RESEARCH

Wolfgang Ziniel

Third Party Product Reviews and Consumer Behaviour

A Dichotomous Measuring via Rasch, Paired Comparison and Graphical Chain Models

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Mit einem Geleitwort von
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Geleitwort

Die Wirkung von Unternehmenskommunikation ist seit langem ein intensiv erforschtes Thema wissenschaftlicher Untersuchungen im Marketing. Gleiches gilt für das aktive Informationsverhalten von Konsumenten in der Form von Weiterempfehlung oder Weiterempfehlungsabsicht. Letzteres wird allerdings zumeist als abhängige Variable modelliert und im weitesten Sinne als Erfolgsindikator behandelt. Die tatsächliche Wirkung von Weiterempfehlungen auf andere Konsumenten wurde bislang hingegen weit weniger intensiv untersucht. Ähnlich verhält es sich bei Produktinformationen die durch institutionelle Parteien bereitgestellt werden. Dies erscheint zunächst überraschend, sind doch unabhängige Produktuntersuchungen und darauf beruhende Bewertungen und Empfehlungen seit langem weit verbreitet (z.B. Warentests von Konsumentenschutzorganisationen, Interessensvertretungen, Autofahrerclubs, usw.). Die Ergebnisse werden traditionell in Fachzeitschriften veröffentlicht, sodass zumindest bei Special-Interest-Produkten von einer gewissen Verbreitung ausgegangen werden kann. Mit der rasanten Durchdringung des Internets erreichen solche Produktbeurteilungen aber heute wohl deutlich mehr Konsumenten als zuvor. Auch die Resonanz auf die Veröffentlichung solcher Produkttests in Massenmedien (Zeitschriften, Nachrichtendienste im Internet) ist zumindest bei Produkten mit breit gestreutem Interesse gestiegen. Im Gegensatz zu Erfahrungen einzelner Konsumenten beruhen Produkttests von Institutionen auf objektiven oder zumindest vergleichsweise transparenteren Grundlagen. Bei Einzelmeinungen besteht auch ein höheres (subjektives, möglicherweise auch objektives) Risiko, dass die Information in Wahrheit vom Anbieter gesteuert wird. In sozialen Medien ist virales Marketing ebenfalls ein Thema, welches die Glaubwürdigkeit von scheinbar unabhängigen Informationen langfristig bedroht.

Macht man sich jedoch an die wissenschaftliche Untersuchung der Effekte von Produktempfehlungen unabhängiger Institutionen, so wird rasch deutlich, dass deren Erforschung mit nicht unerheblichen Schwierigkeiten verbunden ist. In der Praxis interagieren zahlreiche Informationsangebote miteinander. Konsumenten entscheiden auf der Basis von gesteuerter Unternehmenskommunikation seitens des Herstellers bzw. Anbieters, Informationen von Verwandten und Bekannten (klassisches Word-of-Mouth), im Internet veröffentlichter Erfahrungen einzelner Konsumenten (e-Word-of-Mouth), unabhängiger Produkttests und unter Umständen auf der Grundlage eigener

Erfahrungen. Zudem ist von hoher Heterogenität im Entscheidungsverhalten auszugehen.

In der Arbeit wird ein guter Überblick über bislang veröffentlichte Studien zum Thema „Third Party Product Reviews“ geboten, welcher die Schwächen der bisherigen Forschungsbemühungen demonstriert. In der vorgelegten Doktorarbeit wird dieser Herausforderung durch ein experimentelles Vorgehen begegnet, wodurch eine hohe interne Validität sichergestellt wird. Am Beispiel von Qualitätswein werden unterschiedliche Produkttests vorgegeben und deren Wirkung auf Präferenzen seitens der Konsumenten, die wahrgenommene Qualität, den Customer Value und die Kaufabsicht untersucht. Im ersten Experiment werden die unabhängigen Produktempfehlungen zweier bekannter Special-Interest-Zeitschriften sowie die Markenreputation des Weines und der Preis der angebotenen Weine manipuliert. Als abhängige Variable dient hier die Produktpräferenz. Im zweiten Experiment wird der Effekt der unabhängigen Produktempfehlungen auf wahrgenommene Qualität, Wert und Kaufabsicht untersucht. Als moderierende Faktoren werden in den Experimenten soziodemografische Variablen (Alter, Einkommen, Ausbildung), Markenpopularität, Produktwissen, Produktinvolvement, Vertrauenswürdigkeit der Institutionen und Risiko einbezogen. Das gewählte Modell zur angenommenen Wirkung von Produkttests auf die Qualitätswahrnehmung und die Kaufabsicht basiert auf einer sehr umfassenden Analyse entsprechender Ansätze in der Literatur.

Die Arbeit zeichnet sich nicht nur durch ein adäquates Untersuchungsdesign aus, sondern ist auch in Bezug auf die Analysemethodik sehr innovativ. So werden die Messmodelle zu den latenten Variablen auf der Basis des dichotomen Rasch-Modells geprüft, welches aus messtheoretischer Sicht dem traditionellen faktorenanalytischen Ansatz überlegen ist, aber bislang noch keine allzu große Verbreitung in der Marketingforschung gefunden hat. Die Analyse der Produktpräferenzen (Product Choice), welche in Form von Paarvergleichen erhoben wurden, erfolgt mit Hilfe des Bradley-Terry-Modells. Dies ermöglicht auch die Einbeziehung von Produktcharakteristika als Objektkovariaten und von Konsumentenmerkmalen als Subjektkovariaten.

Die Analyse des zweiten Experiments, welches auf die kausale Wirkung der Produkttests auf das beabsichtigte Kaufverhalten abzielt, beruht auf grafischen Chain

Models, welche für die vorliegenden binomial und multinomial verteilten Variablen wesentlich besser geeignet sind als Strukturgleichungsmodelle.

Die Ergebnisse zeigen, dass von der Wirkung unabhängiger Produkttests auf Auswahl- und Kaufentscheidungen auszugehen ist. Unterschiede zwischen dem Studentensample und dem repräsentativeren Panel-Sample in Experiment 2 liefern Hinweise auf die Heterogenität der Zusammenhänge.

Die vorliegende Studie stellt einen wichtigen Schritt in der systematischen Erforschung des Problemfelds dar. Aus methodischer Sicht ist die Arbeit wohl als richtungsweisend anzusehen. Wie von Herrn Dr. Ziniel im abschließenden Kapitel erläutert, bleiben zahlreiche potentiell sehr wichtige qualitätswahrnehmungs-beeinflussende Faktoren (wie z.B. der Geschmack des Weins, die Gestaltung der Flasche, die Herkunft des Weins) unberücksichtigt. Replikationen und Erweiterungen des Designs im Hinblick auf weitere mögliche Einflussgrößen des Entscheidungs-verhaltens sowie die Ausdehnung auf andere Objektbereiche sind daher viel versprechende Aufgabenstellungen zukünftiger Forschung.

Das sprachliche Niveau der auf Englisch verfassten Arbeit ist hoch. Das Werk erfüllt zweifelsohne alle Anforderungen an eine sehr gute Dissertation, welche alle wissenschaftlichen Standards erfüllt. Positiv hervorzuheben ist weiters die geringe Redundanz der Ausführungen, die zu einer sehr präzisen und zugleich nüchternen Darstellung beiträgt.

Zusammenfassend betrachtet widmet sich die Arbeit einer relevanten und bislang nicht ausreichend erforschten Problematik. Die theoretische Fundierung der strukturellen Modelle ist einwandfrei. Das gewählte empirische Design ist adäquat. Gleiches gilt für die innovativen Analysemethoden. Die Studie erlaubt erste empirische Einsichten und stellt eine wichtige Quelle der Anregung weiterführender Forschungsvorhaben dar.

PD Dr. Thomas Salzberger

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Wolfgang Ziniel


quality
model
value
product
TPPR
perceived
information
purchase
price
TPPRs
brand
models
choice
preference
high
behaviour
Rasch
consumer
good
variables
two
sample
parameters
figure
object
research
cues
one
test
influence
risk
experiment
products
attributes
intention
approach
customers
yes
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data

Table of Contents

List of figures

List of tables

List of formulae

1 Introduction

In mature markets, the brands offered are often identical in their core product features. Therefore, differences in product quality are hardly discernible for the consumers. A frequently postulated solution to this dilemma is the placement of additional experience-orientated values in advertising, design, point-of-sale and packaging activities (Belz 1989, 264; Weinberg 1992; Kroeber-Riel and Weinberg 2003, 221).

In view of a growing information overload it is increasingly difficult to position a particular brand in the perception of consumers (Enders 1997). This is especially true for extensive and limited choices, where specific information is sought to reach a purchase decision after careful consideration only. Hence we can assume an increased information overload of the consumers. They often hark back to "chunks" or "cues" during their purchase situations. Examples include price and brand name, country of origin but also Third-Party Product Reviews, in the following referred to as TPPRs (Kroeber-Riel and Weinberg 2003, 284). Except for TPPR, marketing science has devoted a lot of attention to the effect of cues on consumer behaviour (Lichtenstein, Ridgway and Netemeyer 1993; Dawar and Parker 1994; Diller 2000).

1.1 Problem

Market observations do provide strong evidence that TPPRs significantly influence the success or failure of the products evaluated (Chen and Xie 2005). Due to bad results in the *Consumer Reports* and consequently declining sales figures Suzuki took its Samurai from the US-market in 1995 (Hudson 2003). Awful test results published in *PC-Magazine* were followed by very poor sales figures of a *Northgate* computer model. Quite contrary, after being awarded "editor's choice" a database programme released by *Clarion* Software became a bestseller. Although it had been rejected by the influential computer distributor *Softsel* before, it was then finally included into its product range (Lewyn 1989). After favourable TPPRs by Robert Parker[1], the demand for the wines rated highly increases considerably and prices rise significantly (Hadj

[1] He is perhaps the most influential wine critic today. His reviews are published in his special interest magazine *"The Wine Advocate"* among others.

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Ali, Lecocq and Visser 2008). These examples strongly indicate TPPR influences on product success among different product categories.

This thesis will study the interrelationships of TPPRs with important constructs like preference, perceived quality, value and purchasing intention with regard to consumers' product choice decisions. Vintage wines were chosen as the appropriate product line to focus on. These wines are characterised by several experience and credence attributes concerning their quality (e.g. durability, taste). Therefore customers often face risks, dissonances and insecurities prior to purchase. That is why it can be assumed that the purchase of such products is quite regularly preceded by complex decision processes. Based on these thoughts the following research questions are developed:

- Do TPPRs exert an influence on the consumer's product choice processes?
- Do TPPRs shape quality and product value as expected by the customers?
- If so, are there crucial interactions with other cues like price or brand?
- Do personal and demographical factors moderate this interdependency?

The theoretical underpinnings of these questions are discussed in Chapter 2.1.1. Beforehand the notion TPPR is defined and the research gap within marketing literature identified.

1.2 Definition of third-party product reviews (TPPRs)

TPPRs are neutral (as far as the producers' interests are concerned) and consumer-orientated product tests that are carried out by experts and published in consumer journals or in special-interest-magazines (henceforth simply called "SIMs").

SIMs focus on specific topics for specific target groups, but in contrast to professional journals the readers do not have a vocational connection to the subject treated in the magazine (Merten 1999). The range of SIMs covers areas like sports, travel, lifestyle or technical matters, while only one specific matter is usually treated per SIM. *PC-World* and *Runner's World* are examples of SIMs that attract a very big audience with

monthly circulations of 745.000 and 650.000[2] respectively. Quite contrary niche magazines like *Surf-Windsurf Magazin* have only small monthly circulations of around 20.000 copies[3]. TPPRs can also be obtained via websites (e.g. http://www.consumer search.com) that offer collections of TPPRs.

In this context consumer-orientation refers to the fitness of purpose of a product (Müller 1965, 4), but also to the utility and the practical value from a consumer's perspective (Silberer 1979, 34). These aspects mark the differentiation of TPPRs from production-orientated tests but also from marketing-oriented market tests carried out by the manufacturers (for more details see Bauer 1981, 7ff).

Dual neutrality establishes the second constitutive attribute of TPPRs. Firstly, the tests have to be carried out independently; and secondly SIMs that publish test results must be independent of manufacturers' interests.

The latter prerequisite could be questioned as manufacturers advertise in special-interest journals. It is sometimes claimed that they have to be neutral and thus independent of the manufacturers as their own success depends on the reputation among their readers (Silberer 1979, 35). While ads offer important earnings, a big audience guarantees the attraction of the advertisers[4]. In literature this trade-off is called cross-market network effect. This effect claims that the publishers could prefer their important advertisers at the expense of their own credibility (Chen and Xie 2005, 221). However, the probability of an important magazine holding back bad reports due to pressure from the advertisers might be relatively small. Moreover, the corresponding departments of the magazines are usually locally separated (Lewis 1989, 12).

TPPRs typically contain product-specific information like features and functions based on lab testing, experts' evaluations and the suggested retail prices. The reviews usually follow a description or a recommendation format (Chen and Xie 2005, 220). In the former case a comprehensive attribute description without any recommendation

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[2] http://en.wikipedia.org/wiki/PC-World and http://en.wikipