of information, *Keltz/Adelman* (2008): 27f. find that in contrast to the predictions of the Hogarth and Einhorn model, recency rather than primacy effects arise. However, it should be noted that the model merely predicts a "force toward primacy" which increases with growing number of items employed. As 21 very simple items were employed in the study by *Keltz/Adelman* (2008), it can be expected that subjects' tiredness and decreasing sensitivity to new evidence were not strong enough to produce primacy. In addition, *Keltz/Adelman* (2008): 28 admit that due to the directional grouping of evidence items (seven positive, seven negative, and seven neutral cues), a "chunking" effect might have occurred, so that subjects mentally processed three complex evidence bundles instead of 21 simple single cues. Under this point of view, the emergence of recency effect does not appear to be at odds with the rationale of the belief-adjustment model.

392 See *Pei/Reckers/Wyndelts* (1990): 136-139; *Pei/Reckers/Wyndelts* (1992): 188-190.

393 See *Gelardi* (2010): 42f.

394 See *Hite/Stock* (1996): 83f., 93f.

395 See *Mayper/Anderson/Kilpatrick* (1999): 158f.

396 This proposition is reinforced by the fact that there are no auditing studies which explore participants' belief revisions using a review task.

397 See *Cuccia/Mc Gill* (2000): 420, 426-429.

Dillard, Kauffman and Spires (1991) provide support for the intercontextual validity of the belief-adjustment model by demonstrating that the predictions of the model generally hold regardless of the judgment domain (generic vs. management accounting). In addition, they corroborate the validity of the contrast assumption.[398] Further evidence in support of the recency-effect predictions of the Hogarth and Einhorn model in a management accounting context has been provided by *Rutledge* (1995). He also empirically demonstrates that recency can be alleviated by framing the information series in a manner which is inconsistent with the direction of the expected recency effect.[399] Further evidence substantiating the prevalence of recency effects has been provided by *LaSalle* (1997) in the context of accounting students' ethical judgments.[400]

Evidence in support of the validity of the belief-adjustment model has further been provided in the context of financial disclosure. Specifically, *Baird and Zelin* (2000) and *Theis, Yankova and Eulerich* (2012) demonstrate that the order-effect predictions of the model hold in scenarios involving short information series, EoS responses, and both complex and simple evaluation tasks.[401] In addition, the Hogarth and Einhorn model has been found to provide a reasonable account of the manner of information processing in disclosure scenarios involving long information sets. In particular, *Pinsker* (2007) corroborates the validity of the processing and adjustment mechanisms underlying the belief-adjustment model by demonstrating that sequential disclosure induces greater belief revisions compared to simultaneous disclosure because of the more salient contrast effect arising in the case of updating beliefs in a successive manner. This result is reinforced in a follow-up study by *Pinsker* (2011). However, the latter also finds that recency effects pervade subjects' evaluations even in the case of a fairly long series of information items (forty cues), whereas the belief-adjustment model predicts a force toward primacy for such scenarios.[402]

The occurrence of recency effects in a series of contrasting, successively processed stimuli has further been demonstrated by *Guiral-Contreras, Gonzalo-Angulo and Rodgers* (2007) in the context of loan rating decisions.[403] Finally, recency effects have been documented even in experimental market settings. In particular, *Tuttle, Coller and Burton* (1997) report results indicating that contrary to the efficient market hypothesis which posits that the market assimilates new information immediately and immaculately, i.e., free of bias, systematic individual information processing biases like recency can carry over to and "survive" at the market level.[404] These findings suggest the descriptive superiority of the belief-adjustment model over normative theory and highlight the robustness of recency phenomena.

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398 See *Dillard/Kauffman/Spires* (1991): 623-630.

399 See *Rutledge* (1995): 34f.

400 See *LaSalle* (1997): 28-31. Remarkably, non-accounting students have not been found to exhibit recency effects in their ethical judgments. *LaSalle* (1997) argues that this finding might be quite alarming if it mirrors accounting students' inability to critically reflect their role in the profession.

401 See *Baird/Zelin* (2000): 76; *Theis/Yankova/Eulerich* (2012): 143-145.

402 See *Pinsker* (2007): 211; *Pinsker* (2011): 177, 179.

403 See *Guiral-Contreras/Gonzalo-Angulo/Rodgers* (2007): 301.

404 See *Tuttle/Coller/Burton* (1997): 101.

In summary, the results of the studies reviewed above provide substantial support for the descriptive validity of the belief-adjustment model and the reasonableness of its predictions. A striking common finding of a plethora of studies in diverse research areas is the salience and robustness of recency effects in human information processing and inference. Collectively, the empirical evidence reviewed in this section suggests that human information processing and evidential reasoning indeed naturally follows an anchoring-and-adjustment (i.e., adaptive) rather than a probabilistic (e.g., Bayesian) approach.[405]

3.2.5 Critical Evaluation

In conclusion to the general consideration of the belief-adjustment model, the latter is subjected to a critical evaluation. The main advantage of the model is its cognitive and computational simplicity and economy.[406] The underlying anchoring-and-adjustment strategy implies that at any stage, merely the current position (anchor) and the effect of the new piece of information have to be considered in order to arrive at an updated belief. With other words, the model "*allows one to keep a 'running total' of the effects of prior information while reducing memory load.*"[407] The benefits arising from the use of the belief-revision approach in auditing have been empirically demonstrated by *Abou-Seada and Abdel-Kader* (2003) who find that the updating of beliefs in a manner of sequential anchoring and adjustment leads to audit efficiency (i.e., completion of the audit in less time).[408]

However, like any other theoretical model, the belief-adjustment model also has limitations. Its major drawback is the lacking consideration of *interdependencies and correlations* between different pieces of evidence. Hence, the fact that, for instance, in certain situations a new piece of negative information can potentially influence a target hypothesis only by overriding a prior positive information item is not captured by the model. With other words, the belief-adjustment model does not account for reinterpretations of prior information cues.[409] The difficulties of the model to capture the effects of extreme new evidence which irrefutably supersedes prior evidence have been empirically demonstrated by *Trueblood and Busemeyer* (2010, 2011).[410] *Hogarth and Einhorn* (1992) take this critical issue into account by stating that the belief-adjustment model is based on the implicit assumption that "*the outcomes of the*

[405] See *Kerstholt/Jackson* (1998): 452.

[406] See *Asare/Messier* (1991): 76; *Ashton/Ashton* (1988): 625; *Hogarth/Einhorn* (1992): 36.

[407] *Einhorn/Hogarth* (1985): 5.

[408] See *Abou-Seada/Abdel-Kader* (2003): 109, 118.

[409] See *Adelman et al.* (1996): 258; *Adelman et al.* (1997): 328; *Lagnado* (2011): 205f.

[410] See *Trueblood/Busemeyer* (2010): 1169-1171; *Trueblood/Busemeyer* (2011): 1544-1549. In their studies, the authors compare the predictive and explanatory power of the belief-adjustment model and the quantum inference model (see *Trueblood/Busemeyer* (2011): 1522-1533 for a review) in the context of jury decision making and conclude that while generally performing strongly, the belief-adjustment model is inferior in situations involving irrefutable evidence. Whether these findings are also generalizable to the field of auditing, is an open empirical question.

coding process already include whatever conditioning the subject has done based on prior evidence."[411]

In addition to the issue of insufficient reflection of evidence reinterpretations, the qualitative premises regarding the *cognitive mechanisms* underlying the process of belief adjustment, which are essentially the basis for the order-effect predictions of the model, might be at issue. To begin with *encoding*, although *Hogarth and Einhorn* (1992) implicitly assume that an individual will either use an evaluation or an estimation mode within the same task, this assumption might be unwarranted, as the authors themselves admit. In particular, given that minor contextual distinctions have been found to induce different processing modes, it is conceivable that individuals change modes during information processing within the same task.[412] With regard to the evaluation mode, which has been recognized as more relevant to auditing than the estimation mode, the notion that encoding information as positive (negative) consistently leads to upward (downward) belief revisions may not completely reflect real-world human belief updating. More specifically, it is conceivable that due to a "saturation" effect or premature opinion formation and commitment to the individually reached position, subjects do not change their beliefs although they perceive new information as positive or negative. With regard to *processing*, there is no clear indication of when a transition from EoS to SbS processing occurs in tasks involving an EoS response mode and substantial complexity and cognitive demands. Hence, the derivation of order-effect predictions in the case of complex tasks and EoS response mode might be somewhat arbitrary.[413] Finally, it should be born in mind that the *contrast effect* assumption relating to the cognitive subprocess of *adjustment* is crucial for the order-effect predictions of the belief-adjustment model. Hence, evidence which casts doubt on the validity of the contrast effect is also reducing the universality of the model.

These limitations and critical features notwithstanding, the belief-adjustment model possesses considerable cognitive and descriptive appeal, and as indicated in the previous sections, it has advanced the academic understanding of the processes and cognitive mechanisms underlying belief revision and has inspired a wealth of multidisciplinary research. As mentioned at the outset of Section 3.2.4, auditing research has demonstrated substantial interest in the exploration of auditors' belief revisions and has widely adopted the belief-adjustment model as the theoretical foundation of the study of auditors' judgments in a number of different contexts. The following section sheds light on the rationale for this vast amount of research attention.

3.3 Relevance of Belief Revision in Auditing

As indicated in Section 2.4, auditing is a highly complex multi-stage process conducted under conditions of considerable uncertainty, ambiguity, pressure, and information load.[414] As recognized by *Mock et al.* (1997), "*[d]ealing with uncertainty involves implicitly or explicitly*

[411] *Hogarth/Einhorn* (1992): 39.

[412] See *Hogarth/Einhorn* (1992): 37f.

[413] See *Hogarth/Einhorn* (1992): 38.

[414] See *Rose/Rose* (2003): 316.

expressing and updating beliefs about uncertain quantities, events or outcomes."[415] Thus, belief adjustment plays a crucial role in the audit process.

The preceding sections indicate that people generally aggregate evidence and update beliefs in an adaptive (sequential anchoring-and-adjustment) rather than normative (probabilistic) manner. In auditing, this tendency might be even more salient because of the nature of auditor judgment. Specifically, as aptly put by *Gibbins* (1984), naturally auditor "*judgment proceeds incrementally rather than by gathering full information and integrating it all before choosing a response*."[416] With other words, auditor judgment represents "*an ongoing mental process rather than a discrete act.*"[417] Moreover, auditing itself can be characterized as a sequential process in which a number of individual judgments are successively integrated into a higher-level composite judgment, i.e., the audit opinion.[418] Overall, sequential information processing plays a crucial role in auditing. In this context, the belief-adjustment model represents a very relevant and reasonable descriptive account of auditors' information processing and belief updating.[419] The model's relevance and applicability to auditing has been empirically demonstrated by *Krishnamoorthy, Mock and Washington* (1999) whose comparative examination of belief revision models in auditing reveals that the belief-adjustment model outperforms Bayesian inference, cascaded inference theory, and Dempster-Shafer theory of belief functions as a descriptive model of auditors' belief revisions. Specifically, the Hogarth and Einhorn model is the only model found to capture both the direction and magnitude of auditors' belief adjustments.[420]

As implicated by the belief-adjustment model, the sequential processing of evidence and updating of beliefs, although beneficial in terms of relieving cognitive load and demands on memory and effort, can also lead to systematic information order effects in individual belief revision.[421] Ideally, auditors' judgments are determined by the *substance* of evidence (i.e., its diagnosticity, relevance, and reliability), not the *order* in which it happens to be received and evaluated (i.e., its serial position).[422]

Generally, information order effects[423] may have severe implications for both the efficiency and the effectiveness of the audit, in that the order of presentation (1) may affect auditors' search for additional evidence and the extent of audit testing, thus jeopardizing both the cost and the timeliness of the audit, and (2) may also lead to identical information resulting in dif-

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415 *Mock et al.* (1997): 123f.

416 *Gibbins* (1984): 110.

417 *Gibbins* (1984): 110.

418 See *Felix/Kinney* (1982): 246-248; *Libby/Luft* (1993): 435.

419 See *Asare/Messier* (1991): 76; *Trotman* (1999): 19.

420 See *Krishnamoorthy/Mock/Washington* (1999): 119f.

421 For such claims, see, among others, *Asare* (1992): 379 and *Kahle/Pinsker/Pennington* (2005): 2.

422 See *Ashton/Kennedy* (2002): 221; *Kennedy* (1993): 231.

423 It should be noted that order effects and recency bias concern the order of the *presentation* of information, which may not necessarily coincide with the *temporal* (i.e., *chronological*) order in which the events that are reported actually occurred. With regard to the latter, in many situations it reasonable to attach a greater weight to temporally more recent (after year-end) evidence. See *Favere-Marchesi* (2006): 71.

ferent judgments and different actions by virtue of it being processed in a different order. With other words, order effects can cause over- or underauditing and reduce the accuracy and quality of auditor judgment.[424]

Another issue relevant to the discussion of information order effects in the context of auditing is the fact that auditors frequently obtain management-provided information and evidence which may be intentionally or unintentionally biased.[425] Overall, the client may structure and present evidence in such a manner and sequence that it favors auditors' unduly optimistic view on the issue under consideration. Management's control over evidence and the fact that people are generally inclined to intentionally influence the environment in pursuit of their own interest and purposes[426] highlight the necessity for auditors to be aware of the deleterious influence of order effects and the ability of the client to induce them.

After indicating the fundamentality of the process of belief updating as well as the theoretical importance of the belief-adjustment model in auditing, an overview of the relevant auditing literature is provided.

3.4 Empirical Evidence on Information Order Effects in Auditing

The belief-adjustment model has inspired profound experimental research in auditing. For clarification purposes, some basic points relating to the relevant auditing literature on belief revision are addressed prior to the discussion of the central order-effect studies. First, as indicated in Section 3.2.3, the auditing literature on belief revision has majorly focused on scenarios involving a short series of mixed evidence presented and evaluated sequentially (SbS) as these constellations are consistent with the incremental nature of auditor judgment as well as the ambiguity, time and capacity constraints underlying the audit process. Second, auditors' belief revisions have been explored in the context of various audit tasks, including going concern evaluations, internal control assessments, accounts receivable estimations, fraud assessments, material misstatement judgments, and inventory write-down evaluations.[427] Third, while early research using the belief-adjustment model was primarily concerned with testing the model's validity and order-effect predictions, later studies have focused on exploring the interrelations between various task and context variables relevant to the audit environment as well as on identifying and exploring potential debiasing mechanisms.[428] Forth, the auditing literature reviewed below has been somewhat inconsistent in the use of the relevant terminology. Specifically, the terms "response mode", "presentation mode", and "processing mode"

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[424] See *Ashton/Ashton* (1988): 638; *Krull/Reckers/Wong-On-Wing* (1993): 144; *Messier/Tubbs* (1994): 58; *Tubbs/Messier/Knechel* (1990): 459. Note that judgment quality in the context of cognitive biases is typically evaluated in terms of logical consistency, i.e., correspondence to normative theories. However, other judgment quality proxies may also be appropriate depending on the nature of the particular bias. For a discussion of judgment quality criteria, see Section 2.4.1.

[425] See *Bell/Peecher/Solomon* (2005): 19; *Silvoso et al.* (1973): 31.

[426] See *Fiske/Taylor* (2008): 16.

[427] See *Kahle/Pinsker/Pennington* (2005): 9f.; *Trotman/Wright* (2000): 170.

[428] See *Asare/Messier* (1991): 82f.

have generally been used synonymously in the existing auditing literature.[429] This also applies to the terms "attitudes toward evidence" and "sensitivity to evidence" as well as "positive (negative) evidence" and "confirming (disconfirming) evidence".[430] The present work attempts to use these terms as unambiguously and uniformly as possible. Nevertheless, the possibility of remaining ambiguities should be noted. Subsequently, a brief[431] review of the relevant experimental studies dealing with auditors' belief adjustments and susceptibility to information order effects is presented.

As previously indicated, initial support for the predictions of the belief-adjustment model in the context of auditing was provided by *Ashton and Ashton* (1988). The researchers demonstrate that in the presence of inconsistent evidence, auditors' belief revisions are systematically and significantly influenced by the order of information presentation, resulting in judgments reflecting a recency bias[432]. For consistent evidence, the authors do not indicate information order effects. In addition, *Ashton and Ashton* (1988) find that sequential processing leads to more extreme belief revisions than simultaneous processing.[433] Overall, these findings provide strong support for the validity of the Hogarth and Einhorn model.

In conformity with *Ashton and Ashton* (1988), *Tubbs, Messier and Knechel* (1990) also obtain no order effects for consistent evidence and recency effects for mixed evidence.[434] Further empirical evidence for the emergence of recency in auditors' belief revisions in light of a short series of complex, inconsistent, and sequentially presented and processed information is provided by *Asare* (1992) and *Pei, Reed and Koch* (1992).[435] Remarkably, *Asare* (1992) indi-

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[429] See *Kahle/Pinsker/Pennington* (2005): 37. Although these terms are not strictly equivalent in meaning, with regard to the SbS mode, they have identical implications. Hence, the interchangeable application appears reasonable.

[430] Note that whether a piece of evidence of which sign whatsoever is confirming or disconfirming, depends on the framing of the hypothesis under consideration. Thus, an interchangeable use can be misleading.

[431] Note that it is beyond the scope of the present work to provide a detailed consideration and discussion of each study on auditors' belief revision conducted in the last two decades. For an excellent and comprehensive overview of belief-adjustment research in the field of accounting and auditing, refer to *Kahle/Pinsker/Pennington* (2005). They organize their discussion around the following five categories of factors studied in the context of auditors' belief revisions: (1) individual factors (e.g., knowledge, cognitive style, sensitivity to evidence); (2) environmental factors (e.g., incentives, pressures, inherent risk); (3) input task factors (e.g., evidence strength and type, task complexity, response mode); (4) processing factors (e.g., processing mode, accountability requirements); and (5) output task factors (e.g., type and domain of judgment (audit vs. tax)).

[432] While considered under a normative viewpoint, recency represents a bias in information processing, some researchers have pleaded for the reasonableness of recency phenomena as means of easing cognitive strain and information overload. The proponents of the reasonableness of recency effects have argued that the interpretation of recency as information processing bias is not justified. See, e.g., *Pei/Reckers/Wyndelts* (1992): 190.

[433] See *Ashton/Ashton* (1988): 638-640. The finding of more extreme belief revisions in the case of sequential processing is corroborated by *Ashton/Ashton* (1990): 15f. In the context of mixed evidence, this result is attributed to the fact that in the EoS mode, evidence is evaluated in a cumulative manner within a single belief-adaptation process, so that the contrasting informational stimuli are averaged out prior to integration with the current belief. In the SbS mode, on the other hand, each information cue is assessed individually within an evolving process, which is a precondition for the arousal of greater contrast effects. See *Kennedy* (1993): 235; *Trotman/Wright* (1996): 176.

[434] See *Tubbs/Messier/Knechel* (1990): 459.

[435] See *Asare* (1992): 388f.; *Pei/Reed/Koch* (1992): 181.

cates that the recency bias in auditors' going concern judgments is carried over to the choice of type of audit report (modified vs. unqualified) at issue. Specifically, auditors who obtain confirmatory evidence at the end of a series exhibit stronger final beliefs and a greater confidence in the client's viability, and thus issue more unqualified opinions than those who evaluate the same evidence in a reverse order with the unfavorable evidence processed last.[436] *Asare's* (1992) findings are reinforced by *Guiral and Esteo* (2006).[437] In contrast to the two aforementioned studies, *Messier* (1992) reports results suggesting that recency effects in auditors' belief revisions and final judgments do not influence the extent of audit testing or the audit report choice made.[438]

While the aforementioned studies uniformly find evidence of recency effects at least at the judgment level, *Anderson and Maletta* (1999), *Monroe and Ng* (2000), and *Reckers and Schultz* (1993) do not indicate order effects in auditors' judgments made under conditions of high risk.[439] In a similar vein, *Butt and Campbell* (1989) do not document recency effects for participants exhibiting high prior beliefs. Subjects with low priors, however, are found to succumb to recency. Based on these findings, the authors conclude that the extent of recency effects in subjects' responses is inversely related to the strength of prior beliefs.[440] In opposition to the aforementioned studies, *Rose and Rose* (2003) find that high fraud risk exacerbates, rather than mitigates, recency effects because of the increased attention and elaboration in information processing and evidence evaluation under high-risk conditions. The increase in attention and in the amount of mental processing potentially leads to greater complexity and cognitive load, which is a preposition for the emergence of recency effects.[441]

A bunch of studies have focused on the exploration of the role of knowledge and expertise in the context of auditors' belief revisions. This research has addressed the question of whether experienced auditors are less susceptible to information order effects than are novices.[442] In

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[436] See *Asare* (1992): 390f. However, *Adelman/Tolcott/Bresnick* (1993): 366 reconstructed the R^2-values for *Asare*'s (1992) study and found that the belief revision experiment yielded an R^2 of 0.22, while the audit report choice experiment only produced an R^2 of 0.067.

[437] See *Guiral/Esteo* (2006): 607-610.

[438] See *Messier* (1992): 149.

[439] See *Anderson/Maletta* (1999): 83; *Monroe/Ng* (2000): 161-164; *Reckers/Schultz* (1993): 140. For low-risk conditions, both *Anderson/Maletta* (1999) and *Reckers/Schultz* (1993) report order effects (primacy and recency, respectively) in subjects' responses.

[440] See *Butt/Campbell* (1989): 476-478. Unfortunately, the authors fail to provide an explanation for this pattern of findings. As participants are not found to be confirmation-prone, an escalation of commitment to the prior belief is apparently not the mechanism leading to lower recency effects in the case of high prior beliefs. It is conceivable that subjects with a higher commitment to an initial position are generally more focused and effortful in information processing and belief formation, and thus are less susceptible to non-normative factors like the serial position of information. However, it is also conceivable that the results observed are merely an experimental artefact as *Butt/Campbell* (1989) neither employ a strict SbS nor a strict EoS response mode but a mixture of both (i.e., subjects obtain ten items of additional evidence and are asked to make two belief adjustments, each after facing a set of five positive and five negative cues). The authors also employ a rather simplistic task involving only very general data. Under this condition, the belief-adjustment model predicts primacy effects for the EoS response mode and recency effects for the SbS response mode. As the experimental design involves a "hybrid" mode, no clear predictions can be derived and interpretations made.

[441] See *Rose/Rose* (2003): 314, 319, 329-332.

[442] As might be recalled from Section 2.4.2.3.1, auditors' experience has been typically used as a surrogate for knowledge and expertise.

general, experienced auditors are theorized to possess richer and better organized knowledge structures than less experienced auditors which allow them to recognize patterns in the evaluated evidence and identify (more) warning factors and circumstances in the course of the audit. This is expected to lead to a more precise problem assessment (i.e., initial belief), less biased weighting of new evidence, and ultimately to higher judgment quality.[443] While it is undisputed that knowledge and expertise are critical for the performance of high quality financial statement audits, whether they can temper the pervasive, robust, and subconsciously operating recency effect is an empirical question.

Overall, the auditing literature does not provide a uniform picture regarding the debiasing influence of experience in the context of auditors' belief revisions. In particular, while *Kennedy* (1993), *Messier and Tubbs* (1994), and *Trotman and Wright* (1996) find recency effects only in the (unassisted) judgments of inexperienced subjects (students or audit novices), but not experienced auditors, the results obtained by *Arnold et al.* (2000), *Guiral and Esteo* (2006), *Krull, Reckers and Wong-On-Wing* (1993), and *Morton* (2001) suggest that experience does not mitigate order effects. That is, the latter studies indicate that experts and non-experts are likewise prone to recency.[444] However, these conflicting results may be an experimental artefact attributed to the wide range of different experience measures employed across the different studies (e.g., general experience, task-specific experience, professional exams, and professional role (auditor vs. student)).[445]

Beyond experience, auditing research has explored a number of other factors and mechanisms theorized to diminish recency effects in belief updating. This branch of research has evolved around the notion set forth by *Kennedy* (1993) that information order effects are *effort-related* (rather than *data-related*) biases and thus can be diminished by inducing subjects' cognitive effort.[446] In an empirical investigation of this proposition, *Kennedy* (1993) utilizes accountability (announcement of a review of the audit work performed) as an effort-inducing mechanism and reports that it effectively rules out recency effects in the judgments of inexperienced students.[447] Further effort- and attention-enhancing mechanisms found to mitigate recency include documentation requirements (e.g., *Cushing and Ahlawat* (1996)) and self-reviews (e.g., *Ashton and Kennedy* (2002)).[448]

With regard to the influence of teamwork, the empirical evidence is inconsistent. While *Ahlawat* (1999) reports results indicating the superiority of multi-auditor judgment quality (lack of recency bias), cognitive capacity, memory, and confidence over individual perfor-

[443] See *Abou-Seada/Abdel-Kader* (2003): 42; *Kahle/Pinsker/Pennington* (2005): 17.

[444] See *Arnold et al.* (2000): 129; *Guiral/Esteo* (2006): 614; *Kennedy* (1993): 243; *Messier/Tubbs* (1994): 67; *Morton* (2001): 115f.; *Trotman/Wright* (1996): 190f. Interestingly, *Krull/Reckers/Wong-On-Wing* (1993): 151 even find that experience amplifies recency.

[445] See *Kahle/Pinsker/Pennington* (2005): 17f.

[446] *Kennedy* (1993) conceptualizes effort-related biases as generally resulting from an individual's natural reluctance to expend additional cognitive effort and attention. Data-related biases, in contrast, have been viewed as being caused by fallacies in an individual's memory or knowledge structure and/or faulty informational input. See *Kennedy* (1993): 233f.

[447] See *Kennedy* (1993): 243.

[448] See *Ashton/Kennedy* (2002): 226-229; *Cushing/Ahlawat* (1996): 117f.

mance, *Johnson* (1995) finds evidence of recency effects in auditors' belief revisions at both the individual and group level. In addition, he reports that as compared to individual belief revision, group-generated responses are characterized through a greater riskiness in choice. Finally, *Reckers and Schultz* (1993) demonstrate that despite the superiority of multi-auditor judgment over individual judgment in terms of adherence to guidance presented in auditing standards, audit groups and individuals are equally susceptible to recency.[449]

Further important insights concerning the alleviation of recency effects are presented by *Favere-Marchesi* (2006). He demonstrates that awareness of the temporal (chronological) order of evidence mitigates auditors' susceptibility to effects generated by the presentation order of evidence in that it allows auditors to recognize trends, i.e., patterns of change and stability over time, which are particularly relevant to judgment and decision making in auditing.[450]

Another central but quite controversial topic in the relevant auditing literature concerns auditors' sensitivity to evidence. A number of studies, including *Ashton and Ashton* (1988, 1990), *Butt and Campbell* (1989), *Cushing and Ahlawat* (1996), *Favere-Marchesi* (2006)*, Monroe and Ng* (2000), and *Reckers and Schultz* (1993), find that auditors are more sensitive and responsive to negative evidence than positive data as indicated by the larger belief adjustment following the processing of negative cues. The tenor of these studies is that the adoption of a conservative evidence evaluation strategy corresponds to the professional environment which exposes auditors to considerable litigation and reputation risks in the case of erroneous audit judgments and opinions.[451] *Bamber, Ramsay and Tubbs* (1997), on the other hand, find that auditors exhibit confirmation proneness[452] in evidence evaluation in that they respond more sensitively to information that corroborates their initial hypothesis regardless of its directional frame (positive (e.g., fair presentation) vs. negative (e.g., misstatement)). Importantly, this confirmation tendency is found to emerge irrespective of experience level or the presence of potential irregularities in the task scenario.[453] Evidence on auditors' confirmation proneness in information processing and evidence evaluation has also been provided by *Ayers and Kaplan* (1993), *Church* (1991), *Morton* (2001), *Pei, Reed and Koch* (1992), and *Waller and Felix*

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449 See *Ahlawat* (1999): 84f.; *Johnson* (1995): 152; *Reckers/Schultz* (1993): 139f.

450 See *Favere-Marchesi* (2006): 70.

451 See, e.g., *Ashton/Ashton* (1988): 639f.; *Ashton/Ashton* (1990): 15f.; *Butt/Campbell* (1989): 478f.; *Cushing/Ahlawat* (1996): 118; *Favere-Marchesi* (2006): 82; *Monroe/Ng* (2000): 164; *Reckers/Schultz* (1993): 138. For such claims, see also *Smith/Kida* (1991): 484f.

452 In general terms, confirmation proneness (also referred to as "confirmation bias") relates to the phenomenon of information being searched for, evaluated, and memorized in a manner involving a systematic and unconditional corroboration of the own hypothesis or position. Confirmation proneness has been figuratively classified as an immunity-stimulating means against rejection of a hypothesis. See *Oswald/Grosjean* (2004): 79. For a general (psychological) discussion of the confirmation phenomenon, refer to *Oswald/Grosjean* (2004): 79-94. For a comprehensive meta-analysis of confirmatory tendencies in the context of auditing, refer to *Church* (1990): 81-104.

453 See *Bamber/Ramsay/Tubbs* (1997): 263. Overall, the authors provide substantial support for the descriptive validity of the belief-adjustment model.

(1984).[454] In addition, *Krull, Reckers and Wong-On-Wing* (1993) argue that in reality, material adjustments to audited accounts are relatively scarce, suggesting that auditors maintain a positive rather than negative attitude toward the client's financial statements and audit evidence.[455] In contrast to the aforementioned studies, *Guiral and Esteo* (2006) find that auditors are moderately sensitive to both positive and negative evidence.[456] As argued by *Krull, Reckers and Wong-on-Wing* (1993), a neutral (balanced) stance toward evidence might be indeed the most adequate attitude for an auditor because an asymmetry toward negative evidence can lead to overauditing, considerable inefficiencies, and potentially to client loss. An asymmetry toward positive evidence, on the other hand, bears the risk of material misstatements and other problems going undetected which may lead to considerable reputational damages and legal lawsuits.[457]

In summary, despite some inconsistency,[458] the existing belief-revision literature in auditing provides substantial support for the recency-effect predictions of the belief-adjustment model for the sequential presentation and processing of a short series of complex, inconsistent evidence.[459] This overall result has crucial implications for audit practice, as it suggests that when an audit task naturally involves a step-by-step information processing or considerable complexity and cognitive load, the emergence of recency effects could be germane.[460] As indicated previously, firm's management normally controls and determines the order in which information is presented to the auditor. This fact, along with the recommendation for management accountants provided in the academic literature to structure and present data so that the best and strongest piece of information is provided last in order to achieve maximum impact,[461] highlights the necessity for auditors to bear in mind the potential effects of the order of information presentation on their judgments and decisions.[462]

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454 See *Ayers/Kaplan* (1993): 126; *Church* (1991): 531f.; *Morton* (2001): 115f.; *Pei/Reed/Koch* (1992): 180; *Waller/Felix* (1984): 399. For a list of relevant psychological studies corroborating the general human tendency of confirmation proneness, see *Smith/Kida* (1991): 483.

455 See *Krull/Reckers/Wong-On-Wing* (1993): 145.

456 See *Guiral/Esteo* (2006): 613.

457 See *Krull/Reckers/Wong-On-Wing* (1993): 147.

458 As recognized by *Trotman/Wright* (2000): 170f., due to the very diverse and incomparable design choices in the auditing studies on information order effects, it is not possible to determine whether this inconsistency in results is caused by genuine effects and moderating variables or merely represents an experimental artefact.

459 Indeed, as the analysis of 25 belief-revision studies conducted by *Kahle/Pinsker/Pennington* (2005) reveals, in the absence of debiasing factors, recency has been found in 21 studies for at least some experimental condition. See *Kahle/Pinsker/Pennington* (2005): 34. In this context, *Ashton/Kennedy* (2002): 221, 223 classify recency as a "pervasive" and "robust" judgment bias.

460 See *Kahle/Pinsker/Pennington* (2005): 28.

461 See *Dillard/Kauffman/Spires* (1991): 632. It should be noted that this recommendation was made generally and probably was not intended to encourage accounting managers to "manipulate" auditors' judgments and decisions. Nonetheless, managers may be well aware of the impact of information order effects and use them in order to achieve a maximally favorable treatment.

462 *Zhao/Harding* (2013) argue and demonstrate that order effects can also be used in a positive way to enhance the quality of auditors' judgments. Specifically, they show that when evidence suggesting troublesome changes in the client's business environment is considered subsequent to (rather than preceding, as usual in audit practice) positive evidence obtained from information system and substantive audit testing procedures, auditors provide reasonably higher assessments of the risk of material misstatement. See *Zhao/Harding* (2013): 503.

As a final note on this section, it should be noted that prior auditing research on belief updating has largely focused on task variables, contextual factors, and the role of knowledge, whereas personal dispositions[463] have remained relatively unexplored.[464] The only study exploring the influence of a personality trait (cognitive style) on auditors' belief revisions is conducted by *Chan* (1995). He finds that information order interacts with the individual cognitive style to influence auditors' belief adjustments. In particular, the results reported by *Chan* (1995) indicate that auditors classified as field dependent exhibit greater recency bias in their responses compared to their field-independent counterparts.[465] The preliminary findings presented by *Chan* (1995) hint at the relevance of traits in the context of auditors' belief revisions. In this context, *Kahle, Pinsker and Pennington* (2005) emphasize the need for future research on the influence of personal factors on auditors' information processing and belief adjustment.[466] The present study answers this call for research by exploring the effect of trait professional skepticism on auditors' belief revisions.

The following section focuses on the fundamental concept of professional skepticism in auditing. It provides a broad theoretical and empirical consideration of the notion of skepticism as a prelude to the discussion of the role of trait professional skepticism in context of auditors' belief revisions.

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[463] As indicated in Section 2.4.2.3, personal dispositions or traits generally relate to relatively stable and enduring aspects of an individual. Note that the terms "(personality) traits", "personal dispositions", "dispositional characteristics", and "innate characteristics" are used interchangeably in the present work.

[464] See *Kahle/Pinsker/Pennington* (2005): 12.

[465] See *Chan* (1995): 26f. However, it should be noted that the sample size used by *Chan* (1995) consists of twenty auditors only, which is way too small to obtain statistical significance and reliable inferences. In addition, he does not refine upon the rationale for the hypothesis concerning the nature of the link between field dependence-independence and information order effects. As might be recalled from Section 2.4.2.3.6.1, field-dependent individuals generally tend to process information in a global and unstructured manner, while field-independent persons exhibit more analytical and structured information processing. By imposing structure to the task, complexity is expected to decrease and thus, biasing cognitive tendencies may decline as well.

[466] See *Kahle/Pinsker/Pennington* (2005): 12, 22.

4 The Concept of Professional Skepticism

4.1 General Remarks

Professional skepticism is a fundamental concept in auditing[467], as indicated by its prominence throughout the auditing standards and the academic literature.[468] The crucial importance of professional skepticism arises from the fact that it simultaneously affects the *costs* and the *quality* of the audit by influencing the resources exerted in the course of the audit and determining the reliability of the results of the audit, respectively.[469] Despite its immense importance and the voluminous literature on this topic, some unease about the definition, conceptualization, operationalization, and practical application of professional skepticism still seems to exist.[470] Hence, an in-depth consideration and a thorough analytical and empirical study are required in order to explore the cornerstone notion of professional skepticism in auditing.

To pave the way for the inquiry into the concept of professional skepticism undertaken in this section, some semantic remarks and clarifications are presented subsequently. First, in consistency with the relevant auditing literature, in the present work the term "concept" is used to refer to a notion or construct.[471] Second, "professional skepticism" is a compound term which consists of the two words "professional" and "skepticism". While the latter term is the focal point of Section 4.2 where it will be discussed in detail, the former term also deserves consideration. Subsequently, a closer look is taken on the meaning of being "professional" in the context of auditing in general and skepticism in particular.[472] Syntactically, the word "professional" is an adjective. As such, it has the function to describe the noun in question and to provide additional information about the subject of interest. Audit guidance and literature, however, do not provide an explicit definition of what it means to be "professional". Clues on this issue can be drawn by considering the fundamental principles and characteristics that outline professional auditors' image and behavior. Specifically, being professional involves,

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[467] Although genuinely a concept rooted in the field of (external) auditing, professional skepticism, or the ability to challenge claims, motives, arguments, and to critically evaluate evidence and information, is also a crucial attribute to the other participants involved in the financial reporting process, including management, oversight boards, audit committees, and internal auditors. See *CAQ* (2010): 19. In order to keep the scope of the present section within reasonable bounds, the following considerations are limited to the field of external auditing.

[468] See *Hurtt* (2010): 149; *Murray* (2012): 36. Given the dynamics of recent developments in academic research on professional skepticism initiated with the publication of the seminal papers by *Nelson* (2009) and *Hurtt* (2010), it appears reasonable and appropriate to include unpublished research papers dealing with some relevant aspects of skepticism in order to provide a more complete picture of the contemporary research on the concept of professional skepticism.

[469] See *Doucet/Doucet* (1996): 158.

[470] See *Nolder* (2012): 3.

[471] See, e.g., *Rose* (2007): 216. In philosophy, in contrast, "concept" refers to the meaning of words or expressions. See *Craig* (2005): 135; *Dennis* (2013): 4.

[472] The approach of decomposing the compound term "professional skepticism" into its components as well as the lines of argumentation presented here follow the procedure applied and claims made by *Dennis* (2013): 27-30 in his conceptual inquiry into the nature of professional judgment in auditing.

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among other things, acting with integrity[473], objectivity[474], competence, due care, confidentiality, and in compliance with the relevant standards and regulations (IESBA 100.5). Furthermore, a broad array of intellectual, technical, personal, interpersonal, and organizational skills is required for an individual to be qualified as a professional (IES 3.1-3). In addition, according to the view of the Canadian Institute of Chartered Accountants (CICA), skepticism and inquisitiveness are among the most important characteristics of a good professional auditor.[475] In this sense, skepticism is an integral part of professionalism in auditing. A further important aspect of professionalism in auditing concerns the commitment of the profession to serve the public interest (IESBA 100.1). Indeed, placing public service ahead of self-interest and reward is a distinguishing feature of professionalism.[476] In a recent conceptual paper on the fundamental issues of duty and ethics in auditing, *Shaub and Braun* (2014) synthesize the following major attributes of professionalism: (1) possession of knowledge, intellectual skill, and proficiency; (2) adherence to generally accepted values set forth in a code of conduct; and (3) duty to act in the public interest.[477]

It should be noticed that applying professional skepticism is not expounded as the application of skepticism by a professional. Consider in this context the very broad definition of a professional accountant provided by the *IAASB* (2013) as "*[a]n individual who is a member of an IFAC member body*"[478]. This description is not very insightful in comprehending what it takes for skepticism to be qualified as "professional". Clearly, the compound "professional skepticism" is not intended to mean skepticism exercised by a member of a professional accounting body.[479] Rather, being professional in exercising skepticism is a matter of complying with high ethical standards, possessing a broad array of skills and qualities, and placing the public interest above self-interest or the client's interest.

Building on this terminological foundation, Section 4.2 provides an array of general and audit-related definitions and considerations of (professional) skepticism.[480] In Section 4.3, the antecedents of professional skepticism as synthesized in the unifying model developed by *Nelson* (2009) are discussed and underpinned with relevant research findings. Section 4.4 sheds light on the notion of skepticism as a trait and on the psychometric scale developed by

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473 *Cook/Winkle* (1988): 77 define integrity as "*moral soundness, especially when revealed in situations testing one's steadfastness to truth, purpose, responsibility, and trust.*" *Buckley* (1978): 65 argues that integrity has no value *per se* in the context of professionalism, as "*honest idiots have no hope of becoming professionals*". Rather, integrity fulfils the function to add value to the services provided by a competent and skilled professional auditor.

474 *Cook/Winkle* (1988): 77 define objectivity as "*a state of mind enabling the professional to be impartial, intellectually honest, and free from conflicts of interests*."

475 See *CICA* (1995): 35, quoted in *Dennis* (2013): 29.

476 See *Carey* (1956): 50; *Pound* (1953): 5.

477 See *Shaub/Braun* (2014): 4. For a differently nuanced discussion of the meaning and implications of professionalism in auditing, see *Quadackers* (2009): 14.

478 *IAASB* (2013): 29.

479 For such claims and a similar argumentation in the context of professional judgment, see *Dennis* (2013): 30.

480 Given the complexity and multidimensionality of the professional skepticism construct, the adoption of a broad and discursive approach in studying skepticism is inevitable. See *FRC* (2012): 1.

Hurtt (2010) which are of central importance for the present study.[481] In Section 4.5, the role of trait professional skepticism in the context of auditors' belief revisions is discussed.

4.2 Definitions and Views of Professional Skepticism

This section deals with some definitional issues and the various perspectives of (professional) skepticism. The section is organized around three basic lines of consideration: skepticism in a general (humanitarian) sense, professional skepticism in a normative sense, and professional skepticism as discussed in the academic auditing literature.

4.2.1 Skepticism in a General Sense

There is a great variety of skepticism notions, definitions, views, and arguments in the humanities, especially in philosophy and consumer research. Subsequently, some central aspects are highlighted. The following overview does not intend to provide an exhaustive survey of all relevant varieties, aspects, and definitions of skepticism. Rather, it aims to embed skepticism in a broader context, illuminate some important aspects regarding its nature, and highlight the versatility of skepticism, thereby paving the way for the subsequent consideration of professional skepticism in auditing.

The term "skepticism" stems from the Greek word "*skeptikos*" which means "to consider", "to examine", "to observe carefully". It is closely related to the term "*skepsis*" which means "inquiry" and "doubt".[482] In ordinary usage, skepticism generally refers to an attitude of doubt.[483] It essentially involves questioning truth and knowledge claims, challenging assertions and beliefs as well as striving for precision and clarity in definition, consistency in logic, and sufficient reasonableness of arguments and evidence. Despite its controversial acceptance, skepticism plays a key role in philosophy, religion, politics, ethics, science, and consumer research.[484] Subsequently, some of the most important skepticism areas are briefly outlined.

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[481] It should be noted that the mutual consideration and combination of different models and notions of professional skepticism is vital, because contemporary auditing research on skepticism, although progressively developing and quite insightful, is still at a stage that does not allow for a single model of professional skepticism in auditing to be depicted. See *Doucet/Doucet* (1996): 159. In the present study, the models and notions of *Nelson* (2009) and *Hurtt* (2010) are combined to provide the theoretical framework for the consideration of the concept professional skepticism in auditing.

[482] See *Kurtz* (1992): 21; *Stough* (1969): 3.

[483] See http://www.merriam-webster.com/dictionary/skepticism. The term "skepticism" is generally used synonymously with "distrust", "dubiety", "suspicion", and "query". Terms closely related to "skepticism" include "disbelief", "incredulity", and "concern". The antonyms of "skepticism" encompass "credence", "faith", "trust", "belief", "assurance", "conviction", and "certitude". See http://www.merriam-webster.com/thesaurus/skepticism.

[484] See *Kurtz* (2001): 39.

Philosophical Skepticism[485]

The origins of (philosophical) skepticism can be traced back to ancient Greece.[486] Ancient skepticism evolved into two schools of thought: Pyrrhonism, a stream of thought inspired by *Pyrrho of Elis* (360-270 BCE), and academic skepticism which emerged in *Plato*'s Academy, with *Carneades* (213-128 BCE) as its most influential representative. Skeptical thought further flourished in Rome, with *Cicero* (106-43 BCE) and *Sextus Empiricus*[487] as its most notable adherents.[488] Overall, ancient skepticism involves an existential critical[489] questioning of the possibility of knowledge[490]. Hence, skepticism represents the antithesis of dogmatism (the belief that absolute truth exists and knowledge of the truth is possible).[491]

In the ancient civilization, skepticism was considered a valuable virtue[492] and recommended as an attitude in life. It was argued that a life lived in skeptical doubt is superior to a life lived in dogmatic certainty, as the former involves living with a calm, peaceful state of mind, free from particular assumptions, beliefs, and judgments. The ancient Greeks referred to this state of mental tranquility as "*ataraxia*".[493] However, several centuries later, skepticism became subject of severe criticism, most notably by *Saint Augustin* (354-430), and during the Dark Ages, an era dominated by unconditional faith, skepticism virtually eclipsed. During the Renaissance, it reemerged as an essential part of human thought and a vital ingredient of the scientific approach. Skepticism played a central role in the writings of a number of famous

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485 Broadly speaking, philosophy deals with "*questions about the meaning, truth, and logical connections of fundamental ideas that resist solution by the empirical sciences*", *Woodhouse* (2011): 3. Skepticism is an essential part of philosophical thought as raising doubts and maintaining a critical position inevitably accompanies philosophical questioning. See *Lom* (2001): 31. The philosophical considerations provided here focus on epistemological skepticism, i.e., skepticism concerned with central categories such as knowledge, belief, and justification. The counterpart of epistemological skepticism is conceptual skepticism which principally deals with issues of meaning and terminology. See *Stough* (1969): 1; *Williams* (2008): 82. The consideration of the latter is beyond the scope of this section. In addition, it should be noted that the philosophical literature on skepticism is immense and equivocal with regard to the nature, scope, and different forms of philosophical skepticism. As the provision of an in-depth, exhaustive philosophical analysis of skepticism is beyond the scope of this work, the following considerations are necessarily rudimentary and selective in nature. They merely intend to introduce some basic philosophical accounts with regard to skepticism as a prelude to the discussion of professional skepticism in auditing.

486 See *Popkin* (1979): xiii.

487 *Sextus Empiricus* was a prominent defender of Greek Skepticism who lived in the last half of the second and the first quarter of the third century AD. Although there is no historical certainty about his origins and affiliation, it is believed that he was a Greek, a physician, and possibly a medical doctor. See *Hallie* (1985): 27. *Sextus* understood skepticism as "*an ability to place in antithesis, in any manner whatever, appearances and judgments, and thus – because of the equality of force in the objects and arguments opposed – to come first of all to a suspension of judgment and then to mental tranquillity*", quoted in *Hallie* (1985): 32f.

488 See *Kurtz* (1992): 31.

489 Note that in ordinary usage, the term "critical" is frequently negatively loaded. As argued by *Woodhouse* (2011): 48, there is some negativity in the sense that being critical involves questioning, challenging claims and assumptions, suspending beliefs, and exerting cognitive load. However, in essence, critical thought is considered a positive and constructive enterprise because it is the key to problem solving, open-mindedness, and progress. This contention can also be conveyed to skepticism.

490 In a philosophical sense, knowledge can generally be defined as "*justified true belief*", *Johnson* (1978): 12.

491 See *Popkin* (1979): xxi

492 For a definition and discussion of the term "virtue", see *Morales-Sánchez/Cabello-Medina* (2013): 720f.

493 See *Burnyeat* (1983): 121; *Greco* (2008): 4; *Meidan* (2004): 10.

thinkers, including *Montaigne*, *Bayle*, *Descartes*, *Hume*, *Wittgenstein*, *Kant*, *Nietzsche*, and *Freud*.[494]

The brief outline of the central aspects of philosophical skepticism is rounded off with a classification of the main forms of philosophical skepticism. This classification follows *Kurtz* (1992, 2001) and distinguishes between four basic categories of skepticism: total negative skepticism, neutral skepticism, mitigated skepticism, and contextual skepticism.

Total negative skepticism is the most extreme form of skepticism. It involves a total denial of all claims to knowledge, truth, and value.[495] This kind of skepticism involves the notion that there is no certainty and no reasonable and satisfactory basis for beliefs and assertions. Hence, all that people encounter are subjective impressions and perceptions, and there is no reliable evidence or proof that these sensations correspond to the external world[496] or reality.[497] Total negative skepticism can be equated with nihilism or negative dogmatism.[498]

Neutral skepticism is a less dogmatic form of skepticism which involves a position in which one neither accepts nor rejects anything. This state of mind results in an entire suspension of judgment and belief (*epoché*).[499]

Mitigated skepticism builds on the insight that even though knowledge is ephemeral and ultimate truths about reality and the external world are utopic, the development of beliefs is a central demand of life. Hence, even if beliefs merely rest upon probabilities, experience, or other cognitive constructs rather than certainties and ultimate truths, one needs to update beliefs and develop knowledge as a pragmatic requirement of life.[500]

Contextual skepticism, the last and most contemporary major form of skepticism according to *Kurtz*, can be distinguished from the other forms outlined above through its positive and constructive nature. Contextual skepticism does not involve a universal critical position to all

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[494] See *Kurtz* (1992): 31f. For a detailed overview of the historical origins and development of skepticism during the centuries, refer to *Hallie* (1985): 9-28, *Kurtz* (1992): 32-74, and *Lagerlund* (2010). For a discussion of modern (as opposed to ancient) skepticism and the influential work of *Descartes* (1596-1650), *Locke* (1632-1704), *Berkeley* (1685-1753), *Hume* (1711-1776), and *Kant* (1724-1804), consult *Popkin/Stroll* (2002): 59-101. For a discussion of contemporary (twentieth century) skepticism and the seminal work of *Russel* (1872-1970), *Moore* (1873-1958), *Wittgenstein* (1889-1951), and *Derrida* (1930-2004), refer to *Popkin/Stroll* (2002): 103-143.

[495] This dogmatic form of skepticism is based on the famous Socrates' phrase: "I know that I know nothing." See *Popkin/Stroll* (2002): 54.

[496] This term refers to the world that exists outside of an individual's own mind. See *Huemer* (2001): 7.

[497] See *Kurtz* (1992): 23.

[498] See *Kurtz* (2001): 40f. The unconditional rejection of the possibility of knowledge is the credo of academic skepticism. Notice that this form of skepticism is claimed to be self-contradictory, as arguing that no knowledge, certainty, and truth are possible, academic skeptics have already made a claim. See *Johnson* (1978): 22f. However, there are also many good reasons to embrace and study the notion of total skepticism. For an overview, see *Johnson* (1978): 22f.

[499] See *Kurtz* (2001): 41. This neutral state of suspension of judgment and belief reflects the Pyrrhonian notion of skepticism.

[500] See *Kurtz* (2001): 42. The most prominent proponent of mitigated skepticism is the famous Scottish philosopher *David Hume* (1711-1776). Note, however, that the notion of mitigated skepticism arose twenty centuries earlier, in the second century BCE, and was defended by the Greek Philosopher *Carneades*. See *Kurtz* (2001): 42.

possible issues. Rather, it is restricted to the context under consideration.[501] It takes into account that some assertions are unjustified, improbable, and incorrect. Consequently, contextual skepticism involves reflective doubt which results in an increased demand of evidence and reasonable argumentation for the evaluation of hypotheses and claims. This form of skepticism advances the quest of knowledge and constructive informed inquiry. In contrast to neutral skepticism, contextual skepticism builds upon the notion that human knowledge is possible, and that it can even be reliable. Furthermore, it differs from mitigated skepticism in that it does not highlight total uncertainty. Rather, it focuses on the impressive ability of the human mind and cognition to think, infer, and comprehend.[502]

With regard to auditing, the last skepticism form appears most relevant and applicable as it involves reflective situational doubt and critical informed inquiry. In contrast, total negative skepticism, which involves universal denial, disbelief, indecision, and diffidence,[503] seems incompatible with the objective of auditing to provide an overall opinion (i.e., judgment) regarding the compliance of the client's financial statements with the applicable norms and standards.[504]

Religious Skepticism

As indicated above, there is a variety of skepticism prospects. Over the ages, skeptics have questioned the possibility of knowledge, the justification of beliefs, the reality of the external world, human mind, the past, the future, induction, causation, etc.[505] Considering this wide array of abstract and material objects of doubt, it is not surprising that the existence of God and religious[506] claims have also been disavowed. This issue is covered by the genre of religious skepticism, which has a long history in the skeptical tradition.[507]

Religious skepticism is concerned with doubts about theistic religious commitment, resulting in skepticism about God's reality.[508] Religious skeptics typically deny that any religious claim is true and argue that there is no sufficient and adequate evidence supporting the belief in

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501 See *Kurtz* (2001): 44.

502 See *Kurtz* (2001): 44f.

503 See *Naess* (1968): 53. He lists many other negatively-loaded characteristics attached to skeptics beyond the ones mentioned above. However, he claims that this criticism on classical skepticism is groundless and misconcepted, at least with regard to the writings of *Sextus Empiricus*.

504 The fundamental overall objectives of the auditor, i.e., obtaining reasonable assurance about the accuracy (freedom from material misstatement) of the financial reporting statements and their conformity to the applicable financial reporting rules as well as the reporting on the financial statements in accordance with the results of the conducted audit and auditor's findings, are stated in ISA 200.11.

505 See *Moser* (2008): 200.

506 According to *Kurtz* (1992): 193, "religion" generally refers to "*those systems of faith that venerate an occult, supernatural, or divine being*". However, there is a substantial disagreement regarding the meaning of the term "religion" and a number of alternative (broader) definitions.

507 For instance, skeptical thoughts on God and his existence can be found in the ancient writings of *Sextus Empiricus*. See *Hallie* (1985): 175-215.

508 See *Moser* (2008): 202. He acknowledges that each person attaches a different understanding to the term "God", which makes a generally accepted definition, or a common notion, of God utopic. Nonetheless, the term "God" is usually used to refer to an "*authoritatively and morally perfect creator who is worthy of worship, including full adoration, love, and trust.*" *Moser* (2008): 202.

God's reality. Under these circumstances, the cognitively appropriate approach is to raise doubts, i.e., suspend judgment that God or religious reality actually exist.[509]

Political Skepticism

Political skepticism includes raising doubts about the virtue and moral principles of politicians and the government. It mirrors a general distrust of those who rule and exercise power.[510]

Moral Skepticism

Moral skepticism questions the meaning and justifiability of major ethical categories, such as "right" and "wrong", "good" and "bad", "justice" and "unjustice". It posits that no ethical standards, values, and claims are known to be true and correct.[511]

Scientific Skepticism

Skepticism is vital in science,[512] as it implies that theories, postulates, arguments, interpretations, empirical evidence, etc. are not merely taken for granted but are subjected to critical thought and investigation. The tension between skepticism and belief is an essential ingredient of scientific advance, as researchers regularly have to justify their findings, positions, and beliefs against the doubts and concerns of the peers.[513] Scientific skepticism can broadly be described as an ongoing, systematic, and critical informed questioning. In this sense, it exhibits many parallels to auditing.[514]

Advertising Skepticism

Skepticism is also a central topic in the field of consumer research where the attitude with which a person faces marketers' motives and advertising claims and promises is a key determinant of consumer choice and behavior. Similarly to the fields discussed above, advertising skepticism has been defined in terms of an individual's tendency to question and disbelief

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509 See *Moser* (2008): 203; *Schellenberg* (2007): 3. For a more comprehensive philosophical and theistically-oriented overview of religious skepticism, refer to *Moser* (2008), *Popkin/Stroll* (2002): 145-187 and *Schellenberg* (2007).

510 See *Lom* (2001): 2. The most prominent and influential adherent of political skepticism is *Nietzsche*. For a detailed overview of his skeptical view on politics and the state, refer to *Shaw* (2010). For a general philosophical discussion of political skepticism, refer to *Popkin/Stroll* (2002): 245-289.

511 See *Cornman/Lehrer/Pappas* (1992): 299; *Peterson* (2008): 216. For a detailed account and references on the issue of moral skepticism, refer to *Popkin/Stroll* (2002): 189-244, *Sinnott-Armstrong* (2007) and *Superson* (2009).

512 See *FRC* (2012): 6f. Essentially, science is a cognitive achievement of the highest order. It involves a bunch of intellectual qualities and highly complex cognitive processes such as reasoning, logic, analytical and abstract thinking, problem recognition and solving, hypothesis formulation and testing, among others. See *Feist* (2006): ix.

513 See *Feist* (2006): 225.

514 For such claims and a discussion of the analogies as well as the discrepancies between the scientific method and the audit, refer to *FRC* (2012): 6-8.

claims.[515] In addition, and more importantly, in consumer research, skepticism has been conceptualized as involving both a situational and a dispositional component. *Situational* skepticism represents a momentary state of disbelief aroused by contextual stimuli, whereas *dispositional* skepticism reflects an individual's enduring and cross-situationally consistent tendency to doubt and suspicion.[516] As will be shown in Section 4.4, this view of skepticism is also shared by *Hurtt* (2010) and is central to her research work.

Overall, skepticism is a central notion in the humanities. As will be shown subsequently, its role in auditing is not less foundational than in the fields considered above. In a nutshell, skepticism is essentially a state of mind which involves critical questioning and inquiry and often induces deferral of belief and judgment.[517]

4.2.2 Professional Skepticism in a Normative Sense

In the context of growing globalization, complexity, dynamics, and uncertainty of economic conditions worldwide, the needs and expectations of the public regarding the reliability and integrity of financial statement information are continuously increasing. At the same time, accounting and financial reporting are growingly characterized through a great deal of judgment, future orientation, estimation, latitude, and subjectivity.[518] In the context of these developments, auditing, which essentially aims at adding credibility and reliability to financial statement information,[519] is becoming more than ever critical for the effective operation of capital markets worldwide.[520] In order to achieve and maintain high financial statement quality, objectively inform investors, and effectively support market confidence, audit quality is essential.[521] Professional skepticism is a key ingredient of audit quality.[522] As aptly put by *Bogle* (2000), "*[i]t is the auditor's stamp on a financial statement that gives it its validity, its respect, and its acceptability by investors. And only if the auditor's work is comprehensive,*

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[515] See *Forehand/Grier* (2003): 350; *Koslow* (2000): 248; *Obermiller/Spangenberg* (2000): 312.

[516] See *Forehand/Grier* (2003): 349.

[517] See *FRC* (2012): 3.

[518] See *IAASB* (2012): 1; *Peecher/Solomon/Trotman* (2013): 597f.

[519] See, e.g., *Adams* (1978): 39; *Rezaee/Riley* (2010): 130; *Soltani* (2007): 520; *Wahlen/Baginski/Bradshaw* (2010): 41.

[520] See *King* (1991): 108. For an in-depth discussion of the importance of auditing for the capital market, see *Qandil* (2014): 50-72.

[521] See *ASIC* (2012): 5; *CAQ* (2011): 2; *CPAB* (2012): 3. Note that audit quality is an omnipresent term in the auditing literature. However, like professional skepticism, audit quality is a very complex and multifaceted concept which cannot possibly be captured in a single definition, view, or measure. For such claims with respect to audit quality, see *Francis* (2011a): 127 and *Knechel et al.* (2013): 385, and with regard to professional skepticism, see *Hurtt et al.* (2013): 45 and *Toba* (2011): 109. For an in-depth terminological, conceptual, and empirical review of audit quality and the substantial body of research on this topic, consult *Francis* (2011a), *Knechel et al.* (2013) and *Qandil* (2014).

[522] See *FRC* (2010): 10; *Hurtt et al.* (2013): 71; *IAASB* (2012): 1; *Murray* (2012): 36; *PCAOB* (2012): 1; *Shaub/Lawrence* (2002): 168. As indicated by *Carcello/Hermanson/McGrath* (1992): 8, the notion of professional skepticism as an important attribute of audit quality is not a new appearance that merely results from the accounting debacles in the last decades.

***skeptical**, inquisitive, and rigorous, can we have confidence that financial statements speak the truth.*"[523]

Professional skepticism plays a fundamental role in auditing. This is particularly evident in light of the fact that auditing is the only profession in which skepticism is explicitly legally codified.[524] Professional skepticism is considered a crucial, not to say the key, audit skill; "*[w]ith it, an auditor is a powerful independent safeguard. Without it, the auditor risks being reduced to a mere compliance 'rubber stamper'.*"[525] Overall, the importance of professional skepticism in planning and performing an audit cannot possibly be overemphasized.[526]

Subsequently, the central definitions and regulations concerning professional skepticism are presented and discussed.[527] In consistency with the extant literature on professional skepticism in auditing, the focus of the following considerations is on the two world-wide most prevalent and influential sets of auditing standards – the International Standards on Auditing (ISA) and the US auditing standards (SAS).

ISA 200.13(l) defines professional skepticism as "*[a]n attitude*[528] *that includes a questioning mind, being alert to conditions which may indicate possible misstatement due to error or fraud, and a critical assessment of audit evidence.*"[529] According to this definition, professional skepticism is essentially „*a behavioral issue*"[530]. It is a state of mind that implies a questioning stance in evidence evaluation, information processing, judgment and decision making.[531] Professional skepticism involves challenging information and audit evidence ob-

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523 *Bogle* (2000), emphasis added.

524 See *Quadackers* (2009): 14.

525 *Fischer*, quoted in *Murray* (2012): 37.

526 See *AUASB* (2012): 1; *IAASB* (2012): 1.

527 It should be noted that in order to keep the discussion of professional skepticism within reasonable bounds, the subsequent normative consideration is restricted to the currently valid auditing standards and professional guidance as well as recent developments and professional bodies' releases on that topic. For a historical overview of the development and transformation of professional skepticism in auditing with an emphasis on the American Auditing Standards and US professional bodies' releases and comments, see *Toba* (2011): 86-92.

528 The view of skepticism as an attitude is also common in ordinary usage as indicated by the following dictionary entry: http://oxforddictionaries.com/definition/english/scepticism?q=skepticism. In a psychological sense, an attitude can be defined as "*a mental and neural state of readiness, organized through experience, exerting a directing and dynamic influence upon the individual's response to all objects and situation with which it is related*", *Allport* (1935): 810. It represents "*an enduring organization of motivational, emotional, perceptual, and cognitive processes with respect to some aspect of the individual's world*", *Krech/Crutchfield* (1948): 152. Consequently, an attitude is a latent construct that determines an individual's beliefs, judgments, and behavior. Following this line of thought, attitudes and traits are very similar constructs. They are both viewed as "*relatively stable, enduring dispositions*", with attitudes assumed to be more malleable and versatile than traits. See *Ajzen* (2005): 6.

529 Note that the German auditing standards (IDW PS) do not provide an explicit definition of professional skepticism. In the IDW PS, professional skepticism is referred to as "kritische Grundhaltung" (literally: "critical tenor" or "critical attitude"). Whether this translation involves some subtle differences in meaning or nuance, is an open question which has not been addressed to date in academic research in Germany. *Deckers/Hermann* (2013): 2317 indicate that in contrast to the USA, in Germany and Europe there is still a lack of sufficiently strong awareness of the fundamental importance and need for further emphasis of the concept of professional skepticism in auditing.

530 *NZAuASB* (2013): 4.

531 See *IAASB* (2012): 3.

tained throughout the audit as opposed to performing the audit "*in an unthinking box-ticking way.*"[532] This general definition of skepticism has been criticized for being rather vague and unspecific as to what constitutes reasonable degrees of questioning and critical inquiry, and how exactly a professionally skeptical attitude is demonstrated and documented in different audit settings.[533] The IAASB acknowledges that it is virtually impossible for a construct of such fundamentality, multidimensionality, and richness to be fully captured by a single definition. In addition, the board recognizes that professionally skeptical behavior can be demonstrated in a number of different, not narrowly specified, ways. These caveats notwithstanding, the definition contained in ISA 200.13(l) constitutes and highlights some central elements which facilitate the understanding of the meaning of professional skepticism in auditing.[534]

Professional skepticism is – along with ethical requirements, professional judgment, sufficient appropriate audit evidence, and performance of the audit in compliance with the relevant auditing standards – one of the essential requirements for the conduct of an audit according to the ISAs.[535] ISA 200.15 regulates that "*[t]he auditor shall plan and perform an audit with professional skepticism recognizing that circumstances may exist that cause the financial statements to be materially misstated*."[536] Importantly, despite the lack of explicit reference to professional skepticism within each single ISA, skepticism is relevant and crucial throughout the entire audit process.[537]

With regard to auditors' positive past experience with a client, ISA 200.A22 sets straight that a complete disregard of the client's credibility and integrity experienced in the past cannot be expected. Nonetheless, a belief in the client's fidelity and trustworthiness "*does not relieve the auditor of the need to maintain professional skepticism or allow the auditor to be satisfied with less than persuasive audit evidence when obtaining reasonable assurance.*"[538] In a similar vein, the Center for Audit Quality (CAQ) argues that in fulfilling their responsibilities to serve the public interest, "*auditors perform their engagements with a skeptical mindset, and they cannot hesitate to challenge management's assertions whenever those assertions run counter to the audit evidence and the auditor's own judgment*."[539]

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[532] *NZAuASB* (2013): 4. This view is also shared by *Trompeter et al.* (2013): 304. The potentially dysfunctional effects arising from use of checklists (limited thinking, effort, and attention) are emphasized by *Bryant/Murthy/Wheeler* (2009): 39f. and *Hogan et al.* (2008): 246.

[533] See *Glover/Prawitt* (2013): 2.

[534] See *IAASB* (2012): 3.

[535] See ISA 200.14-24.

[536] The corresponding German regulation (IDW PS 200.17) reads as follows: "*Die Abschlussprüfung ist mit einer kritischen Grundhaltung zu planen und durchzuführen; die erlangten Prüfungsnachweise sind kritisch zu würdigen. Der Abschlussprüfer muss sich stets darüber im Klaren sein, dass Umstände (Fehler, Täuschungen, Vermögensschädigungen oder sonstige Gesetzesverstöße) existieren können, aufgrund derer der Jahresabschluss und der Lagebericht wesentliche falsche Aussagen enthalten.*"

[537] See *IAASB* (2012): 7.

[538] The corresponding German regulation (IDW PS 200.17) reads as follows: the auditor "*kann (..) nicht ohne weiteres im Vertrauen auf die Glaubwürdigkeit der gesetzlichen Vertreter bspw. von der Richtigkeit ihrer Auskünfte ausgehen, sondern muss sich diese belegen lassen und die Überzeugungskraft dieser Nachweise würdigen.*"

[539] *CAQ* (2011): 4.

Similarly to ISA 200.13(l), SAS 1 (AU 230.7) defines professional skepticism as "*an attitude that includes a questioning mind and a critical assessment of audit evidence*" and highlights its essentiality for exercising due professional care. In consistency with the ISAs, the US auditing standards also require that the audit is planned and conducted with an attitude of professional skepticism (SAS 109, AU 314.19) and that the auditor refrains from assuming client's (dis)honesty and strives for nothing less than persuasive evidence (SAS 1, AU 230.9).

Professional skepticism is closely related to the cornerstone concept of independence.[540] The IESBA Code differentiates two dimensions of independence – independence of mind and independence in appearance. The former is defined as "*[t]he state of mind that permits the expression of a conclusion without being affected by influences that compromise professional judgment, thereby allowing an individual to act with integrity and exercise objectivity and* ***professional skepticism***."[541] The second dimension, independence in appearance, involves "*[t]he avoidance of facts and circumstances that are so significant that a reasonable and informed third party would be likely to conclude (...) that a firm's, or a member of the audit team's, integrity, objectivity or* ***professional skepticism*** *has been compromised.*"[542] In general, independence in appearance can be thought of as the behavioral manifestation of the latent independence-of-mind construct.[543] Overall, independence is a necessary condition for professional skepticism as only an impartial, autonomous, and objective auditor can critically challenge management's assertions and positions and place the public interest above self-interest or the client's interest.

According to *Nelson* (2009), the view of professional skepticism reflected in the aforementioned auditing standards can be classified as *neutral*. That is, the auditor does not take information, evidence, management explanations and claims at their face value but also does not assume biases and misstatements *ex ante*.[544]

A slightly different view of skepticism is found in the standards that deal with the issue of fraud[545]. As argued by *Nelson* (2009), while these standards still refer to the neutral view of professional skepticism codified in ISA 200.15 and SAS 1 (AU 230.9), they put a somewhat

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[540] See *IAASB* (2012): 1. According to *DeAngelo* (1981b): 186, independence is an integral component of audit quality. Moreover, it has even been labeled "*the most fundamental and vital asset possessed by the auditing profession*", *Johnstone/Sutton/Warfield* (2001): 2.

[541] IESBA Code 290.6(a), emphasis added.

[542] IESBA Code 290.6(b), emphasis added.

[543] As will be shown in Section 4.4, there is a strong parallel between the notion of independence and the notion of skepticism not only regarding their fundamental importance in auditing but also with regard to their similarly compound nature comprising both a mindset dimension ("skepticism in mind" or trait professional skepticism) and a behavioral dimension ("skepticism in appearance" or state professional skepticism manifested in skeptical behavior). In addition, both constructs are multifaceted, with independence comprising numerous dimensions and attributes such as autonomous state of mind, idealism, freedom, conscientiousness, etc. See *Farmer/Rittenberg/Trompeter* (1987): 5.

[544] See *Nelson* (2009): 2f. The notion of neutrality underlying the auditing standards has also been recognized by *O'Malley* (2000): 76.

[545] According to ISA 240.11(a), fraud can be defined as "*[a]n intentional act by one or more individuals among management, those charged with governance, employees, or third parties, involving the use of deception to obtain an unjust or illegal advantage.*" For an excellent review and synthesis of fraud-related auditing research, refer to *Hogan et al.* (2008) and *Trompeter et al.* (2013).

differently nuanced emphasis on it – an emphasis which tendentially points toward a *presumptive doubt* perspective of professional skepticism. This view is similar to the one adopted in forensic auditing where assumptions, statements, and data are generally considered doubtful, unless there is sufficient persuasive evidence to the contrary.[546] In particular, both ISA 240 (A15-16, Appendix 2) and SAS 99 (AU 316.53-54) suggest directing inquiries about the (potential) existence of fraud to other persons than those charged with governance (e.g., operating personnel not directly participating in the accounting and financial reporting process, in-house legal counsels, etc.) in order to obtain valuable information which may not otherwise be communicated, and to perform some audit procedures and tests on a surprise or unannounced basis.[547]

Beyond fraud, professional skepticism is especially important in complex, significant and/or highly judgmental areas of the audit, such as accounting estimates, going concern assessments, impairment testing, and related party transactions.[548] The present study is settled in the context of a going concern assessment where an attitude of professional skepticism is essential.[549]

Bell, Peecher and Solomon (2005) indicate that the notion of professional skepticism in professional guidance and societal perception appears to progressively shift from neutrality toward a presumptive doubt perspective.[550] This tendency is evident in the increasingly vocal demands for auditors to raise the bar with regard to the application and maintenance of professional skepticism.[551]

As a final note on this section, it should be noted that the results of audit quality reviews around the world uniformly report a lack of sufficient professional skepticism in a number of judgment domains in auditing. Insufficient or lacking skepticism has been identified as one of the main reasons for audit failures and deficiencies.[552] For instance, the SEC enforcement

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546 See *Bell/Peecher/Solomon* (2005): 22; *Bunge* (1991): 76; *Nelson* (2009): 3. A more detailed consideration of the neutrality and presumptive doubt views of professional skepticism is provided in the following section within the discussion of the different skepticism perspectives found in the relevant auditing literature.

547 This line of argumentation follows *Bell/Peecher/Solomon* (2005): 22. The crucial importance of professional skepticism for deterring and detecting fraud in financial statements has also been highlighted by the Center for Audit Quality which has termed skepticism the inherent "*enemy of fraud*", *CAQ* (2010): 19. A further apt qualification of professional skepticism in the context of fraud examination is the one expressed by *Wells* (2003): 80 who views skepticism as an amelioration of the auditor's "sixth sense".

548 See *AUASB* (2012): 3f.; *IAASB* (2012): 10f.; *PCAOB* (2012): 1. Due to the significance of these key audit issues, they regularly represent an area of particular focus within the audit quality inspections of oversight bodies. In addition, emphasis is put on complex judgments and audit tasks like revenue recognition, recoverability of deferred tax assets, and group audit considerations. See *FRC* (2013): 17.

549 The going concern assessment has been classified as one of the most critical and important audit judgments because the assumption of viability and continued existence is crucial to the interpretation of financial statement information. See *Dilla et al.* (1991): 114.

550 See *Bell/Peecher/Solomon* (2005): 66.

551 Consider in this context, for instance, the discussion paper issued by the UK's Financial Reporting Council (*FRC* (2010)) labeled "Professional Skepticism: Raising the Bar". Note, however, that the requirement to "raise the bar" and take on a presumptive doubt mindset bears the risk of audit inefficiencies and deteriorated working relationships with the client. This point is addressed in Section 4.2.3.2.

552 See, e.g., *ACRA* (2012): 4f., 32; *APAK* (2011): 3, 13; *ASIC* (2012): 4, 13; *CPAB* (2012): 4, 9, 21; *FRC* (2013): 5. A prominent instance for the consequences of a lack of professional skepticism is the Enron deba-

actions against auditors in the period 1987-1997 show that the lack of an appropriate level of professional skepticism is among the top three audit deficiencies (present in 61% of the cases alleged). Poor skepticism was only preceded by deficient audit evidence (80% of the cases) and lacking due professional care (71% of the cases).[553] Similar results are reported in a recent study by *Messier, Kozloski and Kochetova-Kozloski* (2010) who identified 28 instances of enforcement actions against engagement quality reviewers conducted by the SEC and PCAOB since 1993. In 22 out of the 28 identified cases (78.6%), a lack of sufficient professional skepticism was alleged.[554] Overall, the lack of professional skepticism is clearly a significant issue in auditing. It represents a common finding and source of considerable concern in the context of audit quality inspections worldwide.[555] These findings suggest that despite its prominence throughout the auditing standards and the strong emphasis by auditing standard setting bodies,[556] professional skepticism remains a concept that is difficult to fully grasp, comprehend, and implement.[557] In this context, in its Green Paper on audit policy, the European Commission raises the question of whether and how professional skepticism should be reinforced.[558]

In light of the foregoing, the conduct of a systematic theoretical and empirical inquiry into the nature, determinants, and constraints of professional skepticism in auditing is becoming more critical than ever. The following sections provide an overview of the state of the art of academic research on professional skepticism in auditing. The overview begins with a discussion of the central definitions and views of professional skepticism provided in the relevant auditing literature (Section 4.2.3). Building on that, the conceptual framework of determinants and constraints of professional skepticism in auditing developed by *Nelson* (2009) (Section 4.3) as well as the insightful notion of the nature of professional skepticism offered by *Hurtt* (2010) (Section 4.4) are presented and discussed.

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cle. In this case, strong indications were evident suggesting that the auditors in charge from Arthur Andersen failed to exercise the necessary professional skepticism and to adopt a critical attitude to management's assertions and presentations. Instead of acting skeptically, they appear to have taken at face value management's statements regarding the related-party transactions and complex valuations. In the Enron case, familiarity and fee dependence seem to have played a catalyzing role. See *Benston/Hartgraves* (2002): 126f. For a discussion of the adverse effects of familiarity and fee dependence on auditors' professional skepticism, see Section 4.3.2.3.2.

553 See *Beasley/Carcello/Hermanson* (2001): 65. As demonstrated by *Toba* (2011): 86-92, the identification of insufficient application of professional skepticism throughout the audit is not a recent phenomenon. In fact, professional skepticism deficiencies consistently surround auditing from the emergence of the concept till today.

554 See *Messier/Kozloski/Kochetova-Kozloski* (2010): 234, 243-245. Interestingly, only eight out of the 28 identified cases (28.6%) involved Big 5 audit firms.

555 See *IFIAR* (2013): 9.

556 See, e.g., *IAASB* (2012): 1; *PCAOB* (2012): 7.

557 *Toba* (2011) attributes the difficulties in the implementation and proper application of professional skepticism in auditing to (1) a reluctance to increase professional responsibility; (2) a growing complexity in the audit environment; and (3) a positivistic evidential approach inherent to auditing. For a discussion of the individual categories, see *Toba* (2011): 92-95.

558 See *European Commission* (2010a): 9.

4.2.3 Professional Skepticism as in the Auditing Literature

Although the academic auditing literature has dedicated substantial effort and attention to exploring and specifying professional skepticism, a succinct and generally accepted definition and view of skepticism are still lacking.[559] Indeed, different nuances and emphases have been attached to the term "professional skepticism" in the auditing literature, resulting in a heterogeneous use and understanding of what professional skepticism essentially means. At the one end of the spectrum are definitions and descriptions that view professional skepticism as a *neutral* construct; at the other end of the spectrum, skepticism is conceptualized in terms of *presumptive doubt*.[560] Subsequently, the two predominant views of professional skepticism in the auditing literature are discussed. At the end of this section, other noteworthy definitions and views of professional skepticism found in the relevant auditing literature are briefly outlined.

4.2.3.1 Neutrality Perspective

As touched upon in the preceding section, the neutrality perspective of skepticism is argued to underlie the majority of current auditing standards.[561] In essence, this perspective implies that the auditor neither blindly trusts nor distrusts the entity's management. Under this notion, audit evidence needs to be obtained by the auditor in order to verify and corroborate management's representations and assertions but also to ensure that opposing explanations can be eliminated. The neutrality perspective can be generalized as "*trust but verify*".[562] Subsequently, the main literature sources employing a neutrality approach to professional skepticism are presented and discussed.

Above all, *Hurtt* (2010) embraces the neutrality notion of professional skepticism. She defines skepticism as "*a multi-dimensional construct that characterizes the propensity of an individual to defer concluding until the evidence provides sufficient support for one alternative/explanation over others.*"[563] Her definition is neutral in terms of balancing out confirmation and distrust proneness with regard to management's assertions and claims. Instead of *a priori* assuming bias or unbiasedness, this position involves concentrating on the sufficiency and persuasiveness of audit evidence.[564] *Hurtt's* (2010) neutrality definition and view of professional skepticism has been adopted by *Hurtt, Eining and Plumlee* (2010).

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559 See *Doucet/Doucet* (1996): 159; *Nelson* (2009): 4; *Toba* (2011): 86

560 See *Bell/Peecher/Solomon* (2005): 21f.; *Nelson* (2009): 2-4; *Quadackers/Groot/Wright* (2012): 3.

561 See *Nelson* (2009): 2f.

562 See *Grumet* (2003): 9; *Quadackers/Groot/Wright* (2012): 6; *Reidy/Theobald* (2011): 5; *Toba* (2011): 84. Note that "trust but verify" is a phrase originally stemming from a Russian national saying which the US President *Ronald Reagen* adopted and frequently used in the context of the nuclear arms negotiations between the USA and the Soviet Union during the Cold War period. See *Grumet* (2003): 9.

563 *Hurtt* (2010): 151.

564 See *Hurtt/Eining/Plumlee* (2010): 5f.

A review of older auditing literature sources reveals that despite its recently gained prominence, the idea of professional skepticism as a neutral concept is not really new. Specifically, *Chazen and Solomon* (1975) argue that the auditor is neither an advocate nor an antagonist but rather a fair-minded umpire. They elaborate on this stating that auditors must internalize "*that they are not mechanical voucherers or tick-markers (…). They must keep their eyes and ears open with a bright, shiny sense of imaginative inquisitiveness and healthy skepticism.*"[565] Similarly, *Thomas, Ward and Henke* (1991) describe professional skepticism as "*an attitude of an impartial referee*"[566]. In a similar vein, *Boynton and Kell* (1996) posit that "*auditors should neither disbelief management's assertions nor glibly accept them without concern for their truthfulness.*"[567] *Shaub and Lawrence* (2002) argue along similar lines, vividly stating that "*the auditor is required to find the balance between paranoia and naïveté, a difficult area of professional judgment.*"[568]

The neutral perspective has also been adopted by *Cushing* (2000) who equates skepticism with a lack of bias – either in a positive or negative direction – in auditors' beliefs. Following this line of thought, being skeptical involves the avoidance of trusting or suspicious attitudes and beliefs.[569]

In addition, defining professional skepticism in terms of informed objectivity is also consistent with the neutrality perspective. This view has been embraced by *Copeland* (1996), *Fornelli and Desmond* (2011), and *Heninger* (2001).[570]

Empirical support for the neutrality view is provided by *Rasso* (2013) who finds that auditors adopting a deliberative mindset exhibit more skeptical judgments and actions than subjects operating under an implemental mindset. A deliberative mindset involves impartiality, objectivity, open-mindedness (i.e., lack of commitment to an alternative), and depth in evidence processing and evaluation. Under this mindset, individuals consider broad, multifaceted interpretations of evidence and diverse alternatives in order to understand the "why" of a problem. An implemental mindset, in contrast, involves a settlement to a preferred alternative and a more focused, specific consideration of evidence, particularly evidence favoring the individual position.[571]

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565 *Chazen/Solomon* (1975): 69. The use of the adjective "healthy" in connection with skepticism can be interpreted in terms of the potential negative influence of an overly skeptical attitude. An alternative (and more polarized) explanation is provided by *Toba* (2011): 104 who views herein an indication of the "sickness" of the skepticism concept in audit theory and practice.

566 *Thomas/Ward/Henke* (1991): 113.

567 *Boynton/Kell* (1996): 38.

568 *Shaub/Lawrence* (2002): 169.

569 See *Cushing* (2000): 1. This notion is seized in Section 4.5.

570 See *Copeland* (1996): 37; *Fornelli/Desmond* (2011); *Heninger* (2001): 115.

571 See *Rasso* (2013): 8f., 29. He also finds that in comparison to an implemental mindset, a deliberative mindset involves a greater perceived difficulty of a problem/task. This might force deliberative individuals to exert more cognitive effort to cope with the complexity of the task, which is expected to boost judgment quality. Alternatively, it can lead to a premature resignation and ending of evidence search and processing, thus adversely affecting judgment quality. See *Rasso* (2013): 5.

4.2.3.2 Presumptive Doubt Perspective

As indicated in Section 4.2.2, the positions of some audit boards and regulators as well as societal expectations increasingly reflect a tendency to view professional skepticism under a presumptive doubt lens.[572] This perspective refers to an attitude of disbelief[573] regarding management's honesty and the unbiasedness of client's assertions and claims unless there is sufficient reasonable evidence to resolve these doubts. This notion can be generalized as "*think the worst, and prove the best*" [574]. The presumptive doubt notion basically corresponds to a forensic approach to auditing. It implies a focus on evidence indicative of material misstatement and fraud rather than non-error-related evidence.[575] Overall, the presumptive doubt perspective has found a very broad support and application in the relevant auditing literature. Subsequently, the major studies embracing this perspective are reviewed.

The presumptive doubt view is most prominently manifested in the professional skepticism definition provided by *Nelson* (2009) as "*a heightened assessment of the risk that an assertion is incorrect, conditional on the information available to the auditor.*"[576] He elaborates on this definition inferring that it implicates that auditors who possess a high level of professional skepticism tend to require more sound and convincing evidence – both in terms of quantity and quality – in order to view an assertion as reasonable, correct, and justified.[577] However, *Nelson* (2009) also acknowledges that the maintenance of an attitude of presumptive doubt comes at a cost – it may induce considerable audit inefficiencies (overauditing, deadline and budget issues) and client's bad blood.[578] These caveats notwithstanding, *Nelson's* (2009) definition of professional skepticism has been adopted in a number of recent studies, including *Bowlin, Hobson and Piercey* (2014), *Brown-Liburd, Cohen and Trompeter* (2013), *Carpenter, Durtschi and Gaynor* (2011), *Carpenter and Reimers* (2013), *Fukukawa and Mock* (2011), *Harding and Trotman* (2011), *Peytcheva* (2014)[579], *Robinson* (2011), and *Robinson, Curtis and Robertson* (2013).

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572 See *Bell/Peecher/Solomon* (2005): 66.

573 Note in passing that in there is some controversy in the philosophical literature as to whether "belief" and "disbelief" are opposing categories. While some authors contend that "doubt", rather than "disbelief", is the opposite of "belief" (see, e.g., *Lundholm* (1936): 5), others view "disbelief" and "belief" as the end points of a continuum (see, e.g., *Quine/Ullian* (1978): 12).

574 *Fischer*, quoted in *Murray* (2012): 37.

575 See *Bunge* (1991): 76; *Nelson* (2009): 3.

576 *Nelson* (2009): 1.

577 See *Nelson* (2009): 4. *Quadackers* (2009): 16 argues that, strictly speaking, *Nelson*'s definition cited above does not literally and essentially represent a definition/description of the concept of skepticism but rather reflects its related appearances (i.e., (skeptical) judgments and decisions).

578 See *Nelson* (2009): 4. In this context, *Murray* (2012): 36 emphasizes the importance of achieving the right balance between doubt and practicality. This view is also shared by the *FRC* (2010): 5. In a recent study, *Carpenter/Reimers* (2013): 58f. do not identify efficiency losses due to an emphasis on professional skepticism.

579 Note that in addition to presumptive doubt, *Peytcheva* (2014) considers professional skepticism under a social contract theory lens. Drawing on this theory, she argues that when individuals (auditors) face situations in which others (client's management or personnel) receive benefits in exchange for obligations, a cheater-detection state of mind is automatically activated which involves the explicit consideration of the motives and incentives of the others to violate a social contract as well as an active search for evidence of

Like neutrality, the presumptive doubt perspective is also present in the older literature. In particular, *Hogarth and Einhorn* (1992) define a skeptic as an individual who possesses a high sensitivity to negative evidence but neglects positive evidence. Similarly, *McMillan and White* (1993) define professional skepticism as an attitude involving a focus on evidence hinting at error and misstatement.[580]

Also consistent with the presumptive doubt perspective is the branch of research which defines professional skepticism in terms of *distrust*. Before focusing on distrust, it is important to shed light on the concept from which it originates, i.e., the concept of trust.[581] As defined by *Rotter* (1967), trust involves "*an expectancy (...) that the word, promise, verbal or written statement of another individual or group can be relied upon.*"[582] Trust plays an essential role in human life, both personal and professional.[583] It is also vital in the context of auditing.[584] As argued by *Shaub* (1996), trust is an integral and indispensable part of the audit process, given that a full audit of all transactions is usually not possible and practicable, and hence the auditor has to rely on the truthfulness of the unaudited part of the client's financial files and records.[585] As the results of a recent survey show, auditors indeed believe it is essential to trust the auditee.[586] However, an overly trust[587] in the client may have an impeding influence

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deception. *Peytcheva* argues that the cheater-detection mindset essentially represents a state of enhanced skepticism. For a detailed discussion of the rationale of social contract theory and its applicability to auditing, see *Peytcheva* (2014): 32-35.

580 See *Hogarth/Einhorn* (1992): 40; *McMillan/White* (1993): 443f. As might be recalled from Section 3.4, a battery of auditing studies provide empirical support for auditors' greater sensitivity to negative evidence in information integration and belief revision (e.g., *Ashton/Ashton* (1988), *Ashton/Ashton* (1990), *Butt/Campbell* (1989), *Cushing/Ahlawat* (1996), *Favere-Marchesi* (2006), *McMillan/White* (1993), *Monroe/Ng* (2000), *Reckers/Schultz* (1993)). Studies reporting contrary findings, i.e., providing evidence of higher sensitivity to positive information and confirmation proneness in auditors' judgments and actions, include, e.g., *Bamber/Ramsay/Tubbs* (1997), *Ayers/Kaplan* (1993), *Church* (1991), *Morton* (2001), *Pei/Reed/Koch* (1992), and *Waller/Felix* (1984).

581 For an excellent general discussion of the concepts of trust and suspicion as well as the nature of their interrelation, refer to *Deutsch* (1958): 265-278 and *Kee/Knox* (1970): 357-365. *Kee/Knox* (1970) raise some fundamental (yet open) questions, e.g., are trust and suspicion the extreme end points of a continuum, is distrust actually the opposite of trust, or are distrust and suspicion essentially one and the same thing? See *Kee/Knox* (1970): 357f. *Webb/Worchel* (1986): 215 view trust and distrust as the two extremes of a single dimension.

582 *Rotter* (1967): 651.

583 See *Webb/Worchel* (1986): 213. They argue that without trust, life would be uneasy and unthinkable, and people would turn into paranoids, i.e., individuals who are suspicious of anything and anyone.

584 Following the framework presented by *Lewicki/Bunker* (1996), the most adequate form of trust in the context of auditing is calculus-based trust, that is, trust that is founded on a rational account of the relative costs and benefits arising from trusting or distrusting behaviors. This kind of trust is fragile and adaptive. It follows the principle "trust until otherwise appears justified". In contrast, knowledge-based trust which rests on prior experience and familiarity, and identification-based trust which involves anticipating and sensitizing the desired outcomes of the client both counteract professional skepticism requirements, as they involve a sense of confirmation proneness and lack of critical reflection. See *FRC* (2010): 23.

585 See *Shaub* (1996): 154. *Shaub* (2004): 170 distinguishes between two major types of trust with different implications: rational trust and emotional trust. For a discussion of these trust categories, see *Shaub* (2004): 173-179.

586 See *Rennie/Kopp/Lemon* (2010): 288f.

587 Extreme trust is referred to as "pathological trust", "gullibility", or "credulity". See *Deutsch* (1958): 278. Note that, on the whole, trust is a fragile psychological state which can be much easily and quickly destroyed than built. For a discussion of this issue and further references, refer to *Kramer* (1999): 593f.

on professional skepticism and jeopardize audit quality. Accordingly, distrust is viewed as a more fundamental and critical input to audit quality than trust.[588]

As argued by *Shaub* (1996), distrust and professional skepticism are closely related categories.[589] This notion is also reflected in the definition of professional skepticism provided by *Shaub and Lawrence* (1996) as the "*willing[ness] to doubt, question or disagree with client assertions or generally accepted conclusions*"[590]. The authors emphasize the crucial role of professional skepticism in auditing which consists in "*tempering auditor-client trust with an appropriate measure of suspicion.*"[591] In the same vein, *Shaub and Lawrence* (1999) argue that professional skepticism – understood as the interaction between trust and its opposite – influences auditing at the most fundamental level.[592] The distrust view is also embraced by *Choo and Tan* (2000), *Rose* (2007) as well as *Rose and Rose* (2003).[593]

It is worth noting that the focus of the *distrust* perspective is on the *auditor-client relationship*, with auditors' attitudes toward evidence being of secondary importance. This perspective builds on the notion that the exercise of professional skepticism and suspicion can prevent, or at least reduce, the deleterious consequences of deceptive, hazardous, and self-interested behavior of client's personnel and management. In comparison, the focus of the *presumptive doubt* perspective is on the *risks* auditors are confronted with in the conduct of an audit, such as intentional misstatements, biased information, and "half-truths" obtained from client's management. This view involves an auditor's conservative attitude toward *evidence*.[594]

In summary, neutrality and presumptive doubt are the two most well-established perspectives of professional skepticism. However, as argued by *Glover and Prawitt* (2013), none of them is necessarily optimal in all audit situations,[595] and thus none can be viewed as superior to the other. Empirical research directly comparing the two notions suggests that they indeed involve different implications for audit practice. Specifically, while *Quadackers, Groot and Wright* (2012) find that the presumptive doubt perspective is more reflective of auditors' skeptical behavior than the neutrality view (especially in high audit risk scenarios), *Cohen,*

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588 See *Shaub* (1996): 156.

589 See *Shaub* (1996): 155f. For a contrary opinion, see *Burton* (1980): 52 who argues that professional skepticism does not involve a posture of distrust. He further states that the audit should not be based on an assumption that client's management is concealing facts and throwing dust in the auditor's eyes, and thus should not be conducted in an adversary manner. Interestingly, a similar view could not be identified in the contemporary auditing literature, which suggests that a change of focus from a positive or neutral view of skepticism toward presumptive doubt and distrust has indeed taken place lately.

590 *Shaub/Lawrence* (1996): 126. They view professional skepticism as being determined by an individual's ethical dispositions (personality traits), experience, and situational variables. As will be shown in the next section, this view is in line with the Nelson model of determinants and antecedents of professional skepticism in auditing.

591 *Shaub/Lawrence* (1996): 125.

592 See *Shaub/Lawrence* (1999): 62.

593 Note in passing that *Rose/Rose* (2003): 318f. find that more suspicious auditors exert more elaborative evidence evaluation and information processing in comparison to less suspicious subjects.

594 See *Hurtt/Eining/Plumlee* (2010): 5; *Shaub* (1996): 156; *Shaub/Lawrence* (1996): 125.

595 See *Glover/Prawitt* (2013): 3.

Dalton and Harp (2014) report that presumptive doubt is negatively associated with job attitudes (person-job fit, professional identification, and organizational trust) and involves higher turnover intentions on the part of the auditors. In contrast, neutrality is found to positively affect job attitudes and involve more intentions to continue working within the auditing profession.[596]

4.2.3.3 Other Perspectives

As argued previously, professional skepticism is a very diverse and complex construct that is quite difficult to define and capture. This notion is also reflected by the fact that in addition to the definitions and views of professional skepticism grouped around neutrality and presumptive doubt, a bunch of other perspectives of skepticism can be identified in the relevant auditing literature. Following, the most notable of these different views of professional skepticism are briefly outlined.

Drawing on attitude theory, *Nolder* (2012) views professional skepticism as a construct that is externally (socially) imposed to the auditor.[597] In this context, she suggests the adoption of a more holistic approach in the study of professional skepticism which goes beyond individual aspects and recognizes the role of audit teams, firms, the auditing profession, and society (collective attitudes).[598]

On a more abstract level, *Toba* (2011) defines professional skepticism as a "*hybrid* concept constituting the epistemic[599] *and* psychological aspects of cognition."[600] He elaborates on this definition stating that skepticism encompasses both a knowledge aspect (relating to an individual's attitude toward evidence) and a behavioral aspect (questioning mind, i.e., a personal predisposition).[601] However, this definition appears somewhat tautological because an individual's approach toward evidence evaluation can also be considered as a behavioral aspect that arises from an individual's predisposition to raise questions and doubts vis-à-vis some assertions and evidential matters. Notwithstanding these caveats, the definition provided by *Toba* (2011) highlights the multifaceted cognitive nature of professional skepticism.

The importance of cognitive aspects for the understanding and proper application of professional skepticism has also been recognized by *Plumlee, Rixom and Rosman* (2012) who adopt

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596 See *Cohen/Dalton/Harp* (2014): 24; *Quadackers/Groot/Wright* (2012): 29f. The latter study is described in more detail in Section 4.3.2.2.4 and in Section 4.4.4. For a discussion of the concepts of person-job fit, professional identification, organizational trust, and turnover intentions in connection with the two skepticism notions, see *Cohen/Dalton/Harp* (2014): 8-15. Note in passing that while an attitude of presumptive doubt is increasingly expected from auditors, *Lee/Welker/Wang* (2013): 213 find that auditors' responses in a deception detection scenario fit an attitude of *presumptive trust*.

597 See *Nolder* (2012): 4f., 34f. Note that this view is in contrast to *Hurtt's* (2010) understanding of professional skepticism as an innate personal trait. *Hurtt's* notion of skepticism will be discussed in great detail in Section 4.4.

598 See *Nolder* (2012): 34f.

599 Note in passing that epistemology is the theory of knowledge. See *Butcharov* (1998): 65.

600 *Toba* (2011): 83, italics in original.

601 See *Toba* (2011): 83f.

a cognitive process view of skepticism. In particular, the authors describe professional skepticism as "*a coherent, diagnostic-reasoning process*"[602], the completion of which requires a wide array of cognitive skills. The authors emphasize two specific skills believed to significantly influence an auditor's ability to judge, reason, and act in a skeptical manner: divergent and convergent thinking[603]. Divergent thinking involves the generation of alternative explanations for an unusual evidence or audit findings, whereas convergent thinking refers to the critical evaluation of the reasonableness of the generated hypotheses and explanations. These problem-solving skills are essential for coping with complexity, ambiguity, and lack of structure in the audit domain. In this context, *Plumlee, Rixom and Rosman* (2012) argue that the extant evidence of lacking professional skepticism identified in audit practice can be attributed to the failure of auditing standards and authoritative guidance to provide adequate instructions on the cognitive aspects of information processing and evidence evaluation which underlie professional skepticism. The researchers demonstrate empirically that providing auditors with specific guidance on the proper application and sequencing of thinking modes (divergent thinking followed by convergent thinking) fosters the generation of a more rich set of alternative explanations as well as a more thorough evaluation of the derived alternatives. This finding is in line with the normative requirement of a questioning mind and a critical audit approach.[604]

A different aspect of professional skepticism is addressed by *Bell, Peecher and Solomon* (2005). They emphasize the need for far-reaching skepticism as a prerequisite for high audit quality – skepticism with regard to management's assumptions, evidence, but also regarding the appropriateness of an auditor's own (sometimes fallible) beliefs and judgment processes. While the focus of regulatory, practical, and academic attention has clearly been placed on the former kind of skepticism, i.e., *outward* skepticism, the latter type of skepticism, i.e., *inward* skepticism, although not less fundamental, has largely been neglected. Inward skepticism refers to auditors' preventive self-criticism in anticipation of the claims and objections that others might express against one's beliefs, judgments, and actions.[605] In general, inward (or self-

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602 *Plumlee/Rixom/Rosman* (2012): 3.

603 The notion of divergent and convergent thinking was developed by *J.P. Guilford* (*Guilford* (1950, 1967)) within his conceptualization of creativity and human intelligence. Divergent thinking is closely related to the concept of creativity. It represents a mental process involving the generation of novel ideas on a certain task, with a focus on diversity and quantity of the outcome rather than correctness of the ideas and solutions generated. Divergent thinking encompasses the following aspects of creativity: fluency, flexibility, originality, and elaboration. It involves a number of complex cognitive processes, including deduction, induction, synthesis, differentiation, critical analysis, and problem solving. See *Cohen/Ambrose* (1999): 11; *Razumnikova* (2012): 1028. While divergent thinking naturally involves reasoning in different directions and the generation of a multitude of ideas and potential solutions to a problem, convergent thinking targets at identifying a single (or very few) correct, best possible, or conventional solution(s) from a pool of possible alternatives. See *Plotnik/Kouyoumdjian* (2010): 310; *Runco* (2009): 252. Convergent thinking can be viewed as a fundamental precondition of logical inference. The quality of the convergent thought processes depends on the availability of reasonable declarative knowledge. See *Hammar* (2012): 811. For a concise comparison of divergent and convergent thinking, see *Cash* (2011): 93 and *Cropley* (2006): 391f.

604 See *Plumlee/Rixom/Rosman* (2012): 1-4. For a detailed description of the training modules and experimental procedures, see *Plumlee/Rixom/Rosman* (2012): 17-19, 37.

605 See *Bell/Peecher/Solomon* (2005): 33f. Note that the notion of preemptive self-criticism originates from the psychological literature on accountability effects. See *Tetlock/Skitka/Boettger* (1989): 632f. Empirical support for the benefits of an attitude of self-criticism has been provided by *Grenier* (2013): 4. The requirement

directed) skepticism involves critical, thorough, versatile, counterfactual, and flexible thinking.[606] In the context of growing complexity, uncertainty, and risk of exposure peculiar to the audit environment, inward skepticism appears crucial for avoiding judgment traps, mitigating judgment flaws, and strengthening the justifiability of auditors' beliefs and positions.

Finally, in a recent publication, *Glover and Prawitt* (2013) suggest that viewing professional skepticism as a continuum which ranges from neutrality over presumptive doubt to complete doubt in dependence of the particular audit situation and risk environment might be more beneficial than strictly focusing on any one of the individual skepticism perspectives outlined above.[607] The adoption of a situationally dependent, rather than generalized or aggregated, view of professional skepticism is further advocated by *Robinson* (2011).[608]

In summary, the preceding considerations suggest that a considerable definitional and conceptual unease and heterogeneity exist with regard to professional skepticism in auditing. Overall, professional skepticism can be characterized as a complex, broad, multifaceted, vague, and elusive construct which still involves more questions than answers.[609] In this line of thought, *Doucet and Doucet* (1996) qualify attempts to conceptualize professional skepticism as "*a daunting task, to say the least*"[610]. Nevertheless, endeavors toward reaching a more coherent conceptualization of professional skepticism are critical for gaining a deeper understanding of the nature of this fundamental construct. In the following section, *Nelson's* (2009) model which seeks to provide some remedy for the existing conceptual ambiguity by synthesizing the current theoretical and empirical knowledge in a unifying framework of the determinants of professional skepticism in auditing is presented and discussed.

4.3 The Nelson Model

4.3.1 Model Overview

Recognizing the need for a more systematic and profound understanding of the very complex and entangled construct of professional skepticism in auditing, *Nelson* (2009) synthesized the insights from previous interdisciplinary research into a model of determinants of professional skepticism in auditing (hereafter: the Nelson model). The model is depicted in Figure 5. In a nutshell, the Nelson model indicates that auditors' knowledge, traits, and incentives dynami-

for auditors to be aware of and alert to the ample risks they are exposed to in their profession as well as the possible legal or third party scrutiny of their beliefs, judgments, audit procedures, and working papers has long been recognized in the auditing literature. Given that auditors' *a priori* formed judgments and conducted work are regularly critically questioned in the context of hindsight, i.e., with the distinct benefit of relevant *a posteriori* knowledge, auditors have to be (self-)critical in mind, in style, and in approach. See *Chazen/Solomon* (1975): 67f.

606 See *Grenier* (2013): 7, 9.

607 See *Glover/Prawitt* (2013): 3.

608 See *Robinson* (2011): 18.

609 See *Doucet/Doucet* (1996): 158; *Hurtt et al.* (2013): 45, 72; *Toba* (2011): 109.

610 *Doucet/Doucet* (1996): 158.

cally interact to influence the degree of professional skepticism reflected in auditors' judgments and actions.[611]

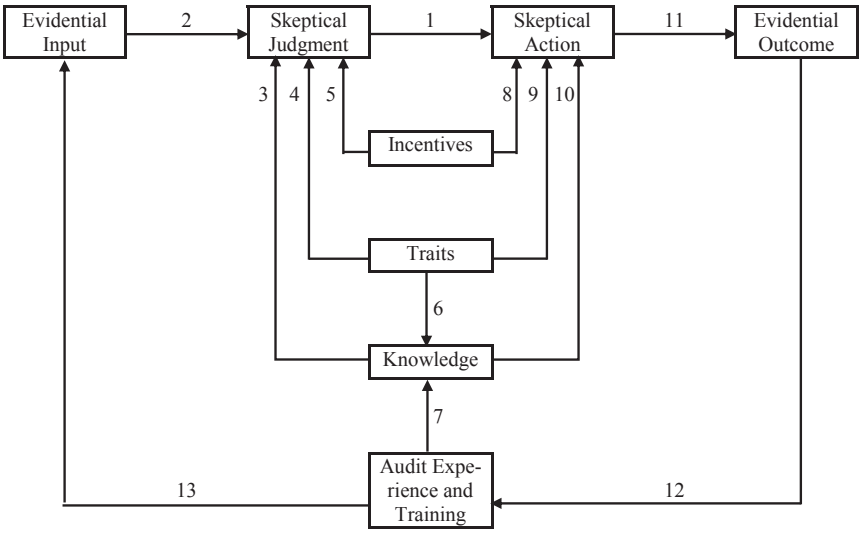

Figure 5: The Nelson Model (Source: Nelson (2009): 5)

At the heart of the Nelson model is the notion that skeptical *judgment* and skeptical *action* are two distinct components that need to be considered separately (link 1). In general, skeptical behavior results from skeptical judgment. However, as will be discussed subsequently, not every skeptical judgment necessarily translates into a skeptical action.[612]

Audit *evidence*[613], i.e., all information obtained and considered throughout the audit, represents a central input to skeptical judgment (link 2). A further important input is *knowledge* (link 3), which on its part is determined by *traits* (link 6) and *experience* (including training) (link 7). Traits generally refer to stable, enduring individual attributes of an auditor, such as intelligence, problem-solving ability, ethical predispositions, skeptical distributions, and the inclination to doubt. Beyond their indirect influence on skeptical judgment (via knowledge), traits also affect the judgment process directly (link 4). In addition, auditors' *incentives* also represent an important determinant of skeptical judgment (link 5).

611 See *Nelson* (2009): 1.

612 See *Nelson* (2009): 5. The distinction between skeptical judgment and skeptical action is further addressed by *Shaub/Lawrence* (2002): 171f.

613 For a detailed discussion of audit evidence, including a consideration of the characteristics of evidence (relevance, authenticity, verifiability), its nature (books of account, mathematical computations, physical existence, documents, letters of representation, oral statements, etc.), and methods of gathering (examination, inspection, confirmation, recomputation, observation, inquiry, and comparison), consult *Cook/Winkle* (1988): 311-333.

Whether a skeptical judgment leads to a skeptical action depends not only on the underlying skeptical judgment (link 1) but also on the presence and constellation of certain incentives (e.g., deadline pressures) (link 8), traits (e.g., autonomy) (link 9), and knowledge (link 10). Finally, skeptical action can influence the extent or nature of evidence cognitively available to the auditor (link 11), which then flows into the auditor's experiential basis (link 12) and transforms into evidential input (link 13) to future judgments and decisions. Accordingly, the Nelson model is circular in nature.[614]

Subsequently, the fundamental determinants of professional skepticism as indicated by *Nelson* (2009) are discussed and underpinned with relevant theoretical and empirical insights.[615] The subsequent review is not intended to be exhaustive or to replicate the contents discussed by *Nelson* (2009). Rather, it aims to provide a broader (meta-analytic) frame within which the very complex and multifaceted construct of professional skepticism to be ranged in.

4.3.2 Determinants

4.3.2.1 Knowledge

Knowledge plays an important role in the context of professional skepticism.[616] As discussed in Section 2.4.2.3.1, knowledge is essentially a latent construct which has generally been operationalized via an individual's experience. Basically, experience is theorized to equip auditors with the knowledge necessary to determine the adequacy, sufficiency, completeness, and validity of audit evidence obtained in the course of the audit.[617] It is expected to increase auditors' ability to identify and anticipate anomalies, inconsistencies, and misstatements in the client's financial statements and to reasonably assess the risk associated with a specific audit engagement.[618] In addition, profound knowledge of financial reporting standards is essential for interacting with client's management regarding contentious accounting treatments. In this sense, knowledge is an elementary condition for exercising professional skepticism.[619]

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614 The model description closely follows *Nelson* (2009): 5f.

615 Note that in a recent synthesis of academic research on professional skepticism, *Hurtt et al.* (2013) proposed an alternative model for the inquiry into professional skepticism. Their model builds upon the model of *Nelson* (2009) but employs a somewhat different approach. Specifically, they build two main categories: skeptical judgment and skeptical action, each of which is analyzed on the basis of the following skepticism antecedents: auditor characteristics, evidential characteristics, client characteristics, and environmental influences. For a comparison of the components of the Nelson model and the alternative model developed by *Hurtt et al.* (2013), see *Hurtt et al.* (2013): 49. Overall, both models are very thorough and insightful. As a parallel in-depth consideration of both models is beyond the scope of the present work, the genuine and more established model developed by *Nelson* (2009) builds the basis for the subsequent discussion of the determinants of professional skepticism. Where necessary and appropriate, *Nelson's* (2009) considerations are extended by adding more dimensions, details and/or novel insights from recent studies recognized as relevant. The most notable supplements are made transparent.

616 See *AUASB* (2012): 5; *IAASB* (2012): 1, 5; *Nelson* (2009): 2, 7f.

617 See *Hurtt et al.* (2013): 51.

618 See *Bell et al.* (1997): 69; *Low* (2004): 203; *Nelson* (2009): 7.

619 See *Nelson* (2009): 2, 7f.

There are numerous studies demonstrating the beneficial influence of auditors' knowledge on performance and judgment quality. For instance, research on this topic has indicated that experience (as a proxy for knowledge) increases the quality of generated hypotheses in identifying material errors in the client's accounts (e.g., *Bedard and Biggs* (1991a), *Wright and Wright* (1997)), improves auditors' risk assessments (e.g., *Low* (2004)), triggers more complete and global problem representations[620] (e.g., *Christ* (1993), *Hammersley* (2006)), and enhances the ability to focus on relevant information (e.g., *Shelton* (1999)) and resist client relations pressures (e.g., *Asare, Cianci and Tsakumis* (2009)).[621] Overall, these experiential aspects can serve to facilitate and increase auditors' professional skepticism. Further empirical support for the benefits of experience for professional skepticism is provided by *Bernardi* (1994), *Carpenter* (2007), *Hammersley* (2006), and *Knapp and Knapp* (2001) who find that more experienced auditors exhibit greater effectiveness in the identification and proper assessment of fraud and material misstatement risk in the client's accounts than less experienced auditors.[622]

However, there is also an array of studies which demonstrate an inverse relation between experience and professional skepticism. Instances for such studies include *Shaub and Lawrence* (1996, 1999, 2002) and *Payne and Ramsay* (2005).[623] A striking example is the study by *Shaub and Lawrence* (2002) who find that the least experienced auditors in their study exhibit the greatest tendencies to not only think but also act in a highly skeptical manner. In contrast, the most experienced auditors are identified as low in both skeptical thought and action.[624]

Likewise, *Taylor* (2000) finds that auditors with no industry-specific experience are more conservative (skeptical) in their inherent risk assessments and exhibit lower confidence in their judgments in comparison with experienced auditors. Corroborating results are presented by *Wright and Wright* (1997).[625]

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620 *Christ* (1993): 306 defines problem representation as an individual's comprehension and interpretation of a specific problem situation which is evoked by the cognitive process of mapping the information available for solving the problem into the existing knowledge structure associated with the particular type of problem.

621 See *Asare/Cianci/Tsakumis* (2009): 230-232; *Bedard/Biggs* (1991b): 87f.; *Christ* (1993): 318f.; *Hammersley* (2006): 310f.; *Low* (2004): 214; *Shelton* (1999): 223; *Wright/Wright* (1997): 290.

622 See *Bernardi* (1994): 77; *Carpenter* (2007): 1132, 1134-1137; *Hammersley* (2006): 332; *Knapp/Knapp* (2001): 25.

623 See *Shaub/Lawrence* (1996): 138-143; *Shaub/Lawrence* (1999): 62, 75f.; *Shaub/Lawrence* (2002): 183; *Payne/Ramsay* (2005): 325f.

624 See *Shaub/Lawrence* (2002): 183. The authors refer to the tendency to exhibit high (low) skeptical thought combined with high (low) skeptical action as "aggressive skepticism" ("reluctant skepticism"). They argue that aggressive skepticism can produce inefficiencies, overauditing and strained relations with the client, whereas reluctant skepticism bears the risk of reduced audit quality. Furthermore, the researchers also identify two additional categories of skepticism: "*measured skepticism*", i.e., skepticism involving moderate skeptical thinking (which is activated in high-risk situations) underpinned with heightened tendency to act skeptically, and "*conflicted skepticism*", i.e., skepticism involving pronounced skeptical thinking combined with reluctance to act on it. The researchers consider measured skepticism superior to the other forms of skepticism as it is involves the lowest cognitive and audit resources and the highest benefits. In contrast, conflicted skepticism is viewed as the least desirable category because it involves recognition of a problem paired with unwillingness to address the issue, which is most common for pragmatic individuals lacking in idealistic values. See *Shaub/Lawrence* (2002): 172-175, 183f.

625 See *Taylor* (2000): 697; *Wright/Wright* (1997): 291f.

At first glance, the finding of more skeptical judgments and behaviors exhibited by inexperienced and/or unspecialized auditors appears counterintuitive, as one may expect novices to lack the knowledge required for a critical evidence evaluation and risk assessment.[626] However, under a dual-process theory perspective (Section 2.2), the documented inverse relationship between experience and professional skepticism is not that surprising. In particular, due to their profound experience and familiarity with specific tasks, industries, and issues, expert and specialist auditors are expected to be confident in their own abilities and to process information in an automatic manner.[627] Automatic thinking and processing (System 1), however, involves a narrow spectrum of alternatives considered, cursory reasoning, and rapid but less thorough and reflected information processing. Consequently, experience and the related automatism in judgment are expected to limit the depth and width of auditors' information processing and to inhibit inward skepticism. Importantly, this phenomenon is neurally conditioned, persistent, and subconscious in nature. Novices, on the other hand, are theorized to exhibit deliberation, effort, and thoroughness in information processing to compensate for the lack of knowledge and to deal with the uncertainty underlying the judgment situation. This condition is expected to foster inward skepticism. Generally, the latter can be viewed as a cognitively demanding attitude which involves reflection, thoroughness, and self-insight, and thus presupposes controlled thinking and processing (System 2). Overall, under a dual-process theory perspective, experience might reduce information processing intensity and inward criticism.[628]

In addition, it should be noted that most auditors lack direct experience with material misstatements and fraudulent reporting, which may lead to a decreasing perception of the possibility of material misstatements and fraud over time.[629] This fact, along with the automatic information processing typical for experienced subjects, may lead to a "default" generation of non-fraud and non-error explanations. Novices, in contrast, are expected to be less automatic and confident in their judgment and decision making. Furthermore, they might be sensitized to the deleterious consequences of fraud through high school and training courses and thus potentially exhibit higher degrees of professional skepticism.[630]

Overall, research on the influence of experience on professional skepticism provides rather inconclusive results. Consequently, future conceptual and empirical research on this topic is clearly needed.[631]

In addition to experience and specialization, auditing standard setters, regulators, and academic research also highlight the importance of training as a knowledge- and skepticism-inducing

[626] For such claims, see *Shaub/Lawrence* (1999): 67.

[627] See *Grenier* (2013): 6f.

[628] The dual-processing analysis of inward skepticism presented here follows *Grenier* (2013): 6-8.

[629] See *Montgomery et al.* (2002): 64; *Rose* (2007): 215; *Zimbelman* (1997): 80.

[630] See *Fullerton/Durtschi* (2004): 23; *Grenier* (2013): 7f.; *Loebbecke/Eining/Willingham* (1989): 25; *Payne/Ramsay* (2005): 323f.; *Shaub/Lawrence* (1999): 67.

[631] For such claims, see *Hurtt et al.* (2013): 52f.

mechanism.[632] Auditing studies on this topic have focused on different aspects and kinds of skepticism training. For instance, *Fullerton and Durtschi* (2004) demonstrate that training internal auditors to be alert to the possibility and symptoms of fraud effectively compensates for low innate (trait) skepticism, so that post training, even naturally less skeptical subjects provide judgments reflecting a higher degree of (state) professional skepticism.[633] *Carpenter, Durtschi and Gaynor* (2011) examine the influence of a forensic accounting course on students' fraud-related judgments and document a significant improvement in subjects' fraud risk assessment abilities upon completion of the specialized forensic training. Importantly, the forensic training appears to have a long-term positive influence on students' mindset and fraud assessment abilities as indicated by the follow-up tests conducted by the authors seven months later. Drawing on *Nelson's* (2009) notion of professional skepticism as involving presumptive doubt and higher risk assessments, the authors infer from the results outlined above that a specialized forensic training can increase an individual's level of professional skepticism.[634]

Another branch of research highlights the importance of sensitizing and training auditors to be skeptical of their own information processing, beliefs, and judgments, as these may be subconsciously biased. This relates to the notion of inward skepticism. As demonstrated by *Grenier* (2013), instructing industry specialists to be self-critical and to bear in mind the chance of bias in their own judgments results in more skeptical judgments than in the case of instructing subjects to be critical of evidence and management's representations. Overall, *Grenier's* results suggest that self-criticism (directed toward the own judgment processes) outperforms outward skepticism (directed toward evidence and client's assertions) in raising experienced auditors' levels of skeptical judgments.[635]

Harding and Trotman (2011), on the other hand, find that inducing outward skepticism is more beneficial in fostering skeptical judgment than inducing inward skepticism. However, it can be argued that these findings are an artefact of the specific research design of the study where views on fraud of differing credibility (partner vs. client) are presented. This condition is expected to interact more strongly with outward rather than inward skepticism. In addition, the operationalization of inward skepticism chosen by *Harding and Trotman* (emphasis on justification) differs from that in the study by *Grenier* (2013) (emphasis on self-insight).[636]

Finally, *Plumlee, Rixom and Rosman* (2012) find that training auditors in convergent and divergent thinking results in more skeptical judgments. The benefits of training auditors to structure their thought processes in particular ways have also been empirically demonstrated

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[632] For instances of auditing boards encouraging the use of training to foster professional skepticism, see *ASIC* (2012): 22, *IAASB* (2012): 5f., and *PCAOB* (2012): 9. Examples of researchers' pleadings for training as an important skepticism-enhancing mechanism include *Plumlee/Rixom/Rosman* (2012): 3 and *Shaub/Lawrence* (2002): 167.

[633] See *Fullerton/Durtschi* (2004): 22f. The concept of skepticism as involving both a state and a trait dimension is discussed in Section 4.4.

[634] See *Carpenter/Durtschi/Gaynor* (2011): 10, 19.

[635] See *Grenier* (2013): 23.

[636] See *Harding/Trotman* (2011): 28.

by *Trotman, Simnett and Khalifa* (2009). They show that instructing auditors to think backward (i.e., beginning with an assumption of an undesirable outcome and searching for a proper diagnose for the problem) leads to more reasonable fraud-related judgments.[637]

To sum up, the preceding overview clearly shows that training auditors to be inwardly and outwardly skeptical and to alter their thinking and information processing toward multidimensionality, creativity, and inquisitiveness appears to be a promising path for improving the application and maintenance of professional skepticism in auditing.[638]

4.3.2.2 Traits

As demonstrated in Section 2.4.2.3, personal factors are central determinants of auditor judgment (quality). In addition, their importance in the context of professional skepticism has been widely recognized as well.[639] *Nelson* (2009) particularly highlights the traits of problem-solving ability, ethical reasoning, dispositional skepticism, and dispositional (dis)trust.[640] A review of the relevant literature suggests that the cultural background and gender of the individual auditor can also affect his/her professional skepticism under certain conditions. Although these attributes do not strictly represent personality traits, they clearly belong to the factors that shape a person's individuality and have an impact on his/her behavior. Hence, culture and gender are also included in the discussion of person-related characteristics which have the potential to influence auditors' professional skepticism.

4.3.2.2.1 Problem-Solving Ability

Nelson (2009) recognizes that the intelligence of an auditor can enhance his/her ability to identify potential irregularities and misstatements in the client's accounts and financial statements. This intelligence-related individual characteristic is referred to as "problem-solving ability".[641]

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637 See *Plumlee/Rixom/Rosman* (2012): 3f.; *Trotman/Simnett/Khalifa* (2009): 1135. By reference to the relevant psychological research, *Trotman/Simnett/Khalifa* (2009) differentiate between backward and forward thinking. The former is retrospective in nature and involves searching for patterns, trying to connect seemingly unrelated events into a sound story, and examining the causational chains behind the outcome. In contrast, forward thinking is prospective and involves gathering and evaluating information in order to determine (predict) an outcome. See *Trotman/Simnett/Khalifa* (2009): 1122.

638 See *Hurtt et al.* (2013): 54f.

639 See, e.g., *AUASB* (2012): 5; *Glover/Prawitt* (2013): 6; *IAASB* (2012): 1, 5; *Nelson* (2009): 2, 8-11.

640 See *Nelson* (2009): 8. As a matter of precision, *Nelson* (2009) uses the generic term "skepticism scales" to include both the concept of trait skepticism (*Hurtt* (2010)) and the concept of (dis)trust (*Shaub* (1996)). Within the present work, both concepts are discussed separately and under the labels "dispositional skepticism" and "dispositional (dis)trust" which more accurately reflect the trait nature of these individual characteristics.

641 See *Nelson* (2009): 8. *Bonner/Lewis* (1990): 6 define problem-solving ability as the skill "*to recognize relationships, interpret data, and reason analytically*". They view this ability as a determinant of expertise. As a matter of fact, the subsequently listed empirical studies which identify a positive influence of problem-solving ability on performance also find a positive relation between experience/knowledge and performance.

Instances for studies indicating that auditors' problem-solving ability contributes to improving performance on complex and ill-structured skepticism-related tasks (e.g., identification of errors causing ratio fluctuations, manipulation of earnings) include *Bonner and Lewis* (1990), *Bierstaker and Wright* (2001), *Libby and Tan* (1994), and *Tan and Kao* (1999).[642] Overall, problem-solving ability has been found to be an important determinant of auditors' judgment performance and an essential attribute for progress and promotion within the auditing profession.[643] To the extent to which problem-solving (analytical) skills increase auditors' ability to cognitively pervade complex and ambiguous audit issues and to recognize potential existing problems and irregularities in audit evidence, it stimulates skeptical judgment. To date, however, empirical research specifically addressing this contention is still missing.[644] Thus, the comprehensive theoretical and empirical exploration of the link between problem-solving ability and professional skepticism represents a promising avenue for future research.

4.3.2.2.2 Ethics and Moral Development

The notion that auditors' independence and professional skepticism are essentially ethical issues is not a novel one.[645] Ethics in the context of auditing involves bearing in mind that auditors' primary responsibility is to serve the public interest. It is crucial for auditors to align their mindsets and behaviors with this ethical compass because a lack of sufficient integrity and objectivity can jeopardize audit quality and lead to considerable reputational damages for the whole auditing profession as in the case of the Arthur Andersen debacle.[646] Hence, an auditor's morality and ethical orientation are critical quality-, independence-, and skepticism-related attributes.[647]

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642 See *Bierstaker/Wright* (2001): 58; *Bonner/Lewis* (1990): 13-16; *Libby/Tan* (1994): 713; *Tan/Kao* (1999): 220f. Note that the results of these studies may not be directly comparable, as different measures of problem-solving ability have been employed. For example, *Bierstaker/Wright* (2001): 50 use the Practical Problem Solving Ability Scale developed by *Devolder* (1993), whereas *Bonner/Lewis* (1990): 10 use excerpts from the Graduate Record Examination (for a general description of the test, see *Green/Wolf* (2011): 3) to measure problem-solving ability. *Tan/Kao* (1999): 216, on the other hand, utilize a set of questions from the Primary Mental Abilities Test developed by *Thurstone* (1938) and the Triarchic Abilities Test designed by *Sternberg* (1988), and *Libby/Tan* (1994) do not specify the measure of problem-solving ability they employ.

643 See *Tan/Libby* (1997): 102.

644 See *Nelson* (2009): 9.

645 See *Falk et al.* (1999): 399; *Jones/Massey/Thorne* (2003): 45.

646 See *Duska* (2005): 19, 28. In a similar vein, *Kung/Huang* (2013): 479f. argue that a stringent and powerful regulation is a necessary condition for preventing corporate misdeeds and scandals, but it may not be sufficient to solve the problem of corporate fraud and dysfunctional behavior. Hence, auditors' high ethical standards are essential for the provision of high audit quality and for strengthening (restoring) public trust in the auditing profession. In this sense, strong ethical reasoning and an idealistic moral outlook can be viewed as the "the last line of defense" for the auditing profession.

647 See, e.g., *IAASB* (2012): 5. As will be demonstrated in Section 4.4.2.5 and in Section 4.4.2.6, moral development strongly relates to the autonomy and self-esteem dimensions of trait professional skepticism. Basically, high ethical standards and moral courage are essential for auditors to skeptically act on the evidence obtained, thereby fulfilling their public interest responsibilities and counteracting pressure and persuasion attempts coming from the client as well as objectivity-, independence, and skepticism-inhibiting incentives. See *Schatzberg et al.* (2005): 233. For a general theoretical and empirical review of the concept of moral development, see Section 2.4.2.3.7.

Prior auditing research indicates that higher levels of moral development are associated with auditors' greater sensitivity to management's competence and integrity (e.g., *Ponemon* (1993)) and generally yield more ethically-oriented judgments and behaviors. Such evidence has been provided in the context of independence issues (e.g., *Falk et al.* (1999), *Ponemon and Gabhart* (1990), *Sweeney and Roberts* (1997), *Windsor and Ashkanasy* (1995)), whistleblowing (e.g., *Arnold and Ponemon* (1991)), earnings management (e.g., *Brandon et al.* (2007)), fraud detection (e.g., *Bernardi* (1994)), and work-related (time, peer, and client-induced) pressure (e.g., *Ponemon* (1992b), *Tsui* (1996), *Tsui and Gul* (1996)).[648] Overall, auditors exhibiting higher degrees of moral development have been found to base their judgments and behaviors on ethical standards and to place professional responsibility over self-interest or client interest. Hence, auditors at high moral development levels are also expected to judge and act in a professionally skeptical manner.

Similarly, auditors with an idealistic ethical philosophy[649] have been found to exhibit greater conservatism and intolerance for dubious client behavior (earnings management) (e.g., *Elias* (2002), *Kung and Huang* (2013)) as well as a higher degree of commitment to the profession (e.g., *Shaub, Finn and Munter* (1993)) than less idealistic auditors.[650] Stronger professional commitment, in turn, has been argued to prevent dysfunctional, non-skeptical behavior that has the potential to harm the profession.[651] Collectively, these findings suggest an association between ethical orientation and auditors' professional skepticism.

Note, however, that not all prior studies report a positive association between auditors' moral development and their ethical behavior. For instance, *Lord and DeZoort* (2001) find that auditors exposed to obedience and conformity pressure from their colleagues display higher acceptance for material misstatements, and hence a lack of professional skepticism, regardless of their level of moral development.[652] Accordingly, strong pressures present in the audit environment may countervail an individual's moral development. *Schatzberg et al.* (2005), on the other hand, report a significant inverse relationship between moral development and sub-

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[648] See *Arnold/Ponemon* (1991): 12f.; *Bernardi* (1994): 78f.; *Brandon et al.* (2007): 59; *Falk et al.* (1999): 420f.; *Ponemon* (1992a): 185; *Ponemon* (1993): 3, 21; *Ponemon/Gabhart* (1990): 245-247; *Sweeney/Roberts* (1997): 348; *Tsui* (1996): 128f.; *Tsui/Gul* (1996): 48; *Windsor/Ashkanasy* (1995): 715. Interestingly, an individual's level of moral development has been found to decrease with increasing career level. See, e.g., *Ponemon* (1990): 191; *Ponemon* (1992b): 245-254; *Ponemon/Gabhart* (1990): 245-247. In a more recent longitudinal study, however, *Bernardi/Arnold* (2004): 361-364 provide evidence for increasing levels of moral development with promotion to high-rank positions at the audit firm. For an excellent systematic overview of empirical research on auditors' moral development and ethical judgments and behaviors, see *Jones/Massey/Thorne* (2003).

[649] In general, there are two higher-level ethical philosophies: idealism and relativism. The former relates to the adoption of universal ethical principles and standards in social interaction as well as to a general concernedness with the consequences of an action on the well-being of others. Relativism, in contrast, involves a more pragmatic approach encompassing a rejection of absolute ethical principles as guidelines for moral reasoning and action and a focus on the particular circumstances underlying the ethical issue. The different combinations of high vs. low levels of these philosophies yield a 2 x 2 matrix with the following subcategories: situationism, absolutism, subjectivism, and exceptionism. For such claims as well as a description of the different ethical ideologies, see *Forsyth* (1980): 175-177.

[650] See *Elias* (2002): 40; *Kung/Huang* (2013): 496; *Shaub/Finn/Munter* (1993): 145, 164.

[651] See *Lord/DeZoort* (2001): 220f.

[652] See *Lord/DeZoort* (2001): 228-230.

jects' tendency to truthfully report sensitive findings (net income overstatements). However, the researchers utilize an abstract experimental audit market setting and student subjects, which may limit the generalizability of their findings.[653]

Finally, recent auditing studies likewise provide mixed evidence regarding the relation between morality and ethics and auditors' skeptical judgments. Specifically, *Kerler and Killough* (2009) do not identify a connection between auditors' moral reasoning and their trust in the client.[654] In addition, *Bobek, Hageman and Radtke* (2013b) do not obtain a direct connection between auditors' ethical behavior and their innate (trait) skepticism[655]. However, the researchers find that when auditors perceive a situation as involving high ethical conflict, they are less likely to tolerate the contentious accounting treatments of the client, i.e., they display more ethical and critical behavior than in situations of perceived low moral intensity. This can be viewed as indicative of increased (state) professional skepticism in situations of intensive moral conflict.[656] In contrast to the former study, *Farag and Elias* (2012) document a significant positive relation between auditing students' trait professional skepticism and their ethical judgments.[657]

In summary, even though ethical orientation and moral development might not be sufficient to induce ethical and skeptical behavior under all conditions, they appear to generally favor professional skepticism.

4.3.2.2.3 Dispositional Skepticism

The notion that skepticism is a personality trait is neither a novel idea[658] nor a specific contribution of auditing theory.[659] However, in the last few years academic auditing research has achieved considerable theoretical and empirical progress in this area, which is mainly attributable to the influential work of *Hurtt* (2010). For the sake of completeness, the idea that professional skepticism contains a dispositional dimension is touched upon here. The in-depth consideration and discussion of this fundamental for the present work aspect is undertaken in Section 4.4.

Overall, prior research has indicated that dispositional skepticism is positively related to auditors' skeptical judgments and behaviors. Specifically, auditors at higher trait skepticism levels

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653 See *Schatzberg et al.* (2005): 258f.

654 See *Kerler/Killough* (2009): 109.

655 Note, however, that the authors use a shortened version of the Hurtt scale (i.e., only the 5-item questioning mind subscale). See *Bobek/Hageman/Radtke* (2013b): 12. Hence, their measure does not actually capture the entire trait skepticism construct as conceptualized by *Hurtt* (2010) but only reflects one dimension of this construct.

656 See *Bobek/Hageman/Radtke* (2013b): 3, 18.

657 See *Farag/Elias* (2012): 194.

658 See, e.g., *Chazen/Solomon* (1975): 69; *Choo/Tan* (2000): 82.

659 In fact, the sense of an individual disposition is present in general dictionary entries to the word "skepticism" (see, e.g., http://www.chambersharrap.co.uk/) as well as in the fields of philosophy, psychology, and consumer behavior. For a detailed theoretical overview of the individual dispositions which constitute professional skepticism, see Section 4.4.2.

have generally been found to need and search for more additional information on which to found their judgments (e.g., *Fullerton and Durtschi* (2004), *Hurtt, Eining and Plumlee* (2010), *Robinson, Curtis and Robertson* (2013)), to identify more inconsistencies in the information provided (e.g., *Hurtt, Eining and Plumlee* (2010), *Robinson, Curtis and Robertson* (2013)), to develop more alternative hypotheses for a problem (e.g., *Hurtt, Eining and Plumlee* (2010)), to anchor less on client explanations and assertions (e.g., *Quadackers, Groot and Wright* (2012)), to be more sensitive to fraud red flags (e.g., *Popova* (2013)), and to apply stringent ethical standards when evaluating morally critical issues (e.g., *Farag and Elias* (2012)).[660]

4.3.2.2.4 Dispositional (Dis)Trust

As indicated in Section 4.2.3.2, professional skepticism can also be viewed under a distrust[661] lens. Generally, individuals having a high propensity to distrust have been found to process and evaluate information in a more thorough and critical manner than trusting subjects, a stance which is considered favorable for exercising professional skepticism.[662]

Prior to the Hurtt scale, a psychometrically developed research instrument to capture professional skepticism (or some aspects of it) has been lacking. Hence, researchers have applied existing psychological trust scales to derive inferences about professional skepticism.[663] The predictive ability of an individual's level of dispositional trust (or lack thereof) for skeptical attitudes, judgments, and behaviors has generally been corroborated in prior research. Specifically, utilizing a modified version of the Trust Scale by *Rempel, Holmes and Zanna* (1985), *Choo and Tan* (2000) demonstrate that skepticism operationalized as low levels of trust (or high levels of distrust) is a stable innate personality trait. In addition, they find that instruction (training) interacts with skepticism to affect an individual's ability to identify fraud.[664] Similarly, *Rose* (2007) find that auditors who exhibit low dispositional trust as measured by the Philosophies of Human Nature Scale by *Wrightsman* (1974) are more sensitive to evidence of aggressive reporting and more inclined to assume misstatement (fraud) than their high-trust colleagues, which is interpreted as indicative of higher professional skepticism. The results reported by *Rose* (2007) further suggest that dispositional trust has greater explanatory power for the variance in auditors' skeptical judgments than contextual risk factors designed to induce skepticism (indication of abnormal sales).[665]

Valuable insights on the relationship between auditors' skeptical dispositions and their skeptical judgments are further provided by *Quadackers, Groot and Wright* (2012). In a direct com-

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660 See *Hurtt et al.* (2013): 51 as well as the review of relevant research provided in Section 4.4.4.

661 In the relevant literature, the terms "distrust", "doubt", "suspicion", and "disbelief" have been used interchangeably. This procedure is also adopted in the present study.

662 See *Rose/Rose* (2003): 313; *Schul/Burnstein/Bardi* (1996): 228.

663 See *Hurtt* (2010): 150.

664 See *Choo/Tan* (2000): 80.

665 See *Rose* (2007): 216.

parison between trait skepticism (measured by the Hurtt scale) and dispositional distrust (measured by the inversed Rotter Interpersonal Trust Scale), the authors find that dispositional distrust better reflects auditors' skeptical judgments than dispositional skepticism, particularly in situations involving high control risk.[666]

Overall, although dispositional (dis)trust and trait skepticism are distinct personality features (and concepts), they seem to be considerably related.[667] *Choo and Tan* (2000) make this point very clear by arguing that trust and skepticism are in essence "*complementary personality traits*".[668]

In summary, research conceptualizing and measuring professional skepticism as a personality trait has generally indicated that higher levels of dispositional skepticism or lower levels of dispositional trust are associated with more skeptical judgments and actions.[669]

4.3.2.2.5 Culture[670]

As indicated in Section 2.4.2.3.8, an auditor's cultural background can affect his/her perceptions, attitudes, judgments, and behaviors in a number of different ways. As might be recalled from this section, the cultural attributes of individualism and low power distance have been contended to positively correlate with the autonomy, self-determination, and ethical orientation within a given country or cultural group. These attributes have the potential to reinforce professional skepticism. In contrast, in collectivistic and high power distance cultures where harmony, consensus, avoidance of confrontation, and respect for (obedience to) authorities are typical, professional skepticism might be a culturally difficult attitude. Likewise relevant in the context of professional skepticism are the cultural dimensions of uncertainty avoidance and long- versus short-term orientation. Specifically, the cultural attributes of high uncertainty avoidance and long-term orientation have been theorized to positively correlate with judgment prudence and the amount of information and evidence gathered in forming a judgment. Following these lines of thought, skepticism may be a more salient attribute in high uncertainty avoidance and long-term orientation countries.

Empirical evidence on the relation between cultural attributes and professional skepticism is rather sparse and ambiguous. Contrary to the expectation that US auditors (representing an individualistic and low power distance culture) will raise more direct, critical, and challenging questions and will test client's assertions more extensively than Japanese auditors (represent-

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666 See *Quadackers/Groot/Wright* (2012): 29.

667 See *Aschauer et al.* (2013): 12; *Doucet/Doucet* (1996): 162; *Popova* (2013): 146; *Quadackers* (2009): 16.

668 *Choo/Tan* (2000): 82. By reference to the relevant psychological literature, the authors attach a positive general (i.e., not audit-related) meaning to trust by associating it with personality features like sincerity, honesty, and duty, while viewing skepticism in a group of traits such as secrecy, cynicism, and even deception.

669 See *Hurtt et al.* (2013): 51.

670 Note that *Nelson* (2009) does not explicitly discuss cultural issues within his model of professional skepticism. However, as indicated by *Hurtt et al.* (2013): 70f., culture is an important behavioral determinant which has the potential to influence auditors' professional skepticism.

ing a collectivistic and high power distance culture), *Yamamura et al.* (1996) do not obtain significant culture-related differences in auditor behavior. The authors attribute this finding to the high standardization among audit firms worldwide.[671] *Cohen, Pant and Sharp* (1995), on the other hand, find that Latin American auditors exhibit stronger ethical reasoning in evaluating hypothetical moral dilemmas than US auditors. The authors explain these (unexpected) results by reference to the desire not to "lose face" by tolerating unethical behavior, which is typical for the Latin American collectivistic and high power distance culture group.[672] *Patel, Harrison and McKinnon* (2002) also demonstrate that cultural differences related to individualism-collectivism and power distance influence auditors' skeptical judgments. They find that Australian auditors are less willing to accede to client pressure in an audit conflict scenario and are more critical of their colleagues' decision to accede to the client (unethical behavior) than are Indian and Chinese auditors.[673] Similarly, *Sim* (2010) finds that in assessing the effectiveness of client's internal control, Taiwanese auditors evaluate evidence in a manner allowing them to "draw a good picture", whereas Australian auditors do not exhibit a client-favorable evidence interpretation.[674] In addition, *Endrawes and Monroe* (2012) demonstrate that in contrast to Australian auditors, Egyptian auditors avoid confrontation with the client.[675]

Further evidence on the relevance of culture for professional skepticism is provided by *Bik* (2010) who reports some striking culture-related survey comments such as the following one: "*(…) the ability to challenge the client and professional skepticism is a huge question mark. (…) We have questions whether you can ever do a truly effective audit in this region, because of the lack of skepticism and the 'bowing' towards seniority and authority. (…) So, if you are a junior auditor and you are talking to the general manager of your client, and the general manager says something, you will always agree because he's a more senior person. He just won't be counted wrong. (…) People tend to bow for pressure of their clients. I think it is deeply rooted in the culture of the region.*"[676]

In addition, even practitioners and regulatory board members appear to recognize the connection between cultural attributes and professional skepticism. Specifically, *Craig Fisher*, audit director at Hayes Knight and member of the New Zeeland Auditing and Assurance Standards Board, acknowledges that professional skepticism might be per se a hardly applicable attitude in New Zeeland, as (in his view) the New Zealanders are a rather trusting nation.[677]

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671 See *Yamamura et al.* (1996): 356f. Note that the authors use a somewhat different terminology than the one outlined in Section 2.4.2.3.8 within the discussion of the cultural dimensions set forth by *Hofstede*. In particular, they use the terms "rank consciousness", which essentially corresponds to power distance, and "group orientation", which essentially corresponds to individualism-collectivism.

672 See *Cohen/Pant/Sharp* (1995): 56f. Recent theoretical and empirical insights provided by *Wong-On-Wing/Lui* (2013): 30f. suggest that these results may also be attributed to differences in the views of causality between the different nations (holistic in the Asian and South American countries versus analytic in the US and the Western countries).

673 See *Patel/Harrison/McKinnon* (2002): 23.

674 See *Sim* (2010): 55.

675 See *Endrawes/Monroe* (2012): 19f.

676 *Bik* (2010): 112.

677 See *Fisher*, quoted in *Murray* (2012): 37.

Collectively, these theoretical and empirical insights reveal that cultural issues should be considered in the context of inquiries into the concept of professional skepticism. This field of research is relatively unexplored and represents a fruitful avenue for future studies. In particular, in light of the growing complexity, ambiguity, and future orientation of accounting and auditing, the dimensions of uncertainty avoidance and long- versus short-term orientation appear central and thus clearly deserve to be addressed by future research. A further important research area concerns the exploration of the nature and strength of the interrelations between the individual cultural dimensions.

4.3.2.2.6 Gender[678]

As indicated in Section 2.4.2.3.9, prior research has documented the existence of gender-related differences in auditors' ethical dispositions, information processing style, sensitivity to evidence, and risk attitudes. All of these behavioral aspects potentially relate to auditors' professional skepticism.

The existing auditing research on the relation between gender effects and professional skepticism has yielded an inconsistent picture. In particular, *Breesch and Branson* (2009) find no significant differences in auditors' skeptical judgments and actions (detection of misstatements and adequate reporting of the findings) between the genders.[679] In contrast, *Hardies, Breesch and Branson* (2014) demonstrate that female auditors are more likely to issue going concern opinions to financially distressed firms than male auditors. This effect is amplified with high client importance or risk. Hence, the authors conclude that female auditors are more independent, risk averse, and concerned with serving the public interest than male auditors, and thus provide higher audit quality.[680] Consistently, *Jonnergård, Stafsudd and Elg* (2010) indicate that male auditors focus on the commercial side of auditing (performance, profitability, and revenue), whereas female auditors are more aligned with audit quality and the ethical aspects of the profession.[681] In addition, *Fullerton and Durtschi* (2004) document higher scores on the Hurtt trait professional skepticism scale for female internal auditors than for male participants.[682] *Bobek, Hageman and Radtke* (2013c), on the other hand, find that male auditors score higher on the questioning mind dimension of skepticism.[683] However, the authors also find that female participants are less likely to recommend conceding to a client's

[678] Note that *Nelson* (2009) does not explicitly discuss gender as an individual characteristic that may influence auditors' professional skepticism. However, a review of the relevant literature reveals a number of gender-related behavioral differences which may also play an important role in the context of professional skepticism in auditing.

[679] See *Breesch/Branson* (2009): 96.

[680] See *Hardies/Breesch/Branson* (2014): 7f., 28.

[681] See *Jonnergård/Stafsudd/Elg* (2010): 737. This contention is echoed by *Hardies/Breesch/Branson* (2014): 7.

[682] See *Fullerton/Durtschi* (2004): 23.

[683] For a detailed discussion of the dimensions of trait professional skepticism, see Section 4.4.2.

questionable preferred position and employ a more reflexive approach to judgment and decision making.[684]

Overall, these findings suggest that female auditors appear to be more skeptically poled than male auditors. To the extent to which these results are generalizable beyond the studies' context, they entail important implications for audit practice where the upper rank positions are usually occupied by male auditors.[685] Specifically, these results, if tenable, would generally imply that it may be beneficial for audit firms to promote more females who can set a proper skeptical tone at the top. Additional research on this issue is clearly needed to provide further insights and a more conclusive picture of the links between gender and auditors' skeptical attitudes, judgments, and behaviors.

Finally, prior research also indicates that not only auditor gender but also client gender might be of relevance for the inquiry into auditors' professional skepticism. In particular, it has been argued that client gender may affect the individual degree of trust (or lack thereof) attached to the client's explanations and claims. However, there is no clarity as to whether a male or female client representative is perceived as more trustworthy and persuasive. While *Shaub* (1996) and *Shaub and Lawrence* (1996) argue that women generally enjoy greater trust than man, and hence auditors may exhibit less skepticism and criticalness when obtaining information and evidence from a female client, *Gold, Hunton and Gomaa* (2009) empirically demonstrate the contrary effect. Specifically, their results indicate a clear male favorability tendency for both genders, i.e., both male and female auditors were found to be more inclined to accede to the client's advocated position when the client representative was male. This finding can be attributed to gender stereotyping according to which men are generally viewed as more capable, successful, self-confident, and assertive than women.[686]

Collectively, the empirical research outlined above, although not particularly conclusive, generally suggests that gender effects involving both inherent individual auditor differences and client-related stereotyping issues might affect auditors' professional skepticism. Further research along these lines is clearly needed. The present study provides additional empirical evidence on the relationship between gender and auditors' (trait) professional skepticism. The results of this inquiry are presented in Section 5.5.2.

4.3.2.3 Incentives

Incentives are a further key determinant of professional skepticism in the Nelson model. They can influence skeptical judgment and behavior through affecting the cost-benefit ratio of (un)skeptical attitudes. Overall, there is a variety of incentives relevant to auditing in general

[684] See *Bobek/Hageman/Radtke* (2013c): 4, 19, 21f., 30.

[685] Indeed, as pictured by *Doucet/Hooks* (1999): 72f., while the distribution between male and female entrants to the auditing profession (staff auditors) is virtually balanced out, the senior manager and partner positions at the audit firms are dominated by male auditors (68% male senior managers and 84% male partners).

[686] See *Gold/Hunton/Gomaa* (2009): 4f., 11; *Shaub* (1996): 160f., 168; *Shaub/Lawrence* (1996): 131.

and professional skepticism in particular. Subsequently, some of the most significant incentives fostering or compromising auditors' professional skepticism are discussed.

4.3.2.3.1 Skepticism-Promoting Incentives

4.3.2.3.1.1 Oversight and Enforcement

Oversight is a meaningful institutional mechanism which aims at controlling audit quality and increasing public trust in the value and reliability of auditing services.[687] In general terms, regulatory scrutiny is hypothesized to enhance professional skepticism by raising the cost (both financial and reputational) of deficient audit (judgment) quality. However, empirical research directly examining the links between oversight intensity and auditors' skeptical attitude is still missing. While it is conceivable that enforcement actions have a deterrent effect on the auditing profession and thus act as skepticism stimulators, it is also possible that the influence of oversight on auditors' skeptical behavior is limited by factors like social distance.[688] Future research on this issue is clearly needed to provide insights into the nature and strength of the relation between oversight and auditors' professional skepticism.

4.3.2.3.1.2 Litigation and Reputation Loss

Reputation is a key success factor in auditing. In fact, it is what adds value to the credibility-enhancing (attestation) function of the audit.[689] Hence, reputational damages which typically result from accounting and/or fraud scandals and litigation procedures represent a powerful incentive that can influence auditors' skeptical judgments and behaviors.[690] Similarly to regulatory oversight, litigation and reputation loss have the potential to reinforce auditors' independence, objectivity, professional skepticism, and in the end to improve audit quality by increasing the cost of dysfunctional (unskeptical and/or unobjective) behavior and audit failure (e.g., impending substantial audit fee reductions and client losses).[691]

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687 See *Johnstone/Sutton/Warfield* (2001): 7. For a normative and institutional discussion of oversight and enforcement in Germany, see *Köhler et al.* (2008): 129-133. For a concise review of audit regulation in the USA, see *Moore et al.* (2006): 13-15.

688 See *Hurtt et al.* (2013): 68; *Nelson* (2009): 11.

689 See *Kinney* (1994): 81; *McCracken* (2003): 165f.

690 See *McCracken* (2003): 177. For a review of the auditing literature on litigation, see *Latham/Linville* (1998): 175-207. For a formal-analytic consideration of reputation losses, see *Bigus* (2011): 297-304. He demonstrates that the prospect of substantial reputation damages renders litigation concerns irrelevant. In addition, while litigation is a factor of great relevance and importance in the USA, it is much less meaningful in continental Europe where the present study is settled. Hence, reputational concerns may be a more powerful skepticism-inducing incentive for German auditors than litigation. Note, however, that under conditions of uncertainty and ambiguity, reputational concerns might not be sufficient to prevent deviations from objectivity and independence, as indicated by the findings of an experimental market study by *Mayhew/Schatzberg/Sevcik* (2001): 66.

691 See *Bigus* (2011): 288; *Davis/Simon* (1992): 66f.; *Firth* (1990): 386; *Johnstone/Sutton/Warfield* (2001): 3; *Palmrose* (1988): 57; *Skinner/Srinivasan* (2012): 1759f.; *Venkataraman/Weber/Willenborg* (2008): 1317.

The scant empirical research on the link between litigation and reputation loss concerns on the one side and professional skepticism on the other side generally corroborates the positive influence of these incentives on auditors' skeptical judgments and choices. In particular, *Asare, Cianci and Tsakumis* (2009) demonstrate that reputation loss consciousness improves auditors' ability to resist client retention pressures and to provide impartial and conservative judgments. Similarly, *Blay* (2005) finds that auditors facing high litigation risk provide more conservative (less client-favorable) going concern judgments and audit opinions than do auditors facing high client loss risk. In addition, he indicates that participants in the high litigation risk condition focus on negative information, while subjects in the high client retention pressure condition strongly attend to positive information. Further support for the conservatism-enhancing influence of litigation risk on auditors' judgments and choices is provided by *Braun* (2001), *Farmer, Rittenberg and Trompeter* (1987) as well as *Hackenbrack and Nelson* (1996).[692] Collectively, these results support the notion that reputation and litigation threats are powerful incentives that advance professional skepticism.

Litigation and reputational concerns are theorized to increase as an auditor advances in his/her career because of the accountability to a larger audience (including the public) and the greater personal and economic consequences (e.g., tarnished reputation, client and capital loss) being at stake.[693] However, similarly to the argumentation provided for oversight, it is also conceivable that due to overconfidence and social distance, individuals consider it less likely for themselves to fall prey to litigation and/or reputational scandals.

4.3.2.3.1.3 Audit Firm Culture

Audit firm culture can be described as the tone at the top, that is, the message that an audit company's management forwards to the firm's personnel concerning the primary addressee of auditors' professional duty. Audit firm culture can be broadly divided into three categories: public duty culture (auditors serving the public interest), risk management culture (auditors occupying a neutral position between the public and client interest), and client advocacy culture (auditors serving the client interest).[694] Clearly, the latter category is at odds with the requirement for auditors to exercise sufficient professional skepticism.

Indeed, as demonstrated by *Peecher* (1996) and *Turner* (2001), a tone at the top which favors client interest and desired audit outcomes can result in biased judgments and insufficient professional skepticism at staff level.[695] In contrast, supervisors' position which straightforwardly emphasizes the importance of serving the public interest is most likely to encourage the application of professional skepticism throughout the audit. As the results reported by *Carpenter and Reimers* (2013) show, the proper tone at the top that emphasizes audit effectiveness rather

[692] See *Asare/Cianci/Tsakumis* (2009): 226; *Blay* (2005): 777-780, 785; *Braun* (2001): 93f.; *Farmer/Rittenberg/Trompeter* (1987): 8, 10; *Hackenbrack/Nelson* (1996): 54f.

[693] See *Asare/Cianci/Tsakumis* (2009): 225; *Hurtt et al.* (2013): 68; *McCracken* (2003): 177.

[694] See *Johnstone/Sutton/Warfield* (2001): 9.

[695] See *Peecher* (1996): 138f.; *Turner* (2001): 702.

than efficiency, thus taking into account the responsibility of the auditing profession to the public, indeed induces skeptical judgments and decisions in a fraud assessment context. Consistent results are reported by *Dennis and Johnstone* (2014).[696]

4.3.2.3.1.4 Accountability[697]

Related to the incentive of skepticism-favoring audit firm culture is the issue of accountability to superiors with unknown or skeptical preferences. As discussed in Section 2.4.2.2.2, accountability to a supervisor with unknown preferences is expected to induce conservatism, thoroughness, and a skeptical attitude in reasoning and information processing. This contention has been empirically supported by *Hoffman and Patton* (1997) who find that when auditors are unaware of the preferences of the supervisor to whom they are accountable, they provide more conservative (i.e., higher) fraud risk assessments because skeptical judgments are perceived as more defensible than unskeptical positions. Similar results are reported by *Lord* (1992) and *Turner* (2001).[698]

In addition to the case of unknown reviewer's[699] preferences, accountability can also benefit professional skepticism when the views of the supervisor are well known and clearly pointing toward a critical, inquisitive attitude in evidence gathering and evaluation. As demonstrated by *Turner* (2001), when auditors are accountable to reviewers with preferences for audit efficiency and client credence, they perform a narrow, client-prompted evidence search and examination. In contrast, when reviewers have a preference for audit effectiveness and professional skepticism, reviewees' responses involve a much more critical, extensive, and independent search for and evaluation of audit evidence. The importance of a superior's (partner's) emphasis on professional skepticism as a skepticism-inducing mechanism has also been empirically demonstrated by *Carpenter and Reimers* (2013). Similarly, *Buchman, Tetlock and Reed* (1996) demonstrate that auditors accountable to a conservative audit partner process more information items in arriving at a judgment and choose more frequently a qualified opinion than auditors who have to justify their position to the client or are not held accountable.[700]

In addition, *Peecher et al.* (2010) find that supervisors' attitude (tendency) toward a client-preferred conclusion affects subordinates' judgments by evoking motivated reasoning[701].

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[696] See *Carpenter/Reimers* (2013): 65f.; *Dennis/Johnstone* (2014): 6, 33.

[697] Note that *Nelson* (2009) does not explicitly discuss accountability as an incentive that stimulates professional skepticism, probably due to the overlap of accountability and audit firm culture aspects. In consistency with *Hurtt et al.* (2013): 61f., and because of the extant literature highlighting the importance of accountability as an effort- and judgment-quality-enhancing mechanism, this aspect is discussed separately from audit firm culture.

[698] See *Hoffman/Patton* (1997): 229f., 233-236; *Lord* (1992): 97f., 103; *Turner* (2001): 685.

[699] For a general discussion of the review process in auditing, see *Rich/Solomon/Trotman* (1997b): 483-485. For an overview of the relevant research on the audit review process, see *Bonner* (2008): 243-246.

[700] See *Buchman/Tetlock/Reed* (1996): 394; *Carpenter/Reimers* (2013): 65f.; *Turner* (2001): 683.

[701] Motivated reasoning refers to the psychological tendency to search for and overestimate information and evidence that corroborate favored assertions and conclusions (in the auditing context typically client-

Moreover, subordinates' distorted judgments are eventually incorporated into the final audit team judgment. With other words, supervisors can first trigger and then anchor on subordinates' unskeptical judgments.[702]

Collectively, these studies highlight the importance of accountability to supervisors with unknown or clearly skeptical preferences for inducing professional skepticism on the part of the subordinates. These findings have important implications for audit practice. They indicate that audit firms may be well advised to encourage and promote auditors exhibiting skeptical mindsets who can convey their skeptical attitude to subordinates and the audit team. Otherwise, when supervisors favor client credence and advocacy, their lack of skepticism is likely to translate into the judgments and actions of their subordinates. In this case, accountability may act as a skepticism-inhibitor rather than skepticism-instigator.[703]

In summary, oversight, litigation, reputation loss concerns, and accountability represent incentives that can stimulate professional skepticism by increasing the cost of audit failure. It should be noted, however, that these incentives target on intentional misconduct, dysfunctional behavior, and corruption, but they do not necessarily counteract subconscious cognitive bias which can, under certain conditions, have a very strong deleterious impact on auditors' behavior.[704]

4.3.2.3.2 Skepticism-Inhibiting Incentives

A potential inherent barrier to professional skepticism lies in the economics of auditing and the incentives arising from the nature of the auditor-client relationship. Specifically, while required to serve the informational needs of shareholders and the broad public, auditors are appointed and paid by the entity, have interest to maintain the engagement, and over time develop an increasing familiarity with and commitment[705] to the client. Consequently, the relationship between the auditor and the client is much more seizable, personal, and direct as compared with the rather distant and impersonal connection to shareholders and the public. The inherent economic and personal bond between the auditor and the client induces consid-

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preferred treatments). In its extreme form, motivated reasoning may turn into "motivated blindness" – the tendency to only see what is convenient to see and overlook the counter-facts. This phenomenon particularly applies to situations of high ethical conflict (e.g., the Enron case where the economic dependency of Arthur Anderson boosted motivational blindness of striking fraud red flags). See *Bazerman/Tenbrunsel* (2011a): 81f.; *Bazerman/Tenbrunsel* (2011b): 61.

[702] See *Peecher et al.* (2010): 1782f.

[703] See *Hurtt et al.* (2013): 62; *Turner* (2001): 702.

[704] See *Bazerman et al.* (2006): 45f. As argued by *Moore et al.* (2006): 16-18, unconscious cognitive biases can affect the quality of auditors' judgments and behaviors to a much greater extent than intentional corruption and misconduct. Biases particularly relevant in the context of auditor-client conflicts of interest include, among others, motivated reasoning, selective perception, and escalation of commitment.

[705] For an excellent review of the antecedents and consequences of commitment in the auditor-client relationship, see *de Ruyter/Wetzels* (1999).

erable conflicts of interest and gives rise to a number of incentives which have the potential to compromise auditors' objectivity, independence, and professional skepticism.[706]

4.3.2.3.2.1 Client Retention Pressure and Fee Dependence

Audit firms operate in a highly competitive environment, which imposes considerable pressure on audit companies to retain their clients, to respond to clients' wishes and preferences in order to keep the clients pleased and secure long-term future audit and non-audit fee streams, and to increase audit efficiency. However, efficiency enhancements and close economic and personal bonds with the client might be achieved at the cost of audit effort, effectiveness, and professional skepticism.[707]

Prior research generally shows that client pressure[708] affects auditors' judgment and decision making in a manner consistent with impaired professional skepticism. Specifically, several studies indicate that when client loss risk is emphasized or an important client is concerned, auditors are more willing to acquiesce to the frequently controversial client-preferred treatments and reporting choices rather than maintain a critical attitude (e.g., *Blay* (2005), *Farmer, Rittenberg and Trompeter* (1987), *Nelson, Elliott and Tarpley* (2002), *Roberts* (2010)).[709] Similarly, prior research has found that fee pressure imposed by the client as well as the client's explicitly stated preferences also adversely affect auditors' judgments and decisions (e.g., *Gramling* (1999), *Haynes, Jenkins and Nutt* (1998), *Houston* (1999)). In addition, client importance is found to increase auditors' identification with the client, with this cognitive attachment having adverse influence on auditors' objectivity (e.g., *Bamber and Iyer* (2007)).[710]

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706 See *Bazerman et al.* (2006): 45; *Moore et al.* (2006): 15f.; *Murray* (2012): 36.

707 See *Gavious* (2007): 461; *Johnstone/Sutton/Warfield* (2001): 3; *Nelson* (2009): 11. As an answer to the growing fee pressure, the auditing profession increasingly utilizes various checklists and templates which provide a structured and time-saving opportunity to get the audit work efficiently conducted. However, this "tick the box, get it done" mentality poses a threat to the thorough and consistent application of professional skepticism in auditing. See *Fischer*, quoted in *Murray* (2012): 37. In addition, time pressure and extensive work load can also lead to breakdowns in skepticism applied in the course of the audit because under these conditions, auditors are more likely to willingly accept information and evidence at their face value, without subjecting them to critical inquiry and testing, simply in order to get the audit work done upon deadline. See *Hurtt et al.* (2013): 63.

708 In the auditing literature, several related terms have been used interchangeably to refer to the economic bonding between the auditor and the client and the resultant conflicts of interests, e.g., "client pressure", "client importance", "client influence", and "fee dependence". See *Kao/Li/Zhang* (2013): 142. Overall, it has been long recognized that there is a power asymmetry in the auditor-client relationship in favor of the client who also has an incentive to employ its power to induce the auditor to accede to the client-preferred outcome. While the client's power and influence is viewed as high, auditors' ability to withstand client pressure has been classified as rather limited. For such contentions and a framework for the analysis of the auditor-client power distribution, see *Goldman/Barlev* (1974): 712.

709 See *Blay* (2005): 777-780; *Farmer/Rittenberg/Trompeter* (1987): 8; *Nelson/Elliott/Tarpley* (2002): 182, 196f.; *Roberts* (2010): 30.

710 See *Bamber/Iyer* (2007): 15-19; *Gramling* (1999): 126; *Haynes/Jenkins/Nutt* (1998): 88, 100f.; *Houston* (1999): 81f.

However, recent archival research (e.g., *Chen, Sun and Wu* (2010), *Kao, Li and Zhang* (2013), *Li* (2009)) suggests that regulatory acts like the Sarbanes-Oxley Act of 2002 (SOX) in the USA or major institutional improvements in China have enhanced auditors' ability to withstand client pressure.[711] These results suggest that tough audit regulation creates incentives inducing auditors to place the cost of audit failure and shredded reputation above the economic benefits associated with a continuous audit engagement and good relationship with the client.[712] Hence, regulation can, at least to some extent, counteract the adverse effects of client importance and retention pressure on professional skepticism.

A further relevant branch of research concerns the influence of fees for non-audit services (i.e., an indicator of the strength of the economic bond between the auditor and the client hinting at potential independence and skepticism threats) on audit quality[713] and professional skepticism.[714] The results of the extant archival research on this topic are quite inconsistent. While some studies indicate that non-audit fees jeopardize audit quality and professional skepticism (e.g., *Frankel, Johnson and Nelson* (2002), *Habib* (2012), *Kinney, Palmrose and Scholz* (2004)), numerous other studies do not indicate an impairment of audit quality associated with the provision of non-audit services (e.g., *Antle et al.* (2006), *Ashbaugh, LaFond and Mayhew* (2003), *Ratzinger-Sakel* (2013), *Willoughby, Carmona and Momparler* (2012)).[715]

The experimental evidence on the association between non-audit fees and auditors' professional skepticism likewise provides an inconclusive picture. Specifically, *Beeler and Hunton* (2002) find that non-audit fee prospects and low balling[716] adversely influence auditors' evidence assessment and going concern evaluations, thereby representing a threat to auditors' independence and professional skepticism. In contrast, *Asare, Cohen and Trompeter* (2005)

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711 See *Chen/Sun/Wu* (2010): 128f.; *Kao/Li/Zhang* (2013): 158-160; *Li* (2009): 225. Note, however, that the results of these archival studies may have been triggered by the severe media and public scrutiny in the aftermath of the epic accounting debacles at the beginning of the twenty-first century and the issuance of SOX. See *Kao/Li/Zhang* (2013): 145.

712 See *Chen/Sun/Wu* (2010): 127.

713 Note in passing that due to the fact that audit quality is an unobservable construct, proxies have been employed in auditing research to measure audit quality. In the studies listed subsequently, the following surrogates of audit quality have been used: auditors' propensity to issue going concern opinions for financially distressed companies, the amount and sign of abnormal accruals, the extent of just beating or missing important earnings targets, and the extent of fraudulent financial reporting. See *Carcello/Nagy* (2004): 55; *Carey/Simnett* (2006): 673.

714 The critical role of non-audit fees in the context of professional skepticism in auditing has been underscored by the results of a recent survey conducted by *Aschauer et al.* (2013): 13f. who find that in the presence of high amounts of non-audit fees, even the client perceives auditors' professional skepticism as compromised.

715 See *Antle et al.* (2006): 238; *Ashbaugh/LaFond/Mayhew* (2003): 613; *Frankel/Johnson/Nelson* (2002): 98-100; *Habib* (2012): 242-244; *Kinney/Palmrose/Scholz* (2004): 584f.; *Ratzinger-Sakel* (2013): 130; *Willoughby/Carmona/Momparler* (2012): 425. Of these studies, the one conducted by *Habib* (2012) deserves particular attention, as it represents a meta-analysis of 45 existing studies on the association between non-audit fees and audit quality. Although his results should be considered in light of the caveat of great diversity and limited comparability of the reviewed prior research, his analysis shows an overall detrimental effect of non-audit fees on audit quality and independence (professional skepticism).

716 Note that while regulating authorities and a substantial part of the academic literature view low balling as a potential threat to auditors' independence and professional skepticism, *Lee/Gu* (1998): 536, 550f., using a formal analysis, argue and demonstrate that when then owner rather than the management of the firm has the right to hire and fire the auditor, low balling can actually improve independence and even represent a less costly substitute for litigation.

report results suggesting that auditors' judgments and client acceptance decisions are based on objective client risk criteria rather than on the potential to obtain non-audit fees from prospective clients.[717]

Overall, conflicting incentives arising from the nature of the auditor-client relationship represent a key factor in the analysis of audit quality. Whether and to what extent client importance and fee dependence actually impair auditors' professional skepticism, independence, and objectivity is a fairly controversial question which cannot be straightforwardly answered on the basis of the existing empirical results. Hence, it is important that more systematic research (both theoretical and empirical) is conducted on the nature and strength of the interrelation between client-related pressures and professional skepticism issues.

4.3.2.3.2.2 Tenure

Tenure is theorized to adversely influence auditors' professional skepticism, as with an increasing duration of the auditor-client relationship, overconfidence and overfamiliarity with the client are expected to grow, which may impede the maintenance of a critical, vigilant, and questioning attitude throughout the audit.[718] This contention has been theoretically corroborated by *Deis and Giroux* (1992), *Mautz and Sharaf* (1961), and *Shaub and Lawrence* (2002).[719]

However, a number of empirical studies (e.g., *Bedard and Johnstone* (2010), *Carcello and Nagy* (2004), *Chih-Ying, Chan-Jane and Yu-Chen* (2008), *Geiger and Raghunandan* (2002), *Johnson, Khurana and Reynolds* (2002), *Knechel and Vanstraelen* (2007), *Manry, Mock and Turner* (2008), *Myers, Myers and Omer* (2003)), although not particularly designed to test the influence of tenure on auditors' professional skepticism, do not support the notion that long tenure impedes audit quality.[720] In fact, most of these studies even find that with lengthening tenure, audit quality is improved, which can be attributed to the acquired expertise (greater knowledge of the client's business, processes, and risks) and reputational capital on the part of the auditor. Collectively, these influences serve to counteract potential independence- and skepticism-impairing effects of long tenure.[721]

In contrast to the aforementioned studies, support for the adverse influence of tenure on independence and audit quality, and thus potentially on professional skepticism, has been provid-

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[717] See *Asare/Cohen/Trompeter* (2005): 491-493; *Beeler/Hunton* (2002): 44.

[718] See *Bedard/Johnstone* (2010): 49; *Gavious* (2007): 461; *Lim/Tan* (2010): 926; *PCAOB* (2012): 2.

[719] See *Deis/Giroux* (1992): 465; *Mautz/Sharaf* (1961): 208; *Shaub/Lawrence* (2002): 169.

[720] See *Bedard/Johnstone* (2010): 47; *Carcello/Nagy* (2004): 57; *Chih-Ying/Chan-Jane/Yu-Chen* (2008): 439f.; *Geiger/Raghunandan* (2002): 73-75; *Johnson/Khurana/Reynolds* (2002): 654f.; *Knechel/Vanstraelen* (2007): 114; *Manry/Mock/Turner* (2008): 570; *Myers/Myers/Omer* (2003): 796. Note that these studies have been conducted using archival data and focus on the macro (audit firm) level as opposed to experimental research focusing on the micro (individual auditor) level.

[721] See *Lim/Tan* (2010): 923, 926. In a recent study, *Aschauer et al.* (2013): 3, 13 likewise do not indicate a negative influence of tenure on auditors' professional skepticism as perceived by the client. However, it is questionable whether the client's view represents the most adequate and objective measure of auditors' professional skepticism.

ed by *Carey and Simnett* (2006), *Junaidi, Miharjo and Hartadi* (2012) as well as *Ye, Carson and Simnett* (2011).[722] In addition, *Bamber and Iyer* (2007) find that long audit tenure, along with client importance and positive image, strengthens auditors' identification with the client and increases auditors' tendency to acquiesce to the client's preferences and desires, thereby impairing auditors' objectivity and professional skepticism.[723]

With regard to the notion that *audit firm rotation* can potentially counteract the skepticism- and independence-inhibiting influence of tenure, empirical results have likewise been inconsistent. While some experimental studies (e.g., *Dopuch, King and Schwartz* (2001), *Wang and Tuttle* (2009)) find that under imposed audit firm rotation regimes, auditors are less likely to concede to the preferences of the client, other studies (e.g., *Bowlin, Hobson and Piercey* (2014)) indicate impairments to professional skepticism and audit effort as a result of mandatory rotation requirements.[724]

With regard to the influence of *individual auditor rotation*, *Tan* (1995) reports results suggesting that staff rotation triggers a novel, fresh viewpoint as well as greater inquisitiveness, vigilance and less dependence on prior year audit procedures and findings. Consistently, *Favere-Marchesi and Emby* (2005) find that partner rotation results in more conservative and vigilant goodwill assessments.[725] Collectively, the two experimental studies indicate that personnel rotation can strengthen professional skepticism both at staff and partner level.

In summary, auditing research on the nature of the relationship between tenure and audit quality, independence, and professional skepticism has produced an inconsistent picture. Additional research along these lines appears crucial, particularly in light of the current regulatory debate concerning mandatory rotation of audit firms as a means of strengthening auditor independence.[726]

4.3.2.3.2.3 Familiarity

Like long audit tenure, familiarity with the client appears inevitable for auditors' deep understanding of the client's business and the planning and performance of audits of high efficiency and effectiveness. Yet this very same aspect of the auditor-client relationship is also viewed as a considerable threat to professional skepticism, as the maintenance of a close, familiar relationship with the client might give raise to personal and economic bonds and undue trust

[722] See *Carey/Simnett* (2006): 673f.; *Junaidi/Miharjo/Hartadi* (2012): 311-313; *Ye/Carson/Simnett* (2011): 144f. Again, the cited research is archival in nature.

[723] See *Bamber/Iyer* (2007): 15-19. For such claims, see also *Nelson* (2009): 12.

[724] See *Bowlin/Hobson/Piercey* (2014): 28f.; *Dopuch/King/Schwartz* (2001): 115f.; *Hurtt et al.* (2013): 67; *Wang/Tuttle* (2009): 239.

[725] See *Favere-Marchesi/Emby* (2005): 6; *Tan* (1995): 114f.

[726] See *European Commission* (2010a): 12.

in the client, thereby inhibiting auditors' ability to judge critically and act with objectivity and integrity.[727]

Empirical research on the influence of familiarity issues on auditors' ability to maintain professional skepticism is very scant and less than consistent. Specifically, *Bamber and Iyer* (2007) find that auditors' familiarity with the client leads to greater cognitive identification with the client and a stronger tendency to acquiesce to the client-preferred treatments, which can be viewed as indicative of impaired skepticism. *Kerler and Killough* (2009), on the other hand, find that auditors are capable of maintaining an appropriate level of professional skepticism in a fraud assessment context regardless of their positive past experience with the client and beliefs in the client's integrity and trustworthiness.[728] Additional research on the influence of familiarity and commitment on auditors' ability and willingness to exercise sufficient professional skepticism is clearly need in order to gain insights into this highly relevant but very weekly explored topic.

In summary, client retention pressure and fee dependence, long audit tenure, and familiarity with the client constitute incentives inherent to auditing which have the potential to compromise auditors' professional skepticism. Overall, professional skepticism can be viewed as a costly attitude in terms of cognitive effort, amount of audit testing, audit budgets, adherence to deadlines as well as client relations. These aspects are typically much more perceptible and obvious to auditors and thus are likely to influence their judgments and decisions in a greater extent compared to the rather abstract benefits of behaving in a professionally skeptical manner.[729] One possible approach to alleviate this problem would be to raise the cost associated with dysfunctional unskeptical behavior. An alternative approach, and – as increasingly argued in the current auditing literature – a potentially more promising one, would be to design and implement incentive frameworks which emphasize rewards over penalties and the quality of judgment processes over results. Such frameworks are believed to enhance auditors' motivation to strive for high judgment quality and consistently apply professional skepticism.[730]

4.3.2.4 Judgment

The Nelson model posits that auditors' skeptical judgments result from a complex and dynamic interplay of auditors' knowledge, personality traits, and various incentives.[731] In addition, evidential characteristics (e.g., nature, sequence, and source of evidence) and client-specific factors (e.g., integrity, riskiness, preferences, and persuasion tactics of the client) also

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[727] See *Bamber/Iyer* (2007): 1f.; *Doucet/Doucet* (1996): 165; *Johnstone/Sutton/Warfield* (2001): 5; *Kerler/Killough* (2009): 109f.; *Murray* (2012): 36.

[728] See *Bamber/Iyer* (2007): 15-19; *Kerler/Killough* (2009): 109. However, it can be argued that past experience with the client does not necessarily equate with long tenure. Hence, both studies potentially measure different constructs.

[729] See *Brazel et al.* (2013): 3f.

[730] See *Bazerman/Tenbrunsel* (2011b): 64; *Hurtt et al.* (2013): 55; *Peecher/Solomon/Trotman* (2013).

[731] See *Nelson* (2009): 5, 13, 17.

influence the degree of professional skepticism reflected in auditors' judgments.[732] Overall, the exploration of the determinants and behavioral manifestations[733] of auditors' skeptical judgments has attracted considerable research interest in auditing and has resulted in a wealth of empirical studies.[734]

In his discussion of the role of judgment in the context of professional skepticism, *Nelson* (2009) adopts a process view and particularly emphasizes a further less salient but not less fundamental factor theorized to affect auditors' skeptical judgment. He draws attention on the various cognitive fallacies and traps found to significantly influence human information processing in general and auditors' judgment and decision making in particular. Drawing on psychological and auditing research, *Nelson* (2009) indicates that cognitive fallacies, such as availability effects, anchoring tendencies, motivated reasoning, confirmation proneness, and recency effects, can systematically and adversely influence the manner in which auditors gather, retrieve, process, evaluate, and integrate information and evidence, generate hypotheses, and form beliefs. These cognitive traps can lead to judgments of impaired quality and professional skepticism.[735] Importantly, these cognitive biases operate at a subconscious level and are thus potentially unaffected by skepticism-enhancing incentives.[736] Recently, the PCAOB has also drawn attention on the fact that unconscious cognitive biases can induce auditors to search for, process, weight, and recall evidence and information in a manner corresponding to the preferences and desired outcomes of the client rather than requirements of due professional skepticism.[737]

Of the aforementioned cognitive biases, *Nelson* (2009) particularly emphasizes information order (recency) effects as highly relevant to professional skepticism because of their pervasive influence on auditors' weighting and integration of evidence.[738] The relevance of information order effects in the context of professional skepticism is reinforced by the fact that the client typically determines the order in which evidence is provided to the auditor and hence can exercise an undue influence on auditors' views and judgments. In particular, the client may pre-

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[732] Note in passing that although the Nelson model entails evidential input as an immediate determinant of skeptical judgment, *Nelson* (2009) does not explicitly discuss this component within his seminal paper. A theoretical and empirical consideration of the influence of evidential characteristics and client-specific features on auditors' skeptical judgments is provided by *Hurtt et al.* (2013): 57-61.

[733] Skeptical judgments have been operationalized in different ways in the existing auditing literature, e.g., as a measurement of auditors' ability to recognize irregularities and contradictions in the evidence presented, to generate reasonable alternative explanations for a potential issue, to concentrate on fraud evidence, to question clients' explanations regarding unusual or unexpected evidence or circumstances, and to consider the questionable actions of client's management unethical. See *Hurtt et al.* (2013): 47, 51.

[734] Indeed, *Hurtt et al.* (2013) identify a total of 42 studies on auditors' skeptical judgment conducted within the last decade. As a great deal of these studies have already been discussed in the context of auditors' knowledge, traits, and incentives as determinants of professional skepticism, a repeated consideration within this subsection is considered dispensable. For a detailed summary of auditing studies on skeptical judgment, see *Hurtt et al.* (2013): 80-91.

[735] See *Nelson* (2009): 13f. for a concise summary of selected cognitive biases and relevant studies on their influence on auditors' skeptical judgments.

[736] See *Bazerman et al.* (2006): 45f.

[737] See *PCAOB* (2012): 7.

[738] See *Nelson* (2009): 14.

sent information in a manner inducing a strong contrast effect and a disproportionately strong weighting of positive (client-favorable) information on the part of the auditor, so that the latter may form an unduly positive and optimistic beliefs and judgments regarding the entity's position, whereas under a normative viewpoint, a much more critical position might be appropriate.

The present study explores the question whether the hypothesized influence of information order effects on auditors' judgments can be countervailed by their skeptical dispositions. Hence, building on the Nelson model, the current study examines the influence of information presentation order (*evidential input*[739]) and auditors' dispositional skepticism (*trait*) on auditors' belief revisions (*judgment*) (link 2 and link 4, respectively). This aspect is elaborated in Section 4.5.

4.3.2.5 Action

Following the Nelson model, skeptical judgment is a primary determinant of skeptical action.[740] Indeed, skeptical judgment is a necessary condition for skeptical behavior, as auditors can only act with skepticism when they have recognized an existing issue, contradiction, or risk factor in the first place.[741] Skeptical actions arise when an auditor behaves in accordance with the underlying skeptical judgment. Skeptical behavior involves, for instance, the conduct of additional audit testing procedures or the confrontation of the client with critical questions and findings.[742] Importantly, while skeptical decisions naturally arise from skeptical judgments, not every skeptical belief and thought initiates skeptical action in the real world. Apparently, an individual threshold level must be reached first in order for a skeptical judgment to trigger a skeptical action.[743] This individual threshold depends on the incentives, traits, knowledge aspects, and cognitive influences discussed above. In addition, client characteristics (e.g., corporate governance quality, management integrity, risk characteristics) may also influence auditors' skeptical behavior.[744]

Overall, research on skeptical action has not been as voluminous and diverse as that on skeptical judgment, probably because as a major input to skeptical action, skeptical judgment needs to be profoundly analyzed and well understood before valid inferences about skeptical

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739 Recall that *Nelson* (2009) does not elaborate on the issue of evidential input as a determinant of auditors' professional skepticism. Rather, he focuses on knowledge, traits, incentives, judgment, and action. Insights into the importance of evidential characteristics in the context of auditor judgment were provided in Section 2 and Section 3. A consideration of evidential characteristics in the context of auditors' professional skepticism is provided by *Hurtt et al.* (2013): 57f.

740 See *Nelson* (2009): 5, 15.

741 See *Hurtt et al.* (2013): 63.

742 *Hurtt* (2010): 165 identifies the following major aspects of skeptical behavior: intensive information search, high detection of contradictions and inconsistencies in arguments and evidence, ability to generate alternative explanations, and pronounced scrutiny of source credibility when facing interpersonal information.

743 See *Shaub/Lawrence* (1999): 63; *Shaub/Lawrence* (2002): 170.

744 See *Hurtt et al.* (2013): 65-67; *Nelson* (2009): 5, 15f.

action can be made. In light of the fact that audit regulators have largely focused on skeptical action in their inspections, future research on auditors' skeptical behavior is clearly needed.[745]

In summary, *Nelson's* (2009) conceptual analysis of the key determinants of professional skepticism in auditing represents an important step toward the achievement of a more precise, rich, and structured view of this fundamental concept. A common finding with regard to virtually all individual determinants is that the results of the existing empirical studies are rather inconsistent and do not allow for the derivation of generalizable and straightforward inferences regarding the influence of the different determinants on auditors' professional skepticism. This may be attributed to the fact that – as shown in Section 4.2.3 – the same label ("professional skepticism") has been attached to essentially different constructs in prior auditing research.[746] Future research would greatly benefit from the development of a consistent definition of and measurement instrument for professional skepticism.

Subsequently, *Hurtt's* (2010) conceptualization of professional skepticism as comprising a *trait* dimension and the measurement scale she developed to capture trait skepticism are presented and discussed. *Hurtt's* (2010) notion of trait professional skepticism and the Hurtt scale are foundational for the present study.

4.4 Hurtt's Notion of Trait Professional Skepticism and the Hurtt Scale

4.4.1 General Remarks

The considerations provided in the preceding sections reveal a remarkable insight: Although broadly acknowledged as a cornerstone of auditing, the concept of professional skepticism is still "*a topic where there are more questions than answers.*"[747] This contention is less than surprising in light of the fact that until very recently, there has been virtually no systematic and profound research on the nature, underpinnings, and dimensions of professional skepticism. Consequently, precise measurement approaches to professional skepticism have also been lacking.[748] Instead of aiming to better understand and precisely operationalize professional skepticism, prior auditing research has readily employed existing one-dimensional scales designed to measure some related constructs such as (dis)trust, suspicion, or independence.[749]

In 2010, *R. Kathy Hurtt* published a seminal paper on professional skepticism in which she not only provides some very essential and valuable insights into the nature of skepticism but also presents a scale specifically developed to *ex ante* measure an individual's level of *innate*

[745] See *Hurtt et al.* (2013): 71. They identify a total of 11 studies exploring auditors' skeptical action conducted within the last decade. Again, some of these studies have already been discussed in the context of auditors' knowledge, traits, and incentives as determinants of professional skepticism. For a detailed summary of the relevant studies on skeptical action, see *Hurtt et al.* (2013): 91-94.

[746] See *Hurtt* (2010): 150.

[747] *Hurtt et al.* (2013): 72.

[748] See *Doucet/Doucet* (1996): 158.

[749] See *Hurtt* (2010): 149f.

professional skepticism. This research instrument is designed on the basis of individual characteristics indicated as relevant to skepticism in auditing standards, psychology, philosophy, and consumer behavior research.[750] The consideration of interdisciplinary views of skepticism aims to enrich the mainstream auditing understanding of professional skepticism. With the publication of her influential research work, *Hurtt* (2010) has significantly advanced the academic state of knowledge and insight into the fundamental concept of professional skepticism.

In essence, *Hurtt* (2010) views professional skepticism as a multifaceted individual characteristic. According to this notion, professional skepticism involves both a trait dimension as well as a state dimension.[751] As discussed in Section 2.4.2.3, *traits* are facets defining human personality. They represent enduring and temporally stable internal attributes which characterize an individual *across various situations*. In contrast, *states* are alterable, temporary, and occasion-specific conditions induced by contextual factors. They characterize a person *in a certain situation*. Overall, traits and states are two interrelated behavioral dispositions which combine to influence human cognition, emotion, thoughts, beliefs, attitudes, judgments, and actions.[752] Consequently, *trait* professional skepticism represents a temporally stable and cross-situationally consistent personality attribute of an individual auditor, whereas *state* professional skepticism reflects a momentary condition caused by situational factors. *Hurtt* (2010) posits that both trait and state skepticism combine to influence an auditor's skeptical mindset which then affects his/her behavior in the manner depicted in Figure 6. According to this view, it is the complex and dynamic interplay between the person and the situation, which determines auditors' skeptical behavior.

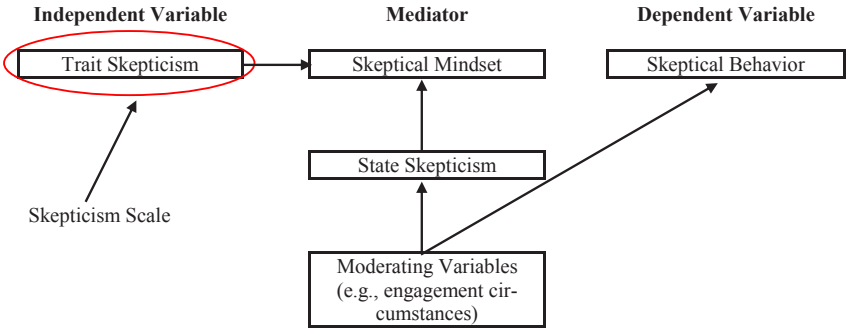

Figure 6: Hurtt's Notion of Professional Skepticism (Source: *Hurtt* (2010): 150)

This model of interaction between trait and state professional skepticism as determinants of auditors' skeptical behavior, although different in focus and emphasis, is compatible with the

[750] See *Hurtt* (2010): 150.

[751] See *Hurtt* (2010): 150. Note that the notion of skepticism as a multidimensional construct is well-established in consumer behavior research. See *Boush/Friestad/Rose* (1994): 170; *Tan* (2002): 60f.

[752] See *Buss* (1989): 1378; *Church* (2000): 651f.; *Eid/Luhmann* (2012): 2323; *Robinson/Curtis/Robertson* (2013): 6f.; *Schmitt/Steyer* (1993): 520, 522; *Steyer/Schmitt/Eid* (1999): 390f.

Nelson model which posits that traits such as dispositional skepticism and the balance of incentives and factors of the audit environment determine the extent to which auditors' judgments and actions reflect professional skepticism.

The main focus of *Hurtt's* (2010) research is on trait professional skepticism. She identifies the following six characteristics that constitute trait professional skepticism: questioning mind, suspension of judgment, search for knowledge, interpersonal understanding, self-esteem, and autonomy.[753] The first three of the professional skepticism characteristics listed above involve a clear focus on audit evidence. They implicate an individual auditor's affinity and willingness to search for and thoroughly examine sufficient amounts of persuasive audit evidence before arriving at a judgment and/or a decision. The last three characteristics address some other aspects that are relevant in the context of judgment and decision making in auditing: an auditor's ability to critically consider the competence, motivation, and incentives of client's management and personnel (interpersonal understanding) as well as auditor's capability and courage to act on the evidence obtained, even if this would displease the client (self-esteem and autonomy).[754] Subsequently, the individual constituent elements of trait professional skepticism are presented and discussed.

4.4.2 Constituent Elements of Trait Professional Skepticism

4.4.2.1 Questioning Mind[755]

Unarguably, a questioning mind is a fundamental part of what constitutes professional skepticism according to the international auditing standards. As indicated in Section 4.2.2, ISA 200.13(l) and SAS 1 (AU 230.7) define professional skepticism as "*[a]n attitude that includes a questioning mind*". A questioning mindset is particularly important in the context of fraud as implied by ISA 240.A7 and SAS 99 (AU 316.13). Both regulations emphasize that "*professional skepticism requires an ongoing questioning of whether the information and audit evidence obtained suggests that a material misstatement due to fraud*" might be present. Overall, a continuous vigilance and an enquiring mindset are essential ingredients of professional skepticism.[756]

Not only auditing standards entail a clear focus on the questioning mind dimension of skepticism. According to Chambers Universal Learners' Dictionary, skepticism involves "*a doubting or questioning attitude*".[757] In addition, the ongoing questioning view underlies auditing research that considers professional skepticism as equivalent to disbelief or doubt. For in-

753 See *Hurtt* (2010): 151.

754 See *Hurtt* (2010): 152. Note that the classification of the skepticism components as evidence-related and non-evidence-related (other) characteristics is somewhat arbitrary, as will be shown in Section 4.4.2.4. Basically, all components are closely interrelated and only their joint consideration provides a full picture of trait professional skepticism.

755 The considerations within this section follow and extend the arguments provided by *Hurtt* (2010): 152f.

756 See *AUASB* (2012): 3.

757 *Chambers Universal Learners' Dictionary* (1994): 647.

stance, *Shaub* (1996) defines a skeptic as an individual "*who instinctively or habitually doubts, questions, or disagrees with assertions or generally accepted conclusions.*"[758] Similarly, *Murray* (2012) argues that doubt is the very essence of skepticism and contends that "*doubt stimulates informed challenge and inquiry*" and "*professional scepticism encourages a structured consideration of an alternative point of view.*"[759] The *CAQ* (2010), on the other hand, argues that people generally possess a natural predisposition to trust and are inclined to believe in the integrity and soundness of the institutions and organizations with which they are affiliated. This trusting predisposition, however, collides with requirements of vigilance and professional skepticism. Consequently, given the trusting human nature, it is even more crucial to consciously maintain a critical and questioning mindset and adopt an attitude of skepticism.[760]

The questioning mind dimension of professional skepticism relates to the psychological concept of tolerance for ambiguity discussed in Section 2.4.2.3.5. Specifically, individuals possessing intolerance for ambiguity are expected to cope with uncertainty in complex problem situations by adopting a questioning stance and seeking for a more solid and extensive evidential basis on which to build their judgments and decisions.[761] In social psychology, the concept of suspicion corroborates the questioning mind element of skepticism. Specifically, suspicion implies refraining from taking claims or behaviors without further questioning and entertaining manifold, reasonably rival arguments and explanations.[762]

As discussed in Section 4.2.1, the notion of raising questions and doubts as an essential constituent part of skepticism is well-established and broadly accepted in philosophy. This notion is reflected in the etymology of the term "skepticism" which, as might be recalled, means "to consider", "to examine", "to inquire".[763] Skepticism involves questioning the appropriateness of one's grounds for holding certain beliefs.[764] Importantly, this questioning stance does not merely concern beliefs and positions held by others; it also relates to the skeptic's own assertions and judgments which are unexceptionally subjected to doubt.[765] Overall, to call things into question and to raise doubts is considered the quintessence of skepticism.[766]

Consistently, the view that skepticism involves questioning and doubting is also present in the field of media and consumer behavior research. Instances for studies dealing with this aspect

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[758] *Shaub* (1996): 155. For a more detailed discussion of the distrust view of professional skepticism in the auditing literature, refer to Section 4.2.3.2.

[759] *Murray* (2012): 36.

[760] See *CAQ* (2010): 19.

[761] See *McGhee/Shields/Birnberg* (1978): 683.

[762] See *Hilton/Fein/Miller* (1993): 503. Note that the authors provide a very multifaceted description of the concept of suspicion which also involves suspension of judgment and interpersonal understanding aspects.

[763] See *Kurtz* (1992): 21; *Stough* (1969): 3.

[764] See *Strawson* (1985): 2.

[765] See *McGinn* (1989): 6; *Strawson* (1985): 2.

[766] See *Bunge* (1991): 131; *Fogelin* (1994): 3.

include *Cozzens and Contractor* (1987), *Ford, Smith and Swasy* (1990), *Koslow* (2000), *Mangleburg and Bristol* (1998) as well as *Obermiller and Spangenberg* (1998).[767]

In summary, the notion that a questioning mindset is a fundamental facet of skepticism is widely and interdisciplinarily acknowledged. The critical importance of a questioning mindset is succinctly illustrated by *Edward Hodnett's* argument that only by asking the right questions, the right answers can be obtained.[768]

4.4.2.2 Suspension of Judgment[769]

The next integral part of professional skepticism is the feature of suspension of judgment. In general terms, professional skepticism involves withholding judgment and conclusion until there is an appropriate amount of audit evidence to corroborate or refute the assertions under consideration. Similarly to questioning mind, the suspension of judgment component is also reflected in the auditing standards. Although the latter do not explicitly use the term "suspension of judgment", the strong requirements regarding the nature and extent of audit evidence needed for well-founded judgments and for obtaining reasonable assurance hint at the importance of withholding judgment until extensive persuasive evidence is obtained. Specifically, ISA 200.13(l) and SAS 1 (AU 230.7) both describe professional skepticism as involving a "*critical assessment of audit evidence*". In addition, ISA 200.A22 as well as SAS 1 (AU 230.9) entail a requirement for auditors not to be "*satisfied with less than persuasive evidence*". Hence, auditing standards make clear statements regarding the essentiality of obtaining reasonable, sufficient, and credible evidence as a necessary condition for auditors' judgment and decision making. The necessity of suspending judgment until reaching a reasonable level of persuasive audit evidence as an integral part of effective auditing has also been recognized in the relevant auditing literature (e.g., *Chazen and Solomon* (1975), *Mautz and Sharaf* (1961)).[770]

In psychology, the definition of suspicion as "*a state of suspended judgment*"[771] provides support for the notion of withholding judgment as a constituent part of skepticism. The suspension of judgment feature is further closely associated with the psychological concept of tolerance for ambiguity. In particular, ambiguity intolerant individuals are theorized to strive for avoiding or reducing uncertainty in complex problem domains by suspending judgment until the informational basis allows for a well-founded judgment to be made.[772] A further relevant psychological concept in this context is need for cognitive closure. The latter reflects an individual's desire to quickly come to a definite judgment or conclusion on a certain issue in or-

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[767] For a more detailed consideration of this stream of research, see *Hurtt* (2010): 152.

[768] This famous contention of the British poet was found in *Fornelli/Desmond* (2011).

[769] The considerations within this section follow and extend the contentions provided by *Hurtt* (2010): 153.

[770] See *Chazen/Solomon* (1975): 68; *Mautz/Sharaf* (1961): 34.

[771] *Hilton/Fein/Miller* (1993): 502.

[772] See *McGhee/Shields/Birnberg* (1978): 683. For a more detailed consideration of the tolerance for ambiguity construct, refer to Section 2.4.2.3.5.

der to dispose of ambiguity and confusion. The need for cognitive closure involves an individual's predisposition to lack interest in new (additional) information and to be satisfied with *any* evidence in arriving at a judgment, not necessarily the most adequate, relevant, and persuasive one. Consequently, the need for cognitive closure is generally associated with limited information search as well as an increased tendency to apply simplified heuristic procedures in information processing, problem solving, judgment, and decision making.[773] With regard to auditing, high levels of need for closure may induce auditors to prematurely discontinue the search for alternative explanations and additional audit evidence. In contrast, low dispositional need for closure may stimulate the consideration of alternative hypotheses and explanations, critical inquiry, extended information search, and withholding belief until the informational basis warrants a well-founded judgment.[774]

Further support for the suspension of judgment characteristic as a central component of skepticism is provided in the field of philosophy. As mentioned in Section 4.2.1, suspension of judgment and belief (*epoché*) is the quintessence of Pyrrhonian skepticism.[775] More contemporary philosophical views likewise corroborate the fundamental interrelation between suspension of judgment and skepticism as indicated by the insight of *Kurtz* (1992) that "*suspension of judgments (...) is a necessary ingredient of skeptical inquiry*"[776]. Similar contentions are provided by *Bunge* (1991) and *Naess* (1968).[777]

Overall, the multidisciplinary overview provided above clearly indicates a strong relationship between suspension of judgment and (professional) skepticism. Importantly, the suspension of judgment aspect does not imply a skeptic's general aversion to form beliefs and judgments. Rather, it implies that a skeptic takes his/her time and exerts effort in judgment and decision making to ensure that beliefs and conclusions are well-founded, i.e., based on sufficient persuasive evidence.

4.4.2.3 Search for Knowledge[778]

As previously stated, the professional skepticism facets of a questioning mind, suspension of judgment, and search for knowledge all entail a focus on the manner in which an auditor processes and evaluates audit evidence. As these three characteristics are interrelated and complement each other, only their joint consideration provides a full picture of what comprises the evidence-related dimension of professional skepticism. Consequently, although the char-

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[773] See *Bailey/Daily/Phillips* (2011): 27f.; *Kruglanski* (1989): 14; *Suedfeld/Tetlock* (2001): 296f.; *Van Hiel/Mervielde* (2003): 560.

[774] See *Bailey/Daily/Phillips* (2011): 28f. The authors find that auditors have significantly lower levels of distributional need for cognitive closure as compared with student subjects used in psychological research, and that low need for closure leads to a greater amount and higher quality of hypotheses generated as well as more deliberate information processing.

[775] See *Lammenranta* (2008): 13.

[776] *Kurtz* (1992): 41.

[777] See *Bunge* (1991): 131; *Naess* (1968): 28.

[778] The considerations within this section follow and extend the arguments provided by *Hurtt* (2010): 153f.

acteristic of search for knowledge is not explicitly discussed in auditing standards, the relevant literature clearly recognizes it as an important facet of skepticism.

In contrast to questioning mind which rather involves doubt or disbelief nuances, the characteristic of search for knowledge has a sense of general inquisitiveness, interest, and curiosity. Overall, an individual's skepticism is not merely restricted to raising doubts, making critical inquiries, and postponing judgment until sufficient evidence is obtained. Beyond these features, the quest for knowledge is an important aspect of skepticism.

In the auditing literature, support for this view has been provided by *Chazen and Solomon* (1975) who discuss skepticism along with curiosity, inquisitiveness, and imagination as essential skills in the auditing profession.[779] Similarly, the Canadian Institute of Chartered Accountants (CICA) considers innate skepticism and inquisitiveness as critical factors for being a good professional auditor.[780] The search for knowledge facet of skepticism has also been corroborated by *Love and Lawson* (2009) who describe professional skepticism as an "*inquisitive attitude*"[781].

The search for knowledge dimension of skepticism is also well recognized within the field of philosophy. In particular, *Naess* (1968) characterizes a skeptic as an open-minded inquirer who is always willing to explore new perspectives and notions.[782] Similarly, *Popkin and Stroll* (2002) argue that skepticism involves a deep look beyond the obvious.[783] *Johnson* (1978) contends that skepticism comprises the quest for knowledge for knowledge's sake.[784] *Kurtz* (2001) argues that skeptical inquiry is foundational for any judgment and quest for insight.[785] *Bunge* (1991) argues that skepticism and neophobia (the fear of the new, including new experiences, arguments, and knowledge) are mutually exclusive concepts.[786]

In psychology, the search for knowledge characteristic has been explored within the concept of curiosity. Curiosity reflects an individual's eagerness for knowledge. It promotes exploration, insight, intellectual growth, and the arousal of individual interests.[787]

Overall, questioning mind, suspension of judgment, and search for knowledge are important facets of professional skepticism as indicated in the auditing standards and the relevant interdisciplinary literature. Collectively, these features reflect auditors' predisposition to maintain a critical attitude and to gather, process, and evaluate sufficient amounts of persuasive audit evidence before they believe, judge, or decide. Subsequently, the non-evidence related aspects of skepticism – interpersonal understanding, self-esteem, and autonomy – are discussed.

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779 See *Chazen/Solomon* (1975): 68f. The importance of being curious in auditing has also been recognized by *Mautz/Sharaf* (1961): 19.

780 See *CICA* (1995): 35, quoted in *Dennis* (2013): 29.

781 *Love/Lawson* (2009): 32.

782 See *Naess* (1968): 5, 26.

783 See *Popkin/Stroll* (2002): 36.

784 See *Johnson* (1978): 14.

785 See *Kurtz* (2001): 45.

786 See *Bunge* (1991): 131.

787 For a number of relevant references along these lines, see *Litman* (2005): 793 and *Litman/Silvia* (2006): 318.

4.4.2.4 Interpersonal Understanding[788]

Although *Hurtt* (2010) does not classify interpersonal understanding among the evidence-related professional skepticism characteristics, she admits that it is also a considerable aspect of vigilantly processing and evaluating evidence, as scrutinizing and comprehending the motivation, objectivity, honesty, and integrity of the persons who provide information is essential for maintaining a skeptical attitude. ISA 200.A22 and SAS 122 (AU-C 200.A26) both require that "*a belief that management and those charged with governance are honest and have integrity does not relieve the auditor of the need to maintain professional skepticism*".[789] Furthermore, ISA 240.A1 and SAS 99 (AU 316.85.A2) recognize that a number of incentives, pressures, and opportunities (reinforced by certain ethical values and mindsets) exist that can induce client's management and personnel to provide biased evidence and/or to involve in fraudulent activities. It is important to be aware of these threats and mind the personal motivation of those charged with governance.

The interpersonal understanding aspect of skepticism is also reflected in the relevant auditing literature. For instance, in their discussion of professional skepticism in auditing, *Shaub and Lawrence* (1996) acknowledge the importance for an auditor to mind the potential incentives and motives of the client.[790] Similarly, the Center for Audit Quality (CAQ) highlights the necessity to consider the personal dimension while communicating with the client. In particular, the CAQ suggests that scrutinizing the body language of the interlocutor may provide valuable insights beyond the verbal content of information.[791] Accordingly, a mismatch between the verbal and the non-verbal content of the information provided by the client may be an alarming issue which possibly hints at bias or irregularity and thus necessitates a pronouncedly critical consideration on the part of the auditor.

As with the other skepticism characteristics, there is multidisciplinary support for the interpersonal understanding dimension of skepticism. Particularly, consumer behavior research identifies that advertising skepticism does not only comprise challenging advertising promises and claims but also involves a scrutiny of the incentives and targets of the advertisers.[792] In psychology, social competence (encompassing social skills and social interaction ability) has been acknowledged as an important ingredient of skilful problem solving, goal achievement, and interpersonal relationships.[793] Following this line of thought, social competence can also be expected to reinforce the individual ability to identify errors and bias in the arguments of the others. In addition, the concept of suspicion defined as questioning "*the motives that un-*

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[788] The considerations within this section follow and extend the contentions provided by *Hurtt* (2010): 154.

[789] Despite these normative requirements, some empirical studies demonstrate that auditors are not particularly sensitive to client integrity. See, e.g., *Bernardi* (1994): 75; *Kaplan/Reckers* (1984): 13. For contrary findings, see *Goodwin* (1999): 13.

[790] See *Shaub/Lawrence* (1996): 125.

[791] See *CAQ* (2010): 24f.

[792] See *Obermiller/Spangenberg* (1998): 160.

[793] See *Wentzel* (2005): 280. An individual's social competence is typically measured via the Texas Social Behavior Inventory Scale developed by *Helmreich/Stapp* (1974).

derlie a person's behavior or (..) the genuineness of that behavior"[794] also relates to the interpersonal understanding dimension of skepticism. Research findings indicate that individuals with disposition toward suspicion and distrust generally tend to more elaborative and critical information processing.[795] Finally, the philosophical understanding of skepticism as an in-depth examination and inquiry also (indirectly) involves the notion of scrutinizing the personal incentives, motives, and objectives underlying a certain claim or assertion.[796]

Overall, the tendency to consider information in light of the personal motivation of the individual from whom it is obtained, along with an attitude of ongoing questioning, withholding judgment, and questing for knowledge, equips the auditor with the flexibility and criticalness needed to effectively process information and assess evidence provided by the client. The last two components of professional skepticism, autonomy and self-esteem, are more general in nature and capture basic personal characteristics of an auditor which are foundational for a skeptical mindset. Subsequently, these two aspects of skepticism are discussed.

4.4.2.5 Autonomy[797]

The term "autonomous" stems from the Greek words "*auto*" (i.e., self) and "*nomus*" (i.e., law) and literally means "self-governed", "not controlled by outside forces".[798] Hence, the attribute of autonomy reflects an individual's independence, self-reliance, and ability to act self-containedly instead of allowing external influences, opinions, and claims to unduly affect his/her beliefs and position. This aspect is critical to skepticism.

The autonomy aspect of professional skepticism is normatively anchored in the independence requirements of ISA 200.14 and AICPA ET 101.1 as well as in the definition of independence of mind provided in the IESBA Code 290.6(a) as a "*state of mind that permits the expression of a conclusion without being affected by influences that compromise professional judgment, thereby allowing an individual to act with integrity and exercise objectivity and professional skepticism*".

In the auditing literature, corroboration for the importance of auditors' autonomy is provided by *Mautz and Sharaf* (1961) who emphasize the essentiality of professional courage, prudence, and impartiality throughout the audit.[799] In addition, *Bobek, Hageman and Radtke* (2013a) demonstrate that autonomy and client advocacy (i.e., the opposite of skepticism) are significantly inversely related.[800]

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[794] *Hilton/Fein/Miller* (1993): 502.

[795] See *Rose/Rose* (2003): 313; *Schul/Burnstein/Bardi* (1996): 228.

[796] In this context, *Hurtt* (2010): 154 refers to the writings of *Burnyeat* (1983), *Hallie* (1985), *Hookway* (1990), *Johnson* (1978), *Kurtz* (1992), *McGinn* (1989), and *Popkin* (1979).

[797] Note that the considerations within this section are differently nuanced as compared with the arguments provided by *Hurtt* (2010): 154f.

[798] See *Moors/De Houwer* (2007): 29.

[799] See *Mautz/Sharaf* (1961): 35, 136. This aspect is also acknowledged by *Hurtt* (2010): 154f.

[800] See *Bobek/Hageman/Radtke* (2013a): 12.

The notion of autonomy as a constituent part of skepticism is also recognized in the field of philosophy where autonomy has been characterized through freedom of the will and sovereignty (absence of external influence) in belief, thought, and action. These attributes are also critical to skepticism.[801] In addition, consumer behavior research suggests that susceptibility to interpersonal influence, i.e., the inverse of autonomy, is negatively associated with skepticism.[802]

4.4.2.6 Self-Esteem[803]

Closely related to autonomy is the attribute of self-esteem which is the sixth and last constituent part of skepticism. Broadly stated, for maintaining objectivity, independence of mind, and fortitude, a certain degree of self-esteem is necessary in order to resist persuasion attempts and pressures.

Auditing standards do not explicitly address the self-esteem dimension of skepticism. However, it can be argued that assertiveness and self-esteem are among the manifold central characteristics required of auditors in order to fulfil their professional duties. This notion has been corroborated by *Chazen and Solomon* (1975) who consider skepticism and the ability to resist pressures from client's management as critical ingredients of audit quality.[804] This view is also shared by *Craig Fischer*, Member of the New Zeeland Auditing and Assurance Standards Board, who aptly argues that professional skepticism "*is about having the self-confidence and strength of character to retain an enquiring mind and to resist the temptation to just accept the easy answer – especially when management presents it to you on a plate.*"[805]

Support for the self-esteem aspect of skepticism can also be found in the field of philosophy where confidence has been acknowledged as essential for skeptical inquiry and self-esteem has been described as a state of inner peace and tranquility. This state of mind reflects the ideal of philosophical skepticism – *ataraxia* (calmness of the mind).[806]

In psychology and consumer behavior research, self-esteem has been described as involving the attributes of self-confidence, self-worth, and faith in the own skills, abilities, and judgments. These characteristics are inversely associated with conformity and convincibility. Hence, skepticism encompasses the confidence and courage to challenge others' claims and conclusions and to withstand persuasive attempts rather than promptly believe whatever is stated.[807]

Consequently, self-esteem can be viewed as a key characteristic of a skeptical auditor, as it enables him/her to maintain a critical mindset and challenge the client's arguments and asser-

[801] See *Dworkin* (1988): 6; *Hookway* (1990): 146f.

[802] See *Boush/Friestad/Rose* (1994): 167.

[803] The considerations within this section follow and extend the contentions provided by *Hurtt* (2010): 155.

[804] See *Chazen/Solomon* (1975): 68.

[805] *Fischer*, quoted in *Murray* (2012): 37.

[806] See *Burnyeat* (1983): 121; *Hookway* (1990): 234; *Lom* (2001): 33.

[807] See *Boush/Friestad/Rose* (1994): 167.

tions. Without a sufficient level of self-esteem, an auditor is likely to readily accept the position of the client and ignore remaining doubts or unanswered questions, which may put at risk the effectiveness of the audit. Hence, although not explicitly mentioned in the auditing standards, self-esteem is a crucial feature in auditing in general and in the context of professional skepticism in particular.

Collectively, these six attributes constitute trait professional skepticism and build the theoretical foundation of the Hurtt scale. The scale is of fundamental importance to the present study because it is the instrument employed to capture and measure auditors' dispositional skepticism. Following, the genesis of the Hurtt scale is outlined.

4.4.3 Scale Development and Validation

Based on the broad interdisciplinary theoretical foundation described above and following the procedure suggested by *Churchill* (1979), *Hurtt* (2010) employed a multi-stage iterative approach in order to develop a scale of high reliability, validity, and quality. Subsequently, the scale development and validation procedure employed by *Hurtt* (2010) is described.

Development of an Initial Item Pool

After specifying the six characteristics which constitute trait professional skepticism, *Hurtt* (2010) generated an initial pool of 220 items designed to reflect each skepticism component. Of these 220 items, 170 cues were derived from existing psychological scales capturing the relevant skepticism attributes.[808] The remaining 50 cues were developed by *Hurtt* (2010) to cover the aspects of professional skepticism that were not reflected by the items from the utilized psychological scales.[809] All items were designed or adapted to involve a six-point Likert response scale[810] with end points labeled "strongly agree" and "strongly disagree." The even

[808] Specifically, the following psychological scales and constructs served as the base frame for the development of the initial item pool: To capture the characteristic of a questioning mind, *Hurtt* employed the State-Trait Personality Inventory (*Spielberger* (1995)) as well as the Interpersonal Trust, Trustworthiness and Gullibility Scale (*Rotter* (1980)). The suspension of judgment component of professional skepticism was reflected by the Ambiguity Tolerance Scale (*MacDonald* (1970)) and the Need for Cognitive Closure Scale (*Kruglanski* (1990)). The search for knowledge dimension of skepticism was taken into account by using the State-Trait Curiosity Inventory (*Naylor* (1981)) as well as the State-Trait Personality Inventory (*Spielberger* (1995)). The interpersonal understanding attribute was also captured through the State-Trait Curiosity Inventory (*Naylor* (1981)). The items related to self-esteem were generated on the basis of the relevant literature (*Forsman/Johnson* (1996); *Fleming/Courtney* (1984)) as well as via the Texas Social Behavior Inventory (*Helmreich/Stapp* (1974)). The last attribute of professional skepticism, autonomy, was reflected using the Locus of Control Scale (*Rotter* (1966)). See *Hurtt* (2010): 158f. Note, however, that *Hurtt* (2010) does not give reasons for the particular scale choices she made. This gives rise to the question by which criteria she decided to employ some scales while leaving other potentially appropriate measures like the Interpersonal Trust Scale (*Rotter* (1967)) or the Self-Esteem Scale (*Rosenberg* (1965)) disregarded.

[809] See *Hurtt* (2010): 151.

[810] Broadly stated, Likert scales, also labeled "summated-rating scales", measure the degree of agreement with an issue or item stem. See *Litwin* (1995): 49; *Wrightsman* (1974): 49.

number of response points was chosen in order to gain valuable insights regarding the direction of participants' responses.[811]

In order to avoid construct underrepresentation, i.e., a too narrow specification of a construct, which may ultimately put at risk construct validity, *Hurtt* (2010) requested 25 experienced auditors to provide their personal views and beliefs about what constitutes professional skepticism and what is its counterpart. She then compared the responses obtained from the audit professionals with the theoretically derived constructs and scale items to determine whether some important aspects and dimensions of skepticism had been missing in her construct and to assure that her theoretical vision of professional skepticism corresponded to the view of professional auditors. The comparison did not reveal any new aspects or underpinnings of professional skepticism beyond the ones already considered by *Hurtt* (2010).[812]

Pretest

Subsequent to the construct specification and the generation of the initial item pool, *Hurtt* (2010) asked three academic experts with rich professional background to review the scale items for consistency, plausibility, relevance, and reasonableness of classification of cues to skepticism subconstructs. This procedure ultimately aimed at enhancing the content validity of the scale. Based on the experts' responses, *Hurtt* (2010) excluded items classified as irrelevant, redundant or inconsistent, resulting in a 49-item scale[813] which was subjected to a pretest with 89 business students. The administration of the scale to student subjects is justified by the fact that the scale is designed to measure an individual disposition and hence is likewise applicable to professional and non-professionals.[814]

Hurtt (2010) analyzed the pretest results employing factor analysis in order to detect and eliminate items that did not correlate with (load on) the theorized constructs. Twenty-six such items were identified, resulting in a reduced scale containing 23 cues. The remaining items exhibited good factor loadings of 0.70 or higher on the six identified skepticism subconstructs, where values exceeding 0.65 are considered substantial.[815] The 23-item scale yielded a Cronbach's alpha value of 0.82, where values above 0.80 are considered very good.[816] In essence, Cronbach's alpha represents a measure of the internal consistency and homogeneity

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[811] See *Hurtt* (2010): 156. For a critical note on the use of response scales involving an even number of scale points and thus forcing participants to pick a side, see *Peytcheva* (2014): 38f.

[812] See *Hurtt* (2010): 156f.

[813] Obviously, the review process conducted by the tree academic members has had a great influence on the final item set, as only 49 of the initially generated 220 cues remained part of the scale after the academic experts' feedback. That is, more than three-fourth of the originally identified cues have been eliminated in the course of the experts' content review. While it is plausible that a scale containing 220 items is way too extensive and thus hardly feasible and practicable, it appears that some additional validating procedures and care could have been undertaken in this review process in order to avoid subjectivity and arbitrariness claims.

[814] See *Hurtt* (2010): 157.

[815] See *DeVellis* (2003): 126.

[816] See *DeVellis* (2003): 95f.; *Hurtt* (2010): 157. *DeVellis* (2003): 95f. indicates the following ranges for alpha values: between 0.60 and 0.65, undesirable; between 0.65 and 0.70, minimally acceptable; between 0.70 and 0.80, respectable; and between 0.80 and 0.90, very good.

of a scale and is thus a reliability (and quality) indicator. It provides clues about the extent to which the items of a psychometric test complement each other in reflecting and measuring the same underlying (latent) construct.[817]

As indicated by *DeVellis* (2003), a replication of the procedure described above on an independent sample is essential for ensuring that "*the results obtained were not one-time chance occurrence.*"[818] Before proceeding to the replication stage, *Hurtt* (2010) developed a number of additional items for the six theoretical subconstructs of professional skepticism, as some of the items had apparently been confusing to the participants in the pretest. This updating procedure resulted in a 40-item refined measure of trait professional skepticism. Note, however, that the ultimate aim of *Hurtt* (2010) was to arrive at a 30-item scale in which each skepticism factor is reflected by an equal number of cues (i.e., five cues per scepticism subconstruct). She considers the equal item weighting reasonable and feasible, since no particular theoretical or empirical evidence exists in the relevant literature suggesting that any single dimension of skepticism is more substantial that the other.[819] *Hurtt* (2010) intentionally subjected more items to pilot testing (40) than the amount desired for the final scale (30) in order to account for the possibility of inconsistent, irrelevant, or invalid items.[820]

Pilot and Reliability Test

The pilot test was conducted using the responses of a sample of 247 business students. Overall, differences in subjects' skepticism scores could not be attributed to demographic factors such as age, gender, native English speaker, etc.[821] Factor analysis of the pilot test data revealed that 25 of the 40 items tested loaded on the six theoretically derived skepticism constituents. After removing the unfit items, the reduced 25-item scale exhibited Cronbach's alpha of 0.85, which is an indicator of a very good internal consistency. As *Hurtt's* (2010) goal was to achieve a 30-item scale comprising an equal number of items for each skepticism factor, she repeated the procedure described above and drafted 15 new cues to extend the item pool and provide the possibility for invalid and improper items to be detected and eliminated.[822]

In the next step, *Hurtt* (2010) performed reliability testing using the intra-subject test-retest approach to demonstrate that an individual's responses and scores on the scale are stable and consistent over time. This technique is an important validation procedure concerning the temporal stability and reproducibility of results.[823] In order to examine the test-retest reliability of the scale, about eight weeks after conducting the pilot test, *Hurtt* (2010) asked the students

[817] See *DeVellis* (2003): 28; *Litwin* (1995): 21, 24. For a detailed (and more formal) consideration of this coefficient, refer to *Cronbach* (1951).

[818] *DeVellis* (2003): 136.

[819] Note, however, that *Hurtt* (2010) does not provide any particular arguments for the desired scale length of 30 items.

[820] See *Hurtt* (2010): 157.

[821] See *Hurtt* (2010): 157, 159.

[822] See *Hurtt* (2010): 161.

[823] See *DeVellis* (2003): 43f.; *Litwin* (1995): 8.

who participated in the pilot study to complete the scale[824] a second time. She obtained 147 responses, of which only 92 were complete and usable for the subsequent analysis. Overall, the results indicated a significant and very strong correlation between subjects' total skepticism scores on the first and second test ($r = 0.89$, $p < 0.001$).[825]

In the course of the re-test, the 15 additional cues were scrutinized in terms of the appropriateness of their factor loadings on the six skepticism components. Based on the results of this factor analysis, *Hurtt* (2010) picked the five "missing" items with the best factor loadings to complement the established core item pool of 25 items and to finally arrive at the desired 30-item scale with equally represented subconstructs. An individual's score on this (final) scale can range from 30 to 180 points. The students participating in the re-test exhibited a mean score of 132.7 with a standard deviation of 15.9. Their scores fell within the range from 77 to 175.[826]

Validity Test

At the end of the instrument development process, the final scale was administrated to practicing auditors from a Big 4 auditing company in order to test the validity of the scale in a professional setting. On average, the auditors participating in the survey reached a score of 138.6 points on the skepticism scale, with results ranging from 111 to 173 and a standard deviation of 12.6. Compared to the student sample, professional auditors exhibited a slightly higher (5.9 points) mean score on the scale indicative of higher levels of trait professional skepticism. In addition, the responses within the auditor sample did not vary that strongly as compared with the student group. In consistency with the results obtained with the student subjects, an individual's score on the scale was not found to be driven by any of his/her demographical characteristics (gender, age, experience, or qualification). The mean age of the auditors who participated in the study was 28.2 years; the average audit experience amounted to 58 months. The majority of the subjects were male (n = 112) and possessed a CPA title (n = 179).[827]

With regard to the internal consistency and validity of the scale, this testing loop also yielded good results (Cronbach's alpha of 0.86). The results of the factor analysis conducted at this administration level revealed that the final 30 items loaded on the six identified skepticism subconstructs, but two cues did not correspond to the factors they were hypothesized to measure. In addition, one of the items in question yielded a factor loading of 0.49, which is minimally below the critical benchmark of 0.50 suggested in the relevant literature.[828] *Hurtt*

[824] Note that *Hurtt* (2010): 161 does not clarify which version of the scale the participants at the re-test stage actually completed. Table 2 on page 160 in *Hurtt*'s (2010) paper suggests that the students completed the re-updated 40-item scale which contains 15 new items as compared to the pilot test scale. Hence, the comparison of the inter-temporal stability of subjects' scores can only concern the 25 core items which proved appropriately loading on the six skepticism dimensions at the pilot test stage. For the additional cues, no basis for comparison appears to exist.

[825] See *Fink* (1995): 36; *Hurtt* (2010): 161; *Litwin* (1995): 8.

[826] See *Hurtt* (2010): 161.

[827] See *Hurtt* (2010): 162.

[828] See *DeVellis* (2003): 95f.

(2010) does not interpret this matter as alarming with regard to the validity of the scale as a whole. She argues that the internal consistency of the items is largely reasonable, so that the improper factor loadings of the two cues might be attributed to the particular sample population rather than to a general deficiency of the scale.[829]

As a final validation procedure, *Hurtt* (2010) re-tested the scale's temporal stability applying the test-retest technique to the auditor sample. On average, the participants completed the repeated study 22 days after the first run, with a range from 2 to 56 days and a modal value of 15 days. Responses to the repeated skepticism survey were obtained from 88 auditors who achieved a mean skepticism score of 135.4 points, with a range from 105 to 177 and a standard deviation of 14.7. These results are very similar to subjects' responses on the previous administration of the instrument. The correlation coefficient between the test and re-test skepticism scores on the scale amounted to 0.85 ($p < 0.01$). In addition, the internal consistency between the test and re-test scores was also very good, as indicated by the obtained Cronbach's alpha value of 0.91. Overall, these findings provide a substantial support for the validity of the Hurtt scale as a theoretically well-founded psychometric instrument with a reasonable inter-item and temporal stability.[830]

Nevertheless, some caveats should be considered with regard to the Hurtt measurement instrument. First, the scale rests on two major assumptions: that all six skepticism subconstructs are equally important and that high levels of a certain characteristic can compensate for low levels of another. However, these assumptions may be untenable. Specifically, it is possible that some trait skepticism subconstructs possess greater predictive and explanatory power regarding auditors' skeptical behavior than others. In addition, it is conceivable that the constituent characteristics combine in a non-compensatory manner, so that deficits in some foundational aspects of skepticism cannot be compensated by another attributes.[831] Second, the Hurtt scale may be inadvertently capturing individual differences in tacit (i.e., non-verbalizable and non-transferrable) knowledge or some other potentially relevant but not anticipated psychological constructs.[832] Third, as a self-report measure of personality aspects, the Hurtt scale bears the inherent threat that subjects' responses are potentially biased into a socially desirable direction.[833]

These caveats notwithstanding, the Hurtt scale is the first thoroughly developed and validated psychometric instrument which enables auditing researchers to *ex ante* measure (and explore) auditors' trait professional skepticism. While prior research has mainly focused on investigating state skepticism induced by situational factors such as fraud red flags or indications of

[829] See *Hurtt* (2010): 162. It should be noted, however, that attributing some potential problems and misconceptions to the characteristics of a particular sample while claiming generalizability, validity, and replicability of the scale might be a slippery slope.

[830] See *Hurtt* (2010): 162, 164. The final Hurtt scale is presented in Appendix 1.

[831] See *Hurtt* (2010): 166.

[832] See *Hurtt/Eining/Plumlee* (2010): 26.

[833] See *Schmitt/Steyer* (1993): 519. Indeed, in their study on linking trait skepticism to skeptical behaviors, *Hurtt/Eining/Plumlee* (2010): 18, 21 obtain a significant correlation between participants' scores on the Hurtt scale and their scores on the Social Desirability Scale developed by *Crowne/Marlowe* (1960).

aggressive reporting,[834] still very little is known about auditors' innate skepticism and how it interacts with contextual and other factors to influence auditors' judgment and behavior. In this context, the Hurtt scale offers a unique opportunity to gain further insights and to develop a better understanding of the nature of professional skepticism in auditing. Consequently, the scale represents a considerable advance in the current state of academic theory and research on auditors' professional skepticism. Subsequently, the findings of the contemporary studies on professional skepticism using the Hurtt scale (or its predecessors) are presented and discussed.

4.4.4 Empirical Evidence

The first study which utilized the Hurtt scale[835] and provided empirical support for its validity was conducted by *Fullerton and Durtschi* (2004). They report a Cronbach's alpha coefficient for the whole scale of 0.96, which indicates a very good inter-item validity. In addition, they find that the trait professional skepticism construct as captured by the Hurtt scale has a reasonable predictive validity for skeptical judgments. In particular, their results demonstrate that when encountering fraud red flags, internal auditors with high trait skepticism exhibit a significantly greater need for additional information than subjects with low trait skepticism.[836] Similarly, using a sample of student participants, *Farag and Elias* (2012) and *Popova* (2013) also confirm both the theoretical and behavioral predictive validity of the Hurtt instrument in the context of ethical reasoning and fraud, respectively.[837] *Peytcheva* (2014) likewise corroborates the internal consistency and reliability of the Hurtt scale. Furthermore, she finds that trait skepticism significantly predicts students' cognitive performance in a hypothesis testing task. However, no significant relationship between dispositional skepticism and cognitive performance is obtained for auditors.[838]

Further support for the reliability and consistency of the Hurtt scale is provided by *Bobek, Hageman and Radtke* (2013a) who report mean trait skepticism scores of 132.5 (SD 10.6) and Cronbach's alpha for the entire scale of 0.838.[839] These values are consistent with those obtained by *Hurtt* (2010). Similarly, using a sample of Dutch auditors, *Quadackers* (2009) and *Quadackers, Groot and Wright* (2012) obtain mean trait skepticism scores of 131.66 (SD: 10.71) and 133.09 (SD: 10.84) as well as Cronbach's alpha values of 0.821 and 0.834, respec-

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834 See *Rose* (2007): 217.

835 As a matter of fact, the authors used a pre-publication version of the Hurtt scale which, however, is identical to the final (published) version of the scale.

836 See *Fullerton/Durtschi* (2004): 15, 19.

837 See *Farag/Elias* (2012): 192, 194; *Popova* (2013): 152f.

838 See *Peytcheva* (2014): 41, 45. It is noteworthy that in deviation from the Hurtt scale which, as might be recalled from the previous section, includes 6-point response scales, *Peytcheva* (2014) utilizes 7-point response scales. She justifies her scale design choice by the desire to provide subjects with a neutral midpoint instead of forcing potentially neutral participants to choose a side. By transforming the scores to a 100-point scale as suggest by *Hurtt* (2010): 161, the comparability of results (scores obtained) is ensured. See *Peytcheva* (2014): 38f., 45.

839 See *Bobek/Hageman/Radtke* (2013a): 11, 22.

tively. However, the authors only partially corroborate the notion that trait skepticism as reflected by the Hurtt scale significantly determines auditors' skeptical judgments and behaviors. Specifically, the researchers report results suggesting that the Hurtt scores are weaker predictors of auditors' skeptical responses compared to the scores on the inverse Interpersonal Trust Scale by *Rotter* (1967). This pattern of results particularly relates to high audit risk scenarios.[840] In contrast, *Hurtt, Eining and Plumlee* (2010) find that under conditions of increased risk, subjects' skeptical behaviors are systematically influenced by the individual level of trait skepticism as measured by the Hurtt scale.[841]

Carpenter and Reimers (2013), on the other hand, report results showing no significant relationship between trait professional skepticism as measured via the Hurtt scale and auditors' fraud-related skeptical judgments and decisions. These findings cast doubt on the predictive and explanatory power of the trait skepticism construct for the variance in auditors' behavior. However, *Carpenter and Reimers'* results corroborate the dispositional nature of trait skepticism suggesting that it is relatively stable over time and is unaffected by situational factors and incentives.[842] Finally, *Robinson, Curtis and Robertson* (2013) obtain results suggesting that while dispositional (trait) and situational (state) skepticism individually and mutually influence auditors' skeptical behavior, the effect of state skepticism is stronger.[843]

Overall, the substantial contemporary research on auditors' professional skepticism corroborates the internal reliability and validity of the Hurtt scale and provides support for the notion that trait skepticism is a stable, distinct individual disposition. With regard to the ability of the trait skepticism construct to explain and predict auditors' (skeptical) behavior, the empirical results are fairly mixed. The present study provides additional empirical evidence along these lines. It extends prior research by examining the effect of trait professional skepticism on auditors' judgments in light of a pervasive cognitive fallacy. The key conceptual aspects of this investigation are discussed in the subsequent section.

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840 See *Quadackers* (2009): 42, 44, 50-52, 92; *Quadackers/Groot/Wright* (2012): 29f., 45, 47. Skeptical judgments and behaviors are operationalized in these studies via measures relating to auditors' trust in the client's explanations, fraud assessments, generation and nature (error vs. non-error) of alternative explanations, and budgeted audit hours. In addition to interpersonal trust and trait skepticism, *Quadackers* (2009) also explores the characteristics of need for closure and locus of control. However, he does not find a strong association between these features and auditors' skeptical judgments, behaviors, or degree of dispositional skepticism.

841 See *Hurtt/Eining/Plumlee* (2010): 22-27. The researchers utilize the extent of evidence search, detection of contradictions and errors as well as the generation of alternative explanations as proxies for skeptical behavior. Note, however, that an extensive evidence search, if related to the examination of information that is *irrelevant* to the particular issue under scrutiny, is likely to impair audit quality both in terms of efficiency and effectiveness. See *Peytcheva* (2014): 42.

842 See *Carpenter/Reimers* (2013): 64f.

843 See *Robinson/Curtis/Robertson* (2013): 19, 23f., 27. The authors operationalize skeptical behavior via measures concerning the extent of audit testing, search for additional evidence as well as the identification of inconsistencies in evidence. With regard to the observed stronger influence of state skepticism on auditors' behavior in comparison to trait skepticism, the authors conclude that this is an encouraging finding since traits are stable and inflexible components of one's personality and thus are not easily changeable. In contrast, states are context-dependent and much more adjustable and malleable. Hence, it might be more productive and beneficial for audit firms and regulators to focus on identifying and implementing effective state skepticism prompts (incentives) rather than personality traits in order to successfully promote professional skepticism in audit practice.

4.5 The Influence of Trait Skepticism on Auditors' Belief Revisions

As indicated in Section 4.3.2.4, *Nelson* (2009) particularly highlights the importance and relevance to professional skepticism of research focusing on auditors' belief updating.[844] Prior studies on this topic have adopted the skepticism notion set forth by *Hogarth and Einhorn* (1992), i.e., skepticism as an extreme sensitivity to negative evidence combined with insensitivity to positive evidence, and have reported fairly inconsistent results.[845] With the Hurtt notion and scale, a more universal, multifaceted, and psychometrically refined concept and measure of auditors' *trait* professional skepticism are employed in the present study. This allows for shedding light on the role of personality traits in the context of auditors' belief adjustments. As indicated in Section 3.4, the relationship between individual dispositions and auditors' belief revisions has remained virtually unexplored in the auditing literature. Beyond the contribution to the belief revision literature in auditing, the present study makes an important contribution to the professional skepticism literature. Specifically, it provides valuable insights into the behavioral manifestations of trait professional skepticism in an important yet still unexplored setting which involves (1) a critical forward-looking audit judgment (going concern) which, as argued in Section 4.2.2, calls for substantial professional skepticism, (2) limitedly available information[846], and (3) no particular skepticism-inducing contextual factors (e.g., fraud signs, seeded errors and/or inconsistencies in the data set).[847]

The study of the effect of dispositional skepticism on auditors' belief revisions encompasses two dimensions. First, the individual effect of trait skepticism on auditors' belief adjustments is explored. This line of investigation follows *Cushing* (2000) who argues that "*skepticism affects auditor behavior primarily by influencing the formation and revision of auditor beliefs*" and that "*auditors who are skeptical will tend to form different beliefs (…), and therefore will tend to process information (e.g., audit evidence) differently in updating their beliefs, than will auditors who are not*"[848]. Similarly, *Abou-Seada and Abdel-Kader* (2003) recognize

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844 See *Nelson* (2009): 14.

845 Specifically, *Bamber/Ramsay/Tubbs* (1997): 262 find that auditors are confirmation prone, i.e., they are highly sensitive to evidence which corroborates the hypothesis under which they operate. Contrary results are obtained by *McMillan/White* (1993): 444 in light of an absolute measure of subjects' belief revision (S_4–S_0). However, when a relative measure which accounts for scale effects potentially resulting from the strength of subjects' initial belief is employed, virtually no difference in auditors' sensitivity to confirming and disconfirming evidence is found. *Guiral/Esteo* (2006): 612, on the other hand, find that auditors are moderately more sensitive to positive evidence than negative evidence, which they interpret as a lack of professional skepticism.

846 Note that in order to confidently derive valid causal inferences on the influence of information order effects on auditors' belief updates, and in consistency with prior belief revision research, the present study uses a *fixed* setting in which subjects are presented with predetermined sequences of information cues and cannot obtain additional audit evidence but have to found their going concern assessments merely on the information available.

847 The critical importance of the exploration of the strength of the link between skepticism and its behavioral manifestations has been acknowledged by *Doucet/Doucet* (1996): 162.

848 *Cushing* (2000): 1.

skepticism as one of the key factors affecting auditors' belief revisions.[849] Based on these contentions, the following hypothesis is stated:

H_2: *Auditors with high levels of trait professional skepticism will exhibit different belief revisions than auditors with low levels of trait professional skepticism c.p.*

Second, beyond the main effect of skepticism, the interaction effect between trait skepticism and information order is explored. With other words, the present study explores whether the influence of information order effects on auditors' belief revisions varies across different levels of trait professional skepticism. Basically, two alternative scenarios are conceivable. These scenarios are discussed subsequently.

Scenario 1: Trait Skepticism Mitigates Recency Effects

Fahrer (2012) and *Hurtt et al.* (2013) argue that under certain conditions, professional skepticism may contribute to overcoming, or at least mitigating, some unconscious cognitive biases.[850] Unfortunately, the authors do not elaborate on this contention and do no clarify whether information order effects count to the fallacies which can be potentially remedied through high dispositional skepticism and why a mitigating effect might be expected.

Schreiber (2000), in contrast, is more specific. He argues that professional skepticism can compensate for information order effects, especially under conditions of high risk present in the audit environment.[851] However, this contention rather concerns state professional skepticism which is a contextually dependent, momentary state aroused by environmental conditions such as high risk. Whether a debiasing effect can also be expected with regard to trait professional skepticism is an open question addressed by the present study.

Generally, different mechanisms via which innate skepticism can potentially alleviate recency in auditors' belief adjustments are conceivable. The first mechanism relates to the cognitive effort exerted during information professing. Specifically, following *Kennedy's* (1993) notion that recency is an effort-related bias which can be reduced via enhanced cognitive effort and in consistency with *Majors, Shefchik and Vitalis* (2014) who argue that higher degrees of trait skepticism are associated with greater amounts of cognitive resources exerted throughout the audit process,[852] it can be expected that auditors with higher levels of dispositional skepticism will apply more cognitive effort to the audit task and will thus be less susceptible to information order effects. This contention is in line with psychological research which indicates that dispositional distrust, which is closely related to skepticism, triggers innate uncertainty about the sufficiency and appropriateness of information, which leads to more effortful, atten-

[849] See *Abou-Seada/Abdel-Kader* (2003): 33. Other factors identified by the authors to affect the process of belief revision (or the formation of initial beliefs and the attitude toward positive and negative evidence) in auditing include confirmation proneness, the diagnostic content of evidence, expertise, motivational and cognitive factors. See *Abou-Seada/Abdel-Kader* (2003): 33.

[850] See *Fahrer* (2012): 31f.; *Hurtt et al.* (2013): 72.

[851] See *Schreiber* (2000): 173.

[852] See *Majors/Shefchik/Vitalis* (2014): 2. However, as will be argued below, the exertion of higher cognitive effort does not necessarily involve higher judgment quality.

tive and profound information processing and ultimately results in less extreme and biased beliefs and judgments.[853]

The second mechanism via which skepticism can potentially mitigate recency in auditors' belief revisions relates to the suspension of judgment facet of trait professional skepticism. Specifically, as argued in Section 4.4.2.2, skeptical auditors are expected to withhold beliefs when facing insufficient information rather than to prematurely "jump" into conclusions. By so doing, auditors can eventually evaluate all available information in a simultaneous manner (rather than sequentially), so that the effect of contrasting information stimuli, and thus the extent of recency effects, may be reduced. To date, however, empirical support for the suspension of information processing and belief updating until judgments can be made with greater certainty is still lacking.[854] This point is also addressed within the discussion of Scenario 2.

The third mechanism by which skepticism can potentially reduce recency relates to auditors' attitude toward evidence. Specifically, in the case of highly asymmetrical individual sensitivity to evidence (i.e., skepticism or advocacy in the sense used by *Hogarth and Einhorn* (1992)), the belief-adjustment model predicts that order effects will become negligible.[855] Under this perspective, in its extreme form, skepticism may rule out recency.[856]

Overall, there are several good reasons to expect an alleviating effect of skepticism on the emergence of information order effects in auditors' belief revisions. However, as will be demonstrated subsequently, there are some not less meaningful clues for assuming the opposite.

Scenario 2: Trait Skepticism is Dominated by Recency Effects

Prior research has generally found that temporal psychological states aroused by situational influences more significantly influence human behavior than traits.[857] Accordingly, even the strongest innate skepticism might be countervailed by some more pronounced and salient environmental effects, e.g., strong skepticism-inhibiting incentives and/or robust cognitive traps such as recency effects.[858]

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[853] See *Fein/Hilton* (1994): 196; *Hilton/Fein/Miller* (1993): 501; *Kramer* (1999): 587; *Schul/Burnstein/Bardi* (1996): 228, 246f.

[854] See *Hilton/Fein/Miller* (1993): 503; *Schul/Burnstein/Bardi* (1996): 248.

[855] See *Pei/Reckers/Wyndelts* (1990): 128.

[856] However, in this case, negative effects like audit inefficiency and a hostile relationship with the client may arise. This view corresponds to the presumptive doubt perspective of professional skepticism.

[857] For such arguments and relevant psychological references along these lines, see *Robinson/Curtis/Robertson* (2013): 7. The results of their study also suggest that the state component of professional skepticism (i.e., situationally induced skepticism) more strongly influences auditors' behavior than the trait (i.e., dispositional) component. See *Robinson/Curtis/Robertson* (2013): 27.

[858] The robustness and pervasiveness of recency effects in belief updating, especially in the absence of debiasing contextual factors, has been long and broadly recognized in psychology (e.g., *Slovic/Lichtenstein* (1971): 693) and auditing (e.g., *Kahle/Pinsker/Pennington* (2005): 10). Additional support for the notion that cognitive biases may counteract and dominate professional skepticism in auditors' judgments is provided by *Payne/Ramsay* (2005): 326 for anchoring effects.

Nelson (2009) provides theoretical support for this idea by arguing that cognitive biases like recency can systematically and adversely affect auditors' professional skepticism.[859] In addition, *Rose and Rose* (2003) demonstrate that higher degrees of suspicion (i.e., a facet of skepticism) are associated with a more profound and effortful evidence evaluation, which, however, instead of reducing recency, as would be expected according to *Kennedy* (1993), has been found to reinforce the bias in auditors' judgments. This phenomenon can be attributed to the fact that elaboration involves drawing more inferences which are stored in long-term memory, which increases the complexity and cognitive load during information processing. Following the predictions of the belief adjustment model, high complexity is expected to induce recency effects.[860] Overall, the results reported by *Rose and Rose* (2003) suggest that higher cognitive effort is not necessarily beneficial in terms of judgment quality under all conditions. In addition, these results suggest that the classification of recency as an effort-related bias in the sense used by *Kennedy* (1993) might not be tenable, as apparently the bias operates beyond conscious awareness and does not relate, as assumed in prior auditing research, to cognitive "laziness".

Further noteworthy findings along these lines have been reported by *Majors, Shefchik and Vitalis* (2014) who find that higher degrees of trait skepticism trigger performance detriments and compromise audit effectiveness due to skeptics' ongoing questioning and critical stance which deplete subjects' cognitive resources available for information processing.[861] These results suggest that high professional skepticism comes at cost and may, under certain conditions, reinforce rather than mitigate cognitive bias.

In addition, *Ashton and Kennedy* (2002) recognize that it is virtually impossible to suspend belief and judgment until there is sufficient and persuasive evidence on which to found one's position because "*forming a judgment is a natural process when evidence is accumulated over time.*"[862] They further argue that by withholding judgment, auditors would collect evidence without processing it, which might jeopardize the possibility for timely follow up, elaboration on and resolving of certain audit issues.[863] With regard to recency, it is conceivable that the postponement of judgment could induce auditors to attach greater weight and importance to evidence presented at the end of the sequence while largely ignoring evidence faced at the outset. Following this line of thought, high degrees of trait professional skepticism are likely to amplify (rather than mitigate) recency effects in auditors' belief revisions.

In summary, there is a lack of theoretical and empirical clarity with regard to the strength and direction of the interrelation between recency effects and dispositional skepticism in auditors'

[859] See *Nelson* (2009): 2, 21. Although not particularly specified by *Nelson* (2009), cognitive biases are likely to affect auditors' *state* professional skepticism (i.e., a temporary condition evoked by environmental circumstances) and its behavioral manifestations (outward signs) rather than individuals' *trait* professional skepticism which is a stable and enduring characteristic and thus is not easily alterable by situational or other factors. The notion of cognitive biases and traps representing a threat to professional skepticism is echoed by *Glover/Prawitt* (2013): 8-11.

[860] See *Rose/Rose* (2003): 313f., 319.

[861] See *Majors/Shefchik/Vitalis* (2014): 22f.

[862] *Ashton/Kennedy* (2002): 224.

[863] See *Ashton/Kennedy* (2002): 224.

belief revisions. As the formulation of an unambiguous and theoretically, empirically and/or logically well-founded hypothesis is not possible, the interaction between information order effects and trait professional skepticism is explored via the following research question:

Will information order affect subjects with high trait skepticism differently than subjects with low trait skepticism?

These theoretical considerations build the frame for the empirical inquiry into the influence of information order effects and trait professional skepticism on auditors' belief revisions. In the subsequent section, the procedures and results of the empirical analysis are presented and discussed.

5 Empirical Analysis

5.1 Research Method

The research method employed within this study is that of a controlled experiment. Following *Peecher and Solomon* (2001), the term "experiment" is used to refer to "*a method of inquiry in which the researcher* ***randomly assigns*** *participants within a controlled setting that allows reproduction of some phenomenon (e.g., an individual's decision process),* ***actively manipulates*** *antecedents hypothesized to affect the nature of the phenomenon and then makes various measurements of the phenomenon, often measurements that could not be made in a natural setting*".[864] The experiment has been viewed as a strong and influential research method that enables the researcher to *explain*, rather than merely explore and describe, behavioral phenomena, thereby achieving the highest degree of scientific understanding.[865]

There are numerous benefits arising from the application of experimentation. The main advantage of this research method is that it allows strong *causal* (as opposed to correlational) inferences about the relationships underlying observed phenomena to be drawn.[866] This is achieved through deliberate manipulation of the independent variable(s), control of other potentially influential factors, and random assignment of participants to treatment conditions. This approach enables the experimenter to isolate effects, i.e., disentangle interrelated factors that interact in natural settings to influence behavior, and explore under which conditions and via which processes particular behavioral phenomena occur. With other words, experimentation allows for exploring *why* and *how*, rather than whether or not, specific phenomena arise. In addition, experiments allow for testing conditions that do not yet exist or would be impossible to directly observe and study in real-world settings. Hence, the experimental method is considered as one of the most powerful research techniques.[867]

In general, there are two major types of experiments: laboratory and field experiments. The former type is characterized through tight experimental control (rather than the research location), which enables the researcher to reduce the noise caused by extraneous variables, whereas the latter involves a more naturalistic (i.e., less controlled) setting in which people frequently do not even know that they are subject to scientific investigation.[868] The present study employs a laboratory experiment in which participants are randomly assigned to treatment conditions and a number of factors potentially influencing their belief revisions are controlled for. While laboratory experiments have frequently been criticized for their artificiality and

[864] *Peecher/Solomon* (2001): 195, bolded terms have been emphasized (italicized) in original.

[865] See *Peecher/Solomon* (2001): 195.

[866] See *Aronson/Wilson/Brewer* (1998): 102; *Loewenstein* (1999): F26; *Solso/MacLin/MacLin* (2008): 23; *Trotman/Tan/Ang* (2011): 280.

[867] See *Libby/Bloomfield/Nelson* (2002): 778; *Libby/Luft* (1993): 428; *Peecher/Solomon* (2001): 195; *Reynolds* (1971): 156f.; *Solomon/Trotman* (2003): 395f.; *Swieringa/Weick* (1982): 63; *Trotman* (2011): 205; *Trotman/Tan/Ang* (2011): 280. Furthermore, experiments are generally conducted under controlled conditions, i.e., under the supervision of the researcher, so that they typically yield good response rates. See *Northrop/Arsneault* (2007): 231.

[868] See *Aronson/Wilson/Brewer* (1998): 105f.; *Roth* (1988): 974. For a general discussion of the advantages and disadvantages of these two types of experiment, see *Coolican* (2013): 115-121.

K. Yankova, *The Influence of Information Order Effects and Trait Professional Skepticism on Auditors' Belief Revisions,* Auditing and Accounting Studies,
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lack of generalizability of findings beyond the context of the particular study, their contribution to increasing the understanding of the processes underlying human behavior achieved via experimental control and specification of cause-effect-relationships cannot be overemphasized.[869]

The trade-off between experimental control and its inevitable by-product simplification on the one hand and realism and extrapolability of the experimental results beyond the particularities of a study on the other hand concerns two crucial aspects of scientific experiments – their internal and external validity, respectively. Generally, *internal validity* has been acknowledged as "*the sine qua non of good experimental research.*"[870] It concerns the confidence with which causal inferences can be drawn based on the research results. That is, internal validity relates to the degree to which observed variation in the dependent measure can be straightforwardly attributed to the variations in the manipulated factor(s). Internal validity is typically enhanced by random assignment of participants to experimental conditions. In essence, randomization is an equalizing procedure which ensures that participants are distributed reasonably evenly across conditions in terms of their personal characteristics, past experiences, etc.[871] *External validity*, on the other hand, concerns the robustness of an observed phenomenon, i.e., the degree to which an inferred causal relationship can be generalized[872] beyond the specific experimental context and extrapolated to other persons, settings, and tasks. External validity is enhanced through realism of the experimental setting and the use of participants who are reasonably representative of the population in question.[873] It should be remarked, however, that in contrast to internal validity, external validity is not always an ultimate goal in experimental research.[874]

A further relevant point that needs to be addressed within the general methodological consideration of experimentation concerns the existence of two major and distinct types of realism which involve different implications: experimental realism and mundane realism.[875] *Experimental realism* relates to whether participants attend to, take seriously, and are impacted by

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869 See *Dobbins/Lane/Steiner* (1988): 282.

870 *Aronson/Wilson/Brewer* (1998): 129.

871 See *Aronson/Wilson/Brewer* (1998): 104, 129; *Keppel* (1973): 25. Note that perfect equivalence of subjects among treatment groups is an ideal condition which is only possible in the "long run", i.e., with the use of a sufficiently large sample size. Real-world experiments, however, are conducted in the "short run", which means that there is no guarantee of (perfect) equivalence of subjects' characteristics among groups. See *Keppel* (1973): 25f.

872 It is instructive to note that there are two types of generalization: *statistical* generalization which is only justified in light of random sampling and *non-statistical* generalization which is justified when the extension of results beyond the bounds of the experiment appears reasonable in light of the knowledge and insights gained in prior research in the particular area. See *Keppel* (1973): 28f. This argument is picked up on in Section 6.2.

873 See *Aronson/Wilson/Brewer* (1998): 130f.; *Peecher/Solomon* (2001): 195. For a brilliant in-depth discussion of validity issues in the context of experimentation, including internal and external validity but also additional types of validity such as statistical conclusion validity and construct validity, consult *Shadish/Cook/Campbell* (2002): 34-102.

874 See, e.g., *Aronson/Wilson/Brewer* (1998): 132f.; *Mook* (1983): 379-387.

875 *Aronson/Wilson/Akert* (1994): 58 suggest a third type of realism which they label "psychological realism". This kind of realism relates to the degree to which the psychological processes elicited in an experiment reflect the relevant psychological processes naturally occurring in the real-world.

experimental stimuli, whereas *mundane realism* concerns the extent to which experiments mimic real-world situations in their full contextual and informational richness. In general, experimental realism has been acknowledged as highly desirable. Mundane realism, in comparison, has been viewed as neither necessary nor sufficient for internal and external validity. In fact, in some cases, mundane realism has been argued to compromise an experiment by distracting subjects' attention away from the primary variables of interest, thereby diminishing experimental control and inducing noise in the experimental setting.[876] Hence, the present study was designed to be reasonably realistic in order to elicit subjects' motivation and involvement with the study (experimental realism), while involving the necessary simplification and abstraction (i.e., lack of mundane realism) in order to ensure tight experimental control, temporal feasibility, and experimental efficiency.

Building on these general methodological considerations, in the subsequent section the experimental design of the current study is discussed.

5.2 Experimental Design

The experimental design of the present study contains one manipulated and one measured[877] independent variable, both applied in a between-subject[878] manner. Particularly, in consistency with prior research, information presentation order was *manipulated* at two levels: In the first treatment condition, two pieces of positive information were followed by two pieces of negative information $(+ + - -)$. In the second treatment condition, the information cues were presented in the exact opposite order $(- - + +)$. Within the positive and the negative cue clusters, presentation order was held constant among the treatment groups.[879]

In contrast to the order of information presentation which was determined (i.e., controlled) by the researcher, professional skepticism is a stable personality trait that is not manipulable.[880] Hence, in the current study participants' trait professional skepticism was *measured* (rather than manipulated) using the Hurtt scale and all subjects were classified into two categories of skepticism, high versus low, based on a median split. The resulting experimental design can be classified as a 2 x 2 randomized post-hoc block between-subjects design.[881] This procedure

[876] See *Peecher/Solomon* (2001): 197; *Swieringa/Weick* (1982): 80f.

[877] In the relevant research design literature, measured variables have also been referred to as "quasi-independent" because in contrast to typical independent variables, they are not manipulated. However, like their manipulated counterparts, measured variables also act as group-building factors in ANOVA procedures. See *Gravetter/Wallnau* (2012): 347, 394. Alternative labels for measured variables include "non-experimental (attribute) variables" (*Kerlinger/Lee* (2000): 367) and "blocking factors" (*Hair/Black/Babin* (2010): 440).

[878] A between-subjects design involves multiple conditions and different participants in each condition. See *Shadish/Cook/Campbell* (2002): 109.

[879] This procedure follows the design of Experiment 4 by *Hogarth/Einhorn* (1992): 28 and has found a broad application in auditing research on belief adjustment. See *Kahle/Pinsker/Pennington* (2005): 12.

[880] See *Peecher/Solomon* (2001): 195.

[881] See *Keppel* (1973): 502, 511.

yielded the following four treatment-block combinations (henceforth referred to as experimental groups or cells):

− − + +, high trait professional skepticism;
− − + +, low trait professional skepticism;
+ + − −, high trait professional skepticism; and
+ + − −, low trait professional skepticism.[882]

In consistency with prior auditing research,[883] the dependent variable used in this study was an individual's belief revision measured as the difference between the last (S_4) and the initial (S_0) belief (going concern likelihood assessment) of each participant. As posited by *Hogarth and Einhorn* (1992), the consideration of the difference between the final judgment and the stem (rather than the final judgment alone) is crucial for avoiding the threat of initial differences in beliefs masking order effects.[884] In this context, a recency effect emerges if subjects' responses reveal significantly greater downward (or smaller upward) belief revisions in the + + − − treatment condition than in the − − + + condition. With other words, evidence of recency would be obtained if $S_4–S_0$ (+ + − −) < $S_4–S_0$ (− − + +).[885] In strict normative terms, in the case of an equal number of approximately equally strong positive and negative information items, the final belief (S_4) should approach the starting position (S_0),[886] i.e., $S_4–S_0$ (+ + − −) = $S_4–S_0$ (− − + +) = 0.

Beyond the variables of primary interest (i.e., the independent variables of information order and trait professional skepticism), a number of demographic, evidence-, and effort-related variables were collected in order to control for potential confounding effects. These variables are listed in Section 5.3.3.

The subsequent section provides a detailed description of how the experimental design outlined above was implemented in the research instrument and which procedures were undertaken to validate the experimental instrument. In addition, the administration of the study is outlined.

5.3 Research Instrument

5.3.1 Development and Preliminary Validation

As indicated in Section 3.2.3, the audit task utilized in the present study was that of a going concern assessment. It may be recalled that the task choice was based on the insight that the going concern evaluation essentially represents an ongoing sequential belief-adjustment pro-

882 The general distribution of participants among experimental groups is presented in Section 5.4.
883 See *Kahle/Pinsker/Pennington* (2005): 13-16 for an overview.
884 See *Hogarth/Einhorn* (1992): 23.
885 See *Favere-Marchesi* (2006): 74.
886 See *Pinsker* (2007): 199.

cess in which previously held beliefs are updated in light of new information which normally arrives in a piecemeal fashion. In evaluating an entity's going concern ability, auditors typically face mixed information comprising both evidence that refutes (negative evidence) and evidence that corroborates (positive evidence) the going concern assumption. Overall, the going concern evaluation has been acknowledged as one of the most complex, difficult, ambiguous, information-intensive, and critical tasks in auditing.[887] Hence, it provides an "ideal context" for the investigation of recency effects in auditors' belief revisions.[888]

Auditors' going concern assessments were elicited using case materials based[889] on a real audit engagement of a Big 4 audit firm which were designed with the close cooperation of the incumbent engagement partner. This approach was chosen in order to ensure the substantive correctness, practical realism, adequacy, and consistency of the case materials.

Importantly, in contrast to the procedure typically employed in prior auditing research, herein it was deliberately refrained from the adoption of an already existing case study. The rationale for this was twofold: First, existing research materials had been designed to fit the specific characteristics of the accounting and auditing regime in the particular country where the study was conducted (typically the USA). Second, prior research instruments dealing with the issue of belief updating in the context of auditors' going concern judgments are not very recent and topical, stemming without exception from the period before the most recent financial and economic crisis in the years 2008 and 2009. This crisis has considerably hit the steel industry where the present case study was located, and it has jeopardized the viability of a number of companies, thereby providing a unique opportunity for the use of a topical, complex, and highly uncertain setting for the study of auditors' belief revisions.[890] Overall, the development of a novel, realistic, contextually well-suited contemporary case was deemed much more reasonable and scientifically meaningful than the mere replication of potentially superseded prior research instruments.

As the validity, consistency, and plausibility of the research instrument are of crucial importance for obtaining meaningful and valid results, great care and deliberation were exerted in developing the case study. Wherever possible and reasonable, measures and scales established in prior research were employed to ensure highest possible validity and comparability. For instance, as indicated in the previous section, in consistency with prior research, total belief revision (S_4–S_0) was used as the dependent measure in the present study and subjects' trait professional skepticism was measured using the well-established Hurtt scale. Furthermore, considerable value was placed on obtaining comprehensive feedback from representa-

[887] See *Carcello/Neal* (2000): 455; *Carmichael/Pany* (1993): 49; *Chow/McNamee/Plumlee* (1987): 129; *Guiral/Esteo* (2006): 603.

[888] See *Cushing/Ahlawat* (1996): 115. This contention is underpinned by the fact that the going concern task has been employed in a number of prior studies of recency effects in auditing, including *Arnold et al.* (2000), *Asare* (1992), *Ashton/Kennedy* (2002), *Cushing/Ahlawat* (1996), *Favere-Marchesi* (2006), *Guiral/Esteo* (2006), *Kennedy* (1993), *Messier* (1992), and *Trotman/Wright* (1996).

[889] Note that to ensure the anonymity of the client firm, the original values were aggregated and modified but the overall picture was substantially retained.

[890] For relevant economic facts and statistics concerning the deleterious influence of the economic and financial crisis on the steel industry, see *European Commission* (2009): 6 and *European Commission* (2010b): 8.

tives of audit practice and academic research. In particular, at the development stage of the study, three university professors specialized in auditing research were asked to review the case study and provide comments on the experimental instrument. Their remarks and suggestions were implemented before the pilot test of the study was conducted. In addition, feedback was also obtained at two PhD seminars conducted in Germany in 2011 where the project was subjected to thorough critical discussion. Furthermore, three highly experienced audit practitioners (two partners and one senior manager) reviewed the experimental materials to ensure the plausibility, realism, and reasonableness of the case study. The comments obtained through this review were integrated into the case materials. A detailed description of the finalized research instrument is provided in Section 5.3.3.

The experimental materials were written in German, as this was the official language used in the training sessions within which the case study was administrated.[891] Overall, it was expected that the participants in the experiment would be more comfortable, motivated, involved, and quick in completing the case study in German rather than in English. In addition, the particular language choice was expected to avoid the threat of terminological confusion and confounding effects. To ensure linguistic uniformity of the research materials, the Hurtt scale, which is originally available in English, was translated into German. For this purpose, the parallel blind technique was employed.[892] The discrepancies identified in the course of this procedure were thoroughly discussed and resolved.

Before a pretest with audit professionals was conducted, the research instrument was subjected to pilot testing with five academic staff members with practical experience in auditing.[893] As a result of the pilot test, minor changes were made to the experimental instrument.

5.3.2 Pretest

The pretest was designed to support the selection of the four additional pieces of information to be used in the final version of the case study, to pilot test the Hurtt scale with German auditors, and last but not least to examine the understandability and plausibility of the case materials. The pretest materials were structured as follows: At the outset, a general description of the audit client and some aggregated financial statement data were provided. This baseline information was followed by a set of ten pieces of additional information. For each of the ten cues, subjects were asked to indicate the direction (positive, negative, or neutral[894]) and im-

[891] For a more detailed description of the administration procedure, see Section 5.3.4.

[892] For a description of this technique and a review of the strengths and weaknesses of alternative translation methods, see *Behling/Law* (2000): 18-24. *Quadackers/Groot/Wright* (2012): 21 also applied the parallel blind technique to translate the Hurtt scale into Dutch.

[893] On the importance of pilot testing and pretesting, see *Litwin* (1995): 60f., 66f.

[894] Note that while the ten cues were conceptualized to be strictly positive or negative, the neutrality of evidence option was also included in order to avoid the issue of participants being forced to choose an option that does not correspond to their perceptions. This approach is in line with prior research. See, e.g., *Adam* (2007): 157f.; *Cushing/Ahlawat* (1996): 115f. This point is also addressed and underpinned with further relevant references in Section 5.5.1.

portance[895] of the individual items for the assessment the going concern ability of the firm. The importance assessments were measured on a scale from 1 ("not at all important") to 7 ("very important"). The initial pool of ten items consisted in part of real facts and in part of fictional cues designed with the help of the engagement partner to fit into the basic scenario. Following the cue assessment task, subjects were asked to complete the Hurtt scale without being informed about the scale's subject in order to prevent untruthful, socially-desirable responses. Finally, subjects answered a number of demographic and debriefing questions and were requested to comment on the case study and to assess its understandability. The full pretest materials are available in Appendix 2.[896]

In total, 15 auditors at different levels within the audit firm (seniors[897], managers, senior managers, and partners) participated in the pretest.[898] Of the 15 participants, two subjects missed to provide an indication regarding the direction of the evidence for all ten items under review. Hence, these subjects were excluded from the cue selection analysis. Table 3 provides an overview of the key demographic characteristics of the 13 auditors who remained in the sample.

[895] In consistency with *Hite/Stock* (1996): 88, 94, in the present work the terms "importance" and "strength" are used interchangeably with regard to evidence or information.

[896] Note that the pretest and the final version of the case materials are nearly identical, with the only difference being that auditors in the pretest evaluated a set of ten additional cues without explicitly indicating their beliefs regarding the going concern ability of the firm, while auditors in the main test had to explicitly state their initial beliefs and belief changes following the sequential presentation of four pieces of additional information. See also the description of the final case materials provided in the next section as well as the full versions of the pretest and main test materials provided in Appendix 2 and 3, respectively. As will be shown below, subjects in the pretest did not provide any critical remarks regarding the plausibility, understandability, or extent of the case study, so that the retention of the baseline structure and content of the experimental draft appeared reasonable and justified.

[897] As will be argued in Section 5.4, although the final going concern assessment and the selection of the related audit report type are typically tasks performed by more experienced, higher-ranked auditors, seniors are also involved, at least at the preliminary stages, in the examination of the going concern assumption. Hence, senior subjects were retained in the sample. However, it was tested whether the overall findings changed if the responses of the two seniors were excluded from the analysis. As this was not the case, the subsequently reported results also include seniors' cue direction and cue importance assessments.

[898] The participants in the pretest were not included in the sample on which the final analyses reported in the following sections were conducted.

Variable	N	Frequency	Mean (SD)	Range
Age	13		42.38 (9.37)	29-61
Gender				
male	10	76.9%		
female	3	23.1%		
General experience	13		16.31 (9.89)	4-38
Industry experience	13		2.00 (1.16)	1-5
Task experience	13		4.69 (1.65)	1-7
Auditor certification				
yes	9	69.2%		
no	4	30.8%		
Position				
senior	2	15.4%		
manager	2	15.4%		
senior manager	1	7.7%		
partner	8	61.5%		

Table 3: Summary of Demographic Information of Participants in the Pretest

Table 3 shows that the participants in the pretest had substantial general audit experience (mean: 16.31 years), above-average experience with the going concern task (mean: 4.69 on a scale ranging from 1 ("no experience at all") to 7 ("very large experience")), and little experience in auditing firms from the steel industry (mean: 2.00 on the same scale).

As indicated at the outset, the first major aim of the pretest was to support the cue selection procedure by testing the directional plausibility and similarity in perceived importance of the ten additional cues. An overview of the results of the cue assessment procedures is provided in Table 4.

Item	Brief Characterization	Sign	Misrated	Neutral	Mean	SD
1	Good order inflow and management's profit forecast	+	0	0	5.54	1.13
2	Favorable external report and banks willing to negotiate	+	0	1	5.54	0.88
3	Rejection of state funding	–	0	2	5.15	1.21
4	Major sales manager and the whole team leave the firm	–	1	0	6.08	0.86
5	Announcement of a cash capital increase	+	1	2	4.85	1.21
6	Warranty risks and product quality problems	–	0	0	5.85	1.14
7	Bankruptcy of a major supplier and lack of alternatives	–	0	0	5.85	1.07
8	Deferral of liabilities	+	1	2	4.00	1.35
9	Planned sale of property	+	1	2	3.69	1.25
10	Environmental violations and threat of plant closure	–	0	0	6.08	0.86

Table 4: Overview of the Results of the Cue Assessment Task

An analysis of participants' *cue direction* responses reveals that only 4 out of 130 observations (13 participants × 10 observations per participant) (3.08%) were not in the intended direction (i.e., a cue which was conceptualized to represent positive (negative) information was rated as negative (positive)). This misclassification rate is comparable to the values reported by prior auditing research.[899] As the four misclassifications were conducted by four different participants and concerned different cues, no systematical misconception regarding a single cue could be identified. Remarkably, however, positive items were more frequently mistaken for negative (three times in total) than conversely (only one time). In addition, participants more frequently viewed positive cues as neutral (seven times in total). In comparison, negative cues were indicated only in two cases as neutral. Furthermore, subjects assigned greater overall importance to negative information (the mean of all five negative cues amounts to 5.80) than to positive information (the mean of all five positive cues amounts to 4.72). However, it cannot be said whether these findings are attributable to auditors being more sensitive to negative information than to positive information, to actual differences in the quality and importance of the negative cues compared to the positive cues utilized in the pretest, or to some other confounding effect.

With regard to participants' *cue importance* assessments, an inspection of the results summarized in Table 4 shows that compared to the other cues, item 8 and item 9 were viewed as relatively weak by the participants in the pretest. Hence, these items were dropped from the initial pool to ensure that the final cue selection was among items with above-average perceived importance and thus sufficiently strong to induce belief revision. The remaining eight items were then thoroughly discussed with the engagement partner of the audit on which the

[899] See, e.g., *Cushing/Ahlawat* (1996): 117; *Monroe/Ng* (2000): 161. The misclassification rates obtained in prior auditing studies are discussed in more detail in Section 5.5.1.

case materials were based, and the two positive and two negative cues which were most crucial to the going concern assessment of the real-world prototype firm were selected.[900] These cues are listed below, with the item number used in Table 4 and the sign of the evidence in parentheses:

1. Favorable external report on the economic outlook and the ability of the firm to continue as a going concern as well as banks' willingness to negotiate over the renewal of the firm's credit lines[901] (item 2) (+);
2. Rejection of state funding (item 3) (−);
3. Announcement of a cash capital increase of 200 MEUR until the end of the current year (item 5) (+); and
4. Bankruptcy of a major supplier and lack of alternatives[902] (item 7) (−).

As noted at the beginning of this section, the second major objective of the pretest was the pilot test and validation of the Hurtt scale with professional auditors. To the author's knowledge, this was the first-time use of the scale with German auditors. All 15 auditors who participated in the pretest filled in the scale in full and were thus included in this part of the analysis. Subjects' responses yielded a Cronbach's alpha value of 0.922, thus hinting at a very good internal consistency (reliability) of the scale. The mean Hurtt score amounted to 136.87, which is significantly above the midpoint of the scale (it may be remembered that the scale ranges from 30 to 180, which yields a theoretical midpoint of 105). The standard deviation of the Hurtt score was 18.18 and subjects' responses ranged from 105 to 163 and thus covered approximately 38.7% of the full theoretical range. These results are in line with prior research.[903] In consistency with *Quadackers, Groot and Wright* (2012), one-sample Kolmogorov-Smirnov test was performed on the Hurtt score and the histogram of the score was visually inspected to test for normal distribution.[904] The approximate normal distribution of the variable was confirmed both formally (asymptotic *p*-value (two-tailed) = 0.200) and visually (the distribution of the scores was relatively symmetrical and bell-shaped, with the majority of values centered around the mean and tapering out toward the tails).

The final major objective of the pretest was to check the understandability and reasonableness of the case materials. Overall, subjects rated the understandability of the materials as above-average (mean: 5.2 (SD: 1.08; range: 3-7) on a scale from 1 ("not at all understandable") to 7 ("totally understandable")). Although at the beginning of the pretest session subjects were particularly encouraged to provide critical or other comments on the case study, no comments

[900] This procedure follows *Asare* (1992): 386.

[901] Note that *Favere-Marchesi* (2006): 73 used a similar cue, however, in the opposite direction (i.e., involving a non-renewal of credit lines). This reinforces the critical importance of the issue of credit lines renewal in the context of a firm's going concern assessment and provides additional support for the cue choice made.

[902] Note that this issue is explicitly stated in IDW PS 270.11 as an example of an operational circumstance that potentially casts doubt on a firm's ability to continue as a going concern. Hence, its direction and importance is also normatively validated.

[903] See, e.g., *Hurtt* (2010): 161f.; *Popova* (2013): 147; *Quadackers/Groot/Wright* (2012): 25, 45.

[904] See *Quadackers/Groot/Wright* (2012): 25.

or remarks were obtained. Based on these results, the pretest was considered successful and the case materials were viewed as understandable and reasonable.

Subsequently, the outcome of the development and validation procedures outlined above is described in detail.

5.3.3 Experimental Materials and Procedures

The case materials utilized for the inquiry into the influence of information order effects and trait professional skepticism on auditors' belief revisions were structured in two parts. In Part 1, a description of the client and the case scenario was provided and auditors' repeated assessments of the viability of the firm were elicited. The client, a company called "Premium Steel AG", was described as a leading manufacturer and distributor of quality steel products for the automotive and plant construction industries, with around 10,500 employees and several production sites in Germany. The company was depicted as currently experiencing a considerable economic downturn[905] due to the global financial and economic crisis and its severe consequences for the automotive and plant construction industries as key consumers of steel products. The portrayed substantial economic difficulties of the firm constitute a critical situation in which auditors are required to be particularly vigilant and skeptical.[906]

Following the general description of the client, participants were placed in the position of the appointed auditor of the Premium Steel AG for the financial year ended 2009 and were told that they were auditing the firm for a third year in succession. In addition, it was clarified that the risk-based audit approach had been applied, the internal controls of the auditee were effective, and the firm had received an unqualified audit opinion in the last years. Participants were then informed that the current-year audit was finished except for the final going concern evaluation. Thereafter, financial statement information was provided comprising an aggregated balance sheet, income statement, and cash flow statement for the past two years (2007 and 2008) and the financial year under audit (2009).

Based on this information, subjects were asked to assess the likelihood that the Premium Steel AG will continue in existence for the next twelve months. To reflect the nature of the likelihood judgment required from the participants, a Likert-type response scale ranging from 0% to 100% portioned into ten discrete intervals of ten percentage points each was employed for eliciting participants' initial beliefs (S_0). At this point, participants were unaware that they would receive further information on the case and the opportunity to update their previous judgments.[907] Importantly, in contrast to some older research works,[908] in the present study

[905] This result is reinforced by a review of the catalogue of 15 criteria indicating potential going concern problems identified by *Mutchler* (1986): 151, according to whom the fulfillment of even one single criterion can cast significant doubt on a firm's viability. Premium Steel AG meets 4 of the 15 negative criteria: reorganization, negative cash flow, current year loss, and negative income from operations.

[906] See *CPAB* (2012): 3. In particular, in a situation of substantial economic downturn, client's management is potentially under increased pressure to represent the best possible picture of the company, i.e., to demonstrate its going concern ability despite the considerable contrary economic conditions and factors.

[907] See *Ahlawat* (1999): 78.

subjects were asked to provide self-generated initial beliefs instead of being given certain priors (initial likelihood values specified in the case materials). This procedure is central in terms of capturing participants' genuine initial beliefs. The assignment of priors, on the other hand, can induce confounding effects (e.g., anchoring on the externally provided priors), thereby compromising the results of the study.[909]

Next, the four additional information cues validated and selected in the pretest were presented in a sequential manner, i.e., each new piece of evidence was presented on a separate page.[910] After encountering each additional cue, subjects were requested to reindicate their assessment of the likelihood that the Premium Steel AG will continue in existence for the next twelve months. Importantly, subjects were instructed to complete each assessment in the predetermined order and not to subsequently adjust already provided assessments. Again, participants' responses were measured on an 11-point Likert-type response scale ranging from 0% to 100%. The resulting four sequential assessments are henceforth referred to as S_1, S_2, S_3, and S_4.

Part 2 of the experimental materials contained the Hurtt scale, manipulation checks as well as demographic data and debriefing questions about the case. At the beginning of this part, subjects were asked to complete the 30-item Hurtt scale. In consistency with prior auditing research using psychometric scales, the Hurtt scale was presented subsequent to the case study in order to avoid distortions of participants' perceptions of the task, demand effects, and biased responses.[911] To reduce the threat of potentially non-genuine responses, participants were not informed about the subject of the scale. Following *Hurtt's* (2010) instructions for administration of the scale, the only explanation provided with regard to the scale was that it contains a number of general statements which have to be assessed from the personal point of view and that there are no right or wrong answers.[912]

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[908] Meant are here especially the following studies: *Ashton/Ashton* (1988, 1990), *Bamber/Ramsey/Tubbs* (1997), *Chan* (1995), and *Kennedy* (1993).

[909] See *Asare* (1992): 386; *Butt/Campbell* (1989): 474; *Hite/Stock* (1996): 86, 95; *Pinsker/Pennington/Schafer* (2009): 98f. For a more detailed consideration of the anchoring phenomenon and the underlying psychological processes and mechanisms, see *Epley/Gilovich* (2005, 2006).

[910] Note that the presentation order of these four cues ($++--$ vs. $--++$) represented the only difference in the case materials provided to both treatment groups. As indicated in Section 5.2, and in consistency with prior research (e.g., *Ashton/Ashton* (1988): 634; *Ashton/Kennedy* (2002): 225; *Cushing/Ahlawat* (1996): 115; *Monroe/Ng* (2000): 157), the order of cues within the positive (mitigating) and negative (contrary) categories was held constant.

[911] See, e.g., *Bernardi* (1994): 74f.; *Peytcheva* (2014): 38. *Demand* effects arise when subjects provide responses in line with the anticipated expectations of the researcher and/or the experimental treatment. Closely related to this phenomenon is the so-called social desirability bias (also known as "halo effect"). This bias occurs when participants respond unnaturally (and untruthfully) to sensitive questions in order to meet societal norms and appear in a more desirable light. See *Cohen/Pant/Sharp* (1995): 41; *Jones/Massey/Thorne* (2003): 92; *Randall/Fernandes* (1991): 805f. Note in passing that *Robinson/Curtis/Robertson* (2013): 15 place the Hurtt scale prior to the case study, which they explain by reference to the desire to ensure that trait skepticism was not affected by the content of the case. However, as an individual disposition, trait skepticism is a stable and enduring characteristic of an auditor's personality, and thus it is not theorized to be easily malleable and context-dependent. Hence, the reasonableness of the above argumentation is at issue.

[912] See *Hurtt* (2010): 168.

Subsequent to the Hurtt scale, the manipulation checks were presented. These procedures aimed at verifying whether participants perceived the positive and negative pieces of additional information in consistency with the intended direction and whether the four cues were viewed as similar in importance. The choice not to place the manipulation checks immediately after the manipulations was motivated by the desire to obtain a more objective and valid assessment of the extent to which participants internalized the manipulations.[913] In analogy to the procedure adopted in the pretest, the manipulation checks consisted of two related ratings for each piece of evidence: a classification of the direction of the cue as positive, negative, or neutral[914] information and an evaluation of its importance for the assessment of the going concern ability of the Premium Steel AG on a scale from 1 ("no importance at all") to 7 ("very large importance").[915]

Upon completion of the manipulation checks, subjects were asked to provide demographic information, including age, gender, general audit experience (in years), self-assessed[916] experience with audits in the steel industry as well as with going concern evaluations, professional certification, and position in the firm. The demographic questions were followed by a number of evidence-, effort-, and skepticism-related questions. Specifically, participants were asked to indicate to what extent they considered the information contained in the case study to be sufficient for a conclusive evaluation of the going concern ability of the Premium Steel AG. Following this question, participants were asked to list the additional information that they would need in order to conclusively evaluate the going concern ability of the Premium Steel AG.

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913 This contention follows *Grenier* (2013): 15.

914 As indicated in the previous section, while the intended manipulation only involved positive and negative information, the neutrality option was also included in order to provide participants with the full range of alternatives and the possibility to provide genuine (rather than forced-choice) responses. This approach is in line with *Anderson/Maletta* (1999): 82, *Bamber/Ramsay/Tubbs* (1997): 257f., and *Blay* (2005): 771 who all used a bipolar manipulation check scale involving a neutral midpoint (0) to capture participants' cue evaluations. The procedure employed herein is also consistent with the manipulation check design utilized by *Cushing/Ahlawat* (1996): 115f. who used the following cue classification options: positive evidence, negative evidence, or neither. In addition, *Adam* (2007): 157f. likewise recognizes that the direction (or tendency) of information can be positive, negative, or neutral.

915 Note that with exception of the likelihood scale (0%-100%) on which subjects' beliefs were measured and the Hurtt scale which involves 6-point "forced-choice" response scales, all scales employed in the present study ranged consistently from 1 to 7, with lower (higher) values indicating lower (higher) degrees of an attribute or lower (higher) agreement with a statement. The use of a 7-point Likert-type scale follows the recommendation of *Krosnick/Fabrigar* (1997): 144f. Generally, a scale involving an odd number of response alternatives offers participants the possibility to pick a neutral midpoint instead of forcing them to choose a direction. However, it goes along with the risk of providing a convenient midpoint to which participants reluctant to exert cognitive effort could adhere. See, among others, *Hurtt* (2010): 156; *Krosnick/Fabrigar* (1997): 147f.; *Peytcheva* (2014): 38f.

916 Self-ratings as measures of industry- and task-specific experience have been broadly applied in behavioral auditing research. See, e.g., *Cuccia/McGill* (2000): 425, *Green* (2008): 247, *Kayadelen* (2007): 345, and *Zhao/Harding* (2013): 492. Note that there also exist alternative measures of industry- and task-specific experience, e.g., the proportion of time spent in auditing clients within a certain industry over the past years (e.g., *Solomon/Shields/Whittington* (1999): 197), the number of audit engagements within a certain industry (e.g., *Wright/Wright* (1997): 278), or the percentage of clients facing going concern problems over the last five years (e.g., *Favere-Marchesi* (2006): 72). However, these measures appeared more time-consuming to elicit and were expected to produce non-uniform, difficultly comparable results, which would have complicated the subsequent analyses. Hence, the use of self-assessments measured on uniform, predetermined scales was preferred over alternative measures.

Next, subjects were asked to indicate the degree of certainty in their (own) assessment of the going concern likelihood of the firm. Subsequently, participants were requested to provide self-assessments of the attention, intensity of thought, and concentration exerted during the going concern assessment task as well as the perceived difficulty of the evaluation. Subjects were then asked to indicate whether they had participated in training courses or workshops on professional skepticism in the past, and if this was the case, to indicate the number of these events. In essence, the demographic and the other questions outlined above were conceptualized to generate a bunch of control variables which were used in the supplemental and explorative analyses reported in the next sections (particularly in Section 5.5.4.3 and in Section 5.5.5).

Finally, subjects were asked to rate the understandability of the case study, to provide comments, and to indicate the time they needed to complete the study. The experimental materials are available at full length in Appendix 3.

In conclusion, an important final note concerning the case study is in order. As is the case for virtually all audit tasks and problems encountered in audit practice and/or studied in auditing research, there is no "right" solution to the present case study.[917] The only "correctness" criterion that can be taken into account is normative theory. Hence, herein judgment quality is evaluated under strictly normative-theoretical criteria.

5.3.4 Administration

Paper-and-pencil administration was selected for the conduct of the experimental study. This procedure was preferred over online administration as it typically ensures higher participation and stronger experimental control.

The experimental study was conducted in August and October 2012 during four annual training course sessions of a Big 4 audit firm. At the outset of each experimental session, support for the project was expressed by an audit partner who encouraged active and diligent participation in the study. Overall, round 85% of all training course attenders participated in the experimental study.

In consistency with prior research, the instructions on the study and the case materials were provided in the official language of the training sessions, i.e., German. At the beginning, a brief verbal introduction was provided, including some very general remarks regarding the study as well as few important instructions to be followed throughout the study. In particular, subjects were asked to work independently, to complete the study in the predetermined order, and not to revise their assessments in hindsight. The only comment regarding the subject of the study was that it involved individual assessments of some economic issues. The verbally provided instructions were summarized on the cover page of the experimental materials and subjects were asked to read them through carefully before proceeding to the case study. In

[917] See *Ashton/Ashton* (1990): 16; *Trotman* (2005): 78.

consistency with research convention, participants were assured anonymity and confidentiality.

To ensure the internal validity of the experimental study, subjects were randomly assigned to treatment conditions ($--++$ vs. $++--$). The randomization procedure was performed using a computer-generated list which specified the sequence in which both versions of the research instrument were administrated.

All experimental sessions were conducted under the vigilant supervision of the author. Overall, no notable questions were addressed during the experimental sessions. On average, it took participants 21.54 minutes (SD: 5.92) to complete the study.

5.4 Participants

The study was completed by auditors from different local offices of a Big 4 audit firm who participated in an annual professional training course. They were encouraged to participate in the case study by a representative of the audit firm's top management. However, participation was on a voluntary basis. Therefore, it can be argued that primarily diligent and motivated persons agreed to complete the case study.[918]

The experimental task used in the present study necessitates the participation of experienced auditors because the case deals with going concern uncertainties with which less experienced audit staff might have insufficient experience in the natural audit setting.[919] Overall, the development of a realistic experimental case study and the choice of participants who meet the requirements of the task aimed to enhance the external validity of the study, i.e., to ensure that the results of the study were not crucially driven by, and solely limited to, either context or participant population.[920]

In total, 181 subjects participated in the experiment. However, 14 participants provided incomplete responses or failed the manipulation check questions and were therefore excluded from the final dataset.[921] Thus, the analyses were conducted based upon on a final sample of 167 participants. Table 5 provides an overview of the demographic characteristics of the participants.

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[918] In consistency with the state of the art in experimental research in auditing, the current study did not make use of explicit extrinsic incentives (e.g., monetary rewards) to enhance participation in the study. Rather, herein intrinsic incentives were emphasized which are also very powerful motivation- and involvement-increasing mechanisms. See, e.g., *Fischhoff* (1982): 435. Intrinsic incentives encompass "*a personal interest in performing the task, a desire to 'help out' the experimenter, and a desire on the part of the subject to see 'how well can I do.'*" *Wright/Aboul-Ezz* (1988): 143.

[919] For such claims, see *Cushing/Ahlawat* (1996): 116.

[920] See *Aronson/Wilson/Brewer* (1998): 130.

[921] For a description of the manipulation check results and the sample rectification procedure, see Section 5.5.1.

Variable	N	Frequency	Mean (SD)	Range
Age	143		36.76 (8.00)	26-59
Gender				
male	106	63.5%		
female	56	33.5%		
no indication	5	3.0%		
Skepticism score	167		134.82 (14.66)	71-165
General experience	164		10.60 (7.37)	3-32
Industry experience	167		2.44 (1.54)	1-7
Task experience	167		3.70 (1.45)	1-6
Auditor certification				
yes	76	45.5%		
no	87	52.1%		
no indication	4	2.4%		
Position				
assistant/other	14	8.4%		
senior	60	35.9%		
manager	34	20.4%		
senior manager	35	21.0%		
partner	23	13.8%		
no indication	1	0.5%		

Table 5: Summary of Participants' Demographic Information

Table 5 reveals that, on average, participants possessed 10.60 years of general audit experience, which exceeds the mean experience values reported in the majority of prior studies on auditors' belief revisions.[922] Subjects' self-assessed experience with audits of firms in the steel industry was relatively low (mean: 2.44 on a scale from 1 to 7). Participants' experience with the going concern task was likewise below-average (mean: 3.70 on a scale from 1 to 7). Nearly half of the participants included in the sample (76 subjects or 45.5%) were professionally certified auditors (in German: "Wirtschaftsprüfer" or abbreviated "WPs"). Of the remaining 91 participants, 30 persons were certified tax consultants (in German: "Steuerberater" or abbreviated "StB")[923], 2 participants were CPAs, and 2 participants had ACCA certifica-

[922] This statement is true both with regard to studies using a going concern experimental task (e.g., *Ashton/Kennedy* (2002): 226; *Cushing/Ahlawat* (1996): 116; *Messier* (1992): 146; *Trotman/Wright* (1996): 185) as well as studies employing other audit tasks (e.g., *Ashton/Ashton* (1988): 631; *Bamber/Ramsay/Tubbs* (1997): 256; *Monroe/Ng* (2000): 159f.).

[923] In Germany, tax law is one of the four major areas of the public auditor examination (§ 4 WiPrPrüfV). For certified tax consultants (StB), examination in tax law is waived within the public auditor examination. That is, for tax consultants an abridged form of the public auditor examination is possible. Given the immense

tion.[924] As the experimental task involved an *assessment* of the going concern ability of the firm, not the provision of a related *report choice*, it was deemed reasonable to include not yet professionally certified participants (usually seniors) in the sample as these are typically the staff members who gather and document evidence on which audit judgments and choices are eventually based.[925] Overall, the participants in the present study possessed the experience and qualification required to complete the experimental task.

The inspection of Table 5 further reveals that 63.5% of the participants were males and 33.5% were females.[926] The obtained distribution reflects the male dominance characteristic for the auditing profession.[927]

In addition, Table 5 shows that the mean skepticism score of the participants in the present study was 134.82 (SD: 14.66). The obtained scores ranged from 71 to 165, thus covering 62.67% of the full theoretical range. The mean and standard deviation values obtained herein are relatively consistent with the results reported in prior research.[928] However, prior studies using the Hurtt scale documented much smaller coverage rates (ca. 40%). The considerable discrepancy between the results of the present study and the findings reported by previous research can be primarily attributed to the scores of four participants in the present study which were below 100 points, while in prior studies the minimal Hurtt scores were above 100.[929] However, as the theoretical low-point of the Hurtt scale is 30, scores above 70 do not appear questionable.

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complexity and scope of the non-abridged professional auditor examination in Germany, WP candidates typically gain StB certification first on the way to the WP certification. For further details on the regulations concerning auditor education, certification and training in Germany, refer to *Köhler et al.* (2008): 117-119.

924 These indications are not contained in Table 5.

925 See *Ashton/Kennedy* (2002): 226. It might be remarked that the participant utilization procedure found in prior research is quite inconsistent. Specifically, *Arnold et al.* (2000), *Asare* (1992), *Cushing/Ahlawat* (1996), and *Favere-Marchesi* (2006) used only very experienced, high-rank subjects (audit partners and (senior) managers) to study subjects' belief revisions in a going concern task. However, the former two studies utilized a task involving the choice of an audit report. *Guiral/Esteo* (2006), *Kennedy* (1993), *Messier* (1992), and *Trotman/Wright* (1996), on the other hand, used staff auditors and/or accounting students in addition to more experienced subjects (audit managers) to examine experience effect. In contrast, *Ashton/Kennedy* (2002) included only staff auditors in their sample.

926 *Schwind* (2011): 146 reported fairly similar results for his sample of German auditors (62.2% male and 37.8% female subjects).

927 In Germany, there are currently 14,390 certified public auditors. Only 15.34% of them (2,207 persons) are females. The vast majority of professional auditors in Germany (84.66% or 12,183 persons) are males. See *WPK* (2014): 2f. While at the entrant level, the proportion of males and females is relatively similar, at higher ranks in the firms, males clearly represent the majority. See, e.g., *Doucet/Hooks* (1999): 72f.; *Schwind* (2011): 146f.

928 For instance, *Hurtt* (2010): 161 obtained a mean trait skepticism score of 138.6 (SD: 12.6); *Quadackers/Groot/Wright* (2012): 24 reported an average score of 133.09 (SD: 10.84); and *Popova* (2013): 147 found a mean skepticism score of 131.5 (no indication of the standard deviation value).

929 In particular, *Hurtt* (2010): 161f. obtained responses ranging from 111 to 173, which implies a coverage of the full range of 41.3%. *Quadackers/Groot/Wright* (2012): 24, 45 documented a response range from 103 to 158, i.e., coverage of about 36.6%. *Popova* (2013): 147 reported scores ranging from 101 to 157, i.e., coverage of 37.3%.

Cronbach's alpha for the Hurtt scale was 0.872, which suggests a very good internal consistency (validity) of the scale.[930] The median Hurtt score was 136.[931] As touched upon in Section 5.2, the dichotomization of the trait skepticism variable was conducted on the basis of a median split. Subjects scoring above 136 were classified as high in professional skepticism; the remaining subjects were classified as low in professional skepticism. This post-stratification of the sample resulted in 80 participants being classified as high in professional skepticism and 87 subjects being categorized as low in professional skepticism. The random assignment of subjects to treatment conditions described in Section 5.3.4 resulted in nearly even distribution of participants across the two information order conditions. Specifically, 85 subjects were assigned to the $--++$ treatment condition and 82 participants were assigned to the $++--$ treatment condition. The distribution of participants across the four experimental cells can be summarized as follows:

$--++$, high professional skepticism: 39 subjects
$--++$, low professional skepticism: 46 subjects
$++--$, high professionals skepticism: 41 subjects
$++--$, low professional skepticism: 41 subjects

As recognized by *Keppel* (1973), the randomized post-hoc block between-subjects design typically does not produce experimental groups of perfectly equal size.[932] However, the obtained cell sizes can be classified as approximately equal as the ratio of the largest group (46 subjects) and the smallest group (39 subjects) is below the benchmark value of 1.5.[933] In addition, the four experimental groups obtained exceed the recommended minimal cell size of 30 participants per cell.[934]

Following these general methodological considerations, in the subsequent section the results of the conducted analyses and tests are presented and discussed.

5.5 Results

5.5.1 Manipulation Checks

As indicated in Section 5.3.3, the aim of the manipulation checks was to verify whether participants apprehended the positive and negative pieces of additional information in consistency with the intended direction and whether a relatively similar importance was attached to the

[930] This information is not contained in Table 5. The Cronbach alpha value obtained herein is comparable to the coefficients reported in prior auditing research. See Section 4.4.4.

[931] This information is also not contained in Table 5.

[932] See *Keppel* (1973): 511f.

[933] See *Stevens* (2009): 218.

[934] See, e.g., *Stiffler* (2008): 57f.; *Tenenbaum/Driscoll* (2005): 84. Note that the recommendation of at least 30 participants per experimental group is rather conservative. Overall, the necessity to use groups of approximately equal and sufficiently large sizes relates to issues of normal distribution (see Section 5.5.4.1) and power of the statistical procedure.

four cues. Following, the manipulation check results are discussed beginning with an analysis of participants' responses regarding the *direction* of the four information items followed by a consideration of the results pertaining to the *importance* attached to the four cues.

As touched upon in the previous section, in total, 181 subjects participated in the study. Of the 724 total observations (181 participants × 4 directional indications per participant), 68 observations (9.39%) entailed missing responses. The belief revisions of the 18 subjects who missed to classify the direction of information were reviewed in order to verify whether participants' responses were in the intended direction. Overall, of the 18 subjects, five responded in a manner inconsistent with the intended manipulation (i.e., revised beliefs upwards (downwards) after viewing negative (positive) evidence) and were thus excluded from the sample. Of the 656 classifications obtained (724 total observations less 68 missing values), 13 were in the incorrect direction (1.98%). A comparison with the relevant auditing literature reveals that the misclassification rate reported in the present study is below the rates obtained in virtually all prior studies.[935] An analysis of the misclassifications revealed that they were conducted by a total of eleven participants, with the majority of subjects (nine) having committed merely one misclassification and only two subjects exhibiting two misclassifications. Of the eleven "violating" participants, only three changed their beliefs in the incorrect direction. In consistency with prior research, the three "violating" subjects were excluded from the sample as they obviously misperceived one of the information items.[936] As a result of the manipulation check, a total of eight participants (4.42%) were excluded from the sample. In addition, six participants (3.31%) failed to complete the Hurtt scale in full. Specifically, five subjects did not provide a response to one item of the scale and one participant missed to respond to eight items. All missing values concerned different items, so that no systematic pattern was identified. As the responses of these six participants were unusable for the statistical testing of the research hypotheses, they were excluded from the sample as well.[937] Consequently, the statis-

[935] For instance, *Messier* (1992): 146 obtained a misclassification rate of 14.0%, *Cushing/Ahlawat* (1996): 117 reported erroneous evidence direction classifications in 3.7% of all observations, *Monroe/Ng* (2000): 161 documented miscoding of the direction of evidence in 3.57% of all observations, *Asare* (1992): 387 in 2.65% of all cases, *Trotman/Wright* (1996): 186 in 2.5%, and *Ashton/Ashton* (1988): 635 in 2.34% of all observations. The only study that reports lower misclassification rates than those obtained herein is the study by *Favere-Marchesi* (2006) who obtained an error rate of 0.0% for a total of 180 participants and 720 observations. The other relevant studies on auditors' belief revisions did not report misclassification rates at all or only provided fairly unspecific result descriptions not allowing for a precise evaluation and derivation of violation rates.

[936] The sample correction procedure used herein follows *Anderson/Maletta* (1999): 82, *Ashton/Ashton* (1990): 8, *Brown* (2009): 26, *McMillan/White* (1993): 451, and *Trotman/Wright* (1996): 186. Note, however, that a substantial part of prior research has readily used the complete sample even in the cases of true misconception of the evidence items obtained. See, e.g., *Asare* (1992): 387; *Cushing/Ahlawat* (1996): 117; *Monroe/Ng* (2000): 161. *Messier* (1992): 146f., on the other hand, only excluded subjects who provided three or four incorrect evidence direction assessments. While from a research efficiency viewpoint, the use of the full sample is plausible, it can introduce noise in the analysis and result interpretation because it is not clear whether subjects' responses were triggered by the presentation order of information or by their misperceptions of the information presented. Hence, as argued by *Ashton/Ashton* (1990): 8, only the responses of participants who understand the directional implications of the additional information presented are deemed truly usable.

[937] This approach is in consistency with *Peytcheva* (2014): 37 who excluded four out of 89 audit participants (4.49%) due to incompletely filled-in Hurtt scales. Other studies using the Hurtt scale do not provide information regarding the completeness of subjects' responses.

tical analyses described below were performed on the basis of a final sample of 167 subjects.[938]

A summary of the misclassifications by cues is provided in Table 6. The table shows that the most frequently misclassified information cue was client management's announcement of a planned cash capital increase until the end of the current year. In addition, this cue was most frequently perceived as neutral in nature. These findings can be potentially attributed to the fact that this information relates to the mere *announcement* rather than the actual *implementation* of a cash capital increase. However, the mean importance assessment of the cue does not suggest that it was systematically underweighted. The second frequently misclassified item was the rejection of state funding. Again, the mean strength assessment of this item does not indicate that it was systematically underweighted. The information cue concerning the favorable external report and banks' willingness to negotiate over the prolongation of the credit lines, on the other hand, was not misclassified at all by the participants in the study. However, it was relatively frequently viewed as neutral. This finding might reflect subjects' insecurity regarding the (successful) outcome of the negotiations with the banks. Finally, the bankruptcy of a major supplier of the company was clearly perceived as an important negative information as indicated by the lowest rate of misclassifications and classifications as neutral evidence as well as the highest mean importance assessment. This result can be attributed to the fact that the loss of a major supplier is explicitly stated in IDW PS 270.11 as a factor potentially casting doubt on an entity's ability to continue as a going concern.

Item	Sign	Misrated	Neutral	Mean	SD
Favorable external report and banks willing to negotiate	+	0	17	4.88	1.43
Announcement of a cash capital increase	+	6	31	4.89	1.41
Rejection of state funding	−	5	11	5.13	1.53
Bankruptcy of a major supplier and lack of alternatives	−	1	5	5.38	1.17

Table 6: Summary of Manipulation Check Results

Overall, the four additional information cues were rated as reasonably similar in importance, with a slightly higher importance attached to the two negative items. In comparison, in prior research participants assessed the additional items as considerably more heterogeneous in strength.[939]

[938] To control for self-selection biases (i.e., the possibility that the final sample consisted of more diligent and thorough subjects who worked more concentratedly and exerted more effort on the case than did the excluded participants), it was tested whether the results of the analyses reported below changed when the full sample of 181 subjects was used. As this was not the case, it can be concluded that the results reported herein were not driven by the sample delimitation procedure.

[939] For instance, *Tubbs/Messier/Knechel* (1990): 458 obtained absolute evidence strength ratings of 78.6 and 71.64 for the positive items as well as 29.67 and 5.33 for the negative items. Similarly, *Messier/Tubbs* (1994): 64 reported mean importance ratings of 78.54 and 39.92 for the positive evidence cues as well as 60.83 and 33.47 for the negative evidence cues. The other auditing studies on information order effects either did not control for subjects' evidence importance perceptions or did not report the corresponding re-

As a final analytical procedure for assessing the quality and plausibility of participants' responses, the amount of belief adjustments in the wrong direction (upwards (downwards) after obtaining negative (positive) evidence) of subjects who correctly classified the direction of the information items in the subsequent manipulation checks was explored.[940] In total, 18 out of 665 belief revisions (167 subjects in the final sample × 4 belief revisions (S_1, S_2, S_3, S_4) each less 3 missing observations) (2.71%) involved error in direction. In comparison, *Hogarth and Einhorn* (1992) documented belief revisions in the incorrect direction in 10.0% of all observations.[941] Unfortunately, prior auditing research on information order effects either did not conduct such an analysis or did not report the corresponding results, so that a benchmark for comparison is lacking. However, the small percentage of belief adjustments in the wrong direction provides a hint of the superior judgment performance of professional auditors in comparison to non-professional subjects typically employed in psychological studies.

Collectively, the results of these analyses suggest that the experimental manipulations were successful both in terms of the hypothesized sign and the overall mean importance of the evidence utilized in the present study. Therefore, any potential differences in subjects' mean belief revisions can confidently be attributed to the different order in which the information items were presented to the participants.

5.5.2 Demographics

As a prelude to the consideration of the hypothesis testing procedures and their results, some relevant demographic aspects are discussed in the present section. At the outset, the distribution of participants among treatment conditions (+ + − − vs. − − + +) is considered in order to explore whether randomization resulted in two approximately balanced groups with regard to participants' demographic characteristics. The results of this analysis are summarized in Table 7.

sults. Similarly to the two preceedingly cited auditing studies, *Hogarth/Einhorn* (1992): 22 obtained overall importance assessments of 65 for positive evidence and of 38 for negative evidence. Despite the significant differences in subjects' perceptions of the strength of the evidence, in all three studies cited above the manipulation checks were viewed as successful.

940 Note that the classification of subjects' upward (downward) belief revisions in light of negative (positive) information as wrong or inconsistent results from the assumption of evaluation-type cognitive processing and additive evidence integration (see Section 3.2.1.3). However, to the extent to which subjects mentally utilize estimation-type processing and averaging evidence integration, their belief revisions would not be deemed counter-intuitive or erroneous.

941 See *Hogarth/Einhorn* (1992): 28.

Variable	Treatment Condition		Mean Difference	*t*-statistics	*p*-value (two-tailed)
	− − + +	+ + − −			
Age	38.11	35.38	2.73	2.064	0.041*
Gender	0.33	0.37	-0.04	-0.556	0.579
Skepticism score	135.39	134.27	1.12	0.492	0.623
General experience	11.64	9.54	2.10	1.843	0.067
Industry experience	2.61	2.27	0.34	1.450	0.149
Task experience	3.95	3.44	0.51	2.320	0.022*
Auditor certification	0.55	0.37	0.18	2.340	0.020*
Position	3.12	2.79	0.33	1.744	0.083

Gender is the proportion of female subjects. *Auditor certification* is the proportion of subjects that are legally certified auditors (WPs). *Position* is subjects' position in the firm hierarchy, where 1= assistant/other; 2 = senior; 3 = manager; 4 = senior manager; 5 = partner.

* Significance level at 0.05

Table 7: Demographic Information by Treatment Condition

Table 7 shows that the two treatment conditions significantly differed in respect to participants' age, task experience, and auditor certification. In addition, marginally significant[942] differences were obtained with regard to subjects' general audit experience and position in the firm hierarchy. With other words, despite random assignment of subjects to treatment conditions, differences between participants were not completely evened out among the two treatment groups. On average, subjects in the $- - + +$ condition were older, possessed more experience, were more frequently certified public auditors, and occupied higher positions in the firm hierarchy compared to participants in the $+ + - -$ condition.[943] This result is not surprising. Specifically, as argued by *Keppel* (1973), it is practically impossible to perform an experiment in which treatment groups only differ in respect of the experimental manipulation (i.e., are perfectly equivalent in all other aspects) because real-world experiments are not conducted using a sufficiently large number of participants.[944]

To further explore the interrelations among participants' demographic characteristics, a correlation analysis was performed. Table 8 provides a summary of the correlation coefficients between the following demographic variables: age (*AGE*), gender (*GEN*), professional skepticism as measured by the Hurtt scale (*PS*), general audit experience (*GEXP*), industry-specific experience (*IEXP*), task-specific experience (*TEXP*), auditor certification (*ACT*), and position in the firm hierarchy (*POS*). As not all of the aforementioned demographic variables are con-

[942] The term "marginally significant" is used herein to refer to significance level at 0.1. On the marginal significance controversy, see *Aron/Coups/Aron* (2013): 155f.

[943] It might be remarked that *Hurtt/Eining/Plumlee* (2010): 18 also obtained differences in subjects' experience between randomly assigned treatment groups.

[944] See *Keppel* (1973): 23, 26.

tinuous (or dichotomous) and approximately normally distributed, Spearman rank correlation coefficients are reported in addition to Pearson product-moment correlation coefficients.[945]

	AGE	*GEN*	*PS*	*GEXP*	*IEXP*	*TEXP*	*ACT*	*POS*
AGE	1.000	-0.197*	-0.097	0.922***	0.268***	0.300***	0.732***	0.737***
GEN	-0.223**	1.000	0.098	-0.185*	-0.172*	-0.351***	-0.189*	-0.280***
PS	-0.051	0.115	1.000	-0.019	-0.065	0.094	0.101	0.075
GEXP	0.956***	-0.201*	-0.030	1.000	0.298***	0.357***	0.771***	0.799***
IEXP	0.298***	-0.167*	-0.095	0.311***	1.000	0.328***	0.174*	0.258***
TEXP	0.315***	-0.349***	0.102	0.364***	0.301***	1.000	0.444***	0.385***
ACT	0.674***	-0.189*	0.125	0.696***	0.160*	0.441***	1.000	0.813***
POS	0.725***	-0.292***	0.074	0.774***	0.267***	0.388***	0.801***	1.000

GEN: dummy variable coded 1 if the participant is female, and 0 otherwise. *ACT*: dummy variable coded 1 if the participant is legally certified auditor (WP), and 0 otherwise.

Pearson correlation coefficients in the lower triangle; Spearman correlation coefficients in the upper triangle
*, **, *** Significance levels at 0.05, 0.01 and 0.001, respectively (two-tailed tests)

Table 8: Correlation among Demographic Variables

Table 8 indicates that trait professional skepticism as measured by the Hurtt scale is not significantly correlated with any other demographic measure. All other demographic variables (age, gender, experience (general, industry- and task specific), auditor certification, and position) are significantly correlated with each other in a plausible pattern which points to male participants being older, more experienced, more frequently having auditor certification, and occupying higher positions in the audit firm hierarchy compared to female participants.[946]

With regard to participants' scores on the Hurtt scale, female auditors were found to score higher on the trait skepticism scale (mean score: 136.98) than male auditors (mean score:

[945] Note that the criteria of normal distribution and continuous (or dichotomous) level of variables must be met in order to use Pearson product-moment correlation. See, e.g., *Field* (2009): 177, 179f.; *Pallant* (2010): 126, 128. As to the *scale levels* of the variables listed in Table 8, gender and auditor certification are dichotomous (also referred to as nominal, discrete, or categorical) variables, position in the firm hierarchy is an ordinal variable, and all other variables – age, professional skepticism score, general experience, industry-specific experience, and task-specific experience – are continuous (also referred to as interval) variables. For a detailed discussion of the different scale levels and their characteristics, see *Bortz/Schuster* (2010): 13-23. The assumption of interval scale level for psychometric tests, rating scales, etc. is in conformity with the state of the art in the empirical research practice. See, among others, *Bortz/Schuster* (2010): 14, 23 (with a list of further references along these lines) and *Tabachnick/Fidell* (2007): 7. As to the *normal distribution* criterion, scores on the age, general audit experience, and industry-specific experience variables are right-skewed and do not appear approximately normally distributed.

[946] A more detailed overview of the differences in demographic characteristics among the genders is provided in Appendix 4.

133.42). This finding is in line with the results reported by *Fullerton and Durtschi* (2004).[947] However, the obtained difference between the genders was not statistically significant (t (160) = -1.466, p (two-tailed) = 0.145).

Finally, a review of the distribution of demographic data across the four experimental cells is presented in Table 9. All of the values summarized in this table represent cell means.

Variable	Experimental Groups			
	− − + +, low PS	− − + +, high PS	+ + − −, low PS	+ + − −, high PS
Age	38.22	37.97	35.91	34.89
Gender	0.28	0.38	0.35	0.38
Skepticism score	124.43	145.87	124.80	145.98
General experience	11.42	11.91	9.94	9.13
Industry experience	2.70	2.51	2.29	2.24
Task experience	3.89	4.03	3.41	3.46
Auditor certification	0.50	0.62	0.32	0.43
Position	2.93	3.34	2.80	2.78

Gender is the proportion of female subjects. *Auditor certification* is the proportion of subjects that are legally certified auditors (WPs). *Position* is subjects' position in the firm hierarchy, where 1= assistant/other; 2 = senior; 3 = manager; 4 = senior manager; 5 = partner.

Table 9: Demographic Information by Experimental Group

Table 9 reveals that although randomization and post-hoc blocking did not result in perfect equality, the four groups are reasonably similar with regard to participants' demographics. However, to account for the identified between-group differences in demographic characteristics (especially with regard to the two treatment groups) and to avoid any potentially confounding effects, subjects' experience is included as a control variable in the supplemental regression analysis (Section 5.5.4.3).[948] To avoid potential multicollinearity issues arising from the high correlation between general experience, age, auditor certification, and position in the firm hierarchy, only general experience is included in the regression model to represent the set of correlated demographic variables. In addition, subjects' industry- and task-specific experience is also controlled for in the regression analysis.[949] However, as pointed out in Sec-

[947] See *Fullerton/Durtschi* (2004): 23.

[948] Beyond the consideration of potential experience effects by the inclusion of subjects' experience in years as a control variable in the regression analysis reported in Section 5.5.4.3, an additional test (analysis of variance (ANOVA)) was conducted with experience as a post-hoc blocking variable. The two experience groups were built on the basis of a rank split. Specifically, following *Asare/Cianci/Tsakumis* (2009): 229, staff auditors and audit seniors were classified as low in experience, whereas managers, senior managers, and partners were categorized as highly experienced. As the ANOVA with information order and experience as experimental factors yielded results which are qualitatively consistent with the results of the regression analysis, only the latter is reported in the present work (see Section 5.5.4.3).

[949] Note in passing that in the present study, a regression analysis is preferred over an analysis of covariance (ANCOVA) to statistically control for experience effects for three major reasons. First, as participants' ex-

tion 3, information order effects operate at a subconscious cognitive level and thus are not likely to be affected by knowledge and general audit experience. Hence, there are no compelling theoretical grounds for expecting that the hypothesized recency effects in participants' belief revisions will be mitigated by experience.

5.5.3 Preliminary Analyses

To set up the stage for the primary statistical tests, the results of some relevant preliminary analyses are presented and discussed in the present section. To begin with, as argued by *Hogarth and Einhorn* (1992), the presence of recency effects at the aggregate level does not necessarily imply the same result at the individual level.[950] To account for this insight, prior to aggregate level investigation, the belief revisions of each participant were analyzed individually in order to determine whether an order effect occurred and of which kind it was (primacy vs. recency). The results of this analysis are summarized in Table 10.

Observed Effect	n	N	%	Psychological Reference (%)
Recency effect	85	167	50.90	60.87
Primacy effect	40	167	23.95	34.78
No order effects	42	167	25.15	4.35

Table 10: Individual-Subject Level Order Effects

As expected, the majority of participants (85 subjects or 50.90%) exhibited responses indicative of recency, i.e., they overweighed evidence presented later in the sequence. However, a considerable number of the subjects (42 subjects or 25.15%) responded in a manner consistent with no order effects in belief revision, i.e., the final beliefs of these subjects reflected their initial positions, resulting in a total belief revision (S_4–S_0) of zero, which is the normatively appropriate response in light of two positive and two negative evidence pieces of (approximately) equal strength.[951] Nearly the same number of participants (40 subjects or 23.95%) responded in consistency with a tendency toward primacy effects, i.e., these subjects anchored on evidence provided early in the sequence. Unfortunately, prior auditing studies did not provide a differentiated analysis of the nature and portion of order effects in participants' re-

perience is only very weakly related to their belief revisions (Pearson product-moment correlation coefficient r = 0.044, p (two-tailed) = 0.574), it is unlikely that experience will provide a viable counter-explanation for any differences between experimental groups. Hence, virtually nothing is to be gained by using the ANCOVA as it will produce results very similar to the ANOVA results. See *Cone/Foster* (1998): 186; *Kutner et al.* (2005): 919. Second, the statistical model underlying the ANCOVA rests on a set of very stringent assumptions (see Section 5.5.4.3) and is fairly sensitive to minor violations thereof. Hence, the ANCOVA technique should be applied with cautiousness and only in very simple and clear cases. See *Keppel* (1973): 514-516; *Kerlinger/Lee* (2000): 523f. Third, AN(C)OVA is essentially a special case of a regression model. See, e.g., *Field* (2009): 349; *Kerlinger/Lee* (2000): 307; *Slovic/Lichtenstein* (1971): 660; *Tabachnick/Fidell* (2007): 119.

[950] See *Hogarth/Einhorn* (1992): 25.

[951] See, e.g., *Pinsker/Pennington/Schafer* (2009): 95.

sponses. Hence, a comparison with the relevant auditing literature is not possible. The only reference study available is the generic belief revision examination conducted by *Hogarth and Einhorn* (1992) who found that 14 out of 23 individuals (60.87%) responded in consistency with recency, eight participants (34.78%) exhibited primacy effects in their responses, and only one subject (4.35%) did not display information order effects in his/her belief revisions.[952] Hence, in comparison with the inexperienced, non-professional participants in *Hogarth and Einhorn's* experiment, the professional auditors in the present study demonstrated a significantly greater proportion of normatively accurate responses (i.e., free of cognitive bias) and relatively smaller proportions of each type of order effects. This is an encouraging finding with respect to auditors' judgment quality.

As a further preliminary analytical procedure, the sequence of subjects' mean belief changes (likelihood assessments) by treatment condition is considered. The results of this analysis are presented in Table 11.

Treatment Condition		**Mean (SD) of Likelihood Assessments**					
Order	**N**	**S_0**	**S_1**	**S_2**	**S_3**	**S_4**	**S_4-S_0**
− − + +	85	55.53 (23.17)	40.94 (22.66)	33.10 (22.06)	54.71 (20.27)	63.06 (21.16)	7.53 (17.59)
+ + − −	82	54.63 (21.27)	69.51 (19.16)	75.43 (18.65)	62.20 (21.03)	50.24 (19.69)	-4.39 (16.49)

Table 11: Mean Likelihood Assessments by Treatment Condition

Table 11 reveals that participants' responses are in line with the predictions of the belief-adjustment model. Specifically, on average, subjects in the − − + + condition exhibited two downward belief revisions followed by two upward belief revisions, resulting in a final assessment of the going concern likelihood of the Premium Steel AG which was above the initial position. In the + + − − condition, subjects' responses exhibited the contrary pattern: two upward belief revisions were followed by two downward belief revisions, resulting in a final belief which was below the initial one. The mean initial likelihood assessments (S_0) among both groups were slightly above the theoretical midpoint of 50%. The difference in initial beliefs between the two treatment conditions was not significant (t (165) = 0.260, p (two-tailed) = 0.795). With other words, after starting with fairly similar initial assessments of the viability of the Premium Steel AG and obtaining the very same information items, the two treatment groups arrived at final beliefs (going concern likelihood assessments) that differed by 12.82 percentage points. When represented graphically, participants' responses yield the prominent "fishtail" pattern (Figure 7) hypothesized by *Hogarth and Einhorn* (1992) and corroborated by prior auditing research.[953]

[952] See *Hogarth/Einhorn* (1992): 25, Table 3, Experiment 3, SbS-column.

[953] See, e.g., *Arnold et al.* (2000): 118; *Favere-Marchesi* (2006): 76; *Hogarth/Einhorn* (1992): 23f., 29.

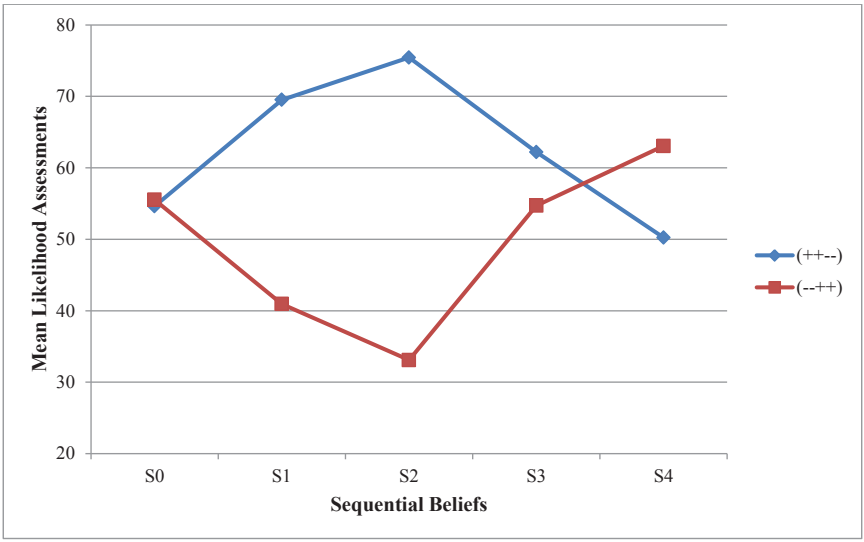

Figure 7: Belief-Revision Curves across Treatment Conditions

The representation of subjects' mean beliefs adjustments (likelihood assessments) by treatment condition is followed by a more differentiated consideration of participants' responses. Table 12 displays the pattern of auditors' belief revisions among the four experimental groups.

Experimental Group			Mean (SD) of Likelihood Assessments					
Order	**Skepticism**	**N**	**S_0**	**S_1**	**S_2**	**S_3**	**S_4**	**S_4-S_0**
− − + +	Low	46	53.70 (24.37)	40.43 (22.70)	32.67 (22.20)	52.39 (21.21)	60.87 (21.06)	7.17 (17.85)
− − + +	High	39	57.69 (21.82)	41.54 (22.89)	33.59 (22.18)	57.44 (19.02)	65.64 (21.25)	7.95 (17.50)
+ + − −	Low	41	58.29 (18.43)	73.17 (17.10)	79.75 (15.77)	65.37 (18.18)	52.20 (18.51)	-6.10 (16.57)
+ + − −	High	41	50.98 (23.43)	65.75 (20.62)	71.22 (20.40)	59.02 (23.32)	48.29 (20.85)	-2.68 (16.44)

Table 12: Mean Likelihood Assessments by Experimental Group

Several interesting findings arise from the exploration of the mean belief revisions among the four experimental groups. In the + + − − condition, participants with low levels of trait skepticism started with higher initial likelihood assessments (S_0 = 58.29) and exhibited greater (more extreme) downward belief revisions (S_4–S_0 = -6.10) than participants with high levels of trait skepticism (S_0 = 50.98, S_4–S_0 = -2.68). However, both differences in initial beliefs (t (80) = 1.572, p (two-tailed) = 0.120) and in total belief revisions (t (80) = -0.937, p (two-

tailed) = 0.352) between high- and low-skepticism individuals were not statistically significant. In the − − + + condition, on the other hand, exactly the opposite results were obtained: Subjects with high levels of trait skepticism started with higher initial beliefs in the going concern ability of the Premium Steel AG (S_0 = 57.69) and exhibited greater (more extreme) upward belief revisions (S_4–S_0 = 7.95) than subjects with low levels of trait skepticism (S_0 = 53.70, S_4–S_0 = 7.17). Again, the differences in initial beliefs (t (83) = -0.791, p (two-tailed) = 0.431) and in total belief revisions (t (83) = -0.201, p (two-tailed) = 0.841) between high- and low-skepticism individuals were not significant.

The mean sequential beliefs (likelihood assessments) among the four experimental groups are depicted in Figure 8. The figure reveals that auditors' sequential belief revisions clearly follow the classic fishtail pattern irrespective of participants' level of trait professional skepticism.

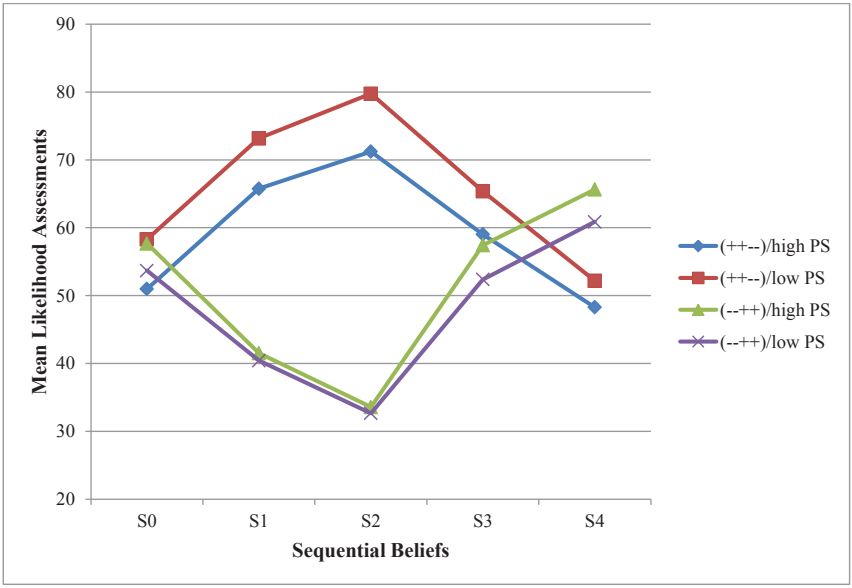

Figure 8: Belief-Revision Curves across Experimental Groups

Building on these preliminaries, the following section focuses on the description of the hypothesis testing procedures and their central findings.

5.5.4 Hypothesis Testing

5.5.4.1 Method of Analysis

The method employed herein to test the hypotheses outlined in the previous sections is that of an analysis of variance (ANOVA). ANOVA is a parametric technique which in its most common form is essentially an application and extension of the method of least squares.[954] The objective of the ANOVA technique is to determine whether there exist any significant mean differences among different treatment conditions (groups) in an experimental study.[955] The concept of ANOVA was developed by *R. A. Fischer* in the 1920s. The technique was initially applied in psychological research by *Hoffman, Slovic and Rorer* (1968), *Rorer et al.* (1967), and *Slovic* (1969). In the field of auditing, ANOVA was first used by *Ashton* (1974).[956] Ever since, it has been the standard analysis technique employed in experimental research in auditing.

The application of ANOVA involves the following major requirements: (1) independence of observations[957], (2) normal distribution of the residuals, and (3) variance homogeneity among experimental groups. While the first requirement concerns the experimental design of the study and was satisfied herein through the use of randomization and experimental control, the latter two conditions concern characteristics of the population under consideration and thus are basically beyond the researcher's control. The latter two ANOVA assumptions are critical for the validity of inferences drawn using the *F*-statistic and therefore require a profound examination and analysis.[958]

Following the recommendations of *Thode* (2002) and *Hair, Black and Babin* (2010), the *normality* assumption was tested using both informal (i.e., visual and descriptive tests) and formal (i.e., inferential tests) assessment techniques.[959] The results of the visual inspection of the histogram, the normal Q-Q plot, and the boxplot (not shown here) indicate that the residuals are approximately normally distributed, with skewness of 0.229 (SE: 0.188) and kurtosis of 0.126 (SE: 0.374).[960] This finding is reinforced by consideration of the standardized values (*z*-scores) for skewness and kurtosis (0.218 and 0.337, respectively), which are safely below the

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954 See *Eisenhart* (1947): 3f. For a detailed formal, graphical, and descriptive analysis of the logic underlying the ANOVA technique, see *Gravetter/Wallnau* (2012): 356-362 and *Keppel* (1973): 35-71.

955 See *Gravetter/Wallnau* (2012): 428; *Kerlinger/Lee* (2000): 307.

956 See *Trotman* (1998): 119; *Slovic/Lichtenstein* (1971): 660.

957 This assumption requires that the dependent measures for each participant are completely uncorrelated with the responses from other participants in the study. This assumption is crucial to the statistical validity of inferences drawn using the ANOVA procedure. See *Hair/Black/Babin* (2010): 441.

958 See, e.g., *Lix/Keselman/Keselman* (1996): 579. For an in-depth formal consideration of the ANOVA assumptions, consult *Eisenhart* (1947): 9-19.

959 See *Hair/Black/Babin* (2010): 74; *Thode* (2002): 16. The latter highlights the variety of methods and techniques available for testing normality, indicating more than 40 formal procedures for examining the sample distribution as well as a number of informal procedures, including plotting, outlier testing, general goodness of fit methods, etc. See *Thode* (2002): 1.

960 A perfectly normal distribution has skewness and kurtosis values equal to zero. *Harwell et al.* (1992): 316 classify skewness values above 0.5 as mild deviations from normality. Under this criterion, the present distribution (skewness value: 0.229) can be classified as reasonably normal.

critical z-value of ±1.96 for rejecting the null hypothesis of normal distribution in the population at a 0.05 significance level.[961] Hence, the results of the informal normality tests uniformly show that the residuals are approximately normally distributed. For the sake of completeness, a one-sample Kolmogorov-Smirnov test was conducted as well. The results of the test indicate that the data are not perfectly normally distributed (asymptotic p-value (two-tailed) < 0.0001). It should be remarked though that the Kolmogorov-Smirnov test is a rather conservative inferential test which reacts sensitively to even small deviations from normality and thus involves a relatively high chance for yielding results in favor of rejecting the null hypothesis that the sample is drawn from a normal distribution. This is particularly true for large samples because of the higher power of the statistical test. As a result of the central limit theorem, normality is not an issue for large samples.[962] In addition, it should be noted that the F-statistic underlying the ANOVA technique has been found to be fairly robust to minor deviations from normality, particularly for symmetrical populations and experimental cells of approximately equal size and more than twelve subjects, as is the case in the present study.[963] Hence, based on these arguments and the results of the informal normality checks, it can be concluded that the normality assumption is tenable.

Finally, the application of ANOVA requires the *homogeneity of variance* among experimental groups. This condition has been viewed as more critical than the normality requirement because if it is violated, the statistical inference will be invalid regardless of the sample size.[964] Based on the results of Levene's F test (F (3, 163) = 0.366, p-value (two-tailed) = 0.778), the underlying null hypothesis of which is that the variances in the different groups are equal, it can be concluded that the homogeneity of variance assumption is fulfilled.[965]

In summary, the assumptions of independence of observations, normal distribution of residuals, and homogeneity of variance are tenable. Hence, the application of the ANOVA technique is reasonable and justified. Following, the central ANOVA results are presented and discussed.

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[961] See *Hair/Black/Babin* (2010): 72f.; *Rovai/Baker/Ponton* (2014): 192f. Although both sources provide alternative formulas for determining the z-score for skewness and kurtosis, both lead to the same results and interpretations.

[962] See, e.g., *Field* (2013): 184; *Kirk* (2013): 52; *Pole/Bondy* (2010): 933f.; *Rovai/Baker/Ponton* (2014): 192f.; *Tabachnick/Fidell* (2007): 78; *Wooldridge* (2009): 172-174. Note that in the relevant statistical literature, there is no universally accepted benchmark regarding the sample size required for the central limit theorem to find application and relieve the strictness of the normality assumption. *Wooldridge* (2009): 174f. indicates that some researchers consider a sample size of 30 respondents sufficient, which in his view is not tenable, particularly when several independent variables are involved. Hence, he recommends that the degrees of freedom are also taken in consideration instead of solely focusing on the sample size. *Pole/Bondy* (2010): 934 provide a more conservative guideline for sample size classifications. They consider samples with less (more) than 50 observations as small (large) samples. Similarly, *Kirk* (2013): 52 considers a sample size of 50 to 100 as sufficient for yielding a nearly normal sampling distribution.

[963] See, e.g., *Cochran* (1947): 24f.; *David/Johnson* (1951): 57; *Glass/Peckham/Sanders* (1972): 246, 273; *Harwell et al.* (1992): 316, 333f.; *Kirk* (2013): 99; *Lix/Keselman/Keselman* (1996): 582; *Pallant* (2010): 206; *Tiku* (1971): 913-915.

[964] See *Eisenhart* (1947): 13; *Pole/Bondy* (2010): 932; *Wooldridge* (2009): 175.

[965] See, e.g., *Field* (2009): 150.

5.5.4.2 Summary of Results

Table 13 reports the overall ANOVA results (Panel A) as well as the mean belief revisions (S_4–S_0) per experimental group (Panel B).

Panel A: ANOVA

Source of Variance	df	Mean Square	*F*-statistic	*p*-value	η^2
Model	3	2060.515	7.034	0.000***	0.115
Information order	1	5941.714	20.283	0.000***	0.111
Professional skepticism	1	182.522	0.623	0.431	0.004
Order × Skepticism	1	72.469	0.247	0.620	0.002
Error	163	292.939			

Panel B: Experimental Group Means for Total Belief Revision (S_4–S_0)

Experimental Group	− − + +	+ + − −	Total
Low PS	7.17	-6.10	0.92
High PS	7.95	-2.68	2.50
Total	7.53	-4.39	1.68

Table 13: ANOVA Results and Experimental Group Means for Total Belief Revision

A review of Table 13 shows that, as expected, subjects in the $++--$ condition exhibited greater downward belief revision (-4.39) than subjects in the $--++$ condition (7.53), suggesting the emergence of a recency effect. The ANOVA results indicate that the effect of information order on auditors' belief revisions is statistically significant (F (1, 163) = 20.283, p (two-tailed) < 0.0001). Consequently, H_1 is supported. The obtained effect size (η^2 = 0.111) indicates that the information order variation accounts for 11.1% of the variance in participants' total belief revisions. According to general methodological convention, this effect size is to be classified as moderate.[966]

The results summarized in Table 13 further reveal no significant difference in the mean belief revisions between individuals with high (2.50) and low levels (0.92) of trait professional skepticism (F (1, 163) = 0.623, p (two-tailed) = 0.431). Hence, there is no support for H_2.

Finally, an analysis of Table 13 shows that the effect of information order on auditors' belief revisions does not vary considerably over different levels of trait professional skepticism. Specifically, among auditors with low levels of trait skepticism exhibited those assigned to

[966] The following effect size reference values set forth by *Cohen* (1988): 284-287 have been broadly adopted in the relevant econometric literature: 0.01, small effect; 0.06, moderate effect; and 0.14, large effect. Note, however, that a small effect size does not automatically imply that the results obtained are not important. In fact, in a number of cases, particularly in psychological research, even very small effect sizes can have fundamentally important implications. For instances along these lines, see *Rosenthal/Rosnow/Rubin* (2000): 25-28.

the − − + + condition greater upward belief revisions (7.17) than auditors assigned to the + + − − condition (-6.10). Consistently, among participants with high levels of trait skepticism displayed those in the − − + + condition greater upward belief revisions (7.95) than subjects in the + + − − condition (-2.68). Overall, the interaction effect between information order and professional skepticism is not significant (F (1, 163) = 0.247, p (two-tailed) = 0.620). Even though the interaction between the two factors of interest was not found to reach statistical significance, the interaction plots are worthy of consideration.[967] Figure 9 reveals that the rank order relationships are consistent among the different groups, i.e., the mean belief revision in the − − + + condition is uniformly above that in the + + − − condition and the mean belief revision in the low skepticism group is uniformly below that in the high skepticism group. Hence, the interaction between information order and professional skepticism can be classified as pure *ordinal*.[968]

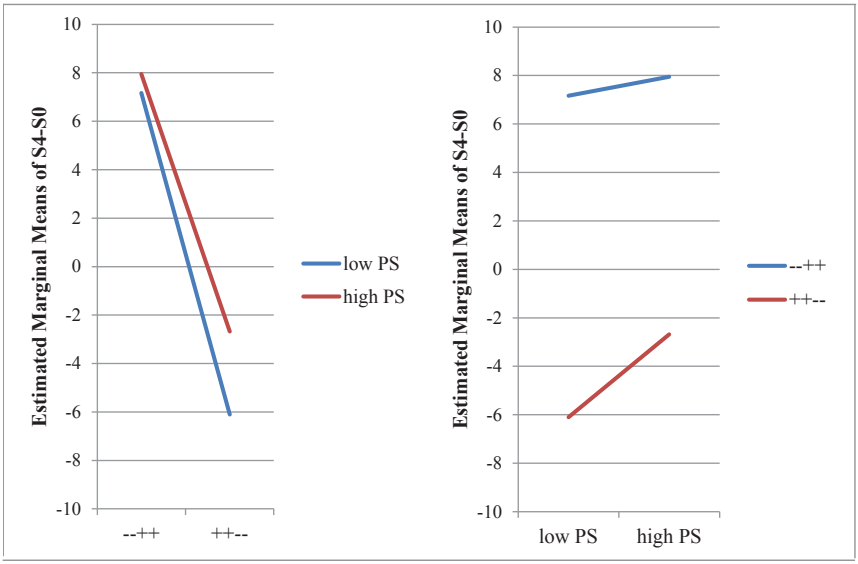

Figure 9: Interaction Plots

To reinforce the robustness of the findings of the main hypothesis testing procedures, a set of supplemental parametric tests was conducted. The results of the supplemental analyses are reported and discussed subsequently.

[967] See, e.g., *Terrell* (2012): 282.

[968] See *Bortz/Schuster* (2010): 244f.; *Leigh/Kinnear* (1980): 842.

5.5.4.3 Supplemental Tests

In consistency with prior research, an analysis of covariance (ANCOVA) with the final belief (S_4) as the dependent variable and the initial belief (S_0) as a covariate was performed.[969] Preliminary analyses were undertaken to ensure no violation of the assumptions of independence[970], normality[971], homoscedasticity[972], linearity[973], homogeneity of regression slopes[974], and independence of the covariate of any treatment effects[975].[976] Table 14 reports the overall ANCOVA results (Panel A) and the mean final beliefs (S_4) per experimental group (Panel B).

Panel A: ANCOVA

Source of Variance	df	Mean Square	*F*-statistic	*p*-value	η^2
Model	4	9813.790	43.440	0.000***	0.518
Information order	1	6337.182	28.051	0.000***	0.148
Professional skepticism	1	90.504	0.401	0.528	0.002
Order × Skepticism	1	25.406	0.112	0.738	0.001
Initial belief (S_0)	1	31608.386	139.911	0.000***	0.463
Error	162	225.918			

Panel B: Experimental Group Means for Final Belief (S_4)

Experimental Group	− − + +	+ + − −	Total
Low PS	60.87	52.20	56.78
High PS	65.64	48.29	56.75
Total	63.06	50.24	56.77

Table 14: ANCOVA Results and Experimental Group Means for Final Belief

969 See *Cushing/Ahlawat* (1996): 118; *Favere-Marchesi* (2006): 74, 77; *Messier/Tubbs* (1994): 66; *Monroe/Ng* (2000): 161; *Trotman/Wright* (1996): 187.

970 The independence assumption was taken into account via the utilization of a randomized between-subjects experimental design.

971 The normality testing procedure is analogue to the procedure described in Section 5.5.4.1.

972 As might be recalled from Section 5.5.4.1, homoscedasticity (i.e., homogeneity of variance) is tested using Levene's *F* test. The test yielded a not significant result (F (3, 163) = 0.026, p (two-tailed) = 0.994), thus indicating the tenability of the assumption.

973 The linearity assumption was tested and corroborated via visual inspection of the scatterplots.

974 Following *Field* (2009): 413f., the homogeneity of regression slopes was verified on the basis of the obtained not significant tree-way covariate by experimental factors interaction (initial belief × information order × professional skepticism) (F (1, 160) = 0.089, p (two-tailed) = 0.766).

975 The independence of the covariate (S_0) of any treatment effects was both logically derived and formally confirmed. Specifically, as the information order treatment (i.e., the four pieces of additional information presented in a varying order between the two treatment conditions) was presented subsequent to the formation and indication of initial beliefs, S_0 could not have been influenced by the different order of information presentation. This conclusion was confirmed by the not significant covariate by treatment interaction (initial belief × information order) (F (1, 160) = 0.001, p (two-tailed) = 0.977).

976 For a summary of the ANCOVA assumptions, see, e.g., *Keppel* (1973): 484; *Van Breukelen* (2010): 21.

In consistency with the theoretical predictions condensed in H_1 and in line with the pattern of results reported in the previous section, participants who processed evidence in the $--++$ order exhibited significantly greater mean final beliefs (63.06) than respondents who processed evidence in the reverse order (50.24) (F (1, 162) = 28.051, p (two-tailed) < 0.0001). With other words, auditors who obtained positive information at the end of the sequence provided significantly more favorable final assessments of the going concern likelihood of the Premium Steel AG than auditors who faced negative information at the end of the series. The obtained information order effect size is large ($\eta^2 = 0.148$).

The ANCOVA results further indicate that the difference in mean final beliefs between participants with high and low levels of skepticism is not statistically significant (F (1, 162) = 0.401, p (two-tailed) = 0.528). In fact, participants' final judgments are virtually identical in both skepticism groups (high skepticism: 56.75 vs. low skepticism: 56.78). Thus, no support is provided for H_2. The interaction effect between information order and trait professional skepticism is not significant either (F (1, 162) = 0.112, p (two-tailed) = 0.738). Hence, in consistency with the ANOVA results reported in the previous section, the effect of information order was not found to change significantly at different levels of professional skepticism. Specifically, among auditors classified as low in professional skepticism exhibited those who were in the $--++$ condition greater mean final beliefs (60.86) than subjects in the $++--$ condition (52.20). Consistent results were obtained for auditors classified as high in professional skepticism (mean final beliefs of 65.64 in the $--++$ condition vs. 48.29 in the $++--$ condition). Hence, at both skepticism levels, information order was found to affect subjects' final beliefs in a manner consistent with a recency effect. It may be remarked that even though the overall effect of information order on auditors' final beliefs appears at first glance to be much more stronger among high skepticism auditors (mean difference: 17.35) compared to low skepticism auditors (mean difference: 8.67), this seems to have been caused by differences in participants' initial beliefs since after controlling for the influence of S_0, the interaction effect was not found to reach statistical significance (see above).

Finally, in consistency with the notion underlying the belief-adjustment model that the starting position serves as an anchor which determines the nature and magnitude of subsequent adjustments, auditors' mean final beliefs (S_4) were found to be highly significantly influenced by their initial assessments (S_0) (F (1, 162) = 139.911, $p < 0.0001$). The effect size of S_0 is very large ($\eta^2 = 0.463$).

Overall, the ANCOVA results corroborate the ANOVA results reported in the previous section with regard to the main effects of information order and professional skepticism as well as the interaction effect of these factors on auditors' judgments.

As a final supplemental test, a linear regression analysis was conducted. The main aim of this analysis was to explore the relationship between a set of demographic, effort-, and evidence-related variables of interest and auditors' going concern assessments.

The regression model tested herein was specified in two alternatives ways: In the first model specification, subjects' total belief revisions (*BELREV*) ($S_4 - S_0$) were employed as the dependent variable. In the second specification, the dependent variable was auditors' final be-

liefs (*FINBEL*) (S_4), and their initial beliefs (*INTBEL*) (S_0) were included as a further control variable. All other variables included in the supplemental analysis were identical between the two model specifications. In particular, the test variables utilized include information order (*INFORD*), professional skepticism (*PS*), and the interaction of both (*INFORD*PS*).[977] Further variables of interest concern subjects' perceptions of the sufficiency of information (*SUFINF*), self-reported certainty in the own assessment (*CERTAIN*), concentration (*CONC*), and intensity of thought (*INTENS*). The rationale underlying the inclusion of these variables was to provide some preliminary insights into the nature and strength of the relationship between uncertainty- and effort-related factors and auditors' judgments. More specifically, as might be recalled from Section 3.4, *Kennedy* (1993) views recency as an effort-related bias that can be mitigated using effort-enhancing mechanisms such as documentation and accountability requirements. In this context, the present study sought to explore whether, when not specifically manipulated or induced, effort (operationalized through self-reported concentration and intensity of thought exerted during the completion of the case study) provides a meaningful contribution in explaining subjects' responses (belief revisions and final beliefs). A further question of research interest is whether and how strong do the perceived information (in)sufficiency and (un)certainty in the own assessment, which have been generally recognized to influence information processing, relate to auditors' belief revisions and final beliefs. Finally, participants' general experience (*GEXP*),[978] industry-specific experience (*IEXP*), task-specific experience (*TEXP*), gender (*GEN*) as well as the individual assessments of the importance of the additional information cues concerning the rejection of state funding (*IMPC1*), the insolvency of a major supplier (*IMPC2*), the favorable external report and banks' willingness to negotiate (*IMPC3*), and the announcement of a cash capital increase (*IMPC4*) were included as control variables in the regression analysis.

Overall, the regression models tested can be summarized as follows:

Model specification 1:

$$BELREV = \beta_0 + \beta_1 INFORD + \beta_2 PS + \beta_3 INFORD*PS + \beta_4 SUFINF + \beta_5 CERTAIN + \beta_6 CONC + \beta_7 INTENS + \beta_8 GEXP + \beta_9 IEXP + \beta_{10} TEXP + \beta_{11} GEN + \beta_{12} IMPC1 + \beta_{13} IMPC2 + \beta_{14} IMPC3 + \beta_{15} IMPC4 + \varepsilon$$

[977] Note that in contrast to the ANOVA procedure, where professional skepticism represented a blocking (post hoc median dichotomized) factor, in the regression analysis, a continuous measure of professional skepticism was used: the mean-centered Hurtt score. In consistency with *Quadackers/Groot/Wright* (2012) and following the best-practice recommendation by *Aguinis/Gottfredson/Culpepper* (2013): 1507 and *Dalal/Zickar* (2012): 351f., mean centering of the Hurtt scores was performed in order to avoid collinearity issues and to improve the interpretability of the results with regard to the interaction effect between *INFORD* and *PS*. Mean centering did not alter the results.

[978] It might be recalled from Section 5.5.2 that age, general audit experience, position in the firm hierarchy, and auditor certification are strongly correlated. Hence, in order to avoid potential multicollinearity issues, only general experience was included in the regression analysis. An inclusion of auditors' age, position in the firm hierarchy, and auditor certification as additional control variables in the regression analysis did not qualitatively change the results reported below. Overall, none of the three variables was found to significantly relate to auditors' belief revision or final beliefs.

Model specification 2:

$$FINBEL = \beta_0 + \beta_1 INFORD + \beta_2 PS + \beta_3 INFORD*PS + \beta_4 SUFINF + \beta_5 CERTAIN + \beta_6 CONC + \beta_7 INTENS + \beta_8 INTBEL + \beta_9 GEXP + \beta_{10} IEXP + \beta_{11} TEXP + \beta_{12} GEN + \beta_{13} IMPC1 + \beta_{14} IMPC2 + \beta_{15} IMPC3 + \beta_{16} IMPC4 + \varepsilon$$

Table 15 and Table 16 report the correlations between the variables included in the regression analysis for model specification 1 and 2, respectively. As not all of the variables satisfy the parametric assumption of normal distribution, Spearman rank correlations are reported in addition to the Pearson product-moment correlation coefficients.[979]

[979] Specifically, the distribution of scores on the *GEXP*, *IEXP*, and *SUFINF* variables are right-skewed, while the scores on the *IMPC1*, *IMPC2*, *IMPC3*, *IMPC4*, and *CONC* variables are left-skewed.

	BELREV	*INFORD*	*PS*	*SUFINF*	*CERTAIN*	*CONC*	*INTENS*	*GEXP*	*IEXP*	*TEXP*	*GEN*	*IMPC1*	*IMPC2*	*IMPC3*	*IMPC4*
BELREV	1.000	-0.325***	0.061	-0.124	-0.085	-0.073	-0.083	0.085	0.116	0.075	0.042	0.046	-0.183*	0.117	0.140
INFORD	-0.332***	1.000	0.034	0.019	-0.127	0.009	-0.021	-0.134	-0.108	-0.179*	0.044	-0.155*	0.108	0.056	0.137
PS	0.058	0.038	1.000	-0.141	-0.088	0.203**	0.151	-0.019	-0.065	0.094	0.098	0.167*	-0.025	0.063	0.011
SUFINF	-0.097	0.018	-0.091	1.000	0.392***	0.197*	0.085	-0.060	0.006	-0.024	0.026	0.100	0.100	0.219**	0.134
CERTAIN	-0.072	-0.131	-0.036	0.408***	1.000	0.271***	0.211**	0.169*	0.229**	0.279***	-0.214**	0.055	-0.017	0.044	0.101
CONC	-0.039	0.031	0.237**	0.200**	0.281***	1.000	0.723***	-0.060	-0.011	0.010	0.034	0.121	0.083	0.145	0.063
INTENS	-0.057	-0.010	0.173*	0.100	0.216**	0.740***	1.000	-0.021	0.031	0.085	0.009	0.004	-0.012	0.023	0.022
GEXP	0.044	-0.143	-0.030	0.036	0.179*	-0.081	-0.048	1.000	0.298***	0.357***	-0.185*	-0.031	-0.151	0.018	0.026
IEXP	0.077	-0.112	-0.095	0.022	0.205**	0.017	0.092	0.311***	1.000	0.328***	-0.172*	-0.175*	-0.207**	-0.061	0.141
TEXP	0.079	-0.178*	0.102	-0.035	0.270***	0.004	0.085	0.364***	0.301***	1.000	-0.351***	-0.085	-0.155*	-0.038	0.000
GEN	0.024	0.044	0.115	0.035	-0.198*	0.032	0.012	-0.201*	-0.167*	-0.349***	1.000	0.094	0.172*	0.037	0.100
IMPC1	0.073	-0.155*	0.106	0.105	0.126	0.137	0.030	-0.014	-0.161*	-0.077	0.080	1.000	0.295***	0.096	0.111
IMPC2	-0.148	0.124	-0.035	0.087	0.019	0.043	0.001	-0.132	-0.175*	-0.132	0.170*	0.252**	1.000	0.095	0.076
IMPC3	0.156*	0.074	0.075	0.199**	0.002	0.124	0.017	0.019	-0.105	-0.032	0.082	0.101	0.107	1.000	0.216**
IMPC4	0.147	0.144	-0.022	0.149	0.067	0.049	0.041	-0.013	0.131	-0.013	0.103	0.116	0.132	0.225**	1.000

INFORD: dummy variable coded 1 if the participant is in the $++--$ condition, and 0 otherwise. *GEN*: dummy variable coded 1 if the participant is female, and 0 otherwise.

Pearson product-moment correlation coefficients in the lower triangle; Spearman rank correlation coefficients in the upper triangle
*, **, *** Significance levels at 0.05, 0.01, and 0.001, respectively (two-tailed tests)

Table 15: Correlation Matrix for Belief Revisions

	FINBEL	*INFORD*	*PS*	*SUFINF*	*CERTAIN*	*CONC*	*INTENS*	*INTBEL*	*GEXP*	*IEXP*	*TEXP*	*GEN*	*IMPC1*	*IMPC2*	*IMPC3*	*IMPC4*
FINBEL	1.000	-0.325***	-0.070	0.173*	0.145	0.079	-0.006	0.639***	0.038	0.109	-0.110	-0.034	-0.027	-0.173*	0.307***	0.282***
INFORD	-0.301***	1.000	0.034	0.019	-0.127	0.009	-0.021	-0.025	-0.134	-0.108	-0.179*	0.044	-0.155*	0.108	0.056	0.137
PS	-0.026	0.038	1.000	-0.141	-0.088	0.203**	0.151	-0.108	-0.019	-0.065	0.094	0.098	0.167*	-0.025	0.063	0.011
SUFINF	0.162*	0.018	-0.091	1.000	0.392***	0.197*	0.085	0.264***	-0.060	0.006	-0.024	0.026	0.100	0.100	0.219**	0.134
CERTAIN	0.105	-0.131	-0.036	0.408***	1.000	0.271***	0.211**	0.210**	0.169*	0.229**	0.279***	-0.214**	0.055	-0.017	0.044	0.101
CONC	0.089	0.031	0.237**	0.200**	0.281***	1.000	0.723***	0.113	-0.060	-0.011	0.010	0.034	0.121	0.083	0.145	0.063
INTENS	-0.001	-0.010	0.173*	0.100	0.216**	0.740***	1.000	0.039	-0.021	0.031	0.085	0.009	0.004	-0.012	0.023	0.022
INTBEL	0.658***	-0.020	-0.071	0.233**	0.158*	0.117	0.046	1.000	-0.026	0.021	-0.147	-0.062	-0.075	-0.037	0.210**	0.166*
GEXP	0.004	-0.143	-0.030	0.036	0.179*	-0.081	-0.048	-0.031	1.000	0.298***	0.357***	-0.185*	-0.031	-0.151	0.018	0.026
IEXP	0.121	-0.112	-0.095	0.022	0.205**	0.017	0.092	0.054	0.311***	1.000	0.328***	-0.172*	-0.175*	-0.207**	-0.061	0.141
TEXP	-0.097	-0.178*	0.102	-0.035	0.270***	0.004	0.085	-0.158*	0.364***	0.301***	1.000	-0.351***	-0.085	-0.155*	-0.038	0.000
GEN	-0.026	0.044	0.115	0.035	-0.198*	0.032	0.012	-0.043	-0.201*	-0.167*	-0.349***	1.000	0.094	0.172*	0.037	0.100
IMPC1	-0.029	-0.155*	0.106	0.105	0.126	0.137	0.030	-0.087	-0.014	-0.161*	-0.077	0.080	1.000	0.295***	0.096	0.111
IMPC2	-0.176*	0.124	-0.035	0.087	0.019	0.043	0.001	-0.049	-0.132	-0.175*	-0.132	0.170*	0.252**	1.000	0.095	0.076
IMPC3	0.329***	0.074	0.075	0.199**	0.002	0.124	0.017	0.191*	0.019	-0.105	-0.032	0.082	0.101	0.107	1.000	0.216**
IMPC4	0.317***	0.144	-0.022	0.149	0.067	0.049	0.041	0.186*	-0.013	0.131	-0.013	0.103	0.116	0.132	0.225**	1.000

INFORD: dummy variable coded 1 if the participant is in the $++--$ condition, and 0 otherwise. *GEN*: dummy variable coded 1 if the participant is female, and 0 otherwise.

Pearson product-moment correlation coefficients in the lower triangle; Spearman rank correlation coefficients in the upper triangle

*, **, *** Significance levels at 0.05, 0.0,1 and 0.001, respectively (two-tailed tests)

Table 16: Correlation Matrix for Final Belief

An inspection of the correlation coefficients summarized in Table 15 and Table 16 suggests that multicollinearity was not an issue as indicated by the fact that most correlations are below 0.3, with the only major exception being the correlation between *CONCEN* and *INTENS* which is slightly above 0.7, but yet below the critical threshold value of 0.8 suggested in the relevant literature.[980] The conclusion of no multicollinearity is reinforced by the fact that the variance inflation factors of the variables included in both model specifications are uniformly less than 2.8, thus falling clearly below the critical value of 10.[981] In addition to the multicollinearity investigation, the residuals scatterplots were examined to ensure the tenability of the assumptions of normality, linearity, and homoscedasticity.[982] All assumptions were found to hold.

Before proceeding to the discussion of the results of the multiple regression analysis, the most notable findings emerging from the inspection of the correlation matrices depicted in Table 15 and Table 16 are briefly considered. As expected, information order (*INFORD*) is significantly related to both subjects' belief revisions (*BELREV*) (r^{983} = -0.332, $p < .0001$) and final beliefs (*FINBEL*) (r = -0.301, $p < .0001$) in the theoretically predicted direction (i.e., involving greater downward belief revisions (smaller final beliefs) for subjects in the $++--$ condition (coded 1) compared to subjects in the $--++$ condition (coded 0)). In addition, participants' belief revisions are significantly correlated with the importance attached to the additional piece of positive information concerning the favorable external report and banks' willingness to negotiate (*IMPC3*) (r = 0.156, p = 0.045). Similar correlation coefficients are obtained for the importance assigned to the information cues concerning the insolvency of a major supplier (*IMPC2*) (r = -0.148, p = 0.056) and the announcement of a cash capital increase (*IMPC4*) (r = 0.147, p = 0.057). Unexpectedly, the correlation between the importance assigned to the rejection of state funding (*IMPC1*) and subjects' belief revisions is positive (r = 0.073, p = 0.350), indicating that the greater importance subjects attached to this cue, the greater (more upward) were their total belief revisions. However, when subjects' final beliefs (*FINBEL*) are considered, the direction of the association is negative (r = -0.029, p = 0.708) and thus consistent with the intention of the experimental manipulation. Nonetheless, the correlation coefficients presented in Table 16 corroborate the finding that the cue concerning the rejection of state funding is the piece of information which is most weakly associated with both dependent variables. The three other pieces of additional information significantly correlate with auditors' final beliefs (*IMPC2*: r = -0.176, p = 0.023; *IMPC3*: r = 0.329, $p < 0.0001$; *IMPC4*: r = 0.317, $p < 0.0001$). Strikingly, even though the manipulation check results discussed in Section 5.5.1 reveal a somewhat higher mean importance assessment of the two

[980] See, e.g., *Field* (2009): 224; *Harlow* (2014): 1035.

[981] See, e.g., *Kleinbaum et al.* (2008): 315; *Myers* (1990): 369. The tolerance statistic and variance inflation factor values are not included in the summary of regression results (Table 17) but were checked to ensure that multicollinearity did not bias the results.

[982] For a concise discussion of the assumptions underlying multiple regression analysis, see, e.g., *Field* (2009): 220f.

[983] For ease of exposure, only the relevant Pearson product-moment correlation coefficients are stated subsequently. The findings do not change qualitatively when the Spearman rank correlation coefficients are considered. All p-values listed above stem from two-tailed tests.

negative items of additional information compared to the two positive items (Table 6), the correlation analysis results reported in Table 15 and Table 16 suggest that the negative items (*IMPC1*, *IMPC2*) are more weakly related to subjects' responses than are the positive cues (*IMPC3*, *IMPC4*). However, it is important to note that the ex post indicated importance assessments of the four additional information cues do not necessarily coincide with the mental assessments of these cues generated in the course of the experimental treatment. Nevertheless, the finding reported above is in line with the results of a number of prior auditing studies which indicate that auditors tend to (subconsciously) overweight positive information (information that confirms their positively-framed hypotheses) in updating beliefs and arriving at judgments.[984]

An analysis of Table 16 also reveals that, as expected, participants' initial beliefs (*INTBEL*) are very strongly related to their final beliefs (*FINBEL*) ($r = 0.658$, $p < 0.0001$).[985] Hence, the higher (more optimistic) the starting position, the higher (more favorable) an individual's final belief in the going concern ability of the Premium Steel AG.

In addition, the following statistically significant correlations are worth noting: First, the more concentrated subjects were (or assessed themselves) (*CONC*), the more sufficient they perceived the information provided in the case study (*SUFINF*) ($r = 0.200$, $p = 0.010$), and the more certain they were in their assessments (*CERTAIN*) ($r = 0.281$, $p < 0.0001$). Perceived sufficiency of information and certainty in the own judgment were found to significantly and positively correlate ($r = 0.408$, $p < 0.0001$). Second, remarkably, the greater importance participants attached to the information concerning the favorable external report and banks' willingness to negotiate over the prolongation of the credit lines (*IMPC3*), the greater was participants' perception of the sufficiency of the information provided in the case study for a definite going concern evaluation of the Premium Steel AG (*SUFINF*) ($r = 0.199$, $p = 0.010$). In addition, the higher subjects' initial belief in the going concern ability of the firm (*INTBEL*), the more sufficient they perceived the information provided in the case ($r = 0.233$, $p = 0.002$), and the more certain they were in their own judgments ($r = 0.158$, $p = 0.043$). Third, the greater subjects' experience with the going concern task (*TEXP*), the lower were their initial beliefs in the going concern ability of the firm ($r = -0.158$, $p = 0.041$). Fourth, participants' certainty in their own judgment was found to be positively associated with their general experience (*GEXP*) ($r = 0.179$, $p = 0.023$), industry-specific experience (*IEXP*) ($r = 0.205$, $p = 0.008$), task-specific experience (*TEXP*) ($r = 0.270$, $p < 0.0001$), and the intensity of thought exerted (*INTENS*) ($r = 0.216$, $p = 0.005$). Furthermore, in consistency with prior

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[984] See, e.g., *Ayers/Kaplan* (1993): 126; *Bamber/Ramsay/Tubbs* (1997): 250, 263; *Church* (1991): 531f.; *Morton* (2001): 115f.; *Pei/Reed/Koch* (1992): 180; *Waller/Felix* (1984): 399. For a list of relevant psychological studies reporting profound confirmation proneness, see *Smith/Kida* (1991): 483.

[985] Following *Cohen* (1988): 79-81, correlation coefficients ranging from 0.1 to 0.29 are classified as small, from 0.30 to 0.49 as medium, and above 0.5 as large. However, as indicated by *Fahrmeir et al.* (2007): 139, the nature of the variables under scrutiny should be taken into account. Specifically, for relatively exact measures such as age, this rough classification appears tenable. For "soft measured" variables (characteristics) such as responses on attitude and other ranking scales, however, obtained correlations are typically not that strong, with coefficients of approximately 0.5 rather representing the maximum.

research findings indicating that women are generally less confident than men,[986] the female participants in the present study were found to be significantly less certain in their own judgment than male participants (r = -0.198, p = 0.012). Finally, in consistency with the contentions set forth at the end of Section 5.5.2, auditors' general, industry-specific, and task-specific experience was not found to be significantly associated with their belief revisions (*GEXP*: r = 0.044, p = 0.574; *IEXP*: r = 0.077, p = 0.320; *TEXP*: r = 0.079, p = 0.309) or final beliefs (*GEXP*: r = 0.004, p = 0.957; *IEXP*: r = 0.121, p = 0.119; *TEXP*: r = -0.097, p = 0.210).

Subsequently, the results of the multiple regression analysis are considered (Table 17).

	Model Specification 1			**Model Specification 2**		
Variables	**Coefficient**	***t***	***p*-value**	**Coefficient**	***t***	***p*-value**
Test Variables						
INFORD	-0.355	-4.501	0.000***	-0.351	-6.590	0.000***
PS	-0.034	-0.333	0.740	0.016	0.235	0.815
*INFORD*PS*	0.120	1.196	0.234	0.021	0.302	0.763
Other Variables of Interest						
SUFINF	-0.096	-1.135	0.258	-0.019	-0.337	0.737
CERTAIN	-0.087	-0.964	0.337	-0.011	-0.180	0.857
CONC	0.028	0.236	0.814	0.085	1.065	0.289
INTENS	-0.085	-0.758	0.450	-0.103	-1.368	0.173
Control Variables						
INTBEL				0.536	9.702	0.000***
GEXP	-0.030	-0.369	0.712	-0.035	-0.624	0.534
IEXP	0.041	0.493	0.623	0.056	0.991	0.323
TEXP	0.041	0.464	0.644	-0.099	-1.605	0.111
GEN	0.026	0.314	0.754	-0.039	-0.703	0.483
IMPC1	0.036	0.448	0.655	-0.054	-0.976	0.331
IMPC2	-0.146	-1.837	0.068	-0.150	-2.813	0.006**
IMPC3	0.185	2.318	0.022*	0.222	4.096	0.000***
IMPC4	0.180	2.254	0.026*	0.242	4.441	0.000***
Constant	4.542	0.426	0.671	27.941	3.143	0.002**
Adjusted R^2	0.151			0.616		
F-Statistic	2.876***			16.841***		

Table 17: Summary of Regression Results

[986] See, e.g., *OECD* (2013): 56f.; *Sonnert/Holton* (1995): 145.

As shown in Table 17, both model specifications are statistically significant, with F (15, 143) = 2.876, p = 0.001, adjusted R^2 = 0.151 for Model 1 and F (16, 142) = 16.841, p < 0.0001, adjusted R^2 = 0.616 for Model 2.[987] As expected, the regression analysis generated the same results regarding the three test variables as the results obtained using the AN(C)OVA procedures. In particular, the regression results reveal that information order has the strongest unique and statistically significant contribution to explaining both participants' belief revisions (*BELREV*, Model 1) (β = -0.355, p < 0.0001) and final beliefs (*FINBEL*, Model 2) (β = -0.351, p < 0.0001), while professional skepticism provides virtually no contribution to explaining the variance in the dependent variables (β = -0.034, p = 0.740 and β = 0.016, p = 0.815 for *BELREV* and *FINBEL*, respectively). Similarly, skepticism was not found to interact significantly with information order in explaining auditors' total belief revisions (β = 0.120, p = 0.234) or final beliefs (β = 0.021, p = 0.763).

With regard to the other variables of interest (*SUFINF*, *CERTAIN*, *CONC*, and *INTENS*), none was found to be significantly associated with auditors' belief revisions or final beliefs. Likewise, the results do not reveal a significant relationship between subjects' experience (*GEXP*, *IEXP*, and *TEXP*) or gender (*GEN*) and the two dependent variables. The only significant relationships between control measures and the dependent variables concern the importance assigned to the two positive cues in Model 1 (*IMPC3*: β = 0.185, p = 0.022; *IMPC4*: β = 0.180, p = 0.026) as well as in addition the negative cue concerning the insolvency of a major supplier (*IMPC2*) in Model 2 (*IMPC2*: β = -0.150, p = 0.006; *IMPC3*: β = 0.222, p < 0.0001; *IMPC4*: β = 0.242, p < 0.0001). Finally, as expected, the regression results show that the *INTBEL* variable has a very strong explanatory power regarding auditors' final beliefs (β = 0.536, p < 0.0001).

Overall, it can be concluded that inferences concerning the hypotheses under consideration are robust to different parametric tests (ANOVA, ANCOVA, and regression analysis) as well as different specifications of the dependent variable (total belief revision vs. final belief and control for initial belief). Collectively, the results of the statistical tests show that auditors who evaluate positive information at the end of the sequence indeed exhibit significantly greater upward belief revisions (and more favorable final beliefs) than auditors who evaluate negative information at the end of the series. Hence, H_1 can be supported. No significant difference was found in the belief revisions (and final beliefs) of auditors at different levels of trait professional skepticism. Hence, there is no support for H_2. Finally, the overall results indicate that the interaction between information order and professional skepticism is not statistically significant. With other words, evidence of recency was obtained for both high and low levels of trait professional skepticism, suggesting that information order does not influ-

[987] It is instructive to note that behavioral studies normally account for less variance than do non-behavioral (e.g., archival) studies because human behavior in the natural environment is influenced by many (frequently latent) factors that are not under the researcher's control. See, e.g., *Tabachnick/Fidell* (2007): 55. Therefore, effect size and R^2-values are not considered of central interest in behavioral research and are typically not reported. One of the very few studies reporting R^2-values is *Quadackers/Groot/Wright* (2012). They also conducted a linear regression analysis and obtained adjusted R^2-values ranging from 0.00 to 0.262 for their individual models. See *Quadackers/Groot/Wright* (2012): 27.

ence auditors at different levels of skepticism differently. Hence, the results of the present study suggest a negative answer to the research question.

Before proceeding to the discussion of these findings and their implications, the results of a set of additional analyses are presented and briefly discussed in the subsequent section. These analyses were conducted to explore (i.e., test without formally stated hypotheses) the association between trait professional skepticism and auditors' evidence-related attitudes, judgment confidence, and cognitive effort in the context of a critical, complex, forward-looking, and uncertainty-involving judgment task (going concern) in which no perfectly exhaustive information was available.

5.5.5 Additional Explorative Analyses

5.5.5.1 Skepticism and Evidence-Related Factors

As discussed in Section 4.4, three of the six constituent elements underlying Hurtt's concept of trait professional skepticism and the Hurtt scale – questioning mind, suspension of judgment, and search for knowledge – are evidence-related and involve an auditor's tendency to search for and evaluate sufficient audit evidence before forming a final belief or judgment. Prior auditing research using the Hurtt scale has typically utilized experimental settings in which auditors can actively search for and obtain additional information and audit evidence. In contrast to previous studies, in order to draw valid inferences on the emergence of recency effects in auditors' belief revisions, a fixed experimental setting was utilized herein, i.e., participants were not able to obtain information beyond the data presented in the case materials. Hence, the present investigation offers the opportunity for some relevant preliminary insights into the link between trait professional skepticism and auditors' responses to limitedly available evidence.

Theoretically, auditors possessing higher degrees of trait professional skepticism are expected to perceive the evidence provided in the current case study as less sufficient for a conclusive evaluation of the going concern ability of the Premium Steel AG than their less skeptical counterparts. This expectation is based on the questioning mind and search for knowledge dimensions of trait skepticism.[988]

A correlation analysis was performed to test whether trait professional skepticism is inversely related to auditors' perceptions of information sufficiency. In consistency with the foregoing theoretical considerations, a statistically significant negative association was found between participants' scores on the Hurtt scale and their perceptions of the sufficiency of information (r_s[989] = -0.141, p (one-tailed) = 0.035). However, the correlation is small, with the amount of

[988] For a general consideration of these dimension, see Section 4.4.2.1 and Section 4.4.2.3

[989] Due to violations of the parametric assumption of normality by several of the relevant tested variables (sufficiency of information, number of additional cues listed, general and industry-specific experience as well as the importance assignments of all four additional information pieces), the nonparametric Spearman rank correlation coefficients are reported in this section.

shared (i.e., explained) variation between both variables being below 2% (coefficient of determination $r_s^2 = 1.99\%$).

In addition, dispositional skepticism is expected to display a positive association with auditors' need for additional information for arriving at a definite going concern evaluation. Again, this expectation arises from the questioning mind and search for knowledge components of trait professional skepticism.

An analysis of the bivariate correlation between the Hurtt score and the number of additional information cues listed by participants as necessary for a conclusive going concern assessment[990] reveals that there is a marginally significant positive association between the two variables ($r_s = 0.110$, p (one-tailed) = 0.078). However, it is conceivable that respondents' indication of additional information cues required for a conclusive assessment of the going concern likelihood of the entity also relates to individual knowledge (approximated via general, industry-, and task-specific experience) and the amount of cognitive effort exerted (approximated via self-reports on concentration and intensity of thought during the completion of the case study). However, neither experience nor effort were found to significantly correlate with the number of additional cues indicated as necessary for a definite going concern evaluation.[991]

A further evidence-related explorative test concerns the inspection of whether subjects' assessments of the importance of the four additional information cues differ between the two skepticism levels. Following *Hogarth and Einhorn's* (1992) notion of skepticism, more skeptical subjects can be expected to attach substantially more weight to negative information than to positive evidence. Table 18 provides a summary of the mean importance assessments by skepticism level and *t*-test results of differences between the two skepticism groups.

Cue	Sign	Skepticism Level		Mean Difference	*t*-statistic	*p*-value (two-tailed)
		Low	High			
Rejection of state funding	–	4.95	5.33	-0.38	-1.571	0.118
Bankruptcy of a major supplier and lack of alternatives	–	5.43	5.33	0.10	0.555	0.580
Favorable external report and banks willing to negotiate	+	4.76	5.01	-0.25	-1.150	0.252
Announcement of a cash capital increase	+	4.87	4.91	-0.04	-0.178	0.859

Table 18: Mean Evidence Importance Assessments by Skepticism Level

[990] The number of information items listed by each respondent was independently counted by the author and by an audit manager who was unfamiliar with the rationale underlying the free formulation question. All inter-rater differences were discussed and mutually resolved. On average, subjects were found to list 2.11 pieces of additionally required information (SD: 1.93). The range of items was from 0 to 9.

[991] Specifically, the obtained bivariate correlations between the number of listed cues and the relevant knowledge- and effort-related variables are as follows: general experience: $r_s = 0.071$, p (one-tailed) = 0.184; industry experience: $r_s = -0.046$, p (one-tailed) = 0.278; task experience: $r_s = 0.102$, p (one-tailed) = 0.094; concentration: $r_s = -0.034$, p (one-tailed) = 0.332; and intensity of thought: $r_s = 0.069$, p (one-tailed) = 0.187.

The results presented in Table 18 indicate that participants' evidence assessments do not differ significantly between subjects in the high skepticism group and subjects in the low skepticism group. This result holds for both positive and negative evidence cues.[992]

Overall, trait professional skepticism was found to be only weakly (negatively) related to the perceived sufficiency of evidence. The number of cues listed as necessary for a definite going concern evaluation as well as the importance ratings of the four additional cues were not found to significantly differ between high and low skepticism auditors. With other words, auditors' evidence-related responses appear only very moderately associated with their dispositional skepticism. These findings can be viewed as supporting the notion that as a trait, professional skepticism is potentially only subtly manifested in human behavior. This aspect will be discussed in Section 6.1.

5.5.5.2 Skepticism and Judgment Confidence

A further aspect that was exploratively tested within the current study concerns the relation between trait skepticism and judgment confidence (certainty in the own judgment). Overall, an inverse relation can be expected between dispositional skepticism and judgment confidence because of a skeptic's ongoing questioning which, as indicated in Section 4.4.2.1, is not merely restricted to extraneous assertions and claims but also concerns the own judgments and beliefs.[993]

The relationship between trait professional skepticism (as measured by the Hurtt score) and participants' self-reported certainty in the own judgment was tested using bivariate correlation. The results obtained suggest that although higher levels of skepticism are tendentially associated with lower levels of judgment confidence, the relationship between the two variables is not statistically significant (r_s = -0.088, p (one-tailed) = 0.131).

5.5.5.3 Skepticism and Cognitive Effort

Finally, as indicated in Section 4.5, innate skepticism can be expected to correlate with greater effort, attention, and thoroughness in information processing. This contention is based on skeptics' ongoing questioning and insatiable need for information and proof, which generally calls for cognitive resources and deliberation.

In consistency with this notion, the results of the conducted correlational analysis indicate that skepticism as measured by the Hurtt score and effort as measured by participants' self-reports[994] on the concentration and intensity of thought exerted during the completion of the

[992] Similar results were obtained when the bivariate correlation between the Hurtt skepticism score (continuous variable) and the importance assigned to the additional information cues was considered.

[993] The view that there is an inverse relationship between skepticism and confidence is also shared by, e.g., *Fuchs* (2001): ii and *Stren* (2001): 133.

[994] Even though self-reports may bear reliability issues (see, e.g., *Cone/Foster* (1998): 245f.), they have been frequently applied as measures of effort in prior research. See, e.g., *Payne/Ramsay* (2005): 324.

case study are significantly positively related (concentration: r_s = 0.203, p (one-tailed) = 0.004; intensity of thought: r_s = 0.151, p (one-tailed) = 0.026). However, the obtained correlations are small, with the amount of shared variation (r_s^2) between skepticism and concentration as well as intensity of thought being 4.12% and 2.28%, respectively.

In addition, the time expended for completing the study was considered as a further proxy for effort. The underlying notion is that auditors exerting higher effort will need more time to complete the case materials. The correlation coefficients obtained for the relationship between time and intensity of thought (r_s = 0.327, p (one-tailed) < 0.0001) as well as time and concentration (r_s = 0.346, p (one-tailed) < 0.0001) appear to support this expectation. However, the relationship between trait skepticism as measured by the Hurtt score and completion time was found to be weak and only marginally significant (r_s = 0.141, p (one-tailed) = 0.064).

In addition to cognitive effort, the relation between skepticism and cognitive load was explored. As previously indicated, trait professional skepticism has been theorized to involve ongoing questioning as well as profound, critical, and elaborative information processing. These cognitive operations require and consume substantial cognitive resources and can lead to high cognitive load. The expected positive relationship between skepticism and cognitive load is directionally supported by the correlation coefficient obtained between the Hurtt score and the self-reported perceived difficulty of the case (r_s = 0.106, p (one-tailed) = 0.088). However, the obtained correlation is only marginally significant.

To summarize, the results of the foregoing analyses suggest that trait skepticism is indeed positively related to cognitive effort. However, the obtained correlation coefficients indicate a relatively weak link between the two constructs. In addition, the results reported above suggest that with increasing degrees of innate skepticism, auditors are tendentially more likely to perceive the task as more difficult, which is viewed as an indication of increased cognitive load. This aspect needs to be more profoundly explored by future research, since it relates to a potential downside of skepticism and thoroughness in information processing: the occupation of considerable cognitive resources, substantial cognitive load, and high likelihood of reverting to heuristic processing to relieve cognitive strain.

Collectively, the results of the explorative analyses concerning the behavioral manifestations of trait professional skepticism in the specific context of the present study suggest that although auditors' evidence-, confidence-, and effort-related responses are at least tendentially in line with the theoretical expectations, the relationship between trait skepticism and the other variables of interest is relatively weak. This finding might be attributed to the dispositional nature of skepticism foundational to the Hurtt concept and her scale as well as the fact that traits have generally been found to more subtly manifest themselves in human behavior than states.[995] Support for the dispositional nature of skepticism as measured by the Hurtt scale is provided by the finding that the Hurtt score is not correlated with the attendance of skepticism trainings in the past (r_s = 0.069, p (one-tailed) = 0.189). This result suggests that trait skepti-

[995] See *Robinson/Curtis/Robertson* (2013): 7, 27; *Ross/Nisbett* (2011): 27f.

cism is a stable, enduring, and cross-situationally consistent personality characteristic rather than an acquired skill.

5.5.5.4 Debriefing Questions

Finally, the results of the debriefing questions are briefly discussed. As indicated in Section 5.3.3, at the end of the experimental study, participants were asked to rate the understandability of the research instrument. The mean assessment of the understandability of the research instrument was 5.48 (SD: 1.18), which is significantly above the theoretical mid-point of the response scale (4.5) as indicated by the results of a one-sample *t*-test (t (162) = 10.674, p (two-tailed) < 0.0001). Accordingly, it can be concluded that participants perceived the case materials as reasonably comprehensible.

In addition, participants were asked to provide comments on the study. Only twelve participants (7.19%) provided comments and remarks, the most notable of which are briefly considered subsequently. Specifically, three participants expressed interest in the research project and curiosity about the aim and the results of the study. This fact underscores the validity of the experiment. It suggests that participants were not able to anticipate the objective of the study, so that it can be expected that they provided genuine responses. In addition, participants' interest in the study suggests that the striven experimental realism of the case was largely achieved. Two participants stressed the fact that a case study is merely a simplification of reality and can never provide the detailed information and mirror the true complexity faced in audit practice. One participant complained about the tight time frame of the study. One participant remarked that this is a classic case for an emphasis of matter paragraph in auditors' report as the going concern ability of the firm appears more likely than not, but is still not certain. Finally, three participants emphasized the uncertainty inherent in the additionally provided information cues and the lack of detail on them.

6 Conclusion

In this concluding section, the experimental results reported above are synthesized and discussed, the key implications of the findings are considered, the limitations of the present work are outlined, and potential avenues for future research are suggested.

6.1 Summary and Discussion

The purpose of the present thesis was two-fold: first, to provide further evidence on the influence of information order effects on auditors' belief revisions, and second, to explore whether auditors exhibiting different degrees of trait professional skepticism adjust their beliefs in a different manner and are to a different extent subject to information order effects.

These objectives were achieved through the conduct of an experimental investigation with experienced professional auditors. The experiment involved auditors' sequential assessments of the likelihood of a firm's going concern ability. The order of information presentation was manipulated between subjects by randomly assigning participants to either a $--++$ condition or a $++--$ condition. Based on the individual scores on the Hurtt scale, subjects were post-experimentally classified as high or low in trait skepticism based on a median split of the sample.

Overall, the results of the present study support the pervasiveness of information order effects (recency) in the context of the sequential processing of complex, mixed evidence. The experimental results reported herein suggest that while auditors' belief revisions and overall judgments are significantly influenced by the order in which subject obtain and process information, an individual's trait professional skepticism does not mitigate this bias. With other words, auditors exhibiting high degrees of dispositional skepticism and those exhibiting low levels of dispositional skepticism likewise fall prey to recency effects in their belief revisions. Consequently, recency appears to dominate trait professional skepticism in participants' responses.

The results obtained in the present study are in line with the findings reported in prior psychological and auditing research which unequivocally indicate that recency is a strong, highly persistent, hard-wired, and ubiquitous cognitive bias that operates at a subconscious level, which renders its recognition and alleviation quite difficult. The results reported here suggest that a high level of trait skepticism is not sufficient to debias recency. This finding contrasts with the results reported by *Chan* (1995) who, as discussed in Section 3.4, found that the cognitive style of field independence (i.e., a personality trait) mitigated recency effects in auditors' belief revisions.[996] However, only 20 auditors participated in his study, which is clearly insufficient for drawing any confident inference.[997] As indicated in Section 3.4, other studies

[996] See *Chan* (1995): 26.

[997] Recall that in the relevant literature, it has been recommended to use a cell size of at least 30 subjects. In the case of four experimental cells of equal size, the total sample should consist of at least 120 subjects, i.e., 100 (!) subjects more than actually used by *Chan* (1995).

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exploring the interrelation between information order effects and personality traits are missing. Prior research has generally indicated that effort-fostering environmental factors like documentation requirements and accountability can, when particularly emphasized, alleviate recency. Taken together, the results of the current study and prior research suggest that environmental factors might be more effective in moderating recency effects than personal dispositions. This contention is in line with the findings in both psychological and auditing research which suggests that states, i.e., temporary conditions evoked by situational factors, typically have a greater influence on human judgments and behaviors (and their distortions) than traits.[998]

While these findings and conclusions do not in any way diminish the fundamental importance of professional skepticism in auditing, it may be that trait skepticism is more effective as a corrective mechanism in "induced" situations where inconsistencies and red flags are present and a state of professional skepticism is evoked rather than in cases involving cognitive biases. This contention is in line with *Robinson* (2011) who argues that traits and states might be useful for explaining different types of human behavior.[999]

Subsequently, the implications of the findings of the present study for the auditing profession, standard setters and regulators as well as academic research are discussed. From a scientific perspective, the suggestions and recommendations outlined subsequently follow a *normative* approach, with the ultimate aim being to improve the quality of auditor judgment and to approach the normative benchmark of unbiased information processing.[1000]

Auditing Profession

The finding that auditors are systematically affected by the order of information presentation in forming beliefs and making judgments regardless of their degree of innate skepticism implies that an increased *awareness* is required in order to eliminate or at least reduce the deleterious influence of the subconsciously operating information order effects.[1001] Given that the greatest portion of audit evidence and information is obtained from the client who is in the position to resume and present information in a way that induces the most favorable position for the firm, and in light of the fact that "last-minute" positive information and good news are

[998] See *McGhee/Shields/Birnberg* (1978): 692-695; *Mischel* (1968): 146; *Robinson* (2011): 89; *Robinson/Curtis/Robertson* (2013): 7, 27; *Ross/Nisbett* (2011): 27f. *Bonner* (2008): 101 even goes one step further and argues that "*personality characteristics may be small potatoes to accounting JDM.*" *Buss* (1989): 1380f., in contrast, argues that paradigms may be constructed and empirical evidence provided both in favor of a trait or a state view of personality. However, he considers the comparison and attempts to identify the superiority of one aspect over the other as not really purposeful since both traits and states matter in human behavior and only their joint consideration provides a more complete picture of the antecedents of judgment and decision making.

[999] See *Robinson* (2011): 17.

[1000] See *Stahl* (2012): 135.

[1001] This view is also shared by *Adam* (2007): 263. In addition, it is in line with *Kahneman's* (2011): 28 notion that cognitive illusions are very difficult to overcome and the most effective strategy for alleviating them appears to be to learn to identify circumstances in which cognitive fallacies are likely, i.e., to sharpen one's awareness of bias-inducing factors.

common in practice,[1002] an increased sensibility to the biasing influence of information order effects appears crucial. In this context, *Nelson* (2009) suggests that the awareness and anticipation of order effects can serve as an opportunity to enhance skepticism by mentally ordering and processing information in such way that any potential recency effect favors rather than inhibits professional skepticism.[1003] On a more general level, a heightened degree of *inward skepticism*, i.e., skepticism directed toward the own judgment processes and their susceptibility to cognitive traps, seems critical for improving judgment quality and forming sound, well-founded, and justifiable beliefs.[1004] This is particularly important in the context of complex and ambiguous audit issues and tasks because high complexity implies great cognitive load and is thus likely to force individuals toward mental shortcuts and cognitive biases in information processing.[1005]

In a nutshell, awareness is the most effective mechanism for preventing judgment from being distorted by cognitive flaws. By being aware of cognitive traps and understanding well their causes, typical situations where they are likely to arise might be better recognized and the biasing influence might be prevented.[1006]

To date, however, the issue of cognitive biases in the context of auditors' judgment and decision making has received very rudimentary consideration and modest attention within the auditing profession. To the best of the author's knowledge, only one of the Big 4 audit firms explicitly addresses the issue of cognitive biases and potential mitigating strategies in its internal materials and proceedings.[1007] Overall, cognitive biases seem to be largely disregarded in audit practice, and it is not clear whether the lack of practical consideration is due to insufficient knowledge and awareness or due to the perceived irrelevance of cognitive phenomena by the auditing profession. In either case, the results of prior research and the present study suggest that cognitive biases may considerably impair the quality of auditors' judgments and thus represent an issue of practical concern. Consequently, it might be beneficial for audit firms to extend the scope of their training materials and programs beyond the provision of technical knowledge and skills to include training and guidance on sound judgment processes. Prompts and reminders integrated into audit procedures (e.g., reminders to be aware of contrast effects and tendencies to over- or underweight information depending on its serial position in a sequence of inconsistent evidence, to consider counterarguments, etc.) can help sustaining auditors' awareness of cognitive fallacies throughout the course of the audit, thereby alleviating biases in auditors' beliefs and judgments.[1008] Further general strategies for enhancing judgment quality discussed in the literature include, among others, the use of judgment-

[1002] See *Asare* (1992): 391; *Schreiber* (2000): 174.

[1003] See *Nelson* (2009): 2.

[1004] The effectiveness of inward skepticism in mitigating fallacies in auditors' information processing and judgment has been demonstrated by *Grenier* (2013): 24.

[1005] See *Salterio/Koonce* (1997): 573.

[1006] See *Glover/Prawitt* (2013): 12; *Kahneman* (2011): 28; *KPMG* (2011): 31. For a general review on debiasing as a strategy for improving judgment quality, see *Bazerman/Moore* (2013): 216-219.

[1007] See *KPMG* (2011): 5-37.

[1008] See *Glover/Prawitt* (2013): 12.

and decision-analysis tools in very complex judgment domains, analogical reasoning, taking an outsider's view, and understanding biases in others.[1009]

Standard Setters

Auditing standards do not provide any guidance on how individual pieces of evidence shall be weighted and integrated into an overall belief or judgment. With more specific and stringent judgment process guidance, the potential for bias might be considerably reduced.

With regard to professional skepticism, standard setters and regulators around the globe intensively address the fundamentality of this concept in auditing and univocally call for improvements in the application of skepticism in audit practice but fail to provide a straightforward description of what professional skepticism essentially is. This conceptual indefiniteness casts ambiguity concerning the proper application of professional skepticism in auditing. Hence, based on the results of the theoretical analysis conducted in Section 4 and in consistency with *Glover and Prawitt* (2013), it is recommended that standard setters work toward the achievement of a coherent definition and understanding of professional skepticism and how it has to be applied to ensure high audit quality.[1010] In this context, insights provided by recent academic studies are crucial.[1011]

Academic Research

The present study provides further support for the descriptive validity of the belief-adjustment model. It adds to the body of psychological and auditing research demonstrating the robustness of recency effects in human judgment. In addition, it offers important insights into the behavioral manifestations of trait professional skepticism in a context that does not involve some skepticism "prompts". Overall, the fact that the results presented herein regarding the debiasing capacity of the personality trait of skepticism contradict the findings reported by *Chan* (1995) highlights the necessity to conduct well-designed studies with adequate sample sizes in order to draw valid inferences. The potential avenues for future research are discussed in the subsequent section along with the limitations of the present study.

6.2 Limitations and Directions for Future Research

As with all empirical research, the present study is subject to several limitations that should be taken into consideration when interpreting the study's results and findings. External validity issues typically associated with experimental research, e.g., a simplified judgment setting which contains limitedly available information, no client-specific knowledge, no possibility to discuss the issue in the audit team as well as potentially weaker cognitive involvement of the

[1009] For a detailed discussion of these strategies and a consideration of additional mechanisms for improving judgment quality, see *Bazerman/Moore* (2013): 206-229.

[1010] See *Glover/Prawitt* (2013): 22.

[1011] See *Franzel* (2013).

subjects as compared to real-world auditing tasks, apply to this study.[1012] Hence, the results reported herein might not be generalizable beyond the context of the present study. In addition, it should be taken into consideration that the results reported in the present work were obtained using a sample which was not randomly drawn. Specifically, auditors from a single Big 4 audit firm participated in the present study. Thus, the results are not *statistically* generalizable to the auditor population in general. The use of a single company, however, ensures constancy with regard to training practice, organizational structure, and firm culture, thereby reducing the threat of confounding effects related to firm-specific factors.[1013] In addition, as the pattern of results documented in the present study fits well into the picture drawn by prior research, the *non-statistical* generalizability of the results beyond the context and subject pool employed herein appears reasonable.[1014]

A further potential caveat concerns the threat of relevant omitted variables that might have affected the results of the study. Of particular relevance to the present study appear the personal dispositions of tolerance for ambiguity, need for cognitive closure, and locus of control since they concern the manner in which individuals process information, form beliefs, and arrive at judgments under conditions of uncertainty. Hence, these personality factors might have influenced auditors' belief revisions. In addition, as discussed in Section 4.4.2, these dispositions are strongly related to trait professional skepticism and might have moderated its effect on auditors' beliefs and judgments. However, as the distinct scales measuring tolerance for ambiguity, need for cognitive closure as well as locus of control are quite comprehensive, and in light of the time constraints for the conduct of the experiment, the three scales were not employed in the present study. Future research might address the interrelations between these personality traits and information order effects in the context of auditors' information integration and belief revision processes.

In addition, the present study is limited to the consideration of *trait* professional skepticism and its interrelation with information order effects in the context of auditors' belief revisions. However, it does not allow for inferences to be made regarding the influence of variations in professional skepticism resulting from environmental factors and changing incentives on auditors' belief revisions. With other words, it is unclear whether and how *state* professional skepticism would affect auditors' belief revisions in the context of sequentially presented complex and inconsistent evidence. This issue might be addressed by future research.

An additional potential caveat of the study concerns the translation of the Hurtt scale. Specifically, although great effort and thoroughness were exerted to ensure the reasonableness and precision of the German translation of the scale, it is still possible that there are some subtle discrepancies in the nuances of the original items contained in the Hurtt scale and their German translations which could have influenced the trait skepticism scores and thus the results obtained and inferences drawn within this work.[1015] However, the Hurtt scores obtained in the

[1012] See *Asare/Cianci/Tsakumis* (2009): 233; *Cushing/Ahlawat* (1996): 111, 121.

[1013] See *Bierstaker/Wright* (2001): 52; *Shaub/Lawrence* (1996): 154.

[1014] See *Keppel* (1973): 28f.

[1015] For such claims in the context of cross-cultural research in auditing, see *Cohen/Pant/Sharp* (1995): 59.

present study are in line with prior research using the scale. This can be interpreted as an indication of the substantial adequacy of the translation of the Hurtt scale.

Finally, as indicated in Section 5.5.2, in spite of random assignment of participants to treatment conditions, the $--++$ group and the $++--$ group differed on a number of demographic variables. However, the supplemental tests conducted to control for the influence of these demographic factors on auditors' belief revisions did not reveal significant effects.

Following the consideration of the potential limitations of the study, in the subsequent paragraphs, a number of directions that auditing researchers can pursue in the future are outlined. With regard to auditors' *belief updating*, one potentially fruitful avenue for future research concerns the effect of information order on the amount of audit evidence collected to support the individual belief (position). Of particular interest here is the influence of the first piece of information on auditors' evidence search activities. Specifically, it is unclear whether auditors who obtain a piece of positive (negative) evidence at the outset prematurely stop searching for additional information and accept (reject) the client's propositions. Empirical evidence on this question would be very valuable, both theoretically and practically, because the extent and intensity of auditors' information search proceedings directly affects the efficiency and effectiveness of the audit.[1016] In addition, valuable novel insights into the processes and determinants underlying information aggregation and belief updating may be gained through the application of refined models of human belief adjustment that take into account the deficiencies of the Hogarth and Einhorn model (e.g., the quantum inference model by *Trueblood and Busemeyer* (2010)).

With regard to *professional skepticism*, several possible directions for future research can be identified. To begin with, future research might investigate the interaction between trait professional skepticism and some other, potentially less pervasive, cognitive fallacies on auditors' skepticism, thereby providing additional insight into the issue addressed by *Nelson* (2009) regarding the deleterious influence of cognitive traps on auditors' skepticism.

An additional promising area for future research concerns the further exploration of the behavioral manifestations of trait professional skepticism. Of particular interest here is evidence on the strength of the link between *trait* skepticism and skeptical judgment and behavior, especially in contexts which do not involve irregularities, contradictions, fraud, or other environmental factors theorized to induce a state of professional skepticism. Relatedly, future research on the *state* dimension of professional skepticism as well as on the interplay between trait and state skepticism appears of central importance. This contention is reinforced by the fact that in consumer research, it has been demonstrated that dispositional (trait) and situational (state) skepticism have independent and additive effects on human judgment and behavior. Specifically, while all subjects are generally found to be affected by skepticism-inducing situational factors, individuals with high trait skepticism seem to respond more sensitively to the particular environmental stimuli than individuals with low trait skepticism.[1017]

[1016] See *Asare/Messier* (1991): 90.

[1017] See *Forehand/Grier* (2003): 355.

This interdisciplinary finding underlines the importance of obtaining a deeper comprehension of the isolated and combined effects of trait and state skepticism in auditors' judgment and decision making. For achieving this goal, the development of a rigorous psychometric scale for *ex ante* measuring the state dimension of skepticism is crucial.[1018]

A further promising avenue for future research concerns the exploration of the interrelation between trait professional skepticism and other individual dispositional characteristics, e.g., risk attitudes, field dependence, and moral development. Specifically, it is worth exploring whether and under which circumstances skepticism and the personality features outlined above reinforce or counteract each other and how this potential interaction influences auditors' behavior.

An additional skepticism-related aspect which deserves to be addressed in future research is the exploration of professional skepticism in a multi-person setting. As prior research has consistently indicated that group judgments frequently differ from individual judgments,[1019] it will be intriguing to see whether these findings also apply to professional skepticism. In particular, are audit teams more skeptical in their overall judgments and decisions as compared to individual judgment and decision making? If so, is this due to the communication, interaction, idea exchange, synergy effects,[1020] or some other potentially relevant effects? Or do the costs of group work (e.g., desire to be in line with the other team members, even if they are not sufficiently skeptical) within audit teams overweight the potential benefits? Hence, it is worth investigating whether and under which circumstances audit teams have the potential to underpin an individual's professional skepticism, to alleviate cognitive biases typically found in individual judgment, and ultimately to improve judgment quality and overall performance. Group-related research can be of great relevance and benefit to audit practice as it may provide suggestions for purposeful and more effective team composition.

[1018] See *Hurtt* (2010): 166. Hurtt's call for future research focusing on the conceptualization of a state skepticism scale has recently been addressed by *Robinson* (2011) and *Robinson/Curtis/Robertson* (2013) who adapted the Hurtt scale to derive a distinct instrument that captures state professional skepticism. In brief, they adopted the procedure used by *Kluemper/Little/DeGroot* (2009): 218 in their study of optimism and modified some of the evidence-related items contained in the Hurtt scale by adding concretizing phrases like "while completing this case" at the outset of each item. As a result, the authors arrived at a 12-item scale with a Cronbach's alpha value of 0.86. An instance of a state-skepticism item reads as follows: "While completing this case, I waited to make decisions until I could get more information." The response scale utilized by *Robinson* (2011) and *Robinson/Curtis/Robertson* (2013) ranges from 1 ("I don't agree at all") to 7 ("Fully agree"), and hence it differs from the response measure employed by *Hurtt* (2010). However, the authors do not provide arguments for this deviation. For a description of the rationale of the scale development and the results of the validation procedures, see *Robinson* (2011): 43-48 and *Robinson/Curtis/Robertson* (2013): 20f. The entire scale is available on p. 52f. of the latter paper. Overall, it can be argued that even though the attempt to shed light on state skepticism and to develop an instrument to operationalize it clearly deserves respect and encouragement, it should be noted that the understanding of professional skepticism can only be effectively expanded through thorough and extensive theoretical and empirical analyses, not a haphazard and eclectic approach.

[1019] See Section 2.4.2.2.4 for a review.

[1020] Synergy effects are a major benefit arising from the hierarchical audit team structure where each member of the team brings in his/her distinct, unique experience, thus contributing to a broader knowledge and idea pool on which current audit judgments and decisions can be drawn. See *Carpenter* (2007): 1124.

Overall, future research must adopt a broad and multidisciplinary perspective because in light of the multifacetedness and complexity of auditor judgment and professional skepticism "*no less a perspective will do*"[1021]. The experience of the past decades has shown that research from a number of other disciplines, including social and cognitive psychology, philosophy, organizational science, consumer behavior, and forensic economics, has proven extremely helpful in informing auditing research about relevant aspects of human information processing and the role of personal dispositions and characteristics in this context. In addition, considerable scientific advance can be expected from current progress in neuroscience which can help to specify the neural substrates for the elementary information processes of the human mind, thereby opening the "black box" of human cognition and thought.[1022]

Finally, it can be concluded that even though the current understanding of the nature, cognitive foundations, and processes underlying auditor judgment and professional skepticism is far away from being perfect or complete, serious academic progress has been achieved in these areas in the last years and decades. This development shows that while the glass might still be half empty with regard to the current state of knowledge and understanding of auditor judgment and professional skepticism, it is as well half full.[1023] Future research has the challenging and critical task to continue the search for the missing puzzle pieces until a more complete picture of auditor judgment and professional skepticism is obtained, or – figuratively stated – until the glass is full.

[1021] *Einhorn/Hogarth* (1981): 27.

[1022] See *Simon* (1980): 77. Instances of studies demonstrating the current progress in the neuroscientific explanation of human cognition include, among many others, *Atlas/Wager* (2013); *Christoff* (2013); *Eichenbaum* (2004); *Rugg* (2004); *Shankar/McClure* (2013). For a concise overview of the neuroscientific approach to human information processing and a discussion of relevant studies along these lines, see *Kennedy et al.* (2005): 91-115.

[1023] Note that *Kramer* (1999): 594 uses a similar formulation with regard to trust research.

Appendix 1

Hurtt Trait Professional Skepticism Scale (Source: *Hurtt* (2010): 167f.)

	Strongly Disagree					**Strongly Agree**
I often accept other people's explanations without further thought.	1	2	3	4	5	6
I feel good about myself.	1	2	3	4	5	6
I wait to decide on issues until I can get more information.	1	2	3	4	5	6
The prospect of learning excites me.	1	2	3	4	5	6
I am interested in what causes people to behave the way that they do.	1	2	3	4	5	6
I am confident of my abilities.	1	2	3	4	5	6
I often reject statements unless I have proof that they are true.	1	2	3	4	5	6
Discovering new information is fun.	1	2	3	4	5	6
I take my time when making decisions.	1	2	3	4	5	6
I tend to immediately accept what other people tell me.	1	2	3	4	5	6
Other people's behavior does not interest me.	1	2	3	4	5	6
I am self-assured.	1	2	3	4	5	6
My friends tell me that I usually question things that I see or hear.	1	2	3	4	5	6
I like to understand the reason for other people's behavior.	1	2	3	4	5	6
I think that learning is exciting.	1	2	3	4	5	6
I usually accept things I see, read, or hear at face value.	1	2	3	4	5	6
I do not feel sure of myself.	1	2	3	4	5	6
I usually notice inconsistencies in explanations.	1	2	3	4	5	6
Most often I agree with what the others in my group think.	1	2	3	4	5	6

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I dislike having to make decisions quickly.	1	2	3	4	5	6
I have confidence in myself.	1	2	3	4	5	6
I do not like to decide until I've looked at all of the readily available information.	1	2	3	4	5	6
I like searching for knowledge.	1	2	3	4	5	6
I frequently question things that I see or hear.	1	2	3	4	5	6
It is easy for other people to convince me.	1	2	3	4	5	6
I seldom consider why people behave in a certain way.	1	2	3	4	5	6
I like to ensure that I've considered most available information before making a decision.	1	2	3	4	5	6
I enjoy trying to determine if what I read or hear is true.	1	2	3	4	5	6
I relish learning.	1	2	3	4	5	6
The actions people take and the reasons for those actions are fascinating.	1	2	3	4	5	6

Appendix 2

Pretest Materials

UNIVERSITÄT DUISBURG ESSEN

MERCATOR SCHOOL OF MANAGEMENT

Fallstudie Premium Steel AG

Sehr geehrte Damen und Herren,

herzlichen Dank, dass Sie sich die Zeit nehmen, diese Fallstudie zu bearbeiten. Bitte lesen Sie zunächst die nachfolgenden Instruktionen sorgfältig durch, bevor Sie mit der Bearbeitung beginnen. Sie werden im Folgenden mit Informationen zur Premium Steel AG konfrontiert und werden gebeten, auf deren Basis Ihre persönlichen **Einschätzungen** bezüglich bestimmter ökonomischer Sachverhalte abzugeben sowie anschließend einige allgemeine Fragen zu beantworten. Bitte beachten Sie, dass in dieser Fallstudie nicht das prüferische Vorgehen im Rahmen der gesetzlichen Abschlussprüfung nachgebildet werden soll und dass Ihre Einschätzungen lediglich auf Basis der in der Fallstudie bereitgestellten Information zu treffen sind; es besteht keine Möglichkeit zur Erlangung weiterer Informationen.

Insgesamt werden Sie zur Bearbeitung der Fallstudie ca. 30 Minuten benötigen. Bitte bearbeiten Sie die Fallstudienmaterialien selbständig, vollständig und in der vorgesehenen Reihenfolge. Sollten Sie Fragen zur Fallbearbeitung haben, signalisieren Sie uns dies bitte durch Handzeichen.

Wir möchten explizit betonen, dass diese Fallstudie ausschließlich der Durchführung einer empirischen Untersuchung im Rahmen eines Forschungsprojekts dient und **nicht** auf eine Leistungsbeurteilung abzielt! Ihre Angaben und Antworten werden streng vertraulich behandelt und ausschließlich zu wissenschaftlichen Zwecken verwendet. Die Auswertung der Befragungsergebnisse erfolgt im Rahmen des Forschungsprojekts auf aggregierter Ebene und es können keine Rückschlüsse auf Ihre Person gezogen werden.

Mit freundlichen Grüßen

Prof. Dr. Annette G. Köhler

Dipl.-Kff. Kristina Yankova

Vielen Dank für Ihre Teilnahme und Unterstützung!

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Teil 1

Bitte lesen Sie die nachfolgenden Informationen sorgfältig durch und beantworten Sie die anschließenden Fragen!

Die Premium Steel AG ist ein führender Hersteller und Händler von Qualitätsspezialstahlprodukten für die Automobil- und Anlagenbauindustrie. Insgesamt sind rund 10.500 Mitarbeiter an mehreren Standorten deutschlandweit für das Unternehmen tätig.

Nach dem sehr erfolgreichen Geschäftsjahr 2007 hatte die Premium Steel AG – wie die meisten Unternehmen in der Stahlbranche auch – ab dem letzten Quartal des Jahres 2008 mit den Folgen der globalen Wirtschaftskrise zu kämpfen. Der durch die internationale Krise ausgelöste konjunkturelle Einbruch hat die Automobil- und Maschinenbauindustrie als zentrale Abnehmer von Stahlprodukten besonders schwer getroffen, was nicht spurlos an der Premium Steel AG vorbeigegangen ist. Im Geschäftsjahr 2009 hatte die Gesellschaft einen Bestellrückgang von mehr als 50 % zu verzeichnen. Eine extreme Unterauslastung der Produktionskapazitäten, ein signifikanter Umsatzeinbruch (von über 50 %) sowie eine drastische Ergebnisverschlechterung waren die Folgen der stark rückläufigen Entwicklung der Weltkonjunktur und der Stahlnachfrage.

Als Reaktion auf die Krisensituation hat die Premium Steel AG mit Hilfe eines externen Beratungsunternehmens ein Restrukturierungsprogramm, das operative und strukturelle Maßnahmen zur Kostensenkung, Ertragsverbesserung und Reduktion des Working Capital umfasst, entwickelt und eingeleitet. Bereits im Geschäftsjahr 2009 konnten erste Erfolge dieses Programms verzeichnet werden – durch den Abbau von Vorräten und die Verbesserung des Forderungsmanagements konnte das Umlaufvermögen (ohne liquide Mittel) um rd. 370 Mio. EUR vermindert werden, was einen positiven Einfluss auf die Liquiditätslage der Premium Steel AG hatte. Ferner wurde das Investitionsvolumen gegenüber den Vorjahren um mehr als 150 Mio. EUR zurückgefahren, um die Liquidität des Unternehmens zu schonen. In den Geschäftsjahren 2006 bis 2008 hat das Unternehmen in Erwartung sich nachhaltig positiv entwickelnder Absatzmärkte für Spezialstahl mit mehr als 300 Mio. EUR erheblich in Produktionsmodernisierungen und punktuelle Kapazitätserweiterungen investiert.

Die rückläufige wirtschaftliche Entwicklung machte auch umfassende Beschäftigungsanpassungen in allen Produktionsstufen und Unternehmensbereichen der Premium Steel AG erforderlich. Zunächst wurden Arbeitszeitkonten sowie Urlaubs- und Überstundenguthaben ausgeschöpft, ferner wurden Verträge mit Leiharbeitskräften aufgehoben und schließlich wurde an allen Standorten Kurzarbeit eingeführt.

Des Weiteren hat die negative Ergebnissituation der Premium Steel AG dazu geführt, dass die von den Banken festgelegten Anforderungen an die Finanzkennzahlen (Financial Covenants) für den laufenden Kreditvertrag (Kreditrahmen in Höhe von 550 Mio. EUR) erstmals zum 30.06.2009 nicht erfüllt werden konnten. Somit mussten die Verbindlichkeiten aus diesem Vertrag als kurzfristig ausgewiesen werden, da den Konsortialbanken das Recht zur außerordentlichen Kündigung des Konsortialvertrages zusteht. Die Premium Steel AG finanziert sich über ein Kontokorrent-Darlehen mit der Hausbank (Kreditrahmen seit 2006 unverändert 60 Mio. EUR), ein Investitionstilgungsdarlehen aus 2006 mit einer Laufzeit von 8 Jahren in Höhe von ursprünglich 90 Mio. EUR sowie einen in 2006 über 5 Jahre abgeschlossenen Konsortialkreditvertrag mit einem Maximalkreditrahmen von 550 Mio. EUR. Zur Sicherstellung der Refinanzierung verfolgt die Premium Steel AG zwei Strategien: Zum einen sucht sie Gespräche mit den Banken, die eine Restrukturierung der Finanzierung sowie eine Anpassung der

Financial Covenants an die veränderte Marktsituation zum Ziel haben. Zum anderen hat die Gesellschaft im Rahmen des "Konjunkturpakets II" eine Bürgschaft der Bundesrepublik Deutschland sowie eine Beteiligung der staatlichen KfW-Bank durch einen Direktkredit beantragt.

Sie sind als Abschlussprüfer der Premium Steel AG für das Geschäftsjahr 2009 bestellt worden und prüfen die Gesellschaft bereits im dritten Jahr. Hierbei wenden Sie einen risikoorientierten Prüfungsansatz an.

Im Rahmen der aussagebezogenen Prüfungshandlungen wurden in den Vorjahren keine wesentlichen Fehler festgestellt und die Jahresabschlüsse 2007 und 2008 der Premium Steel AG wurden mit einem uneingeschränkten Bestätigungsvermerk testiert. Das interne Kontrollsystem wurde im Rahmen der Vorjahresabschlussprüfungen umfassend geprüft und dokumentiert. Insgesamt können die internen Kontrollen als ausreichend und effektiv eingestuft werden.

Nachfolgend finden Sie die zusammengefassten nach handelsrechtlichen Vorschriften aufgestellten Bilanz und Gewinn- und Verlustrechnung sowie Angaben zur Finanzlage der Premium Steel AG für die Geschäftsjahre 2007, 2008 und 2009. Die Prüfung des Jahresabschlusses 2009 wurde bis auf die abschließende Beurteilung der Fortführungsfähigkeit des Unternehmens abgeschlossen und führte zu keinen wesentlichen Feststellungen.

Bilanz (HGB)			
Aktiva	**31.12.2009 TEUR**	**31.12.2008 TEUR**	**31.12.2007 TEUR**
A. Anlagevermögen			
I. Immaterielle Vermögensgegenstände	7.380	7.572	5.798
II. Sachanlagen	593.717	661.133	588.576
III. Finanzanlagen	221	84	17
	601.318	*668.789*	*594.391*
B. Umlaufvermögen			
I. Vorräte	524.456	790.960	796.672
II. Forderungen und sonstige Vermögensgegenstände	296.617	400.012	569.440
III. Kassenbestand und Guthaben bei Kreditinstituten	10.184	20.174	35.236
	831.257	*1.211.146*	*1.401.348*
C. Rechnungsabgrenzungsposten	920	901	640
	1.433.495	*1.880.836*	*1.996.379*
Passiva	**31.12.2009 TEUR**	**31.12.2008 TEUR**	**31.12.2007 TEUR**
A. Eigenkapital	*188.162*	*519.818*	*450.443*
B. Sonderposten mit Rücklagenanteil	0	0	718
C. Rückstellungen			
1. Rückstellungen für Pensionen	229.609	224.438	214.226
2. Steuerrückstellungen	8.624	62.171	129.107
3. Sonstige Rückstellungen	141.850	171.913	211.503
	380.083	*458.522*	*554.836*
D. Verbindlichkeiten			
1. Verbindlichkeiten gegenüber Kreditinstituten	561.117	458.775	447.835
2. Verbindlichkeiten aus Lieferungen und Leistungen	179.209	295.733	394.740
3. Verbindlichkeiten gegenüber verbundenen Unternehmen	18.387	12.881	19.249
4. Sonstige Verbindlichkeiten	106.537	135.107	128.558
	865.250	*902.496*	*990.382*
	1.433.495	*1.880.836*	*1.996.379*

Gewinn- und Verlustrechnung (HGB)			
	31.12.2009 TEUR	**31.12.2008 TEUR**	**31.12.2007 TEUR**
1. Umsatzerlöse	1.825.642	4.177.913	4.228.203
2. Erhöhung oder Verminderung des Bestandes an fertigen und unfertigen Erzeugnissen	-262.861	15.094	166.327
3. Andere aktivierte Eigenleistungen	2.613	2.427	787
4. Sonstige betriebliche Erträge	70.266	53.795	54.637
	1.635.660	*4.249.229*	*4.449.954*
5. Materialaufwand	-1.125.631	-3.119.248	-3.224.218
6. Personalaufwand	-487.146	-581.430	-545.732
7. Abschreibungen auf immaterielle Vermögensgegenstände des Anlagevermögens und Sachanlagen	-134.827	-147.318	-139.636
8. Sonstige betriebliche Aufwendungen	-145.389	-202.430	-213.477
	-1.892.993	*-4.050.426*	*-4.123.063*
9. Finanzergebnis	-50.419	-57.782	-23.942
10. Ergebnis der gewöhnlichen Geschäftstätigkeit	-307.752	141.021	302.949
11. Steuern vom Einkommen und vom Ertrag	18.576	-54.264	-117.145
12. Sonstige Steuern	-2.660	-3.005	-2.576
	15.916	*-57.269*	*-119.721*
13. Jahresüberschuss/-fehlbetrag	-291.836	83.752	183.228

Angaben zur Finanzlage			
Angaben zur Fristigkeit der Verbindlichkeiten gegenüber Kreditinstituten	**2009 TEUR**	**2008 TEUR**	**2007 TEUR**
Restlaufzeit von bis zu einem Jahr	510.692	43.447	31.625
Restlaufzeit von einem bis zu fünf Jahren	50.425	353.698	343.375
Restlaufzeit von mehr als fünf Jahren	0	61.630	72.835
Angaben zum Cash Flow	**2009 TEUR**	**2008 TEUR**	**2007 TEUR**
Cash Flow aus Geschäftstätigkeit	-4.976	210.091	-12.239
Cash Flow aus Investitionstätigkeit	-67.356	-221.716	-66.431
Cash Flow aus Finanzierungstätigkeit	62.342	-3.437	44.637
Veränderung liquider Mittel	-9.990	-15.062	-34.033

******

Bitte beurteilen Sie, ob die nachfolgenden Informationen jeweils positiv, negativ oder neutral im Hinblick auf die Fortführungsfähigkeit der Premium Steel AG sind. Geben Sie bitte ferner auf einer Skala von 1 bis 7 die Bedeutung an, die Sie diesen Informationen in Bezug auf die Beurteilung der Fortführungsfähigkeit der Gesellschaft beimessen würden, wobei 1 „gar keine Bedeutung" und 7 „sehr große Bedeutung" ist.

Bitte bewerten Sie hierbei jeden Sachverhalt für sich und sehen Sie diesen nicht im Kontext zu den anderen aufgeführten Sachverhalten.

Aufgrund der spürbaren Erholung in der Automobilindustrie und der langsamen Verbesserung der allgemeinen konjunkturellen Situation geht das Management der Premium Steel AG davon aus, dass sich die positive Entwicklung der Bestelleingänge der letzten Monate auch im weiteren Verlauf des Geschäftsjahres 2010 fortsetzen wird und es rechnet mit einer tiefgreifenden Erholung des Absatzes und der Produktionskapazitätsauslastung. Spätestens in 2011 soll die Gesellschaft laut Managementprognose in die Gewinnzone zurückkehren und positive operative Cash Flows generieren.

Art der Information	Bedeutung der Information
□ positiv □ negativ □ neutral	gar keine Bedeutung (=1) □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 sehr große Bedeutung (=7)

Das renommierte internationale Beratungsunternehmen, mit dessen Hilfe das Restrukturierungsprogramm entwickelt wurde, hat im Frühjahr 2010 ein Gutachten über die konjunkturellen Entwicklungsaussichten für die nächsten zwei Jahre erstellt. Darin wird von einer mäßigen Wiederbelebung der Konjunktur in 2010 sowie von einer spürbaren, nachhaltigen Besserung des Marktumfeldes ab 2011 ausgegangen. Auf Basis dieser Markteinschätzungen wird im Gutachten der Beratungsexperten die Premium Steel AG als überlebensfähig eingestuft. Infolge des Gutachtens signalisieren die Banken Verhandlungsbereitschaft zur Verlängerung der Kreditlinien.

Art der Information	Bedeutung der Information
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 sehr große Bedeutung (=7)

Dem Antrag der Premium Steel AG auf eine Bürgschaft der Bundesrepublik Deutschland im Rahmen des „Konjunkturpakets II" sowie auf eine Beteiligung der staatlichen KfW-Bank durch einen Direktkredit wird nicht entsprochen.

Art der Information	Bedeutung der Information
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 sehr große Bedeutung (=7)

Auf der ersten Vorstandssitzung im Januar 2010 wird angekündigt, dass eine der wichtigsten Führungskräfte im Bereich Vertrieb die Premium Steel AG verlassen wird, um zum Hauptkonkurrenten der Gesellschaft zu wechseln. Damit geht nicht nur ein erheblicher Know-how-Verlust für die Premium Steel AG einher, sondern auch der Verlust der wichtigsten Verbindung zu zwei Hauptkunden der Gesellschaft, mit denen insgesamt rd. 27 % der Umsätze realisiert werden und die von der Führungskraft akquiriert und betreut wurden. Zusammen mit der ausscheidenden Führungskraft verlassen wichtige Vertriebsmitarbeiter die Premium Steel AG.

Art der Information	**Bedeutung der Information**
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 sehr große Bedeutung (=7)

Auf einer Pressekonferenz im April 2010 hat der Finanzvorstand der Premium Steel AG angekündigt, dass bis Ende 2010 eine Barkapitalerhöhung von 200 Mio. EUR durchgeführt werden soll.

Art der Information	**Bedeutung der Information**
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 sehr große Bedeutung (=7)

Im März 2010 macht ein Kunde der Premium Steel AG Ansprüche in Höhe von 2,6 Mio. EUR aufgrund wesentlicher Qualitätsmängel der gelieferten Stahlprodukte geltend. Diese werden vollumfänglich durch die Garantierückstellung gedeckt. Weitere Ansprüche wurden zum aktuellen Zeitpunkt nicht geltend gemacht. Es ist jedoch unklar, ob es sich bei den aufgetretenen Mängeln um einen Einzelfall handelt oder ob sich die Qualitätsprobleme auf die gesamte Produktreihe beziehen und weitere Schadensfälle hervorrufen können. Im letzteren Fall geht das Management der Premium Steel AG von einem potentiellen Risiko in Höhe von 230 Mio. EUR aus.

Art der Information	**Bedeutung der Information**
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 sehr große Bedeutung (=7)

Im Frühjahr 2010 wird bekanntgegeben, dass Steelo GmbH & Co. KG, einer der Hauptzulieferer der Premium Steel AG, Insolvenz angemeldet hat. Daraus ergibt sich für die Premium Steel ein erheblicher Lieferengpass und damit einhergehend auch die Gefahr, dass Kunden ihre Aufträge bei der Gesellschaft zurückziehen. Aktuell laufen noch Verhandlungen mit anderen Lieferanten, doch abschließende Vereinbarungen stehen noch aus.

Art der Information	Bedeutung der Information								
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Bedeutung (=7)

Im März 2010 kann das Unternehmen eine Stundung von Verbindlichkeiten aus Lieferung und Leistung i.H.v. 84 Mio. EUR über einen Zeitraum von zwei Jahren erreichen.

Art der Information	Bedeutung der Information								
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Bedeutung (=7)

Das Unternehmen verfügt über ein Grundstück, dessen Verkauf die gewöhnliche Geschäftstätigkeit des Unternehmens nicht wesentlich beeinträchtigen würde. Der aktuelle Marktpreis des Grundstücks beläuft sich auf ca. 61 Mio. EUR. Das Management zieht in Erwägung, dieses Grundstück in den nächsten Monaten zu veräußern, da die Kosten für die Verlagerung der durch den Verkauf betroffenen Funktionen im Verhältnis zum erwarteten Verkaufserlös unerheblich sind.

Art der Information	Bedeutung der Information								
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Bedeutung (=7)

Im April 2010 werden der Premium Steel AG aufwendige Modernisierungsmaßnahmen wegen festgestellter massiver Umweltverstöße in zwei Stahlwerken auferlegt. Aufgrund der momentanen Unfähigkeit der Gesellschaft, das erforderliche Investitionsvolumen aufzubringen, droht die Stilllegung der betroffenen Betriebsteile, die insgesamt ca. 23 % des Unternehmens ausmachen.

Art der Information	Bedeutung der Information								
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Bedeutung (=7)

Teil 2

Bitte beurteilen Sie die nachfolgenden Aussagen und beantworten Sie die anschließenden Fragen!

Anleitung

Nachfolgend finden Sie eine Reihe von allgemeinen Aussagen. Bitte beurteilen Sie diese Aussagen aus Ihrer persönlichen Perspektive auf einer Skala von 1 „stimme überhaupt nicht zu“ bis 6 „stimme voll und ganz zu“.

Der Aussagenkatalog ist einem wissenschaftlich anerkannten und vielfach angewandten Befragungsinstrument entnommen. Es ist wichtig, dass Sie **alle** Aussagen beurteilen, selbst wenn sie sich manchmal ähneln. Es gibt keine richtigen oder falschen Antworten! Bitte antworten Sie deshalb so präzise und ehrlich wie möglich. Die Beantwortung soll spontan erfolgen und nicht länger als 5 Minuten beanspruchen. Ihre Angaben bleiben völlig **anonym** und fließen ausschließlich in das vorliegende Forschungsprojekt ein.

Aussagen

	stimme überhaupt nicht zu					stimme voll und ganz zu
Ich nehme oft die Erklärungen anderer Leute ohne Weiteres hin.	1	2	3	4	5	6
Ich fühle mich wohl in meiner Haut.	1	2	3	4	5	6
Ich warte mit Entscheidungen ab, bis ich weitere Informationen erhalten kann.	1	2	3	4	5	6
Die Aussicht auf Lernen begeistert mich.	1	2	3	4	5	6
Mich interessiert, warum sich Menschen so verhalten, wie sie sich verhalten.	1	2	3	4	5	6
Ich vertraue auf meine Fähigkeiten.	1	2	3	4	5	6
Ich lehne Aussagen oft ab, es sei denn, ich habe Beweise dafür, dass sie wahr sind.	1	2	3	4	5	6
Die Entdeckung neuer Information macht Spaß.	1	2	3	4	5	6
Ich lasse mir Zeit, wenn ich Entscheidungen treffe.	1	2	3	4	5	6
Ich neige dazu, sofort zu akzeptieren, was andere Leute mir sagen.	1	2	3	4	5	6
Das Verhalten anderer Menschen interessiert mich nicht.	1	2	3	4	5	6
Ich bin selbstsicher.	1	2	3	4	5	6
Meine Freunde sagen mir, dass ich gewöhnlich Sachen, die ich sehe oder höre, in Frage stelle.	1	2	3	4	5	6

	stimme überhaupt nicht zu					stimme voll und ganz zu
Ich mag es, den Grund für das Verhalten anderer Menschen zu verstehen.	1	2	3	4	5	6
Ich finde, dass Lernen spannend ist.	1	2	3	4	5	6
Ich nehme üblicherweise das, was ich sehe, lese oder höre, für bare Münze.	1	2	3	4	5	6
Ich bin meiner nicht sicher.	1	2	3	4	5	6
Üblicherweise bemerke ich Inkonsistenzen in Erklärungen.	1	2	3	4	5	6
Meistens stimme ich dem, was die anderen in meiner Gruppe denken, zu.	1	2	3	4	5	6
Ich mag es nicht, Entscheidungen schnell treffen zu müssen.	1	2	3	4	5	6
Ich habe Selbstvertrauen.	1	2	3	4	5	6
Ich mag es nicht zu entscheiden, bis ich mir alle verfügbaren Informationen angesehen habe.	1	2	3	4	5	6
Ich mag die Suche nach Wissen.	1	2	3	4	5	6
Ich hinterfrage oft das, was ich sehe und höre.	1	2	3	4	5	6
Es ist leicht für andere Menschen, mich zu überzeugen.	1	2	3	4	5	6
Ich denke selten darüber nach, warum Menschen sich auf eine bestimmte Weise verhalten.	1	2	3	4	5	6
Ich möchte sicherstellen, dass ich die meisten verfügbaren Informationen berücksichtigt habe, bevor ich eine Entscheidung treffe.	1	2	3	4	5	6
Ich genieße es zu versuchen, festzustellen, ob das, was ich lese oder höre, wahr ist.	1	2	3	4	5	6
Ich genieße das Lernen.	1	2	3	4	5	6
Die Handlungen der Menschen und die Gründe dafür sind faszinierend.	1	2	3	4	5	6

Demographische und sonstige Angaben

A. Alter: _____Jahre ☐ keine Angabe

B. Geschlecht: ☐ männlich ☐ weiblich ☐ keine Angabe

C. Position im Unternehmen: ☐ Manager ☐ Senior Manager
☐ Partner ☐ Sonstige: _____

D. Berufsexamina: ☐ WP ☐ CPA
☐ StB ☐ Sonstige: _____

E. Allgemeine Berufserfahrung: _____Jahre

F. Wie würden Sie das Ausmaß Ihrer Erfahrung in der Stahlindustrie einschätzen? Bitte Zutreffendes ankreuzen:

gar keine Erfahrung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Erfahrung (=7)

G. Wie würden Sie das Ausmaß Ihrer Erfahrung in der Prüfung von fortführungsgefährdeten Unternehmen einschätzen? Bitte Zutreffendes ankreuzen:

gar keine Erfahrung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Erfahrung (=7)

H. Inwieweit sind die in der Fallstudie enthaltenen Informationen ausreichend, um die Fortführungsfähigkeit der Premium Steel AG (eindeutig) zu beurteilen? Bitte Zutreffendes ankreuzen:

gar nicht ausreichend (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	völlig ausreichend (=7)

I. Welche Informationen würden Sie noch benötigen, um die Fortführungsfähigkeit der Premium Steel AG eindeutig beurteilen zu können?

J. Bitte beurteilen Sie die nachfolgenden Aussagen in Bezug auf Ihre Vorgehensweise bei der Beurteilung der Art und der Bedeutung der auf S. 5 bis 7 präsentierten Informationen auf einer Skala von 1 „stimme überhaupt nicht zu“ bis 7 „stimme voll und ganz zu“:

	stimme überhaupt nicht zu						stimme voll und ganz zu
Ich war bei der Beurteilung der Informationen vorsichtig.	1	2	3	4	5	6	7
Ich habe bei der Beurteilung der Informationen intensiv nachgedacht.	1	2	3	4	5	6	7
Ich habe mich während der Beurteilung der Informationen sehr konzentriert.	1	2	3	4	5	6	7
Mir ist die Beurteilung der Informationen schwer gefallen.	1	2	3	4	5	6	7

K. Haben Sie an Fortbildungsseminaren teilgenommen, in denen das Thema „Professional Skepticism“ behandelt wurde?

☐ ja Bitte Anzahl angeben: _____

☐ nein

L. Wie würden Sie die Verständlichkeit der Fallstudienmaterialien einschätzen? Bitte Zutreffendes ankreuzen:

gar nicht verständlich (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	völlig verständlich (=7)

M. Anmerkungen/Kommentare:

N. Um wie viel Uhr haben Sie die Studie beendet? _____

Vielen Dank für Ihre Teilnahme!

Appendix 3

Final Experimental Materials (− − + + Treatment Condition)

Fallstudie Premium Steel AG

Sehr geehrte Damen und Herren,

herzlichen Dank, dass Sie sich die Zeit nehmen, diese Fallstudie zu bearbeiten. Bitte lesen Sie zunächst die nachfolgenden Instruktionen sorgfältig durch, bevor Sie mit der Bearbeitung beginnen. Sie werden im Folgenden mit Informationen zur Premium Steel AG konfrontiert und werden gebeten, auf deren Basis Ihre persönlichen **Einschätzungen** bezüglich bestimmter ökonomischer Sachverhalte abzugeben sowie anschließend einige allgemeine Fragen zu beantworten. Bitte beachten Sie, dass in dieser Fallstudie nicht das prüferische Vorgehen im Rahmen der gesetzlichen Abschlussprüfung nachgebildet werden soll und dass Ihre Einschätzungen lediglich auf Basis der in der Fallstudie bereitgestellten Information zu treffen sind; es besteht keine Möglichkeit zur Erlangung weiterer Informationen.

Es ist von höchster Bedeutung, dass Sie die Fallstudie in der vorgesehenen Reihenfolge bearbeiten und einmal abgegebene Antworten nicht nachträglich revidieren.

Insgesamt werden Sie zur Bearbeitung der Fallstudie ca. 30 Minuten benötigen. Bitte bearbeiten Sie die Fallstudienmaterialien selbständig und vollständig. Sollten Sie Fragen zur Fallbearbeitung haben, signalisieren Sie dies bitte durch Handzeichen.

Wir möchten explizit betonen, dass diese Fallstudie ausschließlich der Durchführung einer empirischen Untersuchung im Rahmen eines Forschungsprojekts dient und **nicht** auf eine Leistungsbeurteilung abzielt! Ihre Angaben und Antworten werden streng vertraulich behandelt und ausschließlich zu wissenschaftlichen Zwecken verwendet. Die Auswertung der Befragungsergebnisse erfolgt im Rahmen des Forschungsprojekts auf aggregierter Ebene und es können keine Rückschlüsse auf Ihre Person gezogen werden.

Mit freundlichen Grüßen

Prof. Dr. Annette G. Köhler

Dipl.-Kff. Kristina Yankova

Vielen Dank für Ihre Teilnahme und Unterstützung!

K. Yankova, *The Influence of Information Order Effects and Trait Professional Skepticism on Auditors' Belief Revisions,* Auditing and Accounting Studies,
DOI 10.1007/978-3-658-08871-2, © Springer Fachmedien Wiesbaden 2015

Teil 1

Bitte lesen Sie die nachfolgenden Informationen sorgfältig durch und beantworten Sie die anschließenden Fragen!

Die Premium Steel AG ist ein führender Hersteller und Händler von Qualitätsspezialstahlprodukten für die Automobil- und Anlagenbauindustrie. Insgesamt sind rund 10.500 Mitarbeiter an mehreren Standorten deutschlandweit für das Unternehmen tätig.

Nach dem sehr erfolgreichen Geschäftsjahr 2007 hatte die Premium Steel AG – wie die meisten Unternehmen in der Stahlbranche auch – ab dem letzten Quartal des Jahres 2008 mit den Folgen der globalen Wirtschaftskrise zu kämpfen. Der durch die internationale Krise ausgelöste konjunkturelle Einbruch hat die Automobil- und Maschinenbauindustrie als zentrale Abnehmer von Stahlprodukten besonders schwer getroffen, was nicht spurlos an der Premium Steel AG vorbeigegangen ist. Im Geschäftsjahr 2009 hatte die Gesellschaft einen Bestellrückgang von mehr als 50 % zu verzeichnen. Eine extreme Unterauslastung der Produktionskapazitäten, ein signifikanter Umsatzeinbruch (von über 50 %) sowie eine drastische Ergebnisverschlechterung waren die Folgen der stark rückläufigen Entwicklung der Weltkonjunktur und der Stahlnachfrage.

Als Reaktion auf die Krisensituation hat die Premium Steel AG mit Hilfe eines externen Beratungsunternehmens ein Restrukturierungsprogramm, das operative und strukturelle Maßnahmen zur Kostensenkung, Ertragsverbesserung und Reduktion des Working Capital umfasst, entwickelt und eingeleitet. Bereits im Geschäftsjahr 2009 konnten erste Erfolge dieses Programms verzeichnet werden – durch den Abbau von Vorräten und die Verbesserung des Forderungsmanagements konnte das Umlaufvermögen (ohne liquide Mittel) um rd. 370 Mio. EUR vermindert werden, was einen positiven Einfluss auf die Liquiditätslage der Premium Steel AG hatte. Ferner wurde das Investitionsvolumen gegenüber den Vorjahren um mehr als 150 Mio. EUR zurückgefahren, um die Liquidität des Unternehmens zu schonen. In den Geschäftsjahren 2006 bis 2008 hat das Unternehmen in Erwartung sich nachhaltig positiv entwickelnder Absatzmärkte für Spezialstahl mit mehr als 300 Mio. EUR erheblich in Produktionsmodernisierungen und punktuelle Kapazitätserweiterungen investiert.

Die rückläufige wirtschaftliche Entwicklung machte auch umfassende Beschäftigungsanpassungen in allen Produktionsstufen und Unternehmensbereichen der Premium Steel AG erforderlich. Zunächst wurden Arbeitszeitkonten sowie Urlaubs- und Überstundenguthaben ausgeschöpft, ferner wurden Verträge mit Leiharbeitskräften aufgehoben und schließlich wurde an allen Standorten Kurzarbeit eingeführt.

Des Weiteren hat die negative Ergebnissituation der Premium Steel AG dazu geführt, dass die von den Banken festgelegten Anforderungen an die Finanzkennzahlen (Financial Covenants) für den laufenden Kreditvertrag (Kreditrahmen in Höhe von 550 Mio. EUR) erstmals zum 30.06.2009 nicht erfüllt werden konnten. Somit mussten die Verbindlichkeiten aus diesem Vertrag als kurzfristig ausgewiesen werden, da den Konsortialbanken das Recht zur außerordentlichen Kündigung des Konsortialvertrages zusteht. Die Premium Steel AG finanziert sich über ein Kontokorrent-Darlehen mit der Hausbank (Kreditrahmen seit 2006 unverändert 60 Mio. EUR), ein Investitionstilgungsdarlehen aus 2006 mit einer Laufzeit von 8 Jahren in Höhe von ursprünglich 90 Mio. EUR sowie einen in 2006 über 5 Jahre abgeschlossenen Konsortialkreditvertrag mit einem Maximalkreditrahmen von 550 Mio. EUR. Zur Sicherstellung der Refinanzierung verfolgt die Premium Steel AG zwei Strategien: Zum einen sucht sie Gespräche mit den Banken, die eine Restrukturierung der Finanzierung sowie eine Anpassung der

Financial Covenants an die veränderte Marktsituation zum Ziel haben. Zum anderen hat die Gesellschaft im Rahmen des "Konjunkturpakets II" eine Bürgschaft der Bundesrepublik Deutschland sowie eine Beteiligung der staatlichen KfW-Bank durch einen Direktkredit beantragt.

Sie sind als Abschlussprüfer der Premium Steel AG für das Geschäftsjahr 2009 bestellt worden und prüfen die Gesellschaft bereits im dritten Jahr. Hierbei wenden Sie einen risikoorientierten Prüfungsansatz an.

Im Rahmen der aussagebezogenen Prüfungshandlungen wurden in den Vorjahren keine wesentlichen Fehler festgestellt und die Jahresabschlüsse 2007 und 2008 der Premium Steel AG wurden mit einem uneingeschränkten Bestätigungsvermerk testiert. Das interne Kontrollsystem wurde im Rahmen der Vorjahresabschlussprüfungen umfassend geprüft und dokumentiert. Insgesamt können die internen Kontrollen als ausreichend und effektiv eingestuft werden.

Nachfolgend finden Sie die zusammengefassten nach handelsrechtlichen Vorschriften aufgestellten Bilanz und Gewinn- und Verlustrechnung sowie Angaben zur Finanzlage der Premium Steel AG für die Geschäftsjahre 2007, 2008 und 2009. Die Prüfung des Jahresabschlusses 2009 wurde bis auf die abschließende Beurteilung der Fortführungsfähigkeit des Unternehmens abgeschlossen und führte zu keinen wesentlichen Feststellungen.

Bilanz (HGB)			
Aktiva	**31.12.2009 TEUR**	**31.12.2008 TEUR**	**31.12.2007 TEUR**
D. Anlagevermögen			
J. Immaterielle Vermögensgegenstände	7.380	7.572	5.798
II. Sachanlagen	593.717	661.133	588.576
III. Finanzanlagen	221	84	17
	601.318	*668.789*	*594.391*
E. Umlaufvermögen			
J. Vorräte	524.456	790.960	796.672
II. Forderungen und sonstige Vermögensgegenstände	296.617	400.012	569.440
III. Kassenbestand und Guthaben bei Kreditinstituten	10.184	20.174	35.236
	831.257	*1.211.146*	*1.401.348*
F. Rechnungsabgrenzungsposten	920	901	640
	1.433.495	*1.880.836*	*1.996.379*
Passiva	**31.12.2009 TEUR**	**31.12.2008 TEUR**	**31.12.2007 TEUR**
E. Eigenkapital	*188.162*	*519.818*	*450.443*
F. Sonderposten mit Rücklagenanteil	0	0	718
G. Rückstellungen			
4. Rückstellungen für Pensionen	229.609	224.438	214.226
5. Steuerrückstellungen	8.624	62.171	129.107
6. Sonstige Rückstellungen	141.850	171.913	211.503
	380.083	*458.522*	*554.836*
H. Verbindlichkeiten			
5. Verbindlichkeiten gegenüber Kreditinstituten	561.117	458.775	447.835
6. Verbindlichkeiten aus Lieferungen und Leistungen	179.209	295.733	394.740
7. Verbindlichkeiten gegenüber verbundenen Unternehmen	18.387	12.881	19.249
8. Sonstige Verbindlichkeiten	106.537	135.107	128.558
	865.250	*902.496*	*990.382*
	1.433.495	*1.880.836*	*1.996.379*

Gewinn- und Verlustrechnung (HGB)			
	31.12.2009 TEUR	**31.12.2008 TEUR**	**31.12.2007 TEUR**
6. Umsatzerlöse	1.825.642	4.177.913	4.228.203
7. Erhöhung oder Verminderung des Bestandes an fertigen und unfertigen Erzeugnissen	-262.861	15.094	166.327
8. Andere aktivierte Eigenleistungen	2.613	2.427	787
9. Sonstige betriebliche Erträge	70.266	53.795	54.637
	1.635.660	*4.249.229*	*4.449.954*
10. Materialaufwand	-1.125.631	-3.119.248	-3.224.218
6. Personalaufwand	-487.146	-581.430	-545.732
8. Abschreibungen auf immaterielle Vermögensgegenstände des Anlagevermögens und Sachanlagen	-134.827	-147.318	-139.636
8. Sonstige betriebliche Aufwendungen	-145.389	-202.430	-213.477
	-1.892.993	*-4.050.426*	*-4.123.063*
9. Finanzergebnis	-50.419	-57.782	-23.942
10. Ergebnis der gewöhnlichen Geschäftstätigkeit	-307.752	141.021	302.949
11. Steuern vom Einkommen und vom Ertrag	18.576	-54.264	-117.145
12. Sonstige Steuern	-2.660	-3.005	-2.576
	15.916	*-57.269*	*-119.721*
13. Jahresüberschuss/-fehlbetrag	-291.836	83.752	183.228

Angaben zur Finanzlage			
Angaben zur Fristigkeit der Verbindlichkeiten gegenüber Kreditinstituten	**2009 TEUR**	**2008 TEUR**	**2007 TEUR**
Restlaufzeit von bis zu einem Jahr	510.692	43.447	31.625
Restlaufzeit von einem bis zu fünf Jahren	50.425	353.698	343.375
Restlaufzeit von mehr als fünf Jahren	0	61.630	72.835
Angaben zum Cash Flow	**2009 TEUR**	**2008 TEUR**	**2007 TEUR**
Cash Flow aus Geschäftstätigkeit	-4.976	210.091	-12.239
Cash Flow aus Investitionstätigkeit	-67.356	-221.716	-66.431
Cash Flow aus Finanzierungstätigkeit	62.342	-3.437	44.637
Veränderung liquider Mittel	-9.990	-15.062	-34.033

Frage

Wie hoch würden Sie auf Basis der zur Verfügung gestellten Informationen die Wahrscheinlichkeit einschätzen, dass die Premium Steel AG in den folgenden zwölf Monaten ihre Geschäftstätigkeit fortführt? Bitte verwenden Sie für Ihre Antwort die nachstehende Skala:

Geschäftstätigkeit wird *nicht* fortgeführt (=0%)	☐ 0%	☐ 10%	☐ 20%	☐ 30%	☐ 40%	☐ 50%	☐ 60%	☐ 70%	☐ 80%	☐ 90%	☐ 100%	Geschäftstätigkeit wird fortgeführt (=100%)

Bitte lesen Sie die nachfolgenden Informationen sorgfältig durch und bearbeiten Sie die Fragen in der vorgesehenen Reihenfolge!

Im Rahmen der Durchführung der Jahresabschlussprüfung geht Ihnen die nachfolgende Information zu:

Dem Antrag der Premium Steel AG auf eine Bürgschaft der Bundesrepublik Deutschland im Rahmen des „Konjunkturpakets II" sowie auf eine Beteiligung der staatlichen KfW-Bank durch einen Direktkredit wird nicht entsprochen.

Frage

Wie hoch würden Sie auf Basis dieser zusätzlichen Information die Wahrscheinlichkeit einschätzen, dass die Premium Steel AG in den folgenden zwölf Monaten ihre Geschäftstätigkeit fortführt? Bitte verwenden Sie für Ihre Antwort die nachstehende Skala:

Geschäftstätigkeit wird *nicht* fortgeführt (=0%)	☐ 0%	☐ 10%	☐ 20%	☐ 30%	☐ 40%	☐ 50%	☐ 60%	☐ 70%	☐ 80%	☐ 90%	☐ 100%	Geschäftstätigkeit wird fortgeführt (=100%)

*****

Im Rahmen der Durchführung der Jahresabschlussprüfung geht Ihnen ferner auch die nachfolgende Information zu:

Im Frühjahr 2010 wird bekanntgegeben, dass Steelo GmbH & Co. KG, einer der Hauptzulieferer der Premium Steel AG, Insolvenz angemeldet hat. Daraus ergibt sich für die Premium Steel ein erheblicher Lieferengpass und damit einhergehend auch die Gefahr, dass Kunden ihre Aufträge bei der Gesellschaft zurückziehen. Aktuell laufen noch Verhandlungen mit anderen Lieferanten, doch abschließende Vereinbarungen stehen noch aus.

Frage

Wie hoch würden Sie auf Basis dieser zusätzlichen Information die Wahrscheinlichkeit einschätzen, dass die Premium Steel AG in den folgenden zwölf Monaten ihre Geschäftstätigkeit fortführt? Bitte verwenden Sie für Ihre Antwort die nachstehende Skala:

Geschäftstätigkeit wird *nicht* fortgeführt (=0%)	☐ 0%	☐ 10%	☐ 20%	☐ 30%	☐ 40%	☐ 50%	☐ 60%	☐ 70%	☐ 80%	☐ 90%	☐ 100%	Geschäftstätigkeit wird fortgeführt (=100%)

******

Im Rahmen der Durchführung der Jahresabschlussprüfung geht Ihnen ferner auch die nachfolgende Information zu:

Das renommierte internationale Beratungsunternehmen, mit dessen Hilfe das Restrukturierungsprogramm entwickelt wurde, hat im Frühjahr 2010 ein Gutachten über die konjunkturellen Entwicklungsaussichten für die nächsten zwei Jahre erstellt. Darin wird von einer mäßigen Wiederbelebung der Konjunktur in 2010 sowie von einer spürbaren, nachhaltigen Besserung des Marktumfeldes ab 2011 ausgegangen. Auf Basis dieser Markteinschätzungen wird im Gutachten der Beratungsexperten die Premium Steel AG als überlebensfähig eingestuft. Infolge des Gutachtens signalisieren die Banken Verhandlungsbereitschaft zur Verlängerung der Kreditlinien.

Frage

Wie hoch würden Sie auf Basis dieser zusätzlichen Information die Wahrscheinlichkeit einschätzen, dass die Premium Steel AG in den folgenden zwölf Monaten ihre Geschäftstätigkeit fortführt? Bitte verwenden Sie für Ihre Antwort die nachstehende Skala:

Geschäftstätigkeit wird *nicht* fortgeführt (=0%)	☐ 0%	☐ 10%	☐ 20%	☐ 30%	☐ 40%	☐ 50%	☐ 60%	☐ 70%	☐ 80%	☐ 90%	☐ 100%	Geschäftstätigkeit wird fortgeführt (=100%)

******

Im Rahmen der Durchführung der Jahresabschlussprüfung geht Ihnen ferner auch die nachfolgende Information zu:

Auf einer Pressekonferenz im April 2010 hat der Finanzvorstand der Premium Steel AG angekündigt, dass bis Ende 2010 eine Barkapitalerhöhung von 200 Mio. EUR durchgeführt werden soll.

Frage

Wie hoch würden Sie auf Basis dieser zusätzlichen Information die Wahrscheinlichkeit einschätzen, dass die Premium Steel AG in den folgenden zwölf Monaten ihre Geschäftstätigkeit fortführt? Bitte verwenden Sie für Ihre Antwort die nachstehende Skala:

Geschäftstätigkeit wird *nicht* fortgeführt (=0%)	☐ 0%	☐ 10%	☐ 20%	☐ 30%	☐ 40%	☐ 50%	☐ 60%	☐ 70%	☐ 80%	☐ 90%	☐ 100%	Geschäftstätigkeit wird fortgeführt (=100%)

Teil 2

Bitte beurteilen Sie die nachfolgenden Aussagen und beantworten Sie die anschließenden Fragen!

Anleitung

Nachfolgend finden Sie eine Reihe von allgemeinen Aussagen. Bitte beurteilen Sie diese Aussagen aus Ihrer persönlichen Perspektive auf einer Skala von 1 „stimme überhaupt nicht zu“ bis 6 „stimme voll und ganz zu“.

Der Aussagenkatalog ist einem wissenschaftlich anerkannten und vielfach angewandten Befragungsinstrument entnommen. Es ist wichtig, dass Sie **alle** Aussagen beurteilen, selbst wenn sie sich manchmal ähneln. Es gibt keine richtigen oder falschen Antworten! Bitte antworten Sie deshalb so präzise und ehrlich wie möglich. Die Beantwortung soll spontan erfolgen und nicht länger als 5 Minuten beanspruchen. Ihre Angaben bleiben völlig **anonym** und fließen ausschließlich in das vorliegende Forschungsprojekt ein.

Aussagen

	stimme überhaupt nicht zu					stimme voll und ganz zu
Ich nehme oft die Erklärungen anderer Leute ohne Weiteres hin.	1	2	3	4	5	6
Ich fühle mich wohl in meiner Haut.	1	2	3	4	5	6
Ich warte mit Entscheidungen ab, bis ich weitere Informationen erhalten kann.	1	2	3	4	5	6
Die Aussicht auf Lernen begeistert mich.	1	2	3	4	5	6
Mich interessiert, warum sich Menschen so verhalten, wie sie sich verhalten.	1	2	3	4	5	6
Ich vertraue auf meine Fähigkeiten.	1	2	3	4	5	6
Ich lehne Aussagen oft ab, es sei denn, ich habe Beweise dafür, dass sie wahr sind.	1	2	3	4	5	6
Die Entdeckung neuer Information macht Spaß.	1	2	3	4	5	6
Ich lasse mir Zeit, wenn ich Entscheidungen treffe.	1	2	3	4	5	6
Ich neige dazu, sofort zu akzeptieren, was andere Leute mir sagen.	1	2	3	4	5	6
Das Verhalten anderer Menschen interessiert mich nicht.	1	2	3	4	5	6
Ich bin selbstsicher.	1	2	3	4	5	6
Meine Freunde sagen mir, dass ich gewöhnlich Sachen, die ich sehe oder höre, in Frage stelle.	1	2	3	4	5	6

	stimme überhaupt nicht zu					stimme voll und ganz zu
Ich mag es, den Grund für das Verhalten anderer Menschen zu verstehen.	1	2	3	4	5	6
Ich finde, dass Lernen spannend ist.	1	2	3	4	5	6
Ich nehme üblicherweise das, was ich sehe, lese oder höre, für bare Münze.	1	2	3	4	5	6
Ich bin meiner nicht sicher.	1	2	3	4	5	6
Üblicherweise bemerke ich Inkonsistenzen in Erklärungen.	1	2	3	4	5	6
Meistens stimme ich dem, was die anderen in meiner Gruppe denken, zu.	1	2	3	4	5	6
Ich mag es nicht, Entscheidungen schnell treffen zu müssen.	1	2	3	4	5	6
Ich habe Selbstvertrauen.	1	2	3	4	5	6
Ich mag es nicht zu entscheiden, bis ich mir alle verfügbaren Informationen angesehen habe.	1	2	3	4	5	6
Ich mag die Suche nach Wissen.	1	2	3	4	5	6
Ich hinterfrage oft das, was ich sehe und höre.	1	2	3	4	5	6
Es ist leicht für andere Menschen, mich zu überzeugen.	1	2	3	4	5	6
Ich denke selten darüber nach, warum Menschen sich auf eine bestimmte Weise verhalten.	1	2	3	4	5	6
Ich möchte sicherstellen, dass ich die meisten verfügbaren Informationen berücksichtigt habe, bevor ich eine Entscheidung treffe.	1	2	3	4	5	6
Ich genieße es zu versuchen, festzustellen, ob das, was ich lese oder höre, wahr ist.	1	2	3	4	5	6
Ich genieße das Lernen.	1	2	3	4	5	6
Die Handlungen der Menschen und die Gründe dafür sind faszinierend.	1	2	3	4	5	6

Weitere Fragen

Bitte beurteilen Sie, ob die nachfolgenden Informationen jeweils positiv, negativ oder neutral im Hinblick auf die Fortführungsfähigkeit der Premium Steel AG sind. Geben Sie bitte ferner auf einer Skala von 1 bis 7 die Bedeutung an, die Sie diesen Informationen in Bezug auf die Beurteilung der Fortführungsfähigkeit der Gesellschaft beimessen würden, wobei 1 „gar keine Bedeutung" und 7 „sehr große Bedeutung" ist.

Dem Antrag der Premium Steel AG auf eine Bürgschaft der Bundesrepublik Deutschland im Rahmen des „Konjunkturpakets II" sowie auf eine Beteiligung der staatlichen KfW-Bank durch einen Direktkredit wird nicht entsprochen.

Art der Information	Bedeutung der Information								
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Bedeutung (=7)

Im Frühjahr 2010 wird bekanntgegeben, dass Steelo GmbH & Co. KG, einer der Hauptzulieferer der Premium Steel AG, Insolvenz angemeldet hat. Daraus ergibt sich für die Premium Steel ein erheblicher Lieferengpass und damit einhergehend auch die Gefahr, dass Kunden ihre Aufträge bei der Gesellschaft zurückziehen. Aktuell laufen noch Verhandlungen mit anderen Lieferanten, doch abschließende Vereinbarungen stehen noch aus.

Art der Information	Bedeutung der Information								
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Bedeutung (=7)

Das renommierte internationale Beratungsunternehmen, mit dessen Hilfe das Restrukturierungsprogramm entwickelt wurde, hat im Frühjahr 2010 ein Gutachten über die konjunkturellen Entwicklungsaussichten für die nächsten zwei Jahre erstellt. Darin wird von einer mäßigen Wiederbelebung der Konjunktur in 2010 sowie von einer spürbaren, nachhaltigen Besserung des Marktumfeldes ab 2011 ausgegangen. Auf Basis dieser Markteinschätzungen wird im Gutachten der Beratungsexperten die Premium Steel AG als überlebensfähig eingestuft. Infolge des Gutachtens signalisieren die Banken Verhandlungsbereitschaft zur Verlängerung der Kreditlinien.

Art der Information	Bedeutung der Information								
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Bedeutung (=7)

Auf einer Pressekonferenz im April 2010 hat der Finanzvorstand der Premium Steel AG angekündigt, dass bis Ende 2010 eine Barkapitalerhöhung von 200 Mio. EUR durchgeführt werden soll.

Art der Information	**Bedeutung der Information**
☐ positiv ☐ negativ ☐ neutral	gar keine Bedeutung (=1) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 sehr große Bedeutung (=7)

Demographische und sonstige Angaben

A. Alter: _____Jahre ☐ keine Angabe

B. Geschlecht: ☐ männlich ☐ weiblich ☐ keine Angabe

C. Position im Unternehmen: ☐ Manager ☐ Senior Manager
☐ Partner ☐ Sonstige: _____

D. Berufsexamina: ☐ WP ☐ CPA
☐ StB ☐ Sonstige: _____

E. Allgemeine Berufserfahrung: _____Jahre

F. Wie würden Sie das Ausmaß Ihrer Erfahrung in der Stahlindustrie einschätzen? Bitte Zutreffendes ankreuzen:

gar keine Erfahrung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Erfahrung (=7)

G. Wie würden Sie das Ausmaß Ihrer Erfahrung in der Prüfung von fortführungsgefährdeten Unternehmen einschätzen? Bitte Zutreffendes ankreuzen:

gar keine Erfahrung (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	sehr große Erfahrung (=7)

H. Inwieweit sind die in der Fallstudie enthaltenen Informationen ausreichend, um die Fortführungsfähigkeit der Premium Steel AG (eindeutig) zu beurteilen? Bitte Zutreffendes ankreuzen:

gar nicht ausreichend (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	völlig ausreichend (=7)

I. Welche Informationen würden Sie noch benötigen, um die Fortführungsfähigkeit der Premium Steel AG eindeutig beurteilen zu können?

J. Wie sicher fühlen Sie sich in Ihren Einschätzungen bezüglich der Fortführungsfähigkeit der Premium Steel AG? Bitte Zutreffendes ankreuzen:

gar nicht sicher (=1)	☐	☐	☐	☐	☐	☐	☐	sehr sicher (=7)
	1	2	3	4	5	6	7	

K. Bitte beurteilen Sie die nachfolgenden Aussagen in Bezug auf Ihre Vorgehensweise bei der Beurteilung der Art und der Bedeutung der auf S. 5 bis 7 präsentierten Informationen auf einer Skala von 1 „stimme überhaupt nicht zu“ bis 7 „stimme voll und ganz zu“:

	stimme überhaupt nicht zu						stimme voll und ganz zu
Ich war bei der Beurteilung der Informationen vorsichtig.	1	2	3	4	5	6	7
Ich habe bei der Beurteilung der Informationen intensiv nachgedacht.	1	2	3	4	5	6	7
Ich habe mich während der Beurteilung der Informationen sehr konzentriert.	1	2	3	4	5	6	7
Mir ist die Beurteilung der Informationen schwer gefallen.	1	2	3	4	5	6	7

L. Haben Sie an Fortbildungsseminaren teilgenommen, in denen das Thema „Professional Skepticism“ behandelt wurde?

☐ ja Bitte Anzahl angeben: _____

☐ nein

M. Wie würden Sie die Verständlichkeit der Fallstudienmaterialien einschätzen? Bitte Zutreffendes ankreuzen:

gar nicht verständlich (=1)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	völlig verständlich (=7)

N. Anmerkungen/Kommentare:

O. Um wie viel Uhr haben Sie die Studie beendet? _____

Vielen Dank für Ihre Teilnahme!

Appendix 4

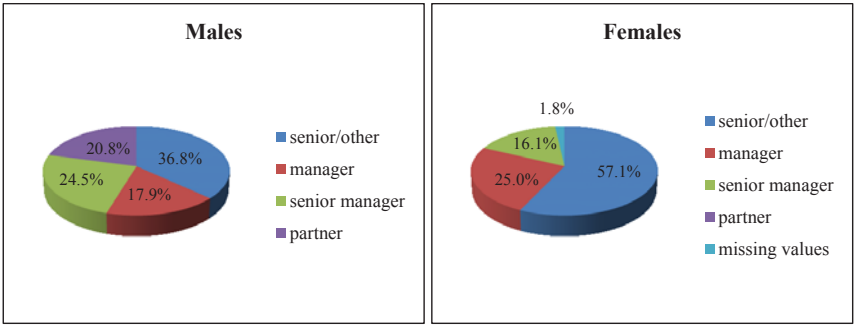
Demographic Characteristics by Gender

Variable	Gender		Mean Difference	*t*-statistics	*p*-value (two-tailed)
	Male	Female			
Age	38.00	34.21	3.79	3.092	0.002**
Skepticism score	133.42	136.98	-3.56	-1.466	0.145
General experience	11.64	8.55	3.09	2.870	0.005**
Industry experience	2.65	2.11	0.54	2.149	0.033*
Task experience	4.08	3.02	1.06	4.649	0.000***
Auditor certification	0.54	0.35	0.19	2.436	0.016*
Position	3.23	2.49	0.74	4.304	0.000***

Auditor certification is the proportion of subjects that are legally certified auditors (WPs) within each subgroup. *Position* is subjects' position in the firm hierarchy, where 1= assistant/other; 2 = senior; 3 = manager; 4 = senior manager; 5 = partner.

*, **, *** Significance levels at 0.05, 0.1. and 0.01, respectively (two-tailed test)

Relative Rank Position by Gender



K. Yankova, *The Influence of Information Order Effects and Trait Professional Skepticism on Auditors' Belief Revisions,* Auditing and Accounting Studies,
DOI 10.1007/978-3-658-08871-2, © Springer Fachmedien Wiesbaden 2015

References

Abdellaoui, Mohammed (2004): Rational Choice under Uncertainty. In: Bourgine, P./Nadal, J. P. (eds.): Cognitive Economics: An Interdisciplinary Approach. Berlin/Heidelberg: Springer: 15-13.

Abdolmohammadi, Mohammad (1985): Bayesian Inference Research in Auditing: Some Methodological Suggestions. In: Contemporary Accounting Research, 2 (1): 76-94.

Abdolmohammadi, Mohammad (1986): Efficiency of the Bayesian Approach in Compliance Testing: Some Empirical Evidence. In: Auditing: A Journal of Practice & Theory, 5 (2): 1-16.

Abdolmohammadi, Mohammad (1987): Bayesian Inference in Auditing: Evidence on the Most Appropriate Assessment Techniques. In: Accounting and Business Research, 17 (68): 291-300.

Abdolmohammadi, Mohammad/Sarens, Gerrit (2011): An Investigation of the Association between Cultural Dimensions and Variations in Perceived Use of and Compliance with Internal Auditing Standards in 19 Countries. In: The International Journal of Accounting, 46 (4): 365-389.

Abdolmohammadi, Mohammad/Wright, Arnold (1987): An Examination of the Effects of Experience and Task Complexity on Audit Judgments. In: The Accounting Review, 62 (1): 1-13.

Abou-Seada, Magda/Abdel-Kader, Magdy (2003): Behavioural Aspects of Auditors' Evidence Evaluation: A Belief Revision Perspectie. Aldershot: Ashgate.

ACRA (2012): Practice Monitoring Programme: Sixth Public Report. URL: https://www.acra.gov.sg/uploadedFiles/Content/Publications/Reports/PMPReport2012170712finalclean.pdf, accessed on: 25.07.2013.

Adam, Silke (2007): Das Going-Concern-Prinzip in der Jahresabschlussprüfung. Wiesbaden: Deutscher Universitäts-Verlag.

Adams, John W. (1978): The Report of the Special Committee to Examine the Role of the Auditor. Toronto: Canadian Institute of Chartered Accountants.

Adelman, Leonard/Tolcott, Martin A./Bresnick, Terry A. (1993): Examining the Effect of Information Order on Expert Judgment. In: Organizational Behavior and Human Decision Processes, 56: 348-369.

Adelman, Leonard et al. (1996): Research with Patriot Air Defense Officers: Examining Information Order Effects. In: Human Factors, 38 (2): 250-261.

Adelman, Leonard et al. (1997): Demonstrating the Effect of Context on Order Effects for an Army Air Defense Task Using the Patriot Simulator. In: Journal of Behavioral Decision Making, 10 (4): 327-342.

K. Yankova, *The Influence of Information Order Effects and Trait Professional Skepticism on Auditors' Belief Revisions,* Auditing and Accounting Studies,
DOI 10.1007/978-3-658-08871-2, © Springer Fachmedien Wiesbaden 2015

Aguinis, Herman/Gottfredson, Ryan K./Culpepper, Steven Andrew (2013): Best-Practice Recommendations for Estimating Cross-Level Interaction Effects Using Multilevel Modeling. In: Journal of Management, 39 (6): 1490-1528.

Ahlawat, Sunita S. (1999): Order Effects and Memory for Evidence in Individual versus Group Decision Making in Auditing. In: Journal of Behavioral Decision Making, 12: 71-88.

AICPA (1955): A Case Study on the Extent of Audit Samples. New York: AICPA.

AICPA (2010): Response to the European Commission's Green Paper on Audit Policy: Lessons from the Crisis. URL: http://www.aicpa.org/Advocacy/International/DownloadableDocuments/AICPAresponse-EUGreenpaper.pdf, accessed on: 01.11.2013.

Ajzen, Icek (2005): Attitudes, Personality and Behavior, 2nd edition. New York: Open University Press.

Akers, Michael D./Eaton, Tim V. (2003): Underreporting Of Chargeable Time: The Impact Of Gender And Characteristics Of Underreporters. In: Journal of Managerial Issues, 15 (1): 82-96.

Akers, Michael D./Horngren, Charles T./Eaton, Tim V. (1998): Underreporting Chargeable Time: A Continuing Problem For Public Accounting Firms. In: Journal of Applied Business Research, 15 (1): 13-20.

Alchourrón, Carlos E./Gärdenfors, Peter/Makinson, David (1985): On the Logic of Theory Change: Partial Meet Contraction and Revision Functions. In: The Journal of Symbolic Logic, 50 (2): 510-530.

Alderman, C. Wayne/Deitrick, James W. (1982): Auditors' Perceptions of Time Budget Pressures and Premature Sign-Offs: A Replication and Extension. In: Auditing: A Journal of Practice & Theory, 1 (2): 54-68.

Aldridge, R. et al. (1995): Measurement of Scene-Dependent Quality Variations in Digitally Coded Television Pictures. In: IEE Proceedings - Vision, Image and Signal Processing, 142 (3): 149-154.

Allais, Maurice (1953): Le comportement de l'homme rationnel devant le risque, critique des postulats et axiomes de l'école américaine. In: Econometrica, 21: 503-546.

Alleyne, Philmore/Hudaib, Mohammad/Pike, Richard (2013): Towards a Conceptual Model of Whistle-Blowing Intentions Among External Auditors. In: The British Accounting Review, 45 (1): 10-23.

Allport, Gordon Willard (1935): Attitudes. In: Murchison, C. (ed.): A Handbook of Social Psychology. Worcester: Clark University Press: 789-994.

Allport, Gordon Willard (1954): The Nature of Prejudice. Reading et al.: Addison-Wesley.

Ameen, Elsie C./Guffey, Daryl M./McMillan, Jeffrey J. (1996): Gender Differences in Determining the Ethical Sensitivity of Future Accounting Professionals. In: Journal of Business Ethics, 15 (5): 591-597.

Anderson, Brenda H./Maletta, Mario J. (1999): Primacy Effects and the Role of Risk in Auditor Belief-Revision Processes. In: Auditing: A Journal of Practice & Theory, 18 (1): 75-89.

Anderson, Norman H. (1981): Foundations of Information Integration Theory. New York: Academic Press.

Anderson, Urton/Koonce, Lisa/Marchant, Garry (1991): A Model of Audit Judgment: Cognition in a Professional Context. In: Ponemon, L. A./Gabhart, D. R. L. (eds.): Auditing: Advances in Behavioral Research. New York et al.: Springer-Verlag: 43-73.

Anshakov, Oleg M./Gergely, Tamás (2010): Cognitive Reasoning: A Formal Approach. Heidelberg et al.: Springer.

Antle, Rick et al. (2006): The Joint Determination of Audit Fees, Non-Audit Fees, and Abnormal Accruals. In: Review of Quantitative Finance and Accounting, 27 (3): 235-266.

APAK (2011): Bericht der Abschlussprüferaufsichtskommission über die Ergebnisse der anlassunabhängigen Sonderuntersuchungen nach § 62b WPO für die Jahre 2007-2010. URL: http://www.apak-aoc.de/pdf/APAK-AOC--Neuigkeiten_Bericht_Sonderuntersuchungen_2007-2010.pdf, accessed on: 11.03.2013.

Arkes, Hal R./Hammond, Kenneth R. (1986): General Introduction. In: Arkes, H. R./Hammond, K. R. (eds.): Judgment and Decision Making: An Interdisciplinary Reader, 2nd edition. Cambridge et al.: Cambridge University Press: 1-10.

Arnold, Donald F. et al. (2007): The Effect of Country and Culture on Perceptions of Appropriate Ethical Actions Prescribed by Codes of Conduct: A Western European Perspective among Accountants. In: Journal of Business Ethics, 70: 327-340.

Arnold, Donald F., Sr./Ponemon, Lawrence A. (1991): Internal Auditors' Perceptions of Whistle-Blowing and the Influence of Moral Reasoning: An Experiment. In: Auditing: A Journal of Practice & Theory, 10 (2): 1-15.

Arnold, Vicky et al. (2000): The Effect of Experience and Complexity on Order and Recency Bias in Decision Making by Professional Accountants. In: Accounting and Finance, 40: 109-134.

Aron, Arthur/Coups, Elliot J./Aron, Elaine N. (2013): Statistics for Psychology, 6th edition. Upper Saddle River: Pearson.

Aronson, Elliot/Wilson, Timothy D./Akert, Robin M. (1994): Social Psychology: The Heart and the Mind. New York: HarperCollins.

Aronson, Elliot/Wilson, Timothy D./Brewer, Marilynn B. (1998): Experimentation in Social Psychology. In: Gilbert, D. T./Fiske, S. T./Lindzey, G. (eds.): The Handbook of Social Psychology, 4th edition. Boston: McGraw-Hill: 99-142.

Asare, Stephen K. (1992): The Auditor's Going-Concern Decision: Interaction of Task Variables and the Sequential Processing of Evidence. In: The Accounting Review, 67 (2): 379-393.

Asare, Stephen K./Messier, William F. (1991): A Review of Audit Research Using the Belief-Adjustment Model. In: Ponemon, L. A./Gabhart, D. R. L. (eds.): Auditing: Advances in Behavioral Research. New York et al.: Springer-Verlag: 75-92.

Asare, Stephen K./Cianci, Anna M. /Tsakumis, George T. (2009): The Impact of Competing Goals, Experience, and Litigation Consciousness on Auditors' Judgments. In: International Journal of Auditing, 13: 223-236.

Asare, Stephen K./Cohen, Jeffrey/Trompeter, Greg (2005): The Effect of Non-Audit Services on Client Risk, Acceptance and Staffing Decisions. In: Journal of Accounting and Public Policy, 24 (6): 489-520.

Asch, S. E. (1946): Forming Impressions of Personality. In: The Journal of Abnormal and Social Psychology, 41 (3): 258-290.

Aschauer, Ewald et al. (2013): Familiarity Threat Argument Revisited: Confidence, Trust and Professional Skepticism. Working Paper presented at the 7th EARNet Symposium in Trier, Germany.

Ashbaugh, Hollis/LaFond, Ryan/Mayhew, Brian W. (2003): Do Nonaudit Services Compromise Auditor Independence? Further Evidence. In: The Accounting Review, 78 (3): 611-639.

Ashton, Alison Hubbard (1985): Does Consensus Imply Accuracy in Accounting Studies of Decision Making? In: The Accounting Review, 60 (2): 173-185.

Ashton, Alison Hubbard/Ashton, Robert H. (1988): Sequential Belief Revision in Auditing. In: The Accounting Review, 63 (4): 623-641.

Ashton, Robert H. (1974): An Experimental Study of Internal Control Judgments. In: Journal of Accounting Research, 12: 143-157.

Ashton, Robert H. (1990): Pressure and Performance in Accounting Decision Settings: Paradoxical Effects of Incentives, Feedback, and Justification. In: Journal of Accounting Research, 28: 148-180.

Ashton, Robert H./Ashton, Alison Hubbard (1990): Evidence-Responsiveness in Professional Judgment: Effects of Positive versus Negative Evidence and Presentation Mode. In: Organizational Behavior and Human Decision Processes, 46: 1-19.

Ashton, Robert H./Kennedy, Jane (2002): Eliminating Recency with Self-Review: The Case of Auditors' 'Going Concern' Judgments. In: Journal of Behavioral Decision Making, 15: 221-231.

ASIC (2012): Audit Inspection Program Report for 2011-12. URL: http://www.asic.gov.au/asic/pdflib.nsf/LookupByFileName/rep317-published-4-December-2012.pdf/$file/rep317-published-4-December-2012.pdf, accessed on: 25.07.2013.

Atlas, Lauren Y./Wager, Tor D. (2013): Expectancies and Beliefs: Insights from Cognitive Neuroscience. In: Ochsner, K./Kosslyn, S. M. (eds.): The Oxford Handbook of Cognitive Neuroscience, Volume 2: The Cutting Edges. Oxford: Oxford University Press: 359-381.

AUASB (2012): Professional Scepticism in an Audit of a Financial Report. URL: http://www.auasb.gov.au/admin/file/content102/c3/Aug12_AUASB_Bulletin_Professional_Scepticism_in_an_Audit_of_a_Financial_Report.pdf, accessed on: 19.07.2013.

Awasthi, Vidya/Pratt, Jamie (1990): The Effects of Monetary Incentives on Effort and Decision Performance: The Role of Cognitive Characteristics. In: The Accounting Review, 65 (4): 797-811.

Ayers, Susam/Kaplan, Steven E. (1993): An Examination of the Effect of Hypothesis Framing on Auditors' Information Choices in an Analytical Procedure Task. In: Abacus, 29 (2): 113-130.

Baars, Bernard J. (1986): The Cognitive Revolution in Psychology. New York: Guilford Press.

Baddeley, Alan D. (1997): Human Memory: Theory and Practice. Hove: Psychology Press.

Bailey, Charles D./Daily, Cynthia M./Phillips, Thomas J. (2011): Auditors' Levels of Dispositional Need for Closure and Effects on Hypothesis Generation and Confidence. In: Behavioral Research in Accounting, 23 (2): 27-50.

Baird, Jane E./Zelin, Robert C. (2000): The Effects of Information Ordering on Investor Perceptions: An Experiment Utilizing Presidents' Letters. In: Journal of Financial and Strategic Decisions, 13 (3): 71-80.

Ballantine, Joan/McCourt, Patricia (2011): The Impact of Ethical Orientation and Gender on Final Year Undergraduate Auditing Students' Ethical Judgments. In: Accounting Education, 20 (2): 187-201.

Ballwieser, Wolfgang/Berger, Karl-Heinz (1985): „Information und Wirtschaftlichkeit" - Hintergrund, Erwartungen und Ergebnisse. In: Ballwieser, W./Berger, K.-H. (eds.): Information und Wirtschaftlichkeit. Wiesbaden: Gabler: 11-36.

Bamber, E. Michael/Bylinski, Joseph H. (1987): The Effects of the Planning Memorandum, Time Pressure and Individual Auditor Characteristics on Audit Managers' Review Time Judgments. In: Contemporary Accounting Research, 4 (1): 127-143.

Bamber, E. Michael/Iyer, Venkataraman M. (2007): Auditors' Identification with Their Clients and Its Effect on Auditors' Objectivity. In: Auditing: A Journal of Practice & Theory, 26 (2): 1-24.

Bamber, E. Michael/Ramsay, Robert J./Tubbs, Richard M. (1997): An Examination of the Descriptive Validity of the Belief-Adjustment Model and Alternative Attitudes to Evidence in Auditing. In: Accounting, Organizations and Society, 22 (3/4): 249-268.

Bargh, John A. (1989): Conditional Automaticity: Varieties of Automatic Influence in Social Perception and Cognition. In: Uleman, J. S./Bargh, J. A. (eds.): Unintended Thought. New York/London: The Guilford Press: 3-51.

Baron, Jonathan (2007): Normative Models of Judgment and Decision Making. In: Koehler, D. J./Harvey, N. (eds.): Blackwell Handbook of Judgment and Decision Making. Malden/Oxford/Carlton: Blackwell Publishing: 19-36.

Bazerman, Max H./Moore, Don A. (2013): Judgment in Managerial Decision Making. Hoboken: John Wiley & Sons.

Bazerman, Max H./Tenbrunsel, Ann E. (2011a): Blind Spots: Why We Fail to Do What's Right and What to Do about It. Princeton: Princeton University Press.

Bazerman, Max H./Tenbrunsel, Ann E. (2011b): Good People Often Let Bad Things Happen. Why?: Ethical Breakdowns. In: Harvard Business Review: 58-65.

Bazerman, Max H./Loewenstein, George/Moore, Don A. (2002): Why Good Accountants Do Bad Audits. In: Harvard Business Review: 97-102.

Bazerman, Max H./Morgan, Kimberley P./Loewenstein, George F. (1997): The Impossibility of Auditor Independence. In: Sloan Management Review, 38 (4): 89-94.

Bazerman, Max H. et al. (2006): Reports of Solving Conflicts of Interest in Auditing are Highly Exaggerated: Reply. In: Academy of Management Review, 31 (1): 43-49.

Beach, Lee Roy/Mitchell, Terence R. (1978): A Contingency Model for the Selection of Decision Strategies. In: Academy of Management Review, 3 (3): 439-449.

Beasley, Mark S./Carcello, Joseph V./Hermanson, Dana R. (2001): Top 10 Audit Deficiencies. In: Journal of Accountancy, 191 (4): 63-66.

Bédard, Jean (1989): Expertise in Auditing: Myth or Reality? In: Accounting, Organizations and Society, 14 (1/2): 113-131.

Bedard, Jean C./Biggs, Stanley F. (1991a): Pattern Recognition, Hypotheses Generation, and Auditor Performance in an Analytical Task. In: The Accounting Review, 66 (3): 622-642.

Bedard, Jean C./Biggs, Stanley F. (1991b): The Effect of Domain-Specific Experience on Evaluation of Management Representations in Analytical Procedures. In: Auditing: A Journal of Practice & Theory, 10 (Supplement): 77-90.

Bédard, Jean/Chi, Michelene T. H. (1993): Expertise in Auditing. In: Auditing: A Journal of Practice & Theory, 12 (2): 21-45.

Bedard, Jean C./Johnstone, Karla M. (2010): Audit Partner Tenure and Audit Planning and Pricing. In: Auditing: A Journal of Practice & Theory, 29 (2): 45-70.

Bedard, Jean C./Biggs, Stanley F./Maroney, James J. (1998): Sources of Process Gain and Loss From Group Interaction in Performance of Analytical Procedures. In: Behavioral Research in Accounting, 10 (Supplement): 207-233.

Beeler, Jesse D./Hunton, James E. (2002): Contingent Economic Rents: Insidious Threats to Audit Independence. In: Advances in Accounting Behavioral Research, 5: 21-50.

Behling, Orlando/Law, Kenneth S. (2000): Translating Questionnaires and Other Research Instruments: Problems and Solutions. Thousand Oaks/London/New Delhi: Sage Publications.

Belkaoui, Ahmed (1989): Human Information Processing in Accounting. New York/Westport/London: Quorum Books.

Bell, Timothy B./Peecher, Mark E./Solomon, Ira (2005): The 21st Century Public Company Audit: Conceptual Elements of KPMG's Global Audit Methodology. URL: http://business.illinois.edu/kpmg-uiuccases/monograph2.pdf, accessed on: 06.02.2014.

Bell, Timothy B. et al. (1997): Auditing Organizations Through a Strategic-Systems Lens: The KPMG Business Measurement Process. New York: KPMG LLP.

Belmore, Susan M. (1987): Determinants of Attention During Impression Formation. In: Journal of Experimental Psychology: Learning, Memory, and Cognition, 13 (3): 480-489.

Benett, Nathan/Herold, David M./Ashford, Susan J. (1990): The Effects of Tolerance for Ambiguity on Feedback-Seeking Behaviour. In: Journal of Occupational Psychology, 63: 343-348.

Bennink, Carl D./Spoelstra, Thomas (1979): Individual Differences in Field Articulation as a Factor in Language Comprehension. In: Journal of Research in Personality, 13 (4): 480-489.

Benston, George J./Hartgraves, Al L. (2002): Enron: What Happened and What We Can Learn from It. In: Journal of Accounting and Public Policy, 21 (2): 105-127.

Bernardi, Richard A. (1994): Fraud Detection: The Effect of Client Integrity and Competence and Auditor Cognitive Style. In: Auditing: A Journal of Practice & Theory, 13 (Supplement): 68-84.

Bernardi, Richard A./Arnold, Donald F., Sr. (2004): Testing the "Inverted-U" Phenomenon in Moral Development on Recently Promoted Senior Managers and Partners. In: Contemporary Accounting Research, 21 (2): 353-367.

Bernstein, Leopold A. (1967): The Concept of Materiality. In: The Accounting Review, 42 (1): 86-95.

Bierstaker, James Lloyd/Wright, Sally (2001): A Research Note Concerning Practical Problem-Solving Ability as a Predictor of Performance in Auditing Tasks. In: Behavioral Research in Accounting, 13: 49-62.

Biggs, Stanley F./Wild, John J. (1985): An Investigation of Auditor Judgment in Analytical Review. In: The Accounting Review, 60 (4): 607-633.

Bigus, Jochen (2011): Auditor's Liability with Overcompensation and Reputation Losses. In: OR Spectrum, 33 (2): 287-307.

Bik, Olof P. G. (2010): The Behavior of Assurance Professionals: A Cross-cultural Perspective. Delfi: Eburon.

Birnberg, Jacob G. (1964): Bayesian Statistics: A Review. In: Journal of Accounting Research, 2 (1): 108-116.

Birnberg, Jacob G. (2011): A Proposed Framework for Behavioral Accounting Research. In: Behavioral Research in Accounting, 23 (1): 1-43.

Blair-Broeker, Charles T./Ernst, Randal M. (2007): Thinking About Psychology: The Science of Mind and Behavior, 2nd edition. New York: Worth Publishers.

Blay, Allen D. (2005): Independence Threats, Litigation Risk, and the Auditor's Decision Process. In: Contemporary Accounting Research, 22 (4): 759-789.

Block, Richard A./Harper, David R. (1991): Overconfidence in Estimation: Testing the Anchoring-and-Adjustment Hypothesis. In: Organizational Behavior and Human Decision Processes, 49: 188-207.

Boatsman, James R./Moeckel, Cindy/Pei, Buck K. W. (1997): The Effects of Decision Consequences on Auditors' Reliance on Decision Aids in Audit Planning. In: Organizational Behavior and Human Decision Processes, 71 (2): 211-247.

Bobek, Donna D./Hageman, Amy M./Radtke, Robin R. (2013a): A Research Note on the Relationship between Professional Skepticism and Client Advocacy. Working Paper.

Bobek, Donna D./Hageman, Amy /Radtke, Robin (2013b): Ethical Sensitivity and Ethical Decision-Making of Accounting Professionals: The Role of Context and Individual Attributes. Working Paper.

Bobek, Donna D./Hageman, Amy M./Radtke, Robin R. (2013c): The Effects of Professional Role, Decision Context and Gender on the Ethical Decision Making of Public Accounting Professionals. Working Paper.

Bogdan, Radu J. (1986): The Importance of Belief. In: Bogdan, R. J. (ed.): Belief: Form, Content, and Function. Oxford: Clarendon Press: 1-16.

Bogle, John C. (2000): Public Accounting: Profession or Business? URL: http://www.vanguard.com/bogle_site/sp20001016.html, accessed on: 18.3.2014.

Bollom, William J. (1988): Ethics and Self-Regulation for CPAs in the U.S.A. In: Journal of Business Ethics, 7 (1/2): 55-61.

Bonner, Sarah E. (1994): A Model of the Effects of Audit Task Complexity. In: Accounting, Organizations and Society, 19 (3): 213-234.

Bonner, Sarah E. (1999): Judgment and Decision-Making Research in Accounting. In: Accounting Horizons, 13 (4): 385-398.

Bonner, Sarah E. (2008): Judgment and Decision Making in Accounting. Upper Saddle River: Pearson Prentice Hall.

Bonner, Sarah E./Lewis, Barry L. (1990): Determinants of Auditor Expertise. In: Journal of Accounting Research, 28 (Supplement): 1-20.

Bonner, Sarah E./Pennington, Nancy (1991): Cognitive Processes and Knowledge as Determinants of Auditor Expertise. In: Journal of Accounting Literature, 10: 1-50.

Bonner, Sarah E./Walker, Paul L. (1994): The Effects of Instruction and Experience on the Acquisition of Auditing Knowledge. In: The Accounting Review, 69 (1): 157-178.

Bortz, Jürgen/Schuster, Christof (2010): Statistik für Human- und Sozialwissenschaftler, 7th edition. Berlin/Heidelberg: Springer-Verlag.

Boush, David M./Friestad, Marian/Rose, Gregory M. (1994): Adolescent Skepticism toward TV Advertising and Knowledge of Advertiser Tactics. In: Journal of Consumer Research, 21: 165-175.

Bowlin, Kendall O./Hobson, Jessen L./Piercey, David M. (2014): The Effects of Auditor Rotation, Professional Skepticism, and Interactions with Managers on Audit Quality. Working Paper. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1914557, accessed on: 29.07.2014.

Bowrin, Anthony R./King, James II (2010): Time Pressure, Task Complexity, and Audit Effectiveness. In: Managerial Auditing Journal, 25 (2): 160-181.

Boylan, Scott J. (2008): A Classroom Excercise on Unconscious Bias in Financial Reporting and Auditing. In: Issues in Accounting Education, 23 (2): 229-245.

Boynton, William C./Kell, Walter G. (1996): Modern Auditing, 6th edition. New York: John Wiley & Sons.

Brabeck, Mary (1984): Ethical Characteristics of Whistle Blowers. In: Journal of Research in Personality, 18 (1): 41-53.

Brandon, Duane M. et al. (2007): The Joint Influence of Client Attributes and Cognitive Moral Development on Students' Ethical Judgments. In: Journal of Accounting Education, 25 (1–2): 59-73.

Braun, Karen Wilken (2001): The Disposition of Audit-Detected Misstatements: An Examination of Risk and Reward Factors and Aggregation Effects. In: Contemporary Accounting Research, 18 (1): 71-99.

Brazel, Joseph et al. (2013): Hindsight Bias and Auditor Skepticism: Does the End Justify the Means? Working Paper presented at the 7th EARNet Symposium in Trier, Germany.

Breesch, Diane/Branson, Joël (2009): The Effect of Gender on Audit Quality. In: The ICFAI University Journal of Accounting Research & Audit Practices, 8 (3-4): 78-107.

Bronner, Rolf (1973): Entscheidungen unter Zeitdruck – Eine Experimentaluntersuchung zur empirischen Theorie der Unternehmnung. Tübingen: J.C.B.Mohr (Paul Siebeck).

Brown, Charles A. (2009): Order Effects and the Audit Materiality Revision Choice. In: The Journal of Applied Business Research, 25 (1): 21-36.

Brown-Liburd, Helen/Cohen, Jeffrey R./Trompeter, Greg (2013): Effects of Earnings Forecasts and Heightened Professional Skepticism on the Outcomes of Client-Auditor Negotiation. In: Journal of Business Ethics, 116 (2): 311-325.

Bruine de Bruin, Wändi/Keren, Gideon (2003): Order Effects in Sequentially Judged Options due to the Direction of Comparison. In: Organizational Behavior and Human Decision Processes, 92: 91-101.

Bruni, Luigino/Sugden, Robert (2007): The Road Not Taken: How Psychology Was Removed From Economics and How It Might Be Brought Back. In: The Economic Journal, 117: 146-173.

Bryant, Stephanie/Murthy, Uday/Wheeler, Patrick (2009): The Effects of Cognitive Style and Feedback Type on Performance in an Internal Control Task. In: Behavioral Research in Accounting, 21 (1): 37-58.

Buchman, Thomas A./Tetlock, Philip E./Reed, Ronald O. (1996): Accountability and Auditors' Judgments about Contingent Events In: Journal of Business Finance & Accounting, 23 (3): 379-398.

Buckley, John W. (1978): An Exploration of Professional Identity. In: Loeb, S. E. (ed.): Ethics in the Accounting Profession. Santa Barbara et al.: John Wiley & Sons: 63-84.

Budner, Stanley (1962): Intolerance of Ambiguity as a Personality Variable. In: Journal of Personality, 30 (1): 29-50.

Bunge, Mario (1991): A Skeptic's Beliefs and Disbeliefs. In: New Ideas in Psychology, 9 (2): 131-149.

Burnyeat, M. F. (1983): Can the Skeptic Live His Skepticism? In: Burnyeat, M. F. (ed.): The Skeptical Tradition. Berkeley/Los Angeles/London: University of California Press: 117-148.

Burton, John C. (1980): A Critical Look at Professionalism and Scope of Services. In: Journal of Accountancy, 149 (4): 48-56.

Buss, Arnold H. (1989): Personality as Traits. In: American Psychologist, 44 (11): 1378-1388.

Butcharov, Panayot (1998): Skepticism About the External World. Oxford et al.: Oxford University Press.

Butler, Stephen A. (1985): Application of a Decision Aid in the Judgmental Evaluation of Substantive Test of Details Samples. In: Journal of Accounting Research, 23 (2): 513-526.

Butt, Jane L./Campbell, Terry L. (1989): The Effects of Information Order and Hypothesis-Testing Strategies on Auditors' Judgments. In: Accounting, Organizations and Society, 14 (5/6): 471-479.

Canary, Daniel J./Emmers-Sommer, Tara M./Faulkner, Sandra (1997): Sex and Gender Differences in Personal Relationships. New York: Guilford Press.

Caplan, Paula J. et al. (1997): Gender Differences in Human Cognition. Oxford et al.: Oxford University Press.

CAQ (2010): Deterring and Detecting Financial Reporting Fraud: A Platform for Action. URL: http://www.thecaq.org/docs/reports-and-publications/deterring-and-detecting-financial-reporting-fraud-a-platform-for-action.pdf?sfvrsn=0, accessed on: 16.5.2014.

CAQ (2011): In-Depth Guide to Public Company Auditing: The Financial Statement Audit. URL: http://www.thecaq.org/docs/audit-committees/in-depth_guidetopubliccompanyauditing.pdf?sfvrsn=0, accessed on: 14.05.2014.

Carcello, Joseph V./Nagy, Albert L. (2004): Audit Firm Tenure and Fraudulent Financial Reporting. In: Auditing: A Journal of Practice & Theory, 23 (2): 55-69.

Carcello, Joseph V./Neal, Terry L. (2000): Audit Committee Composition and Auditor Reporting. In: The Accounting Review, 75 (4): 453-467.

Carcello, Joseph V./Hermanson, Roger H./McGrath, Neal T. (1992): Audit Quality Attributes: The Perceptions of Audit Partners, Preparers, and Financial Statement Users. In: Auditing: A Journal of Practice & Theory, 11 (1): 1-15.

Carcello, Joseph V./Vanstraelen, Ann/Willenborg, Michael (2009): Rules Rather than Discretion in Audit Standards: Going-Concern Opinions in Belgium. In: The Accounting Review, 84 (5): 1395-1428.

Cardello, Armand V. (1996): The Role of the Human Senses in Food Acceptance. In: Meiselman, H. L./MacFie, H. J. H. (eds.): Food Choice, Acceptance and Consumption. London: Chapman & Hall: 1-82.

Carey, John L. (1956): Professional Ethics of Certified Public Accountants. New York: American Institute of Accountants.

Carey, Peter/Simnett, Roger (2006): Audit Partner Tenure and Audit Quality. In: The Accounting Review, 81 (3): 653-676.

Carmichael, Douglas R./Pany, Kurt (1993): Reporting on Uncertainties, Including Going Concern. In: AICPA (ed.): The Expectation Gap Standards: Progress, Implementation Issues, Research Opportunities. Jersey City: AICPA: 35-58.

Carnota, Raul/Rodrigues, Ricardo (2010): AGM Theory and Artificial Intelligence. In: Olsson, E. J./Enqvist, S. (eds.): Belief Revision meets Philosophy of Science. Dordrecht et al.: Springer.

Carpenter, Tina D. (2007): Audit Team Brainstorming, Fraud Risk Identification and Fraud Risk Assessment: Implications of SAS No. 99. In: The Accounting Review, 82 (5): 1119-1140.

Carpenter, Tina D./Reimers, Jane L. (2013): Professional Skepticism: The Effects of a Partner's Influence and the Level of Fraud Indicators on Auditors' Fraud Judgments and Actions. In: Behavioral Research in Accounting, 25 (2): 45-69.

Carpenter, Tina D./Durtschi, Cindy/Gaynor, Lisa Milici (2011): The Incremental Benefits of a Forensic Accounting Course on Skepticism and Fraud-Related Judgments. In: Issues in Accounting Education, 26 (1): 1-21.

Carruthers, Peter (2003): Moderately Massive Modularity. In: O'Hear, A. (ed.): Minds and Persons. Cambridge: Cambridge University Press: 67-90.

Carruthers, Peter (2006): The Architecture of the Mind. Oxford: Oxford University Press.

Cash, Richard M. (2011): Advancing Differentiation: Thinking and Learning for the 21st Century. Minneapolis: Free Spirit Publishing.

Chambers Universal Learners' Dictionary (1994): New Delhi: Allied Chambers.

Chang, C. Janie/Hwang, Nen-Chen Richard (2003): The Impact of Retention Incentives and Client Business Risks on Auditors' Decisions Involving Aggressive Reporting Practices. In: Auditing: A Journal of Practice & Theory, 22 (2): 207-218.

Chapman, Gretchen B./Johnson, Eric J. (2002): Incorporating the Irrelevant: Anchros in Judgments of Belief and Value. In: Gilovich, T./Griffin, D./Kahneman, D. (eds.): Heuristics and Biases: The Psychology of Intuitive Judgment. Cambridge et al.: Cambridge University Press: 120-138.

Chapman, Gretchen B./Bergus, George R./Elstein, Arthur S. (1996): Order of Information Affects Clinical Judgment. In: Journal of Behavioral Decision Making, 9 (3): 201-211.

Chavas, Jean-Paul (2004): Risk Analysis in Theory and Practice. San Diego/London: Elsevier.

Chazen, Charles/Solomon, Kenneth I. (1975): The Art of Defensive Auditing. In: Journal of Accountancy, 140 (4): 66-71.

Chekushina, Tatiana/Loth, Kai Sofia (2014): Die kritische Grundhaltung bei der Abschlussprüfung. In: Neue Zeitschrift für Gesellschaftsrecht, 17 (3): 85-92.

Chen, Serena/Chaiken, Shelly (1999): The Heuristic-Systematic Model in Its Broader Context. In: Chaiken, S./Trope, Y. (eds.): Dual-Process Theories in Social Psychology. New York: Guilford: 73-96.

Chen, Shimin/Sun, Sunny Y. J./Wu, Donghui (2010): Client Importance, Institutional Improvements, and Audit Quality in China: An Office and Individual Auditor Level Analysis. In: The Accounting Review, 85 (1): 127-158.

Chih-Ying, Chen/Chan-Jane, Lin/Yu-Chen, Lin (2008): Audit Partner Tenure, Audit Firm Tenure, and Discretionary Accruals: Does Long Auditor Tenure Impair Earnings Quality? In: Contemporary Accounting Research, 25 (2): 415-445.

Child, D. J. (1981): Culture, Contingency and Capitalism in Cross-National Study of Organizations. In: Cummings, L. L./Staw, B. M. (eds.): Research in Organizational Behavior. Greenwich: JAI Press: 303–356.

Chmielewicz, Klaus (1994): Forschungskonzeptionen der Wirtschaftswissenschaft, 3rd edition. Stuttgart: Shäffer-Poeschel.

Choo, Freddie (1986): Job Stress, Job Performance, and Auditor Personality Characteristics. In: Auditing: A Journal of Practice & Theory, 5 (2): 17-34.

Choo, Freddie (1995): Auditors' Judgment Performance Under Stress: A Test of the Predicted Relationship by Three Theoretical Models. In: Journal of Accounting, Auditing & Finance, 10 (3): 611-641.

Choo, Freddie (1996): Auditors' Knowledge Content and Judgment Performance: A Cognitive Script Approach. In: Accounting, Organizations and Society, 21 (4): 339-359.

Choo, Freddie/Tan, Kim (2000): Instruction, Skepticism, And Accounting Students' Ability To Detect Frauds In Auditing. In: Journal of Business Education, (1): 72-87.

Chow, Chee W./McNamee, Alan H./Plumlee, R. David (1987): Practitioners' Perceptions of Audit Step Difficulty and Criticalness: Implications for Audit Research. In: Auditing: A Journal of Practice & Theory, 6 (2): 123-133.

Christ, Mary York (1993): Evidence on the Nature of Audit Planning Problem Representations: An Examination of Auditor Free Recalls. In: The Accounting Review, 68 (2): 304-322.

Christoff, Kalina (2013): Thinking. In: Ochsner, K./Kosslyn, S. M. (eds.): The Oxford Handbook of Cognitive Neuroscience, Volume 2: The Cutting Edges. Oxford: Oxford University Press: 318-333.

Chung, Janne/Monroe, Gary S. (1998): Gender Differences in Information Processing: An Empirical Test of the Hypothesis-Confirming Strategy in an Audit Context. In: Accounting & Finance, 38 (2): 265-279.

Chung, Janne/Monroe, Gary S. (2001): A Research Note on the Effects of Gender and Task Complexity on an Audit Judgment. In: Behavioral Research in Accounting, 13: 111-125.

Church, A. Timothy (2000): Culture and Personality: Toward an Integrated Cultural Trait Psychology. In: Journal of Personality, 68 (4): 651-703.

Church, Bryan K. (1990): Auditors' Use of Confirmation Processes. In: Journal of Accounting Literature, 9: 81-112.

Church, Bryan K. (1991): An Examination of the Effect that Commitment to a Hypothesis has on Auditors' Evaluations of Confirming and Disconfirming Evidence. In: Contemporary Accounting Research, 7 (2): 513-534.

Churchill, Gilbert A., Jr. (1979): A Paradigm for Developing Better Measures of Marketing Constructs. In: Journal of Marketing Research, 16 (1): 64-73.

CICA (1995): Professional Judgment and the Auditor. Toronto: CICA.

Cochran, Kathryn F./Davis, J. Kent (1987): Individual Differences in Inference Processes. In: Journal of Research in Personality, 21 (2): 197-210.

Cochran, W. G. (1947): Some Consequences When the Assumptions for the Analysis of Variance are not Satisfied. In: Biometrics, 3 (1): 22-38.

Cohen, Jacob (1988): Statistical Power Analysis for the Behavioral Sciences, 2nd edition. Hillsdale: Lawrence Erlbaum Associates.

Cohen, Jeffrey R./Dalton, Derek W./Harp, Nancy (2014): The Effect of Professional Skepticism on Job Attitudes and Turnover Intentions within the Audit Profession. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2410547, accessed on: 29.04.2014.

Cohen, Jeffrey R./Pant, Laurie W./Sharp, David J. (1992): Cultural and Socioeconomic Constraints on International Codes of Ethics: Lessons from Accounting. In: Journal of Business Ethics, 11 (9): 687-700.

Cohen, Jeffrey R./Pant, Laurie W./Sharp, David J. (1993): Culture-Based Ethical Conflicts Confronting Multinational Accounting Firms. In: Accounting Horizons, 7 (3): 1-13.

Cohen, Jeffrey R./Pant, Laurie W./Sharp, David J. (1995): An Exploratory Examination of International Differences in Auditors' Ethical Perceptions. In: Behavioral Research in Accounting, 7: 37-64.

Cohen, Jeffrey R./Pant, Laurie W./Sharp, David J. (2001): An Examination of Differences in Ethical Decision-Making Between Canadian Business Students and Accounting Professionals. In: Journal of Business Ethics, 30 (4): 319-336.

Cohen, LeoNora M./Ambrose, Don (1999): Adaptation and Creativity. In: Runco, M. A./Pritzker, S. R. (eds.): Encyclopedia of Creativity. San Diego: Academic Press: 9-22.

Colbert, Janet L. (1989): The Effect of Experience on Auditors' Judgments. In: Journal of Accounting Literature, 8: 137-149.

Colby, Anne/Kohlberg, Lawrence (1987): The Measurement of Moral Judgment, Volume 1. Cambridge: Cambridge University Press.

Colman, Andrew M. (2009): Oxford Dictionary of Psychology, 3rd edition. Oxford/New York: Oxford University Press.

Cone, John D./Foster, Sharon L. (1998): Dissertations and Theses from Start to Finish: Psychology and Related Fields, 7th printing. Washington: American Psychological Association.

Cook, John W./Winkle, Gary M. (1988): Auditing, 4th edition. Boston: Houghton Mifflin.

Coolican, Hugh (2013): Research Methods and Statistics in Psychology, 5th edition. New York: Routledge.

Copeland, Christopher (1996): Professional Skepticism. In: Business Credit, 98 (8): 37-38.

Corless, John C. (1972): Assessing Prior Distributions for Applying Bayesian Statistics in Auditing. In: The Accounting Review, 47 (3): 556-566.

Cornman, James Welton /Lehrer, Keith Edward/Pappas, George Sotiros (1992): Philosophical Problems and Arguments: An Introduction, 4th edition. Indianapolis: Hackett Publishing.

Costa, Paul T., Jr./McCrae, Robert R. (1992): Four Ways Five Factors are Basic. In: Personality and Individual Differences, 13 (6): 653-665.

Costabile, Kristi A./Klein, Stanley B. (2005): Finishing Strong: Recency Effects in Juror Judgments. In: Basic & Applied Social Psychology, 27 (1): 47-58.

Cowperthwaite, Philip (2010): Culture Matters: How Our Culture Affects the Audit. In: Accounting Perspectives, 9 (3): 175-215.

Cozzens, Michael D./Contractor, Noshir S. (1987): The Effect of Conflicting Information on Media Skepticism. In: Communication Research, 14 (4): 437-451.

CPAB (2012): Meeting the Challenge: "A Call to Action": 2011 Public Report. URL: http://www.cpab-ccrc.ca/Documents/Topics/Public%20Reports/2011%20Public_Report_EN_FNL_tag.pdf, accessed on: 06.08.2014.

Craft, Jana L. (2013): A Review of the Empirical Ethical Decision-Making Literature: 2004–2011. In: Journal of Business Ethics, 117 (2): 221-259.

Craig, Edward (*ed.*) (2005): The Shorter Routledge Encyclopedia of Philosophy. London et al.: Routledge.

Cronbach, Lee J. (1951): Coefficient Alpha and the Internal Structure of Test. In: Psychometrika, 16 (3): 297-334.

Cropley, Arthur (2006): In Praise of Convergent Thinking. In: Creativity Research Journal, 18 (3): 391-404.

Crosby, Michael A. (1981): Bayesian Statistics in Auditing: A Comparison of Probability Elicitation Techniques. In: The Accounting Review, 56 (2): 355.

Crowne, Douglas P./Marlowe, David (1960): A New Scale of Social Desirability Independent of Psychopathology. In: Journal of Consulting Psychology, 24 (4): 349-354.

Cuccia, Andrew D./Mc Gill, Gary A. (2000): The Role of Decision Strategies in Understanding Professionals' Susceptibility to Judgment Biases. In: Journal of Accounting Research, 38 (2): 419-435.

Cuccia, Andrew D./Hackenbrack, Karl/Nelson, Mark W. (1995): The Ability of Professional Standards to Mitigate Aggressive Reporting. In: The Accounting Review, 70 (2): 227-248.

Curtis, Mary B./Taylor, Eileen Z. (2009): Whistleblowing in Public Accounting: The Influence of Identity Disclosure, Situational Context and Personal Characteristics In: Accounting and the Public Interest, 9: 191-220.

Cushing, Barry E. (2000): Economic Analysis of Skepticism in an Audit Setting. In: Solomon, I./Peecher, M. E. (eds.): Proceedings of the 14th Symposium on Auditing Research at the University of Illinois at Urbana-Champaign: 1-3.

Cushing, Barry E./Ahlawat, Sunita S. (1996): Mitigation of Recency Bias in Audit Judgment: The Effect of Documentation. In: Auditing: A Journal of Practice & Theory, 15 (2): 110-122.

Dalal, Dev K./Zickar, Michael J. (2012): Some Common Myths About Centering Predictor Variables in Moderated Multiple Regression and Polynomial Regression. In: Organizational Research Methods, 15 (3): 339-362.

Damien, Paulet al. (2013): Bayesian Theory and Applications. Oxford: Oxford University Press.

Dani, D. N. (1989): Scientific Attitude and Cognitive Styles. New Delhi: Northern Book Centre.

Daniel, Shirley J. (1988): Some Empirical Evidence about the Assessment of Audit Risk in Practice. In: Auditing: A Journal of Practice & Theory, 7 (2): 174-181.

David, F. N./Johnson, N. L. (1951): The Effect of Non-Normality on the Power Function of the F-Test in the Analysis of Variance. In: Biometrika, 38: 43-57.

Davis, Jon S./Solomon, Ira (1989): Experience, Expertise, and Expert-Performance Research in Public Accounting. In: Journal of Accounting Literature, 8: 150-164.

Davis, Larry R./Simon, Daniel T. (1992): The Impact of SEC Disciplinary Actions on Audit Fees. In: Auditing: A Journal of Practice & Theory, 11 (1): 58-68.

DeAngelo, Linda Elizabeth (1981a): Auditor Independence, 'Low Balling', and Disclosure Regulation. In: Journal of Accounting and Economics, 3 (2): 113-127.

DeAngelo, Linda Elizabeth (1981b): Auditor Size and Audit Quality. In: Journal of Accounting and Economics, 3: 183-199.

Deckers, Marc/Hermann, Christian (2013): Die kritische Grundhaltung des Abschlussprüfers (professional scepticism) – Verhaltensanforderung und Charaktereigenschaft im Fokus aktueller Regulierungsbestrebungen. In: Der Betrieb, 66 (41): 2315-2321.

Deis, Donald R., Jr./Giroux, Gary A. (1992): Determinants of Audit Quality in the Public Sector. In: The Accounting Review, 67 (3): 462-479.

Dennis, Ian (2013): The Nature of Professional Judgment in Auditing. Working Paper presented at the 7th EARNet Symposium in Trier, Germany.

Dennis, Sean/Johnstone, Karla M. (2014): Audit Partner Leadership Tone and Professional Skepticism in Fraud Brainstorming. Working Paper. URL: http://www3.nd.edu/~carecob/Workshops/13-14Workshops/Johnstone%20Paper.pdf, accessed on: 29.04.2014.

Dermer, Jerry D. (1973): Cognitive Characteristics and the Perceived Importance of Information. In: The Accounting Review, 48 (3): 511-519.

de Ruyter, Ko/Wetzels, Martin (1999): Commitment in Auditor–Client Relationships: Antecedents and Consequences. In: Accounting, Organizations and Society, 24 (1): 57-75.

Deutsch, Morton (1958): Trust and Suspicion. In: Journal of Conflict Resolution, 2: 265-279.

DeVellis, Robert F. (2003): Scale Development: Theory and Applications, 2nd edition. Thousand Oaks/London/New Delhi: Sage Publications.

Devolder, P. A. (1993): A Scale of Practical Problem-Solving Ability. In: Experimental Aging Research, 19 (2): 129-146.

DeZoort, F. Todd/Lord, Alan T. (1994): An Investigation of Obedience Pressure Effects on Auditors' Judgments. In: Behavioral Research in Accounting, 6 (Supplement): 1-30.

DeZoort, F. Todd/Lord, Alan T. (1997): A Review and Synthesis of Pressure Effects Research in Accounting. In: Journal of Accouting Literature, 16: 28-85.

Digman, John M. (1996): The Curious History of the Five-Factor Model. In: Wiggins, J. S. (ed.): The Five-Factor Model of Personality: Theoretical Perspectives. New York/London: The Guilford Press: 1-20.

Dilla, William N. et al. (1991): Predictive Bankruptcy Judgments by Auditors: A Probabilistic Approach. In: Ponemon, L. A./Gabhart, D. R. L. (eds.): Auditing: Advances in Behavioral Research. New York et al.: Springer-Verlag: 113-129.

Dillard, Jesse F./Kauffman, N. Leroy/Spires, Eric E. (1991): Evidence Order and Belief Revision in Management Accounting Decisions. In: Accounting, Organizations and Society, 16 (7): 619-633.

Dobbins, Gregory H./Lane, Irving M./Steiner, Dirk D. (1988): A Note on the Role of Laboratory Methodologies in Applied Behavioural Research: Don't Throw Out the Baby with the Bath Water. In: Journal of Organizational Behavior, 9 (3): 281-286.

Donnelly, David P./Quirin, Jeffrey J./O'Bryan, David (2003): Attitudes Toward Dysfunctional Audit Behavior: The Effects Of Locus Of Control, Organizational Commitment, and Position. In: The Journal of Applied Business Research, 19 (1): 95-107.

Dopuch, Nicholas/King, Ronald R./Schwartz, Rachel (2001): An Experimental Investigation of Retention and Rotation Requirements. In: Journal of Accounting Research, 39 (1): 93-117.

Doucet, Mary S./Doucet, Thomas A (1996): Commentary on Ethics, Experience and Professional Skepticism: A Situational Analysis. In: Behavioral Research in Accounting, 8 (Supplement): 158-168.

Doucet, Mary S./Hooks, Karen L. (1999): Toward an Equal Future. In: Journal of Accountancy, 187 (6): 71-76.

Douglas, Patricia Casey/Davidson, Ronald A./Schwartz, Bill N. (2001): The Effect of Organizational Culture and Ethical Orientation on Accountants' Ethical Judgments. In: Journal of Business Ethics, 34 (2): 101-121.

Duska, Ronald (2005): The Good Auditor - Skeptic or Wealth Accumulator? Ethical Lessons Learned from the Arthur Andersen Debacle. In: Journal of Business Ethics, 57 (1): 17-29.

Dworkin, Gerald (1988): The Theory and Practice of Autonomy. Cambridge: Cambridge University Press.

Eagly, Alice H. (1987): Sex Differences in Social Behavior: A Social-Role Interpretation. Hillsdale: Lawrence Erlbaum Associates.

Eagly, Alice H./Chaiken, Shelly (1993): The Psychology of Attitudes. Belmont: Wadsworth, Cengage Learning.

Earley, Christine E. (2001): Knowledge Acquisition in Auditing: Training Novice Auditors to Recognize Cue Relationships in Real Estate Valuation. In: The Accounting Review, 76 (1): 81-97.

Earley, Christine E. (2003): A Note on Self-Explanation as a Training Tool for Novice Auditors: The Effects of Outcome Feedback Timing and Level of Reasoning on Performance. In: Behavioral Research in Accounting, 15: 111-124.

Earley, Christine E./Hoffman, Vicky B./Joe, Jennifer R. (2008): Reducing Management's Influence on Auditors' Judgements: An Experimental Investigation of SOX 404 Assessments. In: The Accounting Review, 83 (6): 1461-1485.

Earley, P. Christopher et al. (1990): Impact of Process and Outcome Feedback on the Relation of Goal Setting to Task Performance. In: Academy of Management Journal, 33 (1): 87-105.

Edelmann, Walter/Wittmann, Simone (2012): Lernpsychologie, 7th edition. Weinheim: Beltz Verlag.

Eichenbaum, Howard (2004): An Information Processing Framework for Memory Representation by the Hippocampus. In: Gazzaniga, M. S. (ed.): The Cognitive Neurosciences. Cambridge: MIT Press: 679-690.

Eid, Michael/Luhmann, Maike (2012): Models of Measurement of Persons in Situations. In: Seel, N. M. (ed.): Encyclopedia of the Sciences of Learning. New York et al.: Springer: 2323-2325.

Einhorn, Hillel J. (1976): A Synthesis: Accounting and Behavioral Science. In: Journal of Accounting Research, 14 (Supplement): 196-206.

Einhorn, Hillel J./Hogarth, Robin M. (1978): Confidence in Judgment: Persistence of the Illusion of Validity. In: Psychological Review, 85 (5): 395-416.

Einhorn, Hillel J./Hogarth, Robin M. (1981): Behavioral Decision Theory: Processes of Judgment and Choice. In: Journal of Accounting Research, 19 (1): 1-31.

Einhorn, Hillel J./Hogarth, Robin M. (1985): A Contrast/Surprise Model for Updating Beliefs. Unpublished Manuscript. URL: http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA153937, accessed on: 21.03.2014.

Einhorn, Hillel J./Hogarth, Robin M. (1987): Adaptation and Inertia in Belief Updating: The Contrast-Inertia Model. Unpublished Manuscript.

Eining, Martha M./Jones, Donald R./Loebbecke, James K. (1997): Reliance on Decision Aids: An Examination of Auditors' Assessment of Management Fraud. In: Auditing: A Journal of Practice & Theory, 16 (2): 1-19.

Eisenhart, Churchill (1947): The Assumptions Underlying the Analysis of Variance. In: Biometrics, 3 (1): 1-21.

Elias, Rafik Z. (2002): Determinants of Earnings Management Ethics Among Accountants. In: Journal of Business Ethics, 40 (1): 33-45.

Elliott, Robert K. (2002): Twenty-First Century Assurance. In: Auditing: A Journal of Practice & Theory, 21 (1): 139-146.

Ellsberg, Daniel (1961): Risk, Ambiguity, and the Savage Axioms. In: Quarterly Journal of Economics, 75: 643-649.

El-Masry, El-Hussein E./Hansen, Kathryn A. (2008): Factors Affecting Auditors' Utilization of Evidential Cues: Taxonomy and Future Research Directions. In: Managerial Auditing Journal, 23 (1): 26-50.

Emby, Craig (1994): Framing and Presentation Mode Effects in Professional Judgment: Auditors' Internal Control Judgments and Substantive Testing Decisions. In: Auditing: A Journal of Practice & Theory, 13: 102-115.

Endrawes, Medhat /Monroe, Gary S. (2012): Professional Scepticism of Auditors: A Cross-Cultural Experiment. Working Paper. URL: http://www.unisa.edu.au/Global/business/centres/cags/docs/seminars/Medhat%20G%20Monroe%20paper%20June%2027%202012.pdf, accessed on: 20.05.2014.

Engler, Barbara (2014): Personality Theories, 9th edition. Belmont: Wadsworth.

Epley, Nicholas/Gilovich, Thomas (2005): When Effortful Thinking Influences Judgmental Anchoring: Differential Effects of Forewarning and Incentives on Self-Generated and Externally Provided Anchors. In: Journal of Behavioral Decision Making, 18 (3): 199-212.

Epley, Nicholas/Gilovich, Thomas (2006): The Anchoring-and-Adjustment Heuristic. In: Psychological Science, 17 (4): 311-318.

European Commission (2009): Impact of the Economic Crisis on Key Sectors of the EU – The Case of the Manufacturing and Construction Industries - October 2009 Update. URL: http://ec.europa.eu/enterprise/newsroom/cf/_getdocument.cfm?doc_id=5509, accessed on: 29.04.2014.

European Commission (2010a): Green Paper - Audit Policy: Lessons from the Crisis. URL: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0561:FIN:EN:PDF, accessed on: 13.11.2013.

European Commission (2010b): Impact of the Economic Crisis on Key Sectors of the EU – The Case of the Manufacturing and Construction Industries. URL: http://ec.europa.eu/enterprise/newsroom/cf/_getdocument.cfm?doc_id=5633, accessed on: 29.04.2014.

Evans, Jonathan St. B. T. (2008): Dual-Processing Accounts of Reasoning, Judgment, and Social Cognition. In: Annual Review of Psychology, 59: 255-278.

Evans, Jonathan St. B. T. (2013a): Dual-Process Theories of Deductive Reasoning: Facts and Fallacies. In: Holyoak, K. J./Morrison, R. G. (eds.): The Oxford Handbook of Thinking and Reasoning. Oxford et al.: Oxford University Press: 115-133.

Evans, Jonathan St. B. T. (2013b): Reasoning, Rationality and Dual Processes: Selected Works of Jonathan St B.T. Evans. Hove/New York: Psychology Press.

Eynon, Gail et al. (1996): An International Comparison of Ethical Reasoning Abilities: Accounting Students from Ireland and the United States. In: Journal of Accounting Education, 14 (4): 477-492.

Eysenck, Michael W./Keane, Mark T. (2010): Cognitive Psychology: A Students' Handbook, 6th edition. Hove/New York: Psychology Press.

Fahrer, Marion (2012): Gathering the Evidence. In: Charter: Journal of the Institute of Chartered Accountants in Australia, 83 (8): 30-32.

Fahrmeir, Ludwig et al. (2007): Statistik: Der Weg zur Datenanalyse, 6th edition. Berlin/Heidelberg: Springer-Verlag.

Falk, Haimet al. (1999): Auditor Independence, Self-Interested Behavior and Ethics: Some Experimental Evidence. In: Journal of Accounting and Public Policy, 18 (4–5): 395-428.

Farag, Magdy S./Elias, Rafik Z. (2012): The Impact of Accounting Students' Professional Skepticism on Their Ethical Perception of Earnings Management. In: Research on Professional Responsibility and Ethics in Accounting, 16: 185-200.

Farmer, Timothy A./Rittenberg, Larry E./Trompeter, Gregory M. (1987): An Investigation of the Impact of Economic and Organizational Factors on Auditor Independence. In: Auditing: A Journal of Practice & Theory, 7 (1): 1-14.

Favere-Marchesi, Michael (2006): "Order Effects" Revisited: The Importance of Chronology. In: Auditing: A Journal of Practice & Theory, 25 (1): 69-83.

Favere-Marchesi, Michael/Emby, Craig E. N. (2005): The Impact of Continuity on Concurring Partner Reviews: An Exploratory Study. In: Accounting Horizons, 19 (1): 1-10.

Fein, Steven/Hilton, James L. (1994): Judging Others in the Shadow of Suspicion. In: Motivation and Emotion, 18 (2): 167-198.

Feist, Gregory J. (2006): The Psychology of Science and the Origins of the Scientific Mind. New Haven/London: Yale University Press.

Felix, William L. (1974): A Decision Theory View of Auditing. In: Stettler, H. (ed.): Contemporary Auditing Problems: Proceedins of the Touche Ross/University of Kansas Symposium on Auditing Problems. Kansas: University of Kansas: 63-71.

Felix, William L./Kinney, William R. (1982): Research in the Auditor's Opinion Formulation Process: State of the Art. In: The Accounting Review, 57 (2): 245-271.

Fernberger, Samuel W. (1920): Interdependence of Judgments within the Series for the Method of Constant Stimuli. In: Journal of Experimental Psychology, 3 (2): 126-150.

Field, Andy (2009): Discovering Statistics Using SPSS, 3rd edition. London et al.: Sage Publications.

Field, Andy (2013): Discovering Statistics using IBM SPSS Statistics, 4th edition. London et al.: Sage Publications.

Findley, Maureen J./Cooper, Harris M. (1983): Locus of Conrol and Academic Achievement: A Literature Review. In: Journal of Personality and Social Psychology, 44 (2): 419-427.

Fink, Arlene (1995): How to Analyze Survey Data. Thousand Oaks/London/New Delhi: Sage Publications.

Finucane, Melissa L. et al. (2000): The Affect Heuristic in Judgments of Risks and Benefits. In: Journal of Behavioral Decision Making, 13: 1-17.

Firth, Michael (1990): Auditor Reputation: The Impact of Critical Reports Issued by Government Inspectors. In: Journal of Economics, 21 (3): 374-387.

Fischhoff, Baruch (1975): Hindsight ≠ Foresight: The Effect of Outcome Knowledge on Judgment under Uncertainty. In: Journal of Experimental Psychology: Human Perceptions and Performance, 1: 288-299.

Fischhoff, Baruch (1982): Debiasing. In: Kahneman, D./Slovic, P./Tversky, A. (eds.): Judgment under Uncertainty: Heuristics and Biases. Cambridge et al.: Cambridge University Press: 335-351.

Fischhoff, Baruch/Slovic, Paul/Lichtenstein, Sarah (1977): Knowing with Certainty: The Appropriateness of Extreme Confidence. In: Journal of Experimental Psychology, 3 (4): 552-564.

Fiske, Susan T. (1980): Attention and Weight in Person Perception: The Impact of Negative and Extreme Behavior. In: Journal of Personality and Social Psychology, 38 (6): 889-906.

Fiske, Susan T./Taylor, Shelly E. (2008): Social Cognition: From Brains to Culture. New York: McGraw-Hill.

Fleming, James S./Courtney, Barbara E. (1984): The Dimensionality of Self-Esteem II: Hierarchical Facet Model for Revised Measurement Scales. In: Journal of Personality and Social Psychology, 46 (2): 404–421.

Fodor, Jerry A. (1983): The Modularity of Mind, 2nd print. Cambridge/London: MIT Press.

Fogelin, Robert J. (1994): Pyrrhonian Reflections on Knowledge and Justification. New York: Oxford University Press.

Ford, Gary T./Smith, Darlene B./Swasy, John L. (1990): Consumer Skepticism of Advertising Claims: Testing Hypotheses from Economics of Information. In: Journal of Consumer Research, 16 (4): 433-441.

Forehand, Mark R./Grier, Sonya (2003): When Is Honesty the Best Policy? The Effect of Stated Company Intent on Consumer Skepticism. In: Journal of Consumer Psychology, 13 (3): 349.

Fornelli, Cindy/Desmond, Angela (2011): The Art of Skepticism. URL: http://www.directorship.com/the-art-of-skepticism/, accessed on: 16.9.2013.

Forsman, Lennart/Johnson, Maarit (1996): Dimensionality and Validity of Two Scales Measuring Different Aspects of Self-Esteem. In: Scandinavian Journal of Psychology, 37: 1–15.

Forsyth, Donelson R. (1980): A Taxonomy of Ethical Ideologies. In: Journal of Personality and Social Psychology, 39 (1): 175-184.

Francis, Jere R. (2011a): A Framework for Understanding and Researching Audit Quality. In: Auditing: A Journal of Practice & Theory, 30 (2): 125-152.

Francis, Jere R. (2011b): Auditing without Borders. In: Accounting, Organizations and Society, 36 (4): 318-323.

Frankel, Richard M./Johnson, Marilyn F./Nelson, Karen K. (2002): The Relation between Auditors' Fees for Nonaudit Services and Earnings Management. In: The Accounting Review, 77 (4): 71-105.

Franzel, Jeanette M. (2013): Auditor Objectivity and Skepticism – What's Next? URL: http://pcaobus.org/News/Speech/Pages/08052013_AAA.aspx, accessed on: 21.9.2013.

FRC (2010): Auditor Scepticism: Raising the Bar. URL: http://www.frc.org.uk/getattachment/2a1e0146-a92c-4b7e-bf33-305b3b10fcd2/Discussion-Paper-Auditor-Scepticism-Raising-the-Ba.aspx, accessed on: 06.02.2013.

FRC (2012): Professional Scepticism: Establishing a Common Understanding and Reaffirming its Central Role in Delivering Audit Quality. URL: http://www.frc.org.uk/Our-Work/Publications/APB/Briefing-Paper-Professional-Scepticism.aspx, accessed on 06.03.2014.

FRC (2013): Audit Quality Inspections: Annual Report 2012/13. URL: http://www.frc.org.uk/Our-Work/Publications/Audit-Quality-Review/Audit-Quality-Inspections-Annual-Report-2012-13.aspx, accessed on: 25.07.2013.

Frederick, David M. (1991): Auditors' Representation and Retrieval of Internal Control Knowledge. In: The Accounting Review, 66 (2): 240-258.

Frisch, Deborah (1993): Reasons for Framing Effects In: Organizational Behavior and Human Decision Processes, 54: 399-429.

Fromlet, Hubert (2001): Behavioral Finance - Theory and Practical Application. In: Business Economics, 36 (3): 63-69.

Fuchs, Stephan (2001): Against Essentialism: A Theory of Culture and Society. Cambridge: Harvard University Press.

Fukukawa, Hironori/Mock, Theodore J. (2011): Does Assertion Framing Affect Professional Skepticism? Working Paper presented at the 2011 International Symposium on Audit Research in Quebec, Canada.

Fülbier, Rolf Uwe (2004): Wissenschaftstheorie und Betriebswirtschaftslehre In: Wirtschaftswissenschaftliches Studium, 33 (5): 266-271.

Fullerton, Rosemary R./Durtschi, Cindy (2004): The Effect of Professional Skepticism on the Fraud Detection Skills of Internal Auditors. Working Paper. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=617062, accessed on: 06.02.2014.

Gaertner, James F./Ruhe, John A. (1981): Job-Related Stress in Public Accounting. In: Journal of Accountancy, 151 (6): 68-74.

Galotti, Kathleen M. et al. (2009): Cognitive Psychology: In and Out of the Laboratory. Toronto: Nelson Education.

Garfield, Jay L. (1991): Introduction: Carving the Mind at Its Joints. In: Garfield, J. L. (ed.): Modularity in Knowledge and Representation and Natural-Language Understanding. Cambridge: MIT Press: 1-16.

Gavious, Ilanit (2007): Alternative Perspectives to Deal with Auditors' Agency Problem. In: Critical Perspectives on Accounting, 18 (4): 451-467.

Gazzaniga, Michael S. (1985): The Social Brain: Discovering the Networks of the Mind. New York: Basic Books.

Geiger, Marshall A./Raghunandan, K. (2002): Auditor Tenure and Audit Reporting Failures. In: Auditing: A Journal of Practice & Theory, 21 (1): 67-78.

Gelardi, Alexander M. G. (2010): Information Quantity and Order in Students' Tax Research Judgments. In: Asian Journal of Finance & Accounting, 2 (1): 25-45.

Gemünden, Hans Georg (1993): Informationsverhalten. In: Hauschildt, J./Grün, O. (eds.): Ergebnisse empirischer betriebswirtschaftlicher Forschung - Zu einer Realtheorie der Unternehmung. Stuttgart: Schäffer-Poeschel Verlag: 839-877.

Ghauri, Pervez N./Grønhaug, Kjell (2005): Research Methods in Business Studies: A Practical Guide, 3rd edition. Harlow: Financial Times Prentice Hall.

Gibbins, Michael (1984): Propositions about the Psychology of Professional Judgment in Public Accounting. In: Journal of Accounting Research, 22 (1): 103-125.

Gibbins, Michael/Newton, James D. (1994): An Empirical Exploration of Complex Accountability in Public Accounting. In: Journal of Accounting Research, 32 (2): 165-186.

Gigerenzer, Gerd (2007): Fast and Frugal Heuristics: The Tools of Bounded Rationality. In: Koehler, D. J./Harvey, N. (eds.): Blackwell Handbook of Judgment and Decision Making. Malden/Oxford/Carlton: Blackwell Publishing: 62-88.

Gilbert, Daniel T. (1991): How Mental Systems Believe. In: American Psychologist, 46 (2): 107-119.

Gilbert, Daniel T. (1999): What the Mind's Not. In: Chaiken, S./Trope, Y. (eds.): Dual-Process Theories in Social Psychology. New York: Guilford Press: 3-11.

Glass, Gene V./Peckham, Percy D./Sanders, James R. (1972): Consequences of Failure to Meet Assumptions Underlying the Fixed Effects Analyses of Variance and Covariance. In: Review of Educational Research, 42 (3): 237-288.

Glover, Steven M. (1997): The Influence of Time Pressure and Accountability on Auditors' Processing of Nondiagnostic Information. In: Journal of Accounting Research, 35 (2): 213-226.

Glover, Steven M./Prawitt, Douglas F. (2013): Enhancing Auditor Professional Skepticism. URL:http://www.thecaq.org/docs/research/skepticismreport.pdf,accessed on 24.05.2014.

Glynn, John J. (1985): Value for Money Auditing in the Public Sector. Englewood Cliffs: Prentice-Hall International.

Goffman, Erving (1959): The Presentation of Self in Everyday Life. Garden City: Doubleday Anchor Books.

Gold, Anna/Hunton, James E./Gomaa, Mohamed I. (2009): The Impact of Client and Auditor Gender on Auditors' Judgments. In: Accounting Horizons, 23 (1): 1-18.

Goldman, Arieh/Barlev, Benzion (1974): The Auditor-Firm Conflict of Interests: Its Implications for Independence. In: The Accounting Review, 49 (4): 707-718.

Goodwin, Jenny (1999): The Effects of Source Integrity and Consistency of Evidence on Auditors' Judgments. In: Auditing: A Journal of Practice & Theory, 18 (2): 1-16.

Gramling, Audrey A. (1999): External Auditors' Reliance on Work Performed by Internal Auditors: The Influence of Fee Pressure on This Reliance Decision. In: Auditing: A Journal of Practice & Theory, 18 (Supplement): 117-135.

Gravetter, Frederick J/Wallnau, Larry B. (2012): Essentials of Statistics for the Behavioral Sciences, 8th edition. Belmont: Wadswoth, Cengage Learning.

Greco, John (2008): Introduction. In: Greco, J. (ed.): The Oxford Handbook of Skepticism. Oxford et al.: Oxford University Press: 3-6.

Green, Sharon Weiner/Wolf, Ira K. (2011): Barron's New GRE Graduate Record Examination, 19th edition. Hauppauge: Barron Educational Service.

Green, Wendy (2008): Are Industry Specialists More Efficient and Effective in Performing Analytical Procedures? A Multi-stage Analysis. In: International Journal of Auditing, 12 (3): 243-260.

Grenier, Jonathan H. (2013): Encouraging Professional Skepticism in the Industry Specialization Era. Working Paper. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1533622, accessed on: 19.12.2013.

Griffin, Dale/Tversky, Amos (1992): The Weighing of Evidence and the Determinants of Confidence. In: Cognitive Psychology, 24: 411-435.

Gross, Richard (2009): Introduction to Basic Psychology. In: Puri, B./Treasaden, I. (eds.): Psychiatry: An Evidence-Based Text. Boca Raton: CRC Press: 127-136.

Gross, Richard (2012): Psychology: The Science of Mind and Behaviour, 6th edition. Abingdon: Hodder Education.

Grumet, Louis (2003): Through the Eyes of an Auditor: Trust and Verify. In: CPA Journal, 73 (1): 9-9.

Guilford, J. P. (1950): Creativity. In: American Psychologist, 5 (9): 444-454.

Guilford, J. P. (1959): Personality. New York: McGraw-Hill.

Guilford, J. P. (1967): The Nature of Human Intelligence. New York: McGraw-Hill.

Guiral, Andrés/Esteo, Francisco (2006): Are Spanish Auditors Skeptical in Going Concern Evaluations? In: Managerial Auditing Journal, 21 (6): 598-620.

Guiral-Contreras, Andrés/Gonzalo-Angulo, Jose A./Rodgers, Waymond (2007): Information Content and Recency Effect of the Audit Report in Loan Rating Decisions. In: Accounting and Finance, 47: 285-304.

Gul, Ferdinand A. (1983): A Note on the Relationship between Age, Experience, Cognitive Styles and Accountants' Decision Confidence. In: Accounting and Business Research, 14 (53): 85-88.

Gul, Ferdinand A. (1984): The Joint and Moderating Role of Personality and Cognitive Style on Decision Making. In: The Accounting Review, 59 (2): 264-277.

Gul, Ferdinand A. (1986): Tolerance for Ambiguity, Auditors' Opinions and Their Effects on Decision Making. In: Accounting and Business Research, 16 (62): 99-105.

Gul, Ferdinand A./Zaid, Omer (1981): Field Dependence and Accountants' Confidence in Decisions. In: Psychological Reports, 49: 949-950.

Habib, Ahsan (2012): Non-Audit Service Fees and Financial Reporting Quality: A Meta-Analysis. In: Abacus, 48 (2): 214-248.

Hackenbrack, Karl (1992): Implications of Seemingly Irrelevant Evidence in Audit Judgment. In: Journal of Accounting Research, 30 (1): 126-136.

Hackenbrack, Karl/Nelson, Mark W. (1996): Auditors' Incentives and Their Application of Financial Accounting Standards. In: The Accounting Review, 71 (1): 43-59.

Hair, Joseph F./Black, William C./Babin, Barry J. (2010): Multivariate Data Analysis: A Global Perspective, 7th edition. Upper Saddle River: Pearson Education.

Hallie, Philip P. (*ed.*) (1985): Sextus Empiricus: Selections from the Major Writings on Scepticism, Man & God. Indianapolis: Hackett Publishing.

Halpern, Diane F. (2013): Sex Differences in Cognitive Abilities, 4th edition. New York/Hove: Taylor & Francis.

Hammar, Äsa (2012): Convergent Thinking and Learning. In: Seel, N. M. (ed.): Encyclopedia of the Sciences of Learning. New York et al.: Springer: 811-812.

Hammersley, Jacqueline S. (2006): Pattern Identification and Industry-Specialist Auditors. In: The Accounting Review, 81 (2): 309-336.

Hammersley, Jacqueline S. (2011): A Review and Model of Auditor Judgments in Fraud-Related Planning Tasks. In: Auditing: A Journal of Practice & Theory, 30 (4): 101-128.

Hands, David S./Avons, S. E. (2001): Recency and Duration Neglect in Subjective Assessment of Television Picture Quality. In: Applied Cognitive Psychology, 15 (6): 639-657.

Handzic, Meliha (2004): Knowledge Management: Through the Technology Glass. Singapore: World Scientific Publishing.

Hardies, Kris/Breesch, Diane/Branson, Joel (2014): Do (Fe)Male Auditors Impair Audit Quality? Evidence from Going Concern Opinions. Working Paper. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1583206, accessed on: 05.08.2014.

Harding, Noel/Trotman, Ken T. (2011): Enhancing Professional Skepticism via the Fraud Brainstorming Discussion Outcomes. Working Paper.

Harlow, Lisa L. (2014): The Essence of Multivariate Thinking: Basic Themes and Methods, 2nd edition. New York/Hove: Routledge.

Harper, William L. (1976): Rational Conceptual Change. In: PSA (ed.): Proceedings of the Biennial Meeting of the Philosophy of Science Association: 462-494.

Hartmann, Frank (2005): The Effects of Tolerance for Ambiguity and Uncertainty on the Appropriateness of Accounting Performance Measures. In: Abacus, 41 (3): 241-264.

Harwell, Michael R. et al. (1992): Summarizing Monte Carlo Results in Methodological Research: The One- and Two-Factor Fixed Effects ANOVA Cases. In: Journal of Educational and Behavioral Statistics, 17 (4): 315-339.

Haskins, Mark E./Baglioni, A. J., Jr./Cooper, Cary L. (1990): An Investigation of the Sources, Moderators, and Psychological Symptoms of Stress Among Audit Seniors. In: Contemporary Accounting Research, 6 (2): 361-385.

Hastie, Reid (1980): Memory for Behavioral Information that Confirms or Contradicts a Personality Impression. In: Hastie, R. et al. (eds.): Person Memory : The Cognitive Basis of Social Perception. Hillsdale: Erlbaum: 155-177.

Hawkins, Scott A./Hastie, Reid (1990): Hindsight: Biased Judgments of Past Events After the Outcomes Are Known. In: Psychological Bulletin, 107: 311-327.

Hayes, John/Allinson, Christopher W. (1998): Cognitive Style and the Theory and Practice of Individual and Collective Learning in Organizations. In: Human Relations, 51 (7): 847-871.

Haynes, Christine M./Jenkins, J. Gregory/Nutt, Stacey R. (1998): The Relationship Between Client Advocacy and Audit Experience: An Exploratory Analysis. In: Auditing: A Journal of Practice & Theory, 17 (2): 88-104.

Heintz, James A./White, Gwendolen B. (1989): Auditor Judgment in Analytical Review: Some Further Evidence. In: Auditing: A Journal of Practice & Theory, 8 (2): 22-39.

Helmreich, Robert/Stapp, Joy (1974): Short Forms of the Texas Social Behavior Inventory (TSBI): An Objective Measure of Self-Esteem. In: Bulletin of the Psychonomic Society, 4 (5-A): 473-475.

Heninger, William G. (2001): The Association between Auditor Litigation and Abnormal Accruals. In: The Accounting Review, 76 (1): 111-126.

Hicks, Ernest L. (1974): Standards for the Attest Function. In: Journal of Accountancy, 138 (2): 39-45.

Highhouse, Scott/Gallo, Andrew (1997): Order Effects in Personnel Decision Making. In: Human Performance, 10 (1): 31-46.

Higson, Andrew (1997): Developments in Audit Approaches: From Audit Efficiency to Audit Effectiveness? In: Sherer, M./Turley, S. (eds.): Current Issues in Auditing, 3rd edition. London: Paul Chapman Publishing: 198-215.

Higson, Andrew (2003): Corporate Financial Reporting: Theory and Practice. London/Thousand Oaks/New Delhi: Sage Publications.

Hill, Gayle W. (1982): Group Versus Individual Performance: Are $N + 1$ Heads Better Than One? In: Psychological Bulletin, 91 (3): 517-539.

Hilton, James L./Fein, Steven /Miller, Dale T. (1993): Suspicion and Dispositional Inference. In: Personality and Social Psychology Bulletin, 19 (5): 501-512.

Hirschey, Mark (2009): Managerial Economics, 12th edition. Mason: South-Western, Cengage Learning.

Hite, Peggy A./Stock, Tobby (1996): Taxpayer Belief Revisions and the Importance of Controlling for Prior Beliefs. In: Advances in Taxation, 8: 81-99.

Ho, Joanna L./Chang, Chengyee Janie (1994): Does National Culture or Professional Knowledge Affect Auditors' Probabilistic Conjunction Judgments? A Study of the United States versus Taiwan. In: International Journal of Accounting, 29: 189-205.

Hoffman, Paul J./Slovic, Paul/Rorer, Leonard G. (1968): An Analysis-of-Variance Model for the Assessment of Configural Cue Utilization in Clinical Judgment. In: Psychological Bulletin, 69 (5): 338-349.

Hoffman, Vicky B./Patton, James M. (1997): Accountability, the Dilution Effect, and Conservatism in Auditors' Fraud Judgments. In: Journal of Accounting Research, 35 (2): 227-237.

Hoffrage, Ulrich (2004): Overconfidence. In: Pohl, R. F. (ed.): Cognitive Illusions: A Handbook on Fallacies and Biases in Thinking, Judgment and Memory. Hove/New York: Psychology Press: 235-254.

Hofstede, Geert H. (1980): Culture's Consequences: International Differences of Work Related Values. Beverly Hills: Sage Publications.

Hofstede, Geert H. (2001): Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations, 2nd edition. Thousand Oaks: Sage Publications.

Hogan, Chris E. et al. (2008): Financial Statement Fraud: Insights from the Academic Literature. In: Auditing: A Journal of Practice & Theory, 27 (2): 231-252.

Hogarth, Robin M./Einhorn, Hillel J. (1992): Order Effects in Belief Updating: The Belief-Adjustment Model. In: Cognitive Psychology, 24: 1-55.

Hogarth, Robin M./Reder, Melvin W. (1986): Introduction: Perspectives from Economics and Psychology. In: Hogarth, R. M./Reder, M. W. (eds.): Rational Choice – The Contrast Between Economics and Psychology. Chicago/London: University of Chicago Press: 1–23.

Holt, Charles A./Smith, Angela M. (2009): An Update on Bayesian Updating. In: Journal of Economic Behavior & Organization, 69: 125-134.

Hookway, Christoper (1990): Scepticism. London/New York: Routledge.

Hosmer, Larue Tone (1994): Strategic Planning as if Ethics Mattered. In: Strategic Management Journal, 15: 17-34.

Houston, Richard W. (1999): The Effects of Fee Pressure and Client Risk on Audit Seniors' Time Budget Decisions. In: Auditing: A Journal of Practice & Theory, 18 (2): 70-86.

Hronsky, Jane J. F./Houghton, Keith A. (2001): The Meaning of a Defined Accounting Concept: Regulatory Changes and the Effect on Auditor Decision Making. In: Accounting, Organizations and Society, 26 (2): 123-139.

Huemer, Michael (2001): Skepticism and the Veil of Perception. Lanham: Rowman & Littlefield.

Hughes, Susan B. et al. (2009): The Impact of Cultural Environment on Entry-level Auditors' Abilities to Perform Analytical Procedures. In: Journal of International Accounting, Auditing and Taxation, 18: 29-43.

Hume, David (1748): An Enquiry Concerning Human Understanding, reprint edition 1999 (edited by Beauchamp, T. L.). Oxford et al.: Oxford University Press.

Hurtt, R. Kathy (2010): Development of a Scale to Measure Professional Skepticism. In: Auditing: A Journal of Practice & Theory, 29 (1): 149-171.

Hurtt, R. Kathy/Eining, Martha/Plumlee, R. David (2010): Linking Professional Skepticism to Auditors' Behaviors. Working Paper. URL: http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCcQFjAA&url=http%3A%2F%2Fwww.profbailey.com%2Fseminar%2FReadings%2FSkepticism%2FLinking%2520Professional%2520Skepticism.doc&ei=GZbjU-GFO-XRywPKzICwAw&usg=AFQjCNGg7IuGDb5G8Wwn68moO6s58jGjsQ&sig2=f-pY1UYr81r8FJ7azd3fGg&bvm=bv.72676100,d.bGE, accessed on: 08.02.2014.

Hurtt, R. Kathy et al. (2013): Research on Auditor Professional Skepticism: Literature Synthesis and Opportunities for Future Research. In: Auditing: A Journal of Practice & Theory, 32 (Supplement 1): 45-97.

Hyatt, Troy A./Prawitt, Douglas F. (2001): Does Congruence between Audit Structure and Auditors' Locus of Control Affect Job Performance? In: The Accounting Review, 76 (2): 263-274.

IAASB (2012): Professional Skepticism in an Audit of Financial Statements - Staff Questions and Answers. URL: http://www.ifac.org/sites/default/files/publications/files/IAASB%20Professional%20Skepticism%20QandA-final.pdf, accessed on: 06.02.2013.

IAASB (2013): Handbook of International Quality Control, Auditing Review, Other Assurance, and Related Services Pronouncements - Volume I. New York: IFAC.

IFIAR (2013): Annual Report and Accounts 2012. URL: https://www.ifiar.org/IFIAR/media/Documents/General/About%20Us/IFIAR%20Member%20Updates%202013/IFIAR-Annual-Report-2012.pdf, accessed on: 29.07.2013.

James, William (1890): The Principles of Psychology, Volume 2, reprint edition 2010. New York: Digireads.com Publishing.

James, William (1912): The Will to Believe: And Other Essays in Popular Philosophy, reprint edition 2010. Portland: Floating Press.

Janvrin, Diane/Bierstaker, James/Lowe, D. Jordan (2008): An Examination of Audit Information Technology Use and Perceived Importance. In: Accounting Horizons, 22 (1): 1-21.

Jeffrey, Cynthia/Dilla, William/Weatherholt, Nancy (2004): The Impact of Ethical Development and Cultural Constructions on Auditor Judgments: A Study of Auditors in Taiwan. In: Business Ethics Quarterly, 14 (3): 553-579.

Jennings, Daniel E./Zeithaml, Carl P. (1983): Locus of Control: A Review and Directions for Entrepreneurial Research. Academy of Management Proceedings: 417-421.

Jiambalvo, James/Waller, William (1984): Decomposition and Assessments of Audit Risk. In: Auditing: A Journal of Practice & Theory, 3 (2): 80-88.

Johnson, Eric N. (1995): Effects of Information Order, Group Assistance, and Experience on Auditors' Sequential Belief Revision. In: Journal of Economic Psychology, 16: 137-160.

Johnson, Oliver A. (1978): Skepticism and Cognitivism: A Study in the Foundations of Knowledge. Berkeley/Los Angeles/London: University of California Press.

Johnson, Van E./Kaplan, Steven E. (1991): Experimental Evidence on the Effects of Accountability on Auditor Judgments. In: Auditing: A Journal of Practice & Theory, 10 (Supplement): 96-107.

Johnson, Van E./Khurana, Inder K./Reynolds, J. Kenneth (2002): Audit-Firm Tenure and the Quality of Financial Reports. In: Contemporary Accounting Research, 19 (4): 637-660.

Johnstone, Karla M./Sutton, Michael H./Warfield, Terry D. (2001): Antecedents and Consequences on Independence Risk: Framework for Analysis. In: Accounting Horizons, 15 (1): 1-18.

Jones, Joanne/Massey, Dawn W./Thorne, Linda (2003): Auditors' Ethical Reasoning: Insights from Past Research and Implications for the Future. In: Journal of Accounting Literature, 22: 45-103.

Jonnergård, Karin/Stafsudd, Anna/Elg, Ulf (2010): Performance Evaluations as Gender Barriers in Professional Organizations: A Study of Auditing Firms. In: Gender, Work & Organization, 17 (6): 721-747.

Joyce, Edward J. (1976): Expert Judgment in Audit Program Planning. In: Journal of Accounting Research, 14 (Supplement): 29-60.

Joyce, Edward J./Biddle, Gary C. (1981): Anchoring and Adjustment in Probabilistic Inference in Auditing. In: Journal of Accounting Research, 19 (1): 120-145.

Junaidi/Miharjo, Setiyono/Hartadi, Bambang (2012): Does Auditor Tenure Reduce Audit Quality? In: Gadjah Mada International Journal of Business, 14 (3): 303-315.

Kachelmeier, Steven J./Messier, William F., Jr. (1990): An Investigation of the Influence of a Nonstatistical Decision Aid on Auditor Sample Size Decisions. In: The Accounting Review, 65 (1): 209-226.

Kahle, Jennifer/Pinsker, Robert/Pennington, Robin (2005): Belief Revision in Accounting: A Literature Review of the Belief-Adjustment Model. In: Advances in Accounting Behavioral Research, 8: 1-40.

Kahneman, Daniel (1973): Attention and Effort. Englewood Cliffs: Prentice-Hall.

Kahneman, Daniel (2003a): A Psychological Perspective on Economics. In: The American Economic Review, 93 (2): 162-168.

Kahneman, Daniel (2003b): Maps of Bounded Rationality: Psychology for Behavioral Economics. In: The American Economic Review, 93 (5): 1449-1475.

Kahneman, Daniel (2011): Thinking, Fast and Slow. London: Penguin Books.

Kahneman, Daniel/Frederick, Shane (2002): Representativeness Revisited: Attribute Substitution in Intuitive Judgment. In: Gilovich, T./Griffin, D./Kahneman, D. (eds.): Heuristics and Biases: The Psychology of Intuitive Judgment. Cambridge et al.: Cambridge University Press: 49-81.

Kahneman, Daniel/Frederick, Shane (2005): A Model of Heuristic Judgment. In: Holyoak, K. J./Morrison, R. G. (eds.): Cambridge Handbook of Thinking and Reasoning. New York: Cambridge University Press: 267-293.

Kalat, James W. (2012): Biological Psychology, 11th edition. Belmont: Wadsworth, Cengage Learning.

Kao, Jennifer L./Li, Yan/Zhang, Wenjun (2013): Has SOX Enhanced Non-Big 4 Auditors' Ability to Deal with Client Pressure? In: Accounting Perspectives, 12 (2): 141-164.

Kaplan, Steven E./Reckers, Philip M. J. (1984): An Empirical Examination of Auditors' Initial Planning Processes. In: Auditing: A Journal of Practice & Theory, 4 (1): 1-19.

Karni, Edi (2013): Axiomatic Foundations of Expected Utility and Subjective Probability. In: Machina, M./Viscusi, W. K. (eds.): Handbook of the Economics of Risk and Uncertainty. Oxford/Amsterdam: North-Holland.

Kaufman, Bruce E. (1999): Expanding the Behavioral Foundations of Labor Economics. In: Industrial and Labor Relations Review, 52 (3): 361-392.

Kayadelen, Engin (2007): Zur Durchführung von analytischen Prüfungshandlungen im Rahmen der Jahresabschlussprüfung. Dissertation, Technische Universität Darmstadt. URL: http://tuprints.ulb.tu-darmstadt.de/epda/000971/DissertationKayadelen.pdf, accessed on: 21.04.2014.

Kee, Herbert W./Knox, Robert E. (1970): Conceptual and Methodological Considerations in the Study of Trust and Suspicion. In: The Journal of Conflict Resolution, 14 (3): 357-366.

Kelley, Tim/Margheim, Loren (1990): The Impact of Time Budget Pressure, Personality, and Leadership Variables on Dysfunctional Auditor Behavior. In: Auditing: A Journal of Practice & Theory, 9 (2): 21-42.

Keltz, Ilean K./Adelman, Leonard (2008): Testing Information Order Effects in a Long Series of Evidence. In: Engineering Management Journal, 20 (2): 22-29.

Kennedy, Jane (1993): Debiasing Audit Judgment with Accountability: A Framework and Experimental Results. In: Journal of Accounting Research, 31 (2): 231-245.

Kennedy, Jane (1995): Debiasing the Curse of Knowledge in Audit Judgment. In: The Accounting Review, 70 (2): 249-273.

Kennedy, Jane/Peecher, Mark E. (1997): Judging Auditors' Technical Knowledge. In: Journal of Accounting Research, 35 (2): 279-293.

Kennedy, Robert S. et al. (2005): Quantifying Human Information Processing (QHIP): Can Practice Effects Alleviate Bottlenecks? In: McBride, D. K./Schmorrow, D. (eds.): Quantifying Human Information Processing. Lanham/Oxford: Lexington Books: 91-115.

Keppel, Geoffrey (1973): Design and Analysis: A Researcher's Handbook. Englewood Cliffs: Prentice-Hall.

Keren, Gideon (2011): On the Definition and Possible Underpinnings of Framing Effects: A Brief Review and a Ciritical Evaluation. In: Keren, G. (ed.): Perspectives on Framing. New York/Hove: Psychology Press: 3-34.

Keren, Gideon/Schul, Yaacov (2009): Two Is Not Always Better Than One: A Critical Evaluation of Two-System Theories. In: Perspectives on Psychological Science, 4 (6): 533-550.

Keren, Gideon/Teigen, Karl H. (2007): Yet Another Look at the Heuristics and Biases Approach. In: Koehler, D. J./Harvey, N. (eds.): Blackwell Handbook of Judgment and Decision Making. Malden/Oxford/Carlton: Blackwell Publishing: 89-109.

Kerler, William A./Killough, Larry N. (2009): The Effects of Satisfaction with a Client's Management During a Prior Audit Engagement, Trust, and Moral Reasoning on Auditors' Perceived Risk of Management Fraud. In: Journal of Business Ethics, 85 (2): 109-136.

Kerlinger, Fred N./Lee, Howard B. (2000): Foundations of Behavioral Research, 4th edition. Singapore et al.: Wadsworth, Thomson Learning.

Kerr, David S./Ward, D. Dewey (1994): The Effects of Audit Task on Evidence Integration and Belief Revision. In: Behavioral Research in Accounting, 6: 21-42.

Kerstholt, José H./Jackson, Janet L. (1998): Judicial Decision Making: Order of Evidence Presentation and Availability of Background Information. In: Applied Cognitive Psychology, 12 (5): 445-454.

Kida, Thomas (1984): The Impact of Hypothesis-Testing Strategies on Auditors' Use of Judgment Data. In: Journal of Accounting Research, 22 (1): 332-340.

King, Ronald (1991): Using Experimental Economics in Auditing Research. In: Ponemon, L. A./Gabhart, D. R. L. (eds.): Auditing: Advances in Behavioral Research. New York et al.: Springer-Verlag: 93-112.

Kinney, William R. (1975): A Decision-Theory Approach to the Sampling Problem in Auditing. In: Journal of Accounting Research, 13 (1): 117-132.

Kinney, William R. (1994): Audit Litigation Research: Professional Help is Needed. In: Accounting Horizons, 8 (2): 80-86.

Kinney, William R., Jr./Uecker, Wilfred C. (1982): Mitigation of the Consequences of Anchoring in Auditor Judgments. In: The Accounting Review, 57 (1): 55-69.

Kinney, William R., Jr./Palmrose, Zoe-Vonna/Scholz, Susan (2004): Auditor Independence, Non-Audit Services, and Restatements: Was the U.S. Government Right? In: Journal of Accounting Research, 42 (3): 561-588.

Kirk, Roger E. (2013): Experimental Design: Procedures for the Behavioral Sciences, 4th edition. Thousand Oaks: Sage Publications.

Kleinbaum, David et al. (2008): Applied Regression Analysis and Other Multivariable Methods, 4th edition. Belmont: Thomson.

Kleinmuntz, Don N. (1990): Decomposition and the Control of Error in Decision-Analytic Models. In: Hogarth, R. M. (ed.): Insights in Decision Making: A Tribute to Hillel J. Einhorn. Chicago/London: The University of Chicago Press: 107-126.

Kluemper, Donald H./Little, Laura M./DeGroot, Timothy (2009): State or Trait: Effects of State Optimism on Job-Related Outcomes. In: Journal of Organizational Behavior, 30 (2): 209-231.

Kluger, Avraham N./DeNisi, Angelo (1996): The Effects of Feedback Interventions on Performance: A Historical Review, a Meta Analysis, and a Preliminary Feedback Intervention Theory. In: Psychological Bulletin, 119 (2): 254-284.

Kluger, Avraham N./DeNisi, Angelo (1998): Feedback Interventions: Toward the Understanding of a Double-Edged Sword. In: Current Directions in Psychological Science, 7 (3): 67-72.

Knapp, Carol A./Knapp, Michael C. (2001): The Effects of Experience and Explicit Fraud Risk Assessment in Detecting Fraud with Analytical Procedures. In: Accounting, Organizations and Society, 26 (1): 25-37.

Knapp, Michael C. (1985): Audit Conflict: An Empirical Study of the Perceived Ability of Auditors to Resist Management Pressure. In: The Accounting Review, 60 (2): 202-211.

Knechel, W. Robert/Vanstraelen, Ann (2007): The Relationship between Auditor Tenure and Audit Quality Implied by Going Concern Opinions. In: Auditing: A Journal of Practice & Theory, 26 (1): 113-131.

Knechel, W. Robert et al. (2013): Audit Quality: Insights from the Academic Literature. In: Auditing: A Journal of Practice & Theory, 32: 385-421.

Knoblett, James A. (1970): The Applicability of Bayesian Statistics in Auditing. In: Decision Sciences, 1: 423-440.

Koch, Christopher/Schunk, Daniel (2013): Limiting Liability? - Risk and Ambiguity Attitudes under Real Losses. In: sbr, 65 (1): 54-75.

Koch, Christopher/Wüstemann, Jens (2009): Review of Bias Research in Auditing: Opportunities for Combining Psychological and Economic Research. Working Paper. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1032961, accessed on: 13.06.2014.

Kochetova-Kozloski, Natalia/Messier, William F., Jr./Eilifsen, Aasmund (2011): Improving Auditors' Fraud Judgments Using a Frequency Response Mode. In: Contemporary Accounting Research, 28 (3): 837-858.

Kohlberg, Lawrence (1958): The Development of Modes of Moral Thinking and Choice in the Years 10 to 16. Chicago: University of Chicago.

Kohlberg, Lawrence (1984): Essays on Moral Development, Volume 2: Psychology of Moral Development. San Francisco: Harper & Row.

Köhler, Annette G. et al. (2008): Audit Regulation in Germany: Improvements Driven by Internationalization. In: Quick, R./Turley, S./Willekens, M. (eds.): Auditing, Trust and Governance: Regulation in Europe. London/New York: Routledge: 111-143.

Koonce, Lisa/Anderson, Urton/Marchant, Garry (1995): Justification of Decisions in Auditing. In: Journal of Accounting Research, 33 (2): 369-384.

Kornmeier, Martin (2007): Wissenschaftstheorie und wissenschaftliches Arbeiten – Eine Einführung für Wirtschaftswissenschaftler. Heidelberg: Physica-Verlag.

Koslow, Scott (2000): Can the Truth Hurt? How Honest and Persuasive Advertising Can Unintentially Lead to Increased Consumer Skepticism. In: Journal of Consumer Affairs, 34 (2): 245-268.

Kotchetova, Natalia/Salterio, Steven (2007): Judgment and Decision-Making Accounting Research: A Quest to Improve the Production, Certification, and Use of Accounting Information. In: Koehler, D. J./Harvey, N. (eds.): Blackwell Handbook of Judgment and Decision Making. Malden/Oxford/Carlton: Blackwell Publishing: 547-566.

Kowalczyk, Tamara K./Wolfe, Christopher J. (1998): Anchoring Effects Associated with Recommendations from Expert Decision Aids: An Experimental Analysis In: Behavioral Research in Accounting, 10 (Supplement): 147-169.

Koziol, Leonard F./Budding, Deborah Ely (2009): Subcortical Structures and Cognition: Implications for Neuropsychological Assessment. New York: Springer.

KPMG (2011): Elevating Professional Judgment in Auditing and Accounting: The KPMG Professional Judgment Framework. Delaware: KPMG LLP.

Kramer, Roderick M. (1999): Trus and Distrust in Organizations: Emerging Perspectives, Enduring Questions. In: Annual Review of Psychology, 50: 569-598.

Krech, David/Crutchfield, Richard S. (1948): Theory and Problems of Social Psychology. New York: McGraw-Hill.

Krishnamoorthy, Ganesh/Mock, Theodore J./Washington, Mary T. (1999): A Comparative Evaluation of Belief Revision Models in Auditing. In: Auditing: A Journal of Practice & Theory, 18 (2): 105-127.

Krommes, Werner (2011): Handbuch Jahresabschlussprüfung: Ziele Technik Nachweise - Wegweiser zum sicheren Prüfungsurteil, 3rd edition. Wiesbaden: Gabler.

Krosnick, Jon A./Fabrigar, Leandre R. (1997): Designing Rating Scales for Effective Measurement in Surveys. In: Lyberg, L. et al. (eds.): Survey Measurement and Process Quality. New York: John Wiley & Sons: 141-164.

Kruglanski, Arie W. (1989): Lay Epistemics and Human Knowledge: Cognitive and Motivational Bases. New York/London: Plenum Press.

Kruglanski, Arie W. (1990): Motivations for Judging and Knowing: Implications for Causal Attribution. In: Higgins, E. T./Sorrentino, R. M. (eds.): The Handbook of Motivation and Cognition. Foundation of Social Behavior. New York: Guilford Press: 333-368.

Krull, George/Reckers, Philip M. J./Wong-On-Wing, Bernard (1993): The Effect of Experience, Fraudulent Signals and Information Presentation Order on Audtiors' Beliefs. In: Auditing: A Journal of Practice & Theory, 12 (2): 143-153.

Kühberger, Anton (1998): The Influence of Framing on Risky Decisions: A Meta-analysis. In: Organizational Behavior and Human Decision Processes, 75 (1): 23-55.

Kung, Fan-Hua /Huang, Cheng Li (2013): Auditors' Moral Philosophies and Ethical Beliefs. In: Management Decision, 51 (3): 479-500.

Kurtz, Paul (1992): The New Skepticism: Inquiry and Reliable Knowledge. Buffalo: Prometheus Books.

Kurtz, Paul (2001): Skepticism and Humanism: The New Paradigm. New Brunswick/London: Transaction Publishers.

Kutner, Michael H. et al. (2005): Applied Linear Statistical Models, 5th edition. Boston et al.: McGraw-Hill.

Lagerlund, Henrik (2010): A History of Skepticism in the Middle Ages. In: Lagerlund, H. (ed.): Rethinking the History of Skepticism: The Missing Medieval Background. Leiden: Brill: 1-28.

Lagnado, David (2011): Thinking about Evidence. In: Dawid, P./Twining, W./Vasaliki, M. (eds.): Evidence, Inference and Enquiry. Oxford et al.: Oxford University Press: 183-223.

Lammenranta, Markus (2008): The Pyrrhonian Problematic. In: Greco, J. (ed.): The Oxford Handbook of Skepticism. Oxford et al.: Oxford University Press: 9-33.

LaSalle, Randall E. (1997): Presentation Order Effects on Accounting Students' Ethical Judgments. In: Journal of Accounting Education, 15 (1): 19-38.

Latané, Bibb/Williams, Kipling/Harkins, Stephen (1979): Many Hands Make Light the Work: The Causes and Consequences of Social Loafing. In: Journal of Personality and Social Psychology, 37 (6): 823-832.

Latham, Claire Kamm/Linville, Mark (1998): A Review of the Literature in Audit Litigation. In: Journal of Accounting Literature, 17: 175-213.

Laws, D. J./O'Hagan, A. (2002): A Hierarchical Bayes Model for Multilocation Auditing. In: Journal of the Royal Statistical Society: Series D (The Statistician), 51 (4): 431-450.

Lee, Chih-Chen/Welker, Robert B./Wang, Te-Wei (2013): An Experimental Investigation of Professional Skepticism in Audit Interviews. In: International Journal of Auditing, 17 (2): 213-226.

Lee, Chi-Wen Jevons/Gu, Zhaoyang (1998): Low Balling, Legal Liability and Auditor Independence. In: The Accounting Review, 73 (4): 533-555.

Leigh, James H./Kinnear, Thomas C. (1980): On Interaction Classification. In: Educational and Psychological Measurement, 40 (4): 841-843.

Lerner, Jennifer S./Tetlock, Philip E. (1999): Accounting for the Effect of Accountability. In: Psychological Bulletin, 125 (2): 255-275.

Leung, Patrick W./Trotman, Ken T. (2005): The Effects of Feedback Type on Auditor Judgment Performance for Configural and Non-Configural Tasks. In: Accounting, Organizations and Society, 30 (6): 537-553.

Levi, Isaac (1977): Subjunctives, Dispositions and Chances. In: Synthese, 34 (4): 423-455.

Levi, Isaac (1991): The Fixation of Belief and Its Undoing: Changing Beliefs Through Inquiry. Cambridge/New York/Melbourne: Cambridge University Press.

Lewicki, Roy J./Bunker, Barbara Benedict (1996): Developing and Maintaining Trust in Work Relationships. In: Kramer, R. M./Tyler, T. R. (eds.): Trust in Organizations: Frontiers of Theory and Research. Thousand Oaks: Sage Publications: 114-139.

Li, Chan (2009): Does Client Importance Affect Auditor Independence at the Office Level? Empirical Evidence from Going-Concern Opinions. In: Contemporary Accounting Research, 26 (1): 201-230.

Libby, Robert (1981): Accounting and Human Information Processing: Theory and Applications. Englewood Cliffs: Prentice-Hall.

Libby, Robert (1985): Availability and the Generation of Hypotheses in Analytical Review. In: Journal of Accounting Research, 23 (2): 646-665.

Libby, Robert (1991): Experimental Research and the Distinctive Features of Accounting Settings. In: Ponemon, L. A./Gabhart, D. R. L. (eds.): Auditing: Advances in Behavioral Research. New York et al.: Springer-Verlag: 1-20.

Libby, Robert/Frederick, David M. (1990): Experience and the Ability to Explain Audit Findings. In: Journal of Accounting Research, 28 (2): 348-367.

Libby, Robert/Kinney, William R., Jr. (2000): Does Mandated Audit Communication Reduce Opportunistic Corrections to Manage Earnings to Forecasts? In: The Accounting Review, 75 (4): 383-404.

Libby, Robert/Lewis, Barry L. (1977): Human Information Processing Research in Accounting: The State of the Art. In: Accounting, Organizations and Society, 2 (3): 245-268.

Libby, Robert/Lewis, Barry L. (1982): Human Information Processing Research in Accounting: The State of the Art in 1982. In: Accounting, Organizations and Society, 7 (3): 231-285.

Libby, Robert/Libby, Patricia A. (1989): Expert Measurement and Mechanical Combination in Control Reliance Decisions. In: The Accounting Review, 64 (4): 729-747.

Libby, Robert/Lipe, Marlys Gascho (1992): Incentives, Effort, and the Cognitive Processes Involved in Accounting-Related Judgments. In: Journal of Accounting Research, 30 (2): 249-273.

Libby, Robert/Luft, Joan (1993): Determinants of Judgment Performance in Accounting Settings: Ability, Knowledge, Motivation, and Environment. In: Accounting, Organizations and Society, 18 (5): 425-450.

Libby, Robert/Tan, Hun-Tong (1994): Modeling the Determinants of Audit Expertise. In: Accounting, Organizations and Society, 19 (8): 701-716.

Libby, Robert/Bloomfield, Robert/Nelson, Mark W. (2002): Experimental Research in Financial Accounting. In: Accounting, Organizations and Society, 27: 775-810.

Lightner, Sharon M./Adams, Steven J./Lightner, Kevin M. (1982): The Influence of Situational, Ethical, and Expectancy Theory Variables on Accountants' Underreporting Behavior. In: Auditing: A Journal of Practice & Theory, 2 (1-12): 1.

Lightner, Sharon M./Leisenring, James J./Winters, Alan J. (1983): Underreporting Chargeable Time. In: Journal of Accountancy, 155 (1): 52-57.

Lim, Chee-Yeow/Tan, Hun-Tong (2010): Does Auditor Tenure Improve Audit Quality? Moderating Effects of Industry Specialization and Fee Dependence. In: Contemporary Accounting Research, 27 (3): 923-957.

Lipe, Marlys Gascho (2008): Discussion of "Judging Audit Quality in Light of Adverse Outcomes: Evidence of Outcome Bias and Reverse Outcome Bias". In: Contemporary Accounting Research, 25 (1): 275-282.

Litman, Jordan A. (2005): Curiosity and the Pleasures of Learning: Wanting and Liking New Information. In: Cognition & Emotion, 19 (6): 793-814.

Litman, Jordan A./Silvia, Paul J. (2006): The Latent Structure of Trait Curiosity: Evidence for Interest and Deprivation Curiosity Dimensions. In: Journal of Personality Assessment, 86 (3): 318-328.

Litwin, Mark S. (1995): How to Measure Survey Reliability and Validity. Thousand Oaks: Sage Publications.

Livesley, W. John/Jang, Kerry L./Vernon, Philip A. (2003): Genetic Basis of Personality Structure. In: Millon, T./Lerner, M. J. (eds.): Handbook of Psychology, Volume 5: Personality and Social Psychology. Hoboken: John Wiley & Sons: 59-83.

Lix, Lisa M./Keselman, Joanne C./Keselman, H. J. (1996): Consequences of Assumption Violations Revisited: A Quantitative Review of Alternatives to the One-Way Analysis of Variance "F" Test. In: Review of Educational Research, 66 (4): 579-619.

Loebbecke, James K./Eining, Martha M./Willingham, John J. (1989): Auditors' Experience with Material Irregularities: Frequency, Nature, and Detectability. In: Auditing: A Journal of Practice & Theory, 9 (1): 1-28.

Loewenstein, George (1999): Experimental Economics from the Vantage Point of Behavioural Economics. In: The Economic Journal, 109: F25-F34.

Loftus, Geoffrey R./Loftus, Elizabeth F. (1976): Human Memory: The Processing of Information. Hillsdale: Lawrence Erlbaum Associates.

Lom, Petr (2001): The Limits of Doubt: The Moral and Political Implications of Skepticism. Albany: State University of New York.

Lord, Alan T. (1992): Pressure: A Methodological Consideration for Behavioral Research in Auditing. In: Auditing: A Journal of Practice & Theory, 11 (2): 89-108.

Lord, Alan T./DeZoort, F. Todd (2001): The Impact of Commitment and Moral Reasoning on Auditors' Responses to Social Influence Pressure. In: Accounting, Organizations and Society, 26 (3): 215-235.

Love, Vincent J./Lawson, Celia (2009): Auditing in Turbulent Economic Times: Plan Ahead and Apply Skepticism and Judgment. In: The CPA Journal, (5): 30-34.

Low, Kin-Yew (2004): The Effects of Industry Specialization on Audit Risk Assessments and Audit-Planning Decisions. In: The Accounting Review, 79 (1): 201-219.

Luckett, Peter F./Eggleton, Ian R. (1991): Feedback and Management Accounting: A Review of Research into Behavioural Consequences. In: Accounting, Organizations and Society, 16 (4): 371-394.

Lundholm, Helge (1936): The Psychology of Belief. Durham: Duke University Press.

MacDonald, A. P. J. (1970): Revised Scale for Ambiguity Tolerance: Reliability and Validity In: Psychological Reports, 26: 791–798.

Magee, Robert P./Tseng, Mei-Chiun (1990): Audit Pricing and Independence. In: The Accounting Review, 65 (2): 315-336.

Mahajan, Jayashree (1992): The Overconfidence Effect in Marketing Management Predictions. In: Journal of Marketing Research, 29: 329-342.

Majid, Abdul/Pragasam, John (1997): Interactions of Intolerance of Ambiguity and of Contingent Liability on Auditors' Avoidance of Litigation. In: Psychological Reports, 81 (3): 935-944.

Majors, Tracie M./Shefchik, Lori B./Vitalis, Adam (2014): The Interactive Effect of Ego Depletion and Trait Skepticism on Auditor Performance. Working Paper. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2408227, accessed on: 29.04.2014.

Makkawi, Bilal/Abdolmohammadi, Mohammad J. (2004): Determinants of the Timing of Interim and Majority of Audit Work. In: International Journal of Auditing, 8 (2): 139-151.

Makkawi, Bilal/Rutledge, Robert W. (2000): Evaluating Audit Risk: The Effects of Industry Characteristics, Experience and Tolerance-for-Ambiguity. In: Advances in Behavioral Accounting Research, 3: 63–82.

Mangleburg, Tamara F./Bristol, Terry (1998): Socialization and Adolescents' Skepticism toward Advertising. In: Journal of Advertising, 27 (3): 11-21.

Manis, Melvin (1967): Context Effects in Communication. In: Journal of Personality and Social Psychology, 5 (3): 326–334.

Manry, David L./Mock, Theodore J./Turner, Jerry L. (2008): Does Increased Audit Partner Tenure Reduce Audit Quality? In: Journal of Accounting, Auditing & Finance, 23 (4): 553-572.

March, James G./Simon, Herbert A. (1958): Organizations. New York/London/Sydney: John Wiley & Sons.

Margheim, Loren/Kelley, Tim/Pattison, Diane (2005): An Empirical Analysis Of The Effects Of Auditor Time Budget Pressure And Time Deadline Pressure. In: The Journal of Applied Business Research, 21 (1): 21-35.

Marques, Pedro Augusto/Azevedo-Pereira, José (2009): Ethical Ideology and Ethical Judgments in the Portuguese Accounting Profession. In: Journal of Business Ethics, 86 (2): 227-242.

Marris, Robin (1992): Implications for Economics. In: Simon, H. A. et al. (eds.): Economics, Bounded Rationality and the Cognitive Revolution. Aldershot/Brookfield: Edward Elger: 194-223.

Marschark, Marc (1997): Psychological Development of Deaf Children. Oxford et al.: Oxford University Press.

Marten, Kai-Uwe/Quick, Reiner/Ruhnke, Klaus (2011): Wirtschaftsprüfung: Grundlagen des betriebswirtschaftlichen Prüfungswesens nach nationalen und internationalen Normen, 4th edition. Stuttgart: Schäffer-Poeschel.

Mason, Alister K./Gibbins, Michael (1991): Judgment and U.S. Accounting Standards. In: Accounting Horizons, 5 (2): 14-24.

Massey, Dawn W./Thorne, Linda (2006): The Impact of Task Information Feedback on Ethical Reasoning. In: Behavioral Research in Accounting, 18: 103-116.

Matthews, Gerald/Deary, Ian J./Whiteman, Martha C. (2003): Personality Traits, 2nd edition. Cambridge et al.: Cambridge University Press.

Maurer, Todd J./Alexander, Ralph A. (1991): Contrast Effects in Behavioral Measurement: An Investigation of Alternative Process Explanations. In: Journal of Applied Psychology, 76 (1): 3-10.

Mautz, Robert Kuhn/Sharaf, Hussein Amer (1961): The Philosophy of Auditing. Sarasota: American Accounting Association.

May, Mike (2009): Sensation and Perception. New York: Infobase Publishing.

Mayhew, Brian W./Schatzberg, Jeffrey W./Sevcik, Galen R. (2001): The Effect of Accounting Uncertainty and Auditor Reputation on Auditor Objectivity. In: Auditing: A Journal of Practice & Theory, 20 (2): 49-70.

Mayper, Alan G./Anderson, Urton/Kilpatrick, Bob G. (1999): Tax Workpaper Review: The Impact of Staff Conclusions and Argument Presentation. In: Advances in Taxation, 11: 145-167.

McCracken, Susan A. (2003): Auditors' Strategies to Protect Their Litigation Reputation: A Research Note. In: Auditing: A Journal of Practice & Theory, 22 (1): 165-179.

McCrae, Robert R./Costa, Paul T., Jr. (1996): Toward a New Generation of Personality Theories: Theoretical Contexts for the Five-Factor Model. In: Wiggins, J. S. (ed.): The Five-Factor Model of Personality: Theoretical Perspectives. New York/London: The Guilford Press: 51-87.

McCrae, Robert R./John, Oliver P. (1992): An Introduction to the Five-Factor Model and Its Applications. In: Journal of Personality, 60: 175-215.

McDaniel, Linda S. (1990): The Effects of Time Pressure and Audit Program Structure on Audit Performance. In: Journal of Accounting Research, 28 (2): 267-285.

McGhee, Walter/Shields, Michael D./Birnberg, Jacob G. (1978): The Effects of Personality on a Subject's Information Processing. In: The Accounting Review, 53 (3): 681-697.

McGinn, Marie (1989): Sense and Certainty: A Dissolution of Scepticism. Oxford et al.: Basil Blackwell.

McKenna, Eugene F. (2000): Business Psychology and Organisational Behaviour: A Student's Handbook, 3rd edition. Hove: Psychology Press.

McKinnon, Jill L. (1984): Cultural Constraints on Audit Independence in Japan. In: The International Journal of Accounting, 19: 17–44.

McManus, Lisa/Subramaniam, Nava (2009): Ethical Evaluations and Behavioural Intentions of Early Career Accountants: The Impact of Mentors, Peers and Individual Attributes. In: Accounting & Finance, 49 (3): 619-643.

McMillan, Jeffrey J./White, Richard A. (1993): Auditors' Belief Revisions and Evidence Search: The Effect of Hypothesis Frame, Confirmation Bias, and Professional Skepticism. In: The Accounting Review, 68 (3): 443-465.

Meeden, Glen/Sargent, Dawn (2007): Some Bayesian Methods for Two Auditing Problems. In: Communications in Statistics: Theory & Methods, 36 (15): 2727-2740.

Meidan, Abraham (2004): Skepticism Is True. Boca Raton: Universal Publishers.

Melnick, Edward L./Everitt, Brian S. (*eds.*) (2008): Encyclopedia of Quantitative Risk Analysis and Assessment, Volume 1 A-C. Chichester: John Wiley & Sons.

Messick, Samuel (1976): Personality Consistencies in Cognition and Creativity. In: Messick, S. et al. (eds.): Individuality in Learning: Implications of Cognitive Style and Creativity for Human Development. San Francisco/Washington/London: Jossey-Bass.

Messier, William F. (1992): The Sequencing of Audit Evidence: Its Impact on the Extent of Audit Testing and Report Formulation. In: Accounting and Business Research, 22 (86): 143-150.

Messier, William F./Quilliam, William C. (1992): The Effect of Accountability on Judgment: Development of Hypotheses for Auditing. In: Auditing: A Journal of Practice & Theory, 11: 123-138.

Messier, William F./Tubbs, Richard M. (1994): Recency Effects in Belief Revision: The Impact of Audit Experience and the Review Process. In: Auditing: A Journal of Practice & Theory, 13 (1): 57-72.

Messier, William F./Kozloski, Thomas M./Kochetova-Kozloski, Natalia (2010): An Analysis of SEC and PCAOB Enforcement Actions against Engagement Quality Reviewers. In: Auditing: A Journal of Practice & Theory, 29 (2): 233-252.

Miller, George A. (2003): The Cognitive Revolution: A Historical Perspective. In: Trends in Cognitive Sciences, 7 (3): 141-144.

Mischel, Walter (1968): Personality and Assessment. New York: John Wiley & Sons.

Mock, Theodore J. et al. (1997): Auditors' Uncertainty Representation and Evidence Aggregation. In: Behavioral Research in Accounting, 9 (Supplement): 123-147.

Moeckel, Cindy (1990): The Effect of Experience on Auditors' Memory Errors. In: Journal of Accounting Research, 28 (2): 368-387.

Moeckel, Cindy/Plumlee, R. David (1989): Auditors' Confidence in Recognition of Audit Evidence. In: The Accounting Review, 64 (4): 653-666.

Möller, Manuela/Sigillo, Francesco (2010): Der Enron-Andersen-Skandal und dessen Einfluss auf das Reputationskapital der Institution Wirtschaftsprüfung: Eine empirische Studie zu Kursreaktionen als Folge des Enron-Andersen-Skandals am Schweizer Kapitalmarkt. In: Gesellschafts- und Kapitalmarktrecht: 1-31.

Monroe, Gary S./Ng, Juliana (2000): An Examination of Order Effects in Auditors' Inherent Risk Assessments. In: Accounting and Finance, 40: 153-168.

Montgomery, Daniel D. et al. (2002): Auditors' New Procedures for Detecting Fraud. In: Journal of Accountancy, 193 (5): 63-66.

Mook, Douglas G. (1983): In Defense of External Invalidity. In: American Psychologist, 38: 379-387.

Moore, Don A. et al. (2006): Conflicts of Interest and the Case of Auditor Independence: Moral Seduction and Strategic Issue Cycling. In: Academy of Management Review, 31 (1): 10-29.

Moors, Agnes/De Houwer, Jan (2007): What is Automaticity? An Analysis of Its Component Features and Their Interrelations. In: Bargh, J. A. (ed.): Social Psychology and the Unconscious: The Automaticity of Higher Mental Processes. New York/Hove: Psychology Press: 11-50.

Morales-Sánchez, Rafael/Cabello-Medina, Carmen (2013): The Role of Four Universal Moral Competencies in Ethical Decision-Making. In: Journal of Business Ethics, 116 (4): 717-734.

Morrow, Patricia Bockelman/Fiore, Stephen M. (2013): Team Cognition: Coordination across Individuals *and* Machines. In: Lee, J. D./Kirlik, A./Dainoff, J. (eds.): The Oxford Handbook of Cognitive Engineering. Oxford et al.: Oxford University Press: 200-215.

Morton, Jane E. (2001): Confidence as a Determinant of the Direction of Order Effects: Theory and a Test in an Internal Control Judgment Setting. In: Academy of Accounting and Financial Studies Journal, 5 (1): 95-123.

Moser, Paul K. (2008): Religious Skepticism. In: Greco, J. (ed.): The Oxford Handbook of Skepticism. Oxford et al.: Oxford University Press: 200-224.

Moskowitz, Gordon B./Skurnik, Ian/Galinsky, Adam D. (1999): The History of Dual-Process Notions and the Future of Preconscious Control. In: Chaiken, S./Trope, Y. (eds.): Dual-Process Theories in Social Psychology. New York: Guilford Press: 12-36.

Mueller, Jennifer M./Anderson, John C. (2002): Decision Aids for Generating Analytical Review Alternatives: The Impact of Goal Framing and Audit-Risk Level. In: Behavioral Research in Accounting, 14: 157-177.

Mumpower, Jeryl L./Stewart, Thomas R. (1996): Expert Judgement and Expert Disagreement. In: Thinking & Reasoning, 2 (2/3): 191-212.

Murray, Zowie (2012): Professional Scepticism. In: Chartered Accountants Journal, 91 (11): 36-38.

Mutchler, Jane F. (1986): Empirical Evidence Regarding the Auditor's Going-Concern Opinion Decision. In: Auditing: A Journal of Practice & Theory, 6 (1): 148-163.

Myers, James N./Myers, Linda A./Omer, Thomas C. (2003): Exploring the Term of the Auditor-Client Relationship and the Quality of Earnings: A Case for Mandatory Auditor Rotation? In: The Accounting Review, 78 (3): 779-799.

Myers, Raymond H. (1990): Classical and Modern Regression with Applications, 2nd edition. Belmont: Thomson.

Naess, Arne (1968): Scepticism. London: Routledge & Kegan Paul.

Nasution, Damai/Östermark, Ralf (2012): The Impact of Social Pressures, Locus of Control, and Professional Commitment on Auditors' Judgment: Indonesian Evidence. In: Asian Review of Accounting, 20 (2): 163-178.

Naylor, F. D. (1981): A State-Trait Curiosity Inventory. In: Australian Psychologist, 16 (2): 172-183.

Neisser, Ulric (1967): Cognitive Psychology. New York: Appleton-Century-Corfts.

Neisser, Ulric (1976): Cognition and Reality: Principles and Implications of Cognitive Psychology. New York: W.H. Freeman and Company.

Nelson, Mark W. (2009): A Model and Literature Review of Professional Skepticism in Auditing. In: Auditing: A Journal of Practice & Theory, 28 (2): 1-34.

Nelson, Mark W./Kinney, William R., Jr. (1997): The Effect of Ambiguity on Loss Contingency Reporting Judgements. In: The Accounting Review, 72 (2): 257-274.

Nelson, Mark W./Tan, Hun-Tong (2005): Judgment and Decision Making Research in Auditing: A Task, Person, and Interpersonal Interaction Perspective. In: Auditing: A Journal of Practice & Theory, 24 (Supplement): 41-71.

Nelson, Mark W./Elliott, John A./TarpIey, Robin L. (2002): Evidence from Auditors about Managers' and Auditors' Earnings Management Decisions. In: The Accounting Review, 77 (4): 175-202.

Nichols, Donald R./Price, Kenneth H. (1976): The Auditor-Firm Conflict: An Analysis Using Concepts of Exchange Theory. In: The Accounting Review, 51 (2): 335-346.

Nisbett, Richard/Ross, Lee (1980): Human Inference: Strategies and Shortcomings of Social Judgment. Engelwood Cliffs: Prentice-Hall.

Nisbett, Richard E./Zukier, Henry/Lemley, Ronald E. (1981): The Dilution Effect: Nondiagnostic Information Weakens the Implications of Diagnostic Information. In: Cognitive Psychology, 13 (2): 248-277.

Nolder, Christine J. (2012): The Role of Professional Skepticism, Attitudes and Emotions on Auditor's Judgments. Dissertation, Bentley University. Ann Arbor: ProQuest.

Northrop, Alona/Arsneault, Shelly (2007): Handbook of Research Methods in Public Administration. In: Yang, K./Miller, G. J. (eds.): Public Administration and Public Policy, 2nd edition. Boca Raton: Taylor & Francis: 213-239.

Norton, Robert W. (1975): Measurement of Ambiguity Tolerance. In: Journal of Personality Assessment, 39 (6): 607-619.

Noyes, Jan/Garland, Kate/Bruneau, Daniel (2004): Humans: Skills, Capabilities and Limitations. In: Sandom, C./Harvey, R. S. (eds.): Human Factors for Engineers. Sevenage: Institution of Engineering and Technology: 35-56.

NZAuASB (2013): Explanatory Guide Au7: References to Practical Guidance on Professional Scepticism in an Audit of Financial Statements. URL: http://www.xrb.govt.nz/includes/download.aspx?ID=126424, accessed on: 17.10.2013.

O'Bryan, David/Quirin, Jeffrey J./Donnelly, David P. (2005): Locus Of Control And Dysfunctional Audit Behavior. In: Journal of Business & Economics Research, 3 (10): 9-14.

O'Clock, Priscilla/Devine, Kevin (1995): An Investigation of Framing and Firm Size on the Auditor's Going Concern Decision. In: Accounting and Business Research, 25 (99): 197-207.

O'Donnell, Ed/Prather-Kinsey, Jenice (2010): Nationality and Differences in Auditor Risk Assessment: A Research Note with Experimental Evidence. In: Accounting, Organizations and Society, 35: 558-564.

O'Malley, Shaun F. (2000): The Panel of Audit Effectiveness: Report and Recommendations. Stamford: Public Oversight Board.

Obermiller, Carl/Spangenberg, Eric R. (1998): Development of a Scale to Measure Consumer Skepticism Toward Advertising. In: Journal of Consumer Psychology, 7 (2): 159-186.

Obermiller, Carl/Spangenberg, Eric R. (2000): On the Origin and Distinctness of Skepticism Toward Advertising. In: Marketing Letters, 11 (4): 311.

OECD (2013): Women and Financial Literacy: OECD/INFE Evidence, Survey and Policy Responses. URL: http://www.oecd.org/daf/fin/financial-education/TrustFund2013_OECD_INFE_Women_and_Fin_Lit.pdf, accessed on: 13.05.2014.

Oswald, Margit E./Grosjean, Stefan (2004): Confirmation Bias. In: Pohl, R. F. (ed.): Cognitive Illusions: A Handbook on Fallacies and Biases in Thinking, Judgment and Memory. Hove/New York: Psychology Press: 79-96.

Over, David (2007): Rationality and the Normative/Descriptive Distinction. In: Koehler, D. J./Harvey, N. (eds.): Blackwell Handbook of Judgment and Decision Making. Malden/Oxford/Carlton: Blackwell Publishing: 3-18.

Owhoso, Vincent/Weickgenannt, Andrea (2009): Auditors' Self-Perceived Abilities in Conducting Domain Audits. In: Critical Perspectives on Accounting, 20 (1): 3-21.

Pallant, Julie (2010): SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS, 4th edition. Maidenhead: McGraw-Hill.

Palmrose, Zoe-Vonna (1988): An Analysis of Auditor Litigation and Audit Service Quality. In: The Accounting Review, 63 (1): 55-73.

Parret, Herman (1983): Introduction: Beliefs and Believing: The Web and the Spinning. In: Parret, H. (ed.): On Believing: Epistemological and Semiotic Approaches. Berlin/New York: de Gruyter: 1-15.

Passer, Michael W./Smith, Ronald Edward (2010): Psychology: The Science of Mind and Behavior. Boston et al.: McGraw-Hill.

Patel, Chris (2003): Some Cross-Cultural Evidence on Whistle-Blowing as an Internal Control Mechanism. In: Journal of International Accounting Research, 2: 69-96.

Patel, Chris/Psaros, Jim (2000): Perceptions of External Auditors' Independence: Some Cross-Cultural Evidence. In: The British Accounting Review, 32 (3): 311-338.

Patel, Chris/Harrison, Graeme L./McKinnon, Jill L. (2002): Cultural Influences on Judgments of Professional Accountants in Auditor–Client Conflict Resolution. In: Journal of International Financial Management & Accounting, 13 (1): 1-31.

Patterson, Denise M. (2001): Causal Effects of Regulatory, Organizational and Personal Factors on Ethical Sensitivity. In: Journal of Business Ethics, 30 (2): 123-159.

Payne, Elizabeth A./Ramsay, Robert J. (2005): Fraud Risk Assessments and Auditors' Professional Skepticism. In: Managerial Auditing Journal, 20 (3): 321-330.

Payne, John W. (1976): Task Complexity and Contingent Processing in Decision Making: An Information Search and Protocol Analysis. In: Organizational Behavior and Human Performance, 16 (2): 366-387.

Payne, John W. (1982): Contingent Decision Behavior. In: Psychological Bulletin, 92 (2): 382-402.

Payne, John W./Bettman, James R./Johnson, Eric J. (1993): The Adaptive Decision Maker. Cambridge: Cambridge University Press.

PCAOB (2012): Maintaining and Applying Professional Skepticism in Audits. URL: http://pcaobus.org/Standards/QandA/12-04-2012_SAPA_10.pdf, accessed on: 07.10.2013.

Peecher, Mark E. (1996): The Influence of Auditors' Justification Processes on Their Decisions: A Cognitive Model and Experimental Evidence. In: Journal of Accounting Research, 34 (1): 125-140.

Peecher, Mark E./Solomon, Ira (2001): Theory and Experimentation in Studies of Audit Judgments and Decisions: Avoiding Common Research Traps. In: International Journal of Auditing, 5: 193-203.

Peecher, Mark E./Solomon, Ira/Trotman, Ken T. (2013): An Accountability Framework for Financial Statement Auditors and Related Research Questions. In: Accounting, Organizations and Society, 38: 596-620.

Peecher, Mark E. et al. (2010): The Effects of a Supervisor's Active Intervention in Subordinates' Judgements, Directional Goals, and Perceived Technical Knowledge Advantage on Audit Team Judgements. In: The Accounting Review, 85 (5): 1763-1786.

Pei, Buck K. W./Reckers, Philip M. J./Wyndelts, Robert W. (1990): The Influence of Information Presentation Order on Professional Tax Judgment. In: Journal of Economic Psychology, 11: 119-146.

Pei, Buck K. W./Reckers, Philip M. J./Wyndelts, Robert W. (1992): Tax Professionals Belief Revision: The Effects of Information Presentation Sequence, Client Preference, and Domain Experience. In: Decision Sciences, 23: 175-199.

Pei, Buck K. W./Reed, Sarah A./Koch, Bruce S. (1992): Auditor Belief Revisions in a Performance Auditing Setting: An Application of the Belief-Adjustment Model. In: Accounting, Organizations and Society, 17 (2): 169-183.

Pennington, Nancy/Hastie, Reid (1986): Evidence Evaluation in Complex Decision Making. In: Journal of Personality and Social Psychology, 51 (2): 242-258.

Perera, M. H. B. (1989): Towards a Framework to Analyze the Impact of Culture on Accounting. In: International Journal of Accounting, 24: 42-56.

Peterson, John (2008): Aquinas: A New Introduction. Lanham et al.: University Press of America.

Peytcheva, Marietta (2014): Professional Skepticism and Auditor Cognitive Performance in a Hypothesis-Testing Task. In: Managerial Auditing Journal, 29 (1): 27-49.

Pincus, Karen V. (1990): Auditor Individual Differences and Fairness of Presentation Judgments. In: Auditing: A Journal of Practice & Theory, 9 (3): 150-166.

Pincus, Karen V. (1991): Audit Judgment Confidence. In: Behavioral Research in Accounting, 3: 39-65.

Pinker, Steven (1994): The Language Instinct. New York: W. Morrow and Co.

Pinker, Steven (1997): How the Mind Works. New York: W.W. Norton.

Pinsker, Robert (2007): Long Series of Information and Nonprofessional Investors' Belief Revision. In: Behavioral Research in Accounting, 19: 197-214.

Pinsker, Robert (2011): Primacy or Recency? A Study of Order Effects When Nonprofessional Investors are Provided a Long Series of Disclosures. In: Behavioral Research in Accounting, 23 (1): 161-183.

Pinsker, Robert/Pennington, Robin/Schafer, Jennifer Kahle (2009): The Influence of Roles, Advocacy, and Adaption to the Accounting Decision Environment. In: Behavioral Research in Accounting, 21 (2): 91-111.

Plotnik, Rod/Kouyoumdjian, Haig (2010): Introduction to Psychology, 9th edition. Belmont: Wadsworth, Cengage Learning.

Plotnik, Rod/Kouyoumdjian, Haig (2013): Introduction to Psychology, 10th edition. Belmont: Cengage Learning.

Plous, Scott (1993): The Psychology of Judgment and Decision Making. New York: McGraw-Hill.

Plumlee, David/Rixom, Brett A./Rosman, Andrew J. (2012): Training Auditors to Think Skeptically. Working Paper. URL: http://web.ku.edu/~audsymp/myssi/_pdf/Plumlee%20et%20al.%202012%20Training%20Auditors%20to%20Think%20Skeptically%20-%20April%202012%20KU%20Symposium.pdf, accessed on: 06.11.2013.

Pohl, Rüdiger F. (2004): Hindsight Bias. In: Pohl, R. F. (ed.): Cognitive Illusions: A Handbook on Fallacies and Biases in Thinking, Judgment and Memory. Hove/New York: Psychology Press: 363-378.

Pole, Jason D./Bondy, Susan J. (2010): Normality Assumption. In: Salkind, N. J. (ed.): Encyclopedia of Research Design, Volume 2. Thousand Oaks et al.: Sage Publications: 932-935.

Ponemon, Lawrence A. (1990): Ethical Judgments in Accounting: A Cognitive-Developmental Perspective. In: Critical Perspectives on Accounting, 1 (2): 191-215.

Ponemon, Lawrence A. (1992a): Auditor Underreporting of Time and Moral Reasoning: An Experimental Lab Study. In: Contemporary Accounting Research, 9 (1): 171-189.

Ponemon, Lawrence A. (1992b): Ethical Reasoning and Selection-Socialization in Accounting. In: Accounting, Organizations and Society, 17 (3/4): 239-258.

Ponemon, Lawrence A. (1993): The Influence of Ethical Reasoning on Auditors' Perceptions of Management Competence and Integrity. In: Advances in Accounting, 11: 1-29.

Ponemon, Lawrence A./Gabhart, David R. L. (1990): Auditor Independence Judgments: A Cognitive-Developmental Model and Experimental Evidence. In: Contemporary Accounting Research, 7 (1): 227-251.

Ponemon, Lawrence A./Gabhart, David R. L. (1994): Ethical Reasoning Research in the Accounting and Auditing Professions. In: Rest, J. R./Narváez, D. (eds.): Moral Development in the Professions: Psychology and Applied Ethics. New Jersey: Hillsdale: 101-119.

Popkin, Richard H. (1979): The History of Scepticism from Erasmus to Spinoza. Berkeley: University of California Press.

Popkin, Richard H./Stroll, Avrum (2002): Skeptical Philosophy for Everyone. New York: Prometheus Books.

Popova, Velina (2013): Exploration of Skepticism, Client-Specific Experiences, and Audit Judgments. In: Managerial Auditing Journal, 28 (2): 140-160.

Pound, Roscoe (1953): The Lawyer from Antiquity to Modern Times: With Particular Reference to the Development of Bar Associations in the United States. St. Paul: West Publishing Company.

Pratt, Jamie (1980): The Effects of Personality on a Subject's Information Processing: A Comment. In: The Accounting Review, 55 (3): 501-506.

Preston, Malcolm G. (1936a): Contrast Effects and the Psychometric Functions. In: The American Journal of Psychology, 48 (4): 625-631.

Preston, Malcolm G. (1936b): Contrast Effects and the Psychophysical Judgments. In: The American Journal of Psychology, 48 (3): 389-402.

Prevignano, Carlo/Thibault, Paul J. (2003): Continuing the Discussion with John J. Gumperz. In: Eerdmans, S./Prevignano, C./Thibault, P. J. (eds.): Language and Interaction: Discussions with John J. Gumperz. Amsterdam/Philadelphia: John Benjamins: 149-162.

Pritchard, Robert D. et al. (2013): Long-Term Effects of Goal Setting on Performance with the Productivity Measurement and Enhancement System (ProMES). In: Locke, E. A./Latham, G. P. (eds.): New Developments in Goal Setting and Task Performance. New York/Hove: Routledge: 233-245.

Qandil, Johanna Souad (2014): Wahrnehmung der Qualität der Abschlussprüfung: Eine theoretische und empirische Analyse für den deutschen Kapitalmarkt. Wiesbaden: Springer Gabler.

Quadackers, Luc (2009): A Study of Auditors' Skeptical Characteristics and Their Relationship to Skeptical Judgments and Decisions. Dissertation, Vrije Universiteit Amsterdam. URL: http://dare.ubvu.vu.nl/bitstream/handle/1871/13280/8931.pdf;jsessionid=D89295F46D9861C1DED98CDF637A2EE4?sequence=5, accessed on: 15.07.2013.

Quadackers, Luc/Groot, Tom/Wright, Arnold (2012): Auditors' Professional Skepticism: Neutrality versus Presumptive Doubt. Working Paper. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2162947, accessed on: 30.05.2013.

Quick, Reiner/Warming-Rasmussen, Bent (2007): Unabhängigkeit des Abschlussprüfers – Zum Einfluss von Beratungsleistungen auf Unabhängigkeitswahrnehmungen von Aktionären. In: Zeitschrift für Betriebswirtschaft, 77 (10): 1007–1033.

Quine, Williard van Orman /Ullian, Joseph S. (1978): The Web of Belief, 2nd edition. New York: Random House.

Radtke, Robin R. (2000): The Effects of Gender and Setting on Accountants' Ethically Sensitive Decisions. In: Journal of Business Ethics, 24 (4): 299-312.

Raghunathan, Bhanu (1991): Premature Signing-Off of Audit Procedures: An Analysis. In: Accounting Horizons, 5 (2): 71-79.

Randall, Donna M./Fernandes, Maria F. (1991): The Social Desirability Response Bias in Ethics Research. In: Journal of Business Ethics, 10 (11): 805-817.

Rasso, Jason (2013): The Influence of Mindsets on Professional Skepticism in Auditors. Working Paper. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2357676, accessed on 04.12.2013.

Ratzinger-Sakel, Nicole V. S. (2013): Auditor Fees and Auditor Independence: Evidence from Going Concern Reporting Decisions in Germany. In: Auditing: A Journal of Practice & Theory, 32 (4): 129-168.

Razumnikova, Olga M. (2012): Divergent Thinking and Learning. In: Seel, N. M. (ed.): Encyclopedia of the Sciences of Learning. New York et al.: Springer: 1028-1031.

Reckers, Philip M. J./Schultz, Joseph J. (1993): The Effects of Fraud Signals, Evidence Order, and Group-Assisted Counsel on Independent Auditor Judgment. In: Behavioral Research in Accounting, 5: 124-143.

Reheul, Anne-Mie et al. (2013): The Relationship Between Personal Auditor Characteristics and Audit Opinions. Working Paper presented at the 7th EARNet Symposium in Trier, Germany.

Reidy, Mari/Theobald, Jonathan (2011): Financial Reporting Fraud: Prevention Starts at the Top. URL: http://www.financialexecutives.org/KenticoCMS/getattachment/News---Publications/news/FEI-Fraud-Literacy-Quiz/FEI-Mag-Article-on-Fraud---Nov--2011.pdf.aspx, accessed on: 16.08.2013.

Rempel, John K. /Holmes, John G./Zanna, Mark P. (1985): Trust in Close Relationships. In: Journal of Personality and Social Psychology, 49 (1): 95-112.

Rennie, Morina D./Kopp, Lori S./Lemon, W. Morley (2010): Exploring Trust and the Auditor-Client Relationship: Factors Influencing the Auditor's Trust of a Client Representative. In: Auditing: A Journal of Practice & Theory, 29 (1): 279-293.

Rest, James R. (1979): Development in Judging Moral Issues. Minneapolis: University of Minnesota Press.

Rest, James R. et al. (1999): Postconventional Moral Thinking: A Neo-Kohlbergian Approach. Mahwah: Lawrence Erlbaum Associates.

Reynolds, Paul Davidson (1971): A Primer in Theory Construction. Boston: Allyn and Bacon.

Rezaee, Zabihollah/Riley, Richard (2010): Financial Statement Fraud: Prevention and Detection, 2nd edition. Hoboken: John Wiley & Sons.

Rich, Jay S./Solomon, Ira/Trotman, Ken T. (1997a): Multi-Auditor Judgment/Decision Making Research: A Decade Later. In: Journal of Accounting Literature, 16: 86-126.

Rich, Jay S./Solomon, I./Trotman, K. T. (1997b): The Audit Review Process: A Characterization from the Persuasion Perspective. In: Accounting, Organizations and Society, 22 (5): 481-505.

Roberts, Michael L. (2010): Independence, Impartiality, and Advocacy in Client Conflicts. In: Research in Accounting Regulation, 22 (1): 29-39.

Robinson, John A./Bennink, Carl D. (1978): Field Articulation and Working Memory. In: Journal of Research in Personality, 12 (4): 439-449.

Robinson, Shani N. (2011): An Experimental Examination of the Effects of Goal Framing and Time Pressure on Audiotrs' Professional Skepticism. Dissertation, University of North Texas.

Robinson, Shani N./Curtis, Mary B./Robertson, Jesse C. (2013): A Person-Situation Approach to the Examination of Professional Skepticism: Consideration of Time Pressure and Goal Framing. Working Paper. URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2276478, accessed on: 04.12.2013.

Rohrmann, Bernd (2005): Risk Attitude Scales: Concepts, Questionnaires, Utilizations. Project Report. URL: http://www.rohrmannresearch.net/pdfs/rohrmann-racreport.pdf, accessed on: 11.03.2013.

Rorer, Leonard G. et al. (1967): Configural Judgments Revealed. In: Proceedings of the 75th Annual Convention of the American Psychological Association, 2: 195-196.

Rose, Anna M./Rose, Jacob M. (2003): The Effects of Fraud Risk Assessments and a Risk Analysis Decision Aid on Auditors' Evaluation of Evidence and Judgment. In: Accounting Forum, 27 (3): 312-338.

Rose, Jacob M. (2007): Attention to Evidence of Aggressive Financial Reporting and Intentional Misstatement Judgments: Effects of Experience and Trust. In: Behavioral Research in Accounting, 19: 215-229.

Rosenberg, Morris (1965): Society and the Adolescent Self-Image. Princeton: Princeton University Press.

Rosenthal, Robert/Rosnow, Ralph L./Rubin, Donald B. (2000): Contrasts and Effect Sizes in Behavioral Research: A Correlational Approach. Cambridge: Cambridge University Press.

Ross, Lee/Nisbett, Richard E. (2011): The Person and the Situation: Perspectives of Social Psychology. London: Pinter & Martin.

Roth, Alvin E. (1988): Laboratory Experimentation in Economics: A Methodological Overview. In: The Economic Journal, 98: 974-1031.

Rott, Hans (2008): Belief Revision. In: Adler, J. E./Rips, L. J. (eds.): Reasoning: Studies of Human Inference and Its Foundations. Cambridge et al.: Cambridge University Press: 514-534.

Rott, Hans/Williams, Mary-Anne (2001): Introduction. In: Williams, M./Rott, H. (eds.): Frontiers in Belief Revision. Dordrecht: Kluwer Academic Publishers: 1-6.

Rotter, Julian B. (1966): Generalized Expectancies for Internal versus External Control of Reinforcement. In: Psychological Monographs: General and Applied, 80 (1): 1-28.

Rotter, Julian B. (1967): A New Scale for the Measurement of Interpersonal Trust. In: Journal of Personality, 35 (4): 651-665.

Rotter, Julian B. (1980): Interpersonal Trust, Trustworthiness, and Gullibility. In: American Psychologist, 35 (1): 1-7.

Rovai, Alfred P./Baker, Jason D./Ponton, Michael K. (2014): Social Science Research Design and Statistics: A Practitioner's Guide to Research Methods and IBM SPSS, 2nd edition. Chesapeake: Watertree Press.

Rugg, Michael D. (2004): Retrieval Processing in Human Memory: Electrophysiological and fMRI Evidence. In: Gazzaniga, M. S. (ed.): The Cognitive Neurosciences. Cambridge: MIT Press: 727-737.

Runco, Mark A. (2009): Divergent Thinking. In: Kerr, B. (ed.): Encyclopedia of Giftedness, Creativity, and Talent, Volume 1. Thousand Oaks: Sage Publications: 252-253.

Russell, Bertrand (1921): The Analysis of Mind. New York: McMillan.

Rutledge, Robert W. (1995): The Ability to Moderate Recency Effects through Framing of Management Accounting Information. In: Journal of Managerial Issues, 7 (1): 27-40.

Salterio, S./Koonce, L. (1997): The Persuasiveness of Audit Evidence: The Case of Accounting Policy Decisions. In: Accounting, Organizations and Society, 22 (6): 573-587.

Satava, David/Caldwell, Cam/Richards, Linda (2006): Ethics and the Auditing Culture: Rethinking the Foundation of Accounting and Auditing. In: Journal of Business Ethics, 64 (3): 271-284.

Schandl, Charles W. (1978): Theory of Auditing: Evaluation, Investigation, and Judgement. Houston: Scholars Book Company.

Schatzberg, Jeffrey W. et al. (2005): A Reexamination of Behavior in Experimental Audit Markets: The Effects of Moral Reasoning and Economic Incentives on Auditor Reporting and Fees. In: Contemporary Accounting Research, 22 (1): 229-264.

Schellenberg, J. L. (2007): The Wisdom to Doubt: A Justification of Religious Skepticism. Ithaca: Cornell University Press.

Schmitt, Manfred J./Steyer, Rolf (1993): A Latent State-Trait Model (Not Only) for Social Desirability. In: Personality and Individual Differences, 14 (4): 519-529.

Schneider, Walter/Shiffrin, Richard M. (1977): Controlled and Automatic Human Information Processing: I. Detection, Search, and Attention. In: Psychological Review, 84 (1): 1-66.

Schreiber, Stefan M. (2000): Das Informationsverhalten von Wirtschaftsprüfern - Eine Prozessanalyse aus verhaltenswissenschaftlicher Perspektive. Wiesbaden: Deutscher Universitäts-Verlag.

Schul, Yaacov/Burnstein, Eugene/Bardi, Anat (1996): Dealing with Deceptions that are Difficult to Detect: Encoding and Judgment as a Function of Preparing to Receive Invalid Information. In: Journal of Experimental Social Psychology, 32 (3): 228-253.

Schultz, Joseph J., Jr./Reckers, Philip M. J. (1981): The Impact of Group Processing on Selected Audit Disclosure Decisions. In: Journal of Accounting Research, 19 (2): 482-501.

Schwind, Jochen (2011): Die Informationsverarbeitung von Wirtschaftsprüfern bei der Prüfung geschätzter Werte: Eine verhaltenswissenschaftliche und empirische Analyse. Wiesbaden: Gabler Verlag.

Scott, William R. (1973): A Bayesian Approach to Asset Valuation and Audit Size. In: Journal of Accounting Research, 11 (2): 304-330.

Seow, Jean-Lin (2009): Cue Usage in Financial Statement Fraud Risk Assessments: Effects of Technical Knowledge and Decision Aid Use. In: Accounting & Finance, 49 (1): 183-205.

Shadish, William R./Cook, Thomas D./Campbell, Donald T. (2002): Experimental and Quasi-Experimental Designs for Generalized Causal Inference. Belmont: Wadsworth, Cengage Learning.

Shankar, Maya U./McClure, Samuel M. (2013): Decision Neuroscience. In: Ochsner, K./Kosslyn, S. M. (eds.): The Oxford Handbook of Cognitive Neuroscience, Volume 2: The Cutting Edges. Oxford: Oxford University Press: 334-341.

Shaub, Michael K. (1994): An Analysis of the Association of Traditional Demographic Variables with the Moral Reasoning of Auditing Students and Auditors. In: Journal of Accounting Education, 12 (1): 1-26.

Shaub, Michael K. (1996): Trust and Suspicion: The Effects of Situational and Dispositional Factors on Auditors' Trust of Clients. In: Behavioral Research in Accounting, 8: 154-174.

Shaub, Michael K. (2004): Trust as a Threat to Independence: Emotional Trust, Auditor-Client Interdependence, and Their Impact on Professional Skepticism. In: Research on Professional Responsibility and Ethics in Accounting, 9: 169-188.

Shaub, Michael K./Braun, Robert L. (2014): Call of Duty: A Framework for Auditors' Ethical Decisions. In: Mintz, S. (ed.): Accounting for the Public Interest: Perspectives on Accountability, Professionalism and Role in Society. New York et al.: Springer: 3-25.

Shaub, Michael K./Lawrence, Janice E. (1996): Ethics, Experience and Professional Skepticism: A Situational Analysis. In: Behavioral Research in Accounting, 8 (Supplement): 124-157.

Shaub, Michael K./Lawrence, Janice E. (1999): Differences in Auditors' Professional Skepticism across Career Levels in the Firm. In: Advances in Accounting Behavioral Research, 2: 61-83.

Shaub, Michael K./Lawrence, Janice E. (2002): A Taxonomy of Auditors' Professional Skepticism. In: Research on Accounting Ethics, 8: 167-194.

Shaub, Michael K./Finn, Don W./Munter, Paul (1993): The Effects of Auditors' Ethical Orientation on Commitment and Ethical Sensitivity. In: Behavioral Research in Accounting, 5: 145.

Shaw, Tamsin (2010): Nietzsche's Political Skepticism. Princeton: Princeton University Press.

Shelton, Sandra Waller (1999): The Effect of Experience on the Use of Irrelevant Evidence in Auditor Judgment. In: The Accounting Review, 74 (2): 217-224.

Shields, Michael D./Solomon, Ira/Waller, William S. (1987): Effects of Alternative Sample Space Representations on the Accuracy of Auditors' Uncertainty Judgments. In: Accounting, Organizations and Society, 12 (4): 375-385.

Silvoso, J. A. et al. (1973): A Statement of Basic Auditing Concepts. Sarasota: American Accounting Association.

Sim, Marc (2010): National Culture Effects on Groups Evaluating Internal Control. In: Managerial Auditing Journal, 25 (1): 53-78.

Simnett, Roger (1996): The Effect of Information Selection, Information Processing, and Task Complexity on Predictive Accuracy of Auditors. In: Accounting, Organizations and Society, 21 (7/8): 699-719.

Simon, Herbert A. (1955): A Behavioral Model of Rational Choice. In: Quarterly Journal of Economics, 69: 99-118.

Simon, Herbert A. (1957a): Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations, 2nd edition. New York: McMillan.

Simon, Herbert A. (1957b): Models of Man: Social and Rational. New York: John Wiley & Sons.

Simon, Herbert A. (1959): Theories of Decision-Making in Economics and Behavioral Science. In: The American Economic Review, 49 (3): 253-283.

Simon, Herbert A. (1980): The Behavioral and Social Sciences. In: Science, 209: 72-78.

Simon, Herbert A. (1992): Introductory Comment. In: Simon, H. A. et al. (eds.): Economics, Bounded Rationality and the Cognitive Revolution. Aldershot/Brookfield: Edward Elger: 3-7.

Simon, Herbert A. (1997): Models of Bounded Rationality: Empirically Grounded Economic Reason. Cambridge: MIT Press.

Simon, Herbert A. (2013): Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations, 4th edition. New York: The Free Press.

Simpson, David D./Ostrom, Thomas M. (1976): Contrast Effects in Impression Formation. In: Journal of Personality and Social Psychology, 34 (4): 625-629.

Sinnott-Armstrong, Walter (2007): Moral Skepticism. Oxford et al.: Oxford University Press.

Skinner, Douglas J./Srinivasan, Suraj (2012): Audit Quality and Auditor Reputation: Evidence from Japan. In: The Accounting Review, 87 (5): 1737-1767.

Slovic, Paul (1969): Analyzing the Expert Judge: A Descriptive Study of a Stockbroker's Decision Processes In: Journal of Applied Psychology, 53 (4): 255-263.

Slovic, Paul/Lichtenstein, Sarah (1971): Comparison of Bayesian and Regression Approaches to the Study of Information Processing in Judgment. In: Organizational Behavior and Human Performance, 6 (6): 649-744.

Smith, James F./Kida, Thomas (1991): Heuristics and Biases: Expertise and Task Realism in Auditing. In: Psychological Bulletin, 109 (3): 472-489.

Smith, Neil (2003): Dissociation and Modularity: Reflections on Language and Mind. In: Banich, M. T./Mack, M. (eds.): Mind, Brain, and Language: Multidisciplinary Perspectives. Mahwah: Lawrence Erlbaum Associates: 87-111.

Solomon, Ira (1982): Probability of Assessment by Individual Auditors and Audit Teams: An Empirical Investigation. In: Journal of Accounting Research, 20 (2): 689-710.

Solomon, Ira (1987): Multi-Auditors Judgment/Decision Making Research. In: Journal of Accounting Literature, 6: 1-25.

Solomon, Ira/Shields, Michael D. (1995): Judgment and Decision-Making Research in Auditing. In: Ashton, R. H./Ashton, A. H. (eds.): Judgment and Decision-Making Research in Accounting and Auditing. Cambridge et al.: Cambridge University Press: 137-175.

Solomon, Ira/Trotman, Ken T. (2003): Experimental Judgment and Decision Research in Auditing: The First 25 Years of AOS. In: Accounting, Organizations and Society, 28: 395-412.

Solomon, Ira/Shields, Michael D./Whittington, O. Ray (1999): What Do Industry-Specialist Auditors Know? In: Journal of Accounting Research, 37 (1): 191-208.

Solso, Robert L./MacLin, Otto H./MacLin, M. Kimberly (2008): Cognitive Psychology, 8th edition. Boston et al.: Pearson.

Soltani, Bahram (2007): Auditing: An International Approach. Harlow: Pearson Education.

Sonnert, Gerhard/Holton, Gerald (1995): Who Succeeds in Science?: The Gender Dimension. New Brunswick: Rutgers University Press.

Sontheimer, Kevin (2006): Behavioral Versus Neoclassical Economics: Paradigm Shift or Generalization? In: Altman, M. (ed.): Handbook of Contemporary Behavioral Economics: Foundations and Developments. New York/London: M.E. Sharpe: 237-256.

Sperber, Dan (1996): Explaining Culture: A Naturalistic Approach. Oxford/Cambridge: Blackwell.

Spielberger, Charles D. (1995): State-Trait Personality Inventory (STPI). Redwood City: Mind Garden.

Spilker, Brian C./Prawitt, Douglas F. (1997): Adaptive Responses to Time Pressure: The Effects of Experience on Tax Information Search Behavior. In: Behavioral Research in Accounting, 9: 172-198.

Srivastava, Rajendra P./Mock, Theodore J./Turner, Jerry L. (2009): Bayesian and Belief-Functions Formulas for Auditor Independence Risk Assessment. In: International Journal of Auditing, 13: 163-183.

Stahl, Silvana (2012): Der Urteilsbildungsprozess von Abschlussprüfern: Eine experimentelle Untersuchung zur Verarbeitung von Prüfungsnachweisen. Frankfurt am Main et al.: Peter Lang.

Stanga, Keith G./Turpen, Richard A. (1991): Ethical Judgments on Selected Accounting Issues: An Empirical Study. In: Journal of Business Ethics, 10 (10): 739-747.

Stanovich, Keith E. (1999): Who Is Rational?: Studies of Individual Differences in Reasoning. Mahwah: Lawrence Erlbaum Associates.

Stanovich, Keith E. (2004): The Robot's Rebellion: Finding Meaning in the Age of Darwin. Chicago/London: University of Chicago Press.

Stanovich, Keith E. (2009): What Intelligence Tests Miss: The Psychology of Rational Thought. New Haven: Yale University Press.

Stanovich, Keith E. (2011): Rationality and the Reflective Mind. Oxford et al.: Oxford University Press.

Stanovich, Keith E./West, Richard F. (2000): Individual Differences in Reasoning: Implications for the Rationality Debate? In: Behavioral and Brain Sciences, 23: 645-726.

Sternberg, Robert J. (1988): The Triarchic Mind: A New Theory of Human Intelligence. New York: Viking.

Sternberg, Robert J. (2009): Cognitive Psychology, 5th edition. Belmont: Wadsworth.

Sternberg, Robert J./Ben-Zeev, Talia (2001): Complex Cognition: The Psychology of Human Thought. Oxford: Oxford University Press.

Sternberg, Robert J./Kaufman, James C. (1998): Human Abilities. In: Annual Review of Psychology, 49 (1): 479-502.

Stevens, James P. (2009): Applied Multivariate Statistics for the Social Sciences, 5th edition. New York/London: Routledge.

Stewart, Trevor R./Kinney, William R., Jr. (2013): Group Audits, Group-Level Controls, and Component Materiality: How Much Auditing Is Enough? In: The Accounting Review, 88 (2): 707-737.

Steyer, Rolf/Schmitt, Manfred/Eid, Michael (1999): Latent State–Trait Theory and Research in Personality and Individual Differences. In: European Journal of Personality, 13 (5): 389-408.

Stiffler, Kirsten L. (2008): Adolescents and Anger: An Investigation of Variables that Influence the Expression of Anger. Dissertation, Indiana University of Pennsylvania. Ann Arbor: ProQuest.

Stoner, James A. F. (1968): Risky and Cautious Shifts in Group Decisions: The Influence of Widely Held Values. In: Journal of Experimental Social Psychology, 4 (4): 442-459.

Stough, Charlotte L. (1969): Greek Skepticism: A Study in Epistemology. Berkeley/Los Angeles: University of California Press.

Stout, G. F. (1896): Analytic Psychology, Volume 1, reprint edition 2013. London: Routledge.

Strawson, P. F. (1985): Skepticism and Naturalism: Some Varieties. New York: Columbia University Press.

Stren, Richard (2001): Knowledge Networks and New Approaches to 'Development'. In: Stein, J. G. et al. (ed.): Networks of Knowledge: Collaborative Innovation in International Learning. Toronto/Buffalo/London: University of Toronto Press: 133-150.

Suedfeld, Peter/Tetlock, Philip E. (2001): Individual Differences in Information Processing In: Tesser, A./Schwarz, N. (eds.): Blackwell Handbook of Social Psychology: Intraindividual Processes. Malden/Oxford: Blackwell Publishers: 284-304.

Superson, Anita M. (2009): The Moral Skeptic. Oxford et al.: Oxford University Press.

Sweeney, John T./Roberts, Robin W. (1997): Cognitive Moral Development and Auditor Independence. In: Accounting, Organizations and Society, 22 (3/4): 337-352.

Sweller, John/Ayres, Paul/Kalyuga, Slava (2011): Cognitive Load Theory. New York et al.: Springer.

Swieringa, Robert J./Weick, Karl E. (1982): An Assessment of Laboratory Experiments in Accounting. In: Journal of Accounting Research, 20: 56-101.

Tabachnick, Barbara G./Fidell, Linda S. (2007): Using Multivariate Statistics, 5th edition. Boston et al.: Pearson.

Tan, Hun-Tong (1995): Effects of Expectations, Prior Involvement, and Review Awareness on Memory for Audit Evidence and Judgment. In: Journal of Accounting Research, 33 (1): 113-135.

Tan, Hun-Tong/Kao, Alison (1999): Accountability Effects on Auditors' Performance: The Influence of Knowledge, Problem-Solving, and Task Complexity. In: Journal of Accounting Research, 37 (1): 209-223.

Tan, Hun-Tong/Libby, Robert (1997): Tacit Managerial versus Technical Knowledge as Determinants of Audit Expertise in the Field. In: Journal of Accounting Research, 35 (1): 97-113.

Tan, Hun-Tong/Ng, Terence Bu-Peow/Mak, Bobby Wai-Yeong (2002): The Effects of Task Complexity on Auditors Performance: The Impact of Accountability and Knowledge. In: Auditing: A Journal of Practice & Theory, 21 (2): 81-95.

Tan, Soo Jiuan (2002): Can Consumers' Scepticism be Mitigated by Claim Objectivity and Claim Extremity? In: Journal of Marketing Communications, 8 (1): 45-64.

Taylor, Mark H. (2000): The Effects of Industry Specialization on Auditors' Inherent Risk Assessments and Confidence Judgements. In: Contemporary Accounting Research, 17 (4): 693-712.

Tellegen, Auke et al. (1988): Personality Similarity in Twins Reared Apart and Together. In: Journal of Personality and Social Psychology, 54 (6): 1031-1039.

Tenenbaum, Gershon/Driscoll, Marcy Perkins (2005): Methods of Research in Sport Sciences: Quantitative and Qualitative Approaches. Aachen et al.: Meyer & Meyer Sport.

Terrell, Steven R. (2012): Statistics Translated: A Step-by-Step Guide to Analyzing and Interpreting Data. New York: The Guilford Press.

Tetlock, Philip E. (1983): Accountability and Complexity of Thought. In: Journal of Personality and Social Psychology, 45 (1): 74-83.

Tetlock, Philip E./Boettger, Richard (1989): Accountability: A Social Magnifier of the Dilution Effect. In: Journal of Personality and Social Psychology, 57 (3): 388-398.

Tetlock, Philip E./Skitka, Linda/Boettger, Richard (1989): Social and Cognitive Strategies for Coping With Accountability: Conformity, Complexity, and Bolstering. In: Journal of Personality and Social Psychology, 57 (4): 632-640.

Theis, Jochen Christopher/Yankova, Kristina/Eulerich, Marc (2012): Information Order Effects in the Context of Management Commentary: Initial Experimental Evidence. In: Journal of Management Control, 23 (2): 133-150.

Thode, Henry C., Jr. (2002): Testing For Normality. New York/Basel: Marcel Dekker.

Thoma, Stephen J./Rest, James/Barnett, Robert (1986): Moral Judgment, Behavior, Decision Making, and Attitudes In: Rest, J. (ed.): Moral Development: Advances in Theory and Research. New York/Westport/London: Praeger: 133-175.

Thomas, William C./Ward, Bart H./Henke, Emerson O. (1991): Auditing: Theory and Practice, 3rd edition. Boston: PWS-Kent.

Thorne, Linda (2000): The Development of Two Measures to Assess Accountants' Prescriptive and Deliberative Moral Reasoning. In: Behavioral Research in Accounting, 12: 139-169.

Thorne, Linda/Massey, Dawn W./Magnan, Michel (2003): Institutional Context and Auditors' Moral Reasoning: A Canada-U.S. Comparison. In: Journal of Business Ethics, 43 (4): 305-321.

Thurstone, Louis Leon (1938): Primary Mental Abilities. Chicago: University of Chicago Press.

Tiku, M. L. (1971): Power Function of the F-Test Under Non-Normal Situations. In: Journal of the American Statistical Association, 66 (336): 913-916.

Tisdell, Clem (1975): Concepts of Rationality in Economics. In: Philosophy of the Social Sciences, 5 (3): 259-272.

Toba, Yoshihide (2011): Toward a Conceptual Framework of Professional Skepticism in Auditing. In: Waseda Business & Economic Studies, (47): 83-116.

Tooby, John/Cosmides, Leda (1992): The Psychological Foundations of Culture. In: Barkow, J./Cosmides, L./Tooby, J. (eds.): The Adapted Mind: Evolutionary Psychology and the Generation of Culture. New York: Oxford University Press: 19-136.

Trevino, Linda Klebe (1986): Ethical Decision Making in Organizations: A Person-Situation Interactionist Model. In: The Academy of Management Review, 11 (3): 601-617.

Trevino, Linda Klebe/Youngblood, Stuart A. (1990): Bad Apples in Bad Barrels: A Causal Analysis of Ethical Decision-Making Behavior. In: Journal of Applied Psychology, 75 (4): 378-385.

Trompeter, Greg (1994): The Effect of Partner Compensation Schemes and Generally Accepted Accounting Principles on Audit Partner Judgment. In: Auditing: A Journal of Practice & Theory, 13 (2): 56-68.

Trompeter, Gregory M. et al. (2013): A Synthesis of Fraud-Related Research. In: Auditing, 32: 287-321.

Trotman, Ken T. (1985): The Review Process and the Accuracy of Auditor Judgments. In: Journal of Accounting Research, 23 (2): 740-752.

Trotman, Ken T. (1998): Audit Judgment Research - Issues Addressed, Research Methods and Future Directions. In: Accounting and Finance, 38: 115-156.

Trotman, Ken T. (1999): Perspectives on JDM Research in Auditing over 25 Years. In: Advances in Accounting Behavioral Research, 2 (March): 15-31.

Trotman, Ken T. (2005): Discussion of Judgment and Decision Making Research in Auditing: A Task, Person, and Interpersonal Interaction Perspective. In: Auditing: A Journal of Practice & Theory, 24 (Supplement): 73-87.

Trotman, Ken T. (2011): A Different Personal Perspective through the Behavioral Accounting Literature. In: Behavioral Research in Accounting, 23 (1): 203-208.

Trotman, Ken T./Wright, Arnold (1996): Recency Effects: Task Complexity, Decision Mode, and Task-Specific Experience. In: Behavioral Research in Accounting, 8: 175-192.

Trotman, Ken T./Wright, Arnold (2000): Order Effects and Recency: Where Do We Go From Here? In: Accounting and Finance, 40: 169-182.

Trotman, Ken T./Yetton, Philip W. (1985): The Effect of the Review Process on Auditor Judgments. In: Journal of Accounting Research, 23 (1): 256-267.

Trotman, Ken T./Simnett, Roger/Khalifa, Amna (2009): Impact of the Type of Audit Team Discussions on Auditors' Generation of Material Frauds. In: Contemporary Accounting Research, 26 (4): 1115-1142.

Trotman, Ken T./Tan, Hwee C./Ang, Nicole (2011): Fifty-Year Overview of Judgment and Decision-Making Research in Accounting. In: Accounting & Finance, 51 (1): 278-360.

Trotman, Ken T./Yetton, Philip W./Zimmer, Ian R. (1983): Individual and Group Judgments of Internal Control Systems. In: Journal of Accounting Research, 21 (1): 286-292.

Trueblood, Jennifer S./Busemeyer, Jerome R. (2010): A Comparison of the Belief-Adjustment Model and the Quantum Inference Model as Explanations of Order Effects in Human Inference. In: Ohlsson, S./Catrambone, R. (eds.): Proceedings of the 32nd Annual Conference of the Cognitive Science Society. Austin: Cognitive Science Society: 1166-1171.

Trueblood, Jennifer S./Busemeyer, Jerome R. (2011): A Quantum Probability Account of Order Effects in Inference. In: Cognitive Science, 35: 1518-1552.

Tsakumis, George T. (2007): The Influence of Culture on Accountants' Application of Financial Reporting Rules. In: Abacus, 43 (1): 27-48.

Tsui, Judy S. L. (1996): Auditors' Ethical Reasoning: Some Audit Conflict and Cross Cultural Evidence. In: The International Journal of Accounting, 31 (1): 121-133.

Tsui, Judy S. L./Gul, Ferdinand A. (1996): Auditors' Behaviour in an Audit Conflict Situation: A Research Note on the Role of Locus of Control and Ethical Reasoning. In: Accounting, Organizations and Society, 21 (1): 41-51.

Tsui, Judy S. L./Windsor, Carolyn (2001): Some Cross-Cultural Evidence on Ethical Reasoning. In: Journal of Business Ethics, 31 (2): 143-150.

Tubbs, Richard M./Messier, William F./Knechel, W. Robert (1990): Recency Effects in the Auditor's Belief-Revision Process. In: The Accounting Review, 65 (2): 452-460.

Tubbs, Richard M. et al. (1993): Order Effects in Belief Updating with Consistent and Inconsistent Evidence. In: Journal of Behavioral Decision Making, 6: 257-269.

Turner, Cynthia Williams (2001): Accountability Demands and the Auditor's Evidence Search Strategy: The Influence of Reviewer Preferences and the Nature of the Response (Belief vs. Action). In: Journal of Accounting Research, 39 (3): 683-706.

Tuttle, Brad/Coller, Maribeth/Burton, F. Greg (1997): An Examination of Market Efficiency: Information Order Effects in a Laboratory Market. In: Accounting, Organizations and Society, 22 (1): 89-103.

Tversky, Amos/Kahneman, Daniel (1974): Judgment under Uncertainty: Heuristics and Biases. In: Science, 185 (4157): 1124-1131.

Tversky, Amos/Kahneman, Daniel (1981): The Framing of Decisions and the Psychology of Choice. In: Science, 211 (4481): 453-458.

Tversky, Amos/Kahneman, Daniel (1986): Rational Choice and the Framing of Decisions. In: The Journal of Business, 59 (4): S251-S278.

Van Boven, Leaf et al. (2013): Judgment and Decision-Making. In: Carlston, D. E. (ed.): The Oxford Handbook of Social Cognition. Oxford et al.: Oxford University Press: 375-401.

Van Breukelen, Gerard J. P. (2010): Analysis of Covariance (ANCOVA), Volume 1. In: Salkind, N. J. (ed.): Encyclopedia of Research Design. Thousand Oaks et al.: Sage Publications: 20-26.

Van Hiel, Alain/Mervielde, Ivan (2003): The Need for Closure and the Spontaneous Use of Complex and Simple Cognitive Structures. In: Journal of Social Psychology, 143 (5): 559-568.

Venkataraman, Ramgopal/Weber, Joseph P./Willenborg, Michael (2008): Litigation Risk, Audit Quality, and Audit Fees: Evidence from Initial Public Offerings. In: The Accounting Review, 83 (5): 1315-1345.

Villoro, Luis (1998): Belief, Personal, and Propositional Knowledge. Amsterdam/Atlanta: Rodopi.

Visala, Aku (2011): Naturalism, Theism, and the Cognitive Study of Religion: Religion Explained? Farnham/Burlington: Ashgate.

von Neumann, John/Morgenstern, Oscar (1944): Theory of Games and Economic Behavior. Princeton: Princeton University Press.

Wahlen, James M./Baginski, Stephen P./Bradshaw, Mark (2010): Financial Reporting, Financial Statement Analysis and Valuation: A Strategic Perspective, 7th edition. Mason: South-Western, Cengage Learning.

Waller, William S./Felix, William I., Jr. (1984): The Auditor and Learning from Experience: Some Conjectures. In: Accounting, Organizations and Society, 9 (3/4): 383-406.

Walters, Glenn D. (2002): Criminal Belief Systems: An Integrated-Interactive Theory of Lifestyles. Westport: Praeger Publishers.

Wang, Karl J./Tuttle, Brad M. (2009): The Impact of Auditor Rotation on Auditor–Client Negotiation. In: Accounting, Organizations and Society, 34 (2): 222-243.

Ward, James (1933): Psychological Principles, reprint edition 2013. Cambridge: Cambridge University Press.

Wärneryd, Karl-Erik (1999): The Psychology of Saving: A Study on Economic Psychology. Cheltenham: Edward Elgar Publishing.

Webb, William M./Worchel, Philip (1986): Trust and Distrust. In: Worchel, S. (ed.): Psychology of Intergroup Relationships, 2nd edition. Chicago: Nelson-Hall Publishers: 213-228.

Wedemeyer, Phil D. (2010): A Discussion of Auditor Judgment as the Critical Component in Audit Quality: A Practitioner's Perspective. In: International Journal of Disclosure and Governance, 7 (4): 320-333.

Wee, Chow-Hou/Lim, Wei-Shi/Lee, Roger (1994): Enterpreneurship: A Review with Implications for Future Research. In: Journal of Small Business and Entrepreneurship, 11 (4): 25-49.

Weeks, William A. et al. (1999): The Effects of Gender and Career Stage on Ethical Judgment. In: Journal of Business Ethics, 20 (4): 301-313.

Weld, H. P./Roff, Merrill (1938): A Study in the Formation of Opinion Based upon Legal Evidence. In: The American Journal of Psychology, 51 (4): 609-628.

Weldon, Rebecca B./Corbin, Jonathan C./Reyna, Valerie F. (2013): Gist Processing in Judgment and Decision Making: Developmental Reversals Predicted by Fuzzy-Trace Theory. In: Markovits, H. (ed.): The Developmental Psychology of Reasoning and Decision-Making. Hove: Psychology Press: 36-62.

Wells, Joseph T. (2003): The Fraud Examiners. In: Journal of Accountancy, 196 (4): 76-80.

Wentzel, Kathryn R. (2005): Peer Relationships, Motivation, and Academic Performance at School. In: Elliot, A. J./Dweck, C. S. (eds.): Handbook of Competence and Motivation. New York: Guilford: 279-296.

Westra, Laura S. (1986): Whose "Loyal Agent"? Towards an Ethic of Accounting. In: Journal of Business Ethics, 5 (2): 119-128.

White, B. Jack (1964): Availability of Categories and Contrast-Effects in Judgment. In: The American Journal of Psychology, 77 (2): 231-239.

Wickelgren, Wayne A. (1979): Cognitive Psychology. Engelwood Cliffs: Prentice-Hall.

Wilks, T. Jeffrey (2002): Predecisional Distortion of Evidence as a Consequence of Real-Time Audit Review. In: The Accounting Review, 77 (1): 51-71.

Williams, Michael (2008): Hume's Skepticism. In: Greco, J. (ed.): The Oxford Handbook of Skepticism. Oxford et al.: Oxford University Press: 80-107.

Willoughby, Michael/Carmona, Pedro/Momparler, Alexandre (2012): The Effects of the Provision of Consulting Services on Audit Reporting Quality. In: Service Industries Journal, 32 (3): 411-429.

Wilson, Jonathan (2014): Essentials of Business Research: A Guide to Doing Your Research Project, 2nd edition. Thousand Oaks: Sage Publications.

Wilson, Timothy D. (2002): Strangers to Ourselves: Discovering the Adaptive Unconscious. Cambridge/London: The Belknap Press of Harvard University Press.

Windsor, Carolyn A./Ashkanasy, Neal M. (1995): The Effect of Client Management Bargaining Power, Moral Reasoning Development, and Belief in a Just World on Auditor Independence. In: Accounting, Organizations and Society, 20 (7/8): 701-720.

Witkin, H. A. et al. (1977): Field-Dependent and Field-Independent Cognitive Styles and Their Educational Implications. In: Review of Educational Research, 47 (1): 1-64.

Witkin, Herman A. (1976): Cognitive Style in Academic Performance and in Teacher-Student Relations. In: Messick, S. et al. (ed.): Individuality in Learining: Implications of Cognitive Style and Creativity for Human Development. San Francisco/Washington/London: Jossey-Bass: 38-72.

Wittmann, Waldemar (1959): Unternehmung und unvollkommene Information: Unternehmerische Voraussicht, Ungewißheit und Planung. Köln/Opladen: Westdeutscher Verlag.

Wong-On-Wing, Bernard/Lui, Gladie (2013): Beyond Cultural Values: An Implicit Theory Approach to Cross-Cultural Research in Accounting Ethics. In: Behavioral Research in Accounting, 25 (1): 15-36.

Woodhouse, Mark B. (2011): A Preface to Philosophy, 9th edition. Boston: Wadsworth.

Wooldridge, Jeffrey M. (2009): Introductory Econometrics: A Modern Approach, 4th edition. Mason: South-Western, Cengage Learning.

WPK (2014): Mitgliederstatistik der WPK. URL: http://www.wpk.de/fileadmin/documents/WPK/Organisation/WPK-Statistiken_Januar_2014.pdf, accessed on: 24.06.2014.

Wright, Arnold (1988a): The Impact of Prior Working Papers on Auditor Evidential Planning Judgments. In: Accounting, Organizations and Society, 13 (6): 595-605.

Wright, Sally/Wright, Arnold M. (1997): The Effect of Industry Experience on Hypothesis Generation and Audit Planning Decisions. In: Behavioral Research in Accounting, 9: 273-294.

Wright, William F. (1988b): Audit Judgment Consensus and Experience. In: Ferris, K. R. (ed.): Behavioral Accounting Research: A Critical Analysis. Columbus: Century VII Publishing Company: 305-328.

Wright, William F. (1995): Superior Loan Collectibility Judgments Given Graphical Displays. In: Auditing: A Journal of Practice & Theory, 14 (2): 144-154.

Wright, William F./Aboul-Ezz, Mohamed E. (1988): Effects of Extrinsic Incentives on the Quality of Frequency Assessments. In: Organizational Behavior and Human Decision Processes, 41: 143-152.

Wrightsman, Lawrence S. (1974): Assumptions about Human Nature: A Social-Psychological Approach. Monterey: Brooks/Cole Publishing.

Yamamura, Jeanne H. et al. (1996): A Comparison of Japanese and U.S. Auditor Decision-Making in Behavior. In: The International Journal of Accounting, 31 (3): 347-363.

Ye, Ping/Carson, Elizabeth/Simnett, Roger (2011): Threats to Auditor Independence: The Impact of Relationship and Economic Bonds. In: Auditing: A Journal of Practice & Theory, 30 (1): 121-148.

Ylinen, Mika/Gullkvist, Benita (2012): The Effects of Tolerance for Ambiguity and Task Uncertainty on the Balanced and Combined Use of Project Controls. In: European Accounting Journal, 21 (2): 395-415.

Zalabardo, José L. (2012): Scepticism & Reliable Belief. Oxford: Oxford University Press.

Zhao, Yifan/Harding, Noel (2013): Improving the Interpretation of Complex Audit Evidence: The Beneficial Role of Order Effects. In: Abacus, 49 (4): 476-505.

Zimbelman, Mark F. (1997): The Effects of SAS No. 82 on Auditors' Attention to Fraud Risk Factors and Audit Planning Decisions. In: Journal of Accounting Research, 35 (3): 75-97.

Zouboulakis, Michel S. (2014): The Varieties of Economic Rationality: From Adam Smith to Contemporary Behavioural and Evolutionary Economics. Abingdon/New York: Routledge.

Zuckerman, Marvin (2003): Biological Bases of Personality In: Millon, T./Lerner, M. J. (eds.): Handbook of Psychology, Volume 5: Personality and Social Psychology. Hoboken: John Wiley & Sons: 85-116.

List of Normative Rules and Regulations

AICPA ET 101 (1988): American Institute of Certified Public Accountants Code of Professional Conduct ET Section 101 – Independence. New York: AICPA.

IDW PS 200 (2000): IDW Prüfungsstandard 200: Ziele und allgemeine Grundsätze der Durchführung von Abschlussprüfungen. State: 28.06.2000. In: Die Wirtschaftsprüfung, 53: 706.

IDW PS 210 (2012): IDW Prüfungsstandard: Zur Aufdeckung von Unregelmäßigkeiten im Rahmen der Abschlussprüfung. State: 12.12.2012. In: Die Wirtschaftsprüfung, 66: 7.

IDW PS 270 (2010): IDW Prüfungsstandard: Die Beurteilung der Fortführung der Unternehmenstätigkeit im Rahmen der Abschlussprüfung. State: 09.09.2010. In: Die Wirtschaftsprüfung, 63 (Supplement): 1.

IES 3 (2004): International Education Standard 3: Professional Skills and General Education. URL: http://www.ifac.org/sites/default/files/publications/files/ies-3-professional-skills-1.pdf.

IESBA Code (2013): Handbook of the Code of Ethics for Professional Accountants. URL: http://www.ifac.org/sites/default/files/publications/files/2013-IESBA-Handbook.pdf.

ISA 200 (2009): International Standard on Auditing 200: Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance with International Standards on Auditing. URL: http://www.ifac.org/sites/default/files/downloads/a008-2010-iaasb-handbook-isa-200.pdf.

ISA 570 (2009): International Standard on Auditing 2010: Going Concern. URL: http://www.ifac.org/sites/default/files/downloads/a031-2010-iaasb-handbook-isa-570.pdf.

SAS 1 (2003): References in Auditors' Reports to the Standards of the Public Company Accounting Oversight Board. URL: http://pcaobus.org/Standards/Auditing/Pages/Auditing_ Standard_1.aspx.

SAS 99, AU Section 316 (2002): Consideration of Fraud in a Financial Statement Audit. URL: http://www.aicpa.org/Research/Standards/AuditAttest/DownloadableDocuments/AU-00316. pdf.

SAS 109, AU Section 314 (2006): Understanding the Entity and Its Environment and Assessing the Risks of Material Misstatement. URL: http://www.aicpa.org/Research/Standards/AuditAttest/DownloadableDocuments/AU-00314.pdf.

SAS 122, *AU-C Section 200* (2012): Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance With Generally Accepted Auditing Standards. URL: http://www.aicpa.org/Research/Standards/AuditAttest/DownloadableDocuments/AU-C-0020 0.pdf.

K. Yankova, *The Influence of Information Order Effects and Trait Professional Skepticism on Auditors' Belief Revisions,* Auditing and Accounting Studies,
DOI 10.1007/978-3-658-08871-2, © Springer Fachmedien Wiesbaden 2015

SAS 126, AU-C Section 570 (2012): The Auditor's Consideration of an Entity's Ability to Continue as a Going Concern (Redrafted). URL: http://www.aicpa.org/Research/Standards/AuditAttest/DownloadableDocuments/AU-C-00570.pdf.

WiPrPrüfV (2007): Prüfungsverordnung für Wirtschaftsprüfer nach §§ 14 und 131l der Wirtschaftsprüferordnung (Wirtschaftsprüferprüfungsverordnung – WiPrPrüfV) of 20.07.2004 (BGBl. I p. 1707), last amended by Article 3 of the Act of 03.09.2007 (BGBl. I p. 2178).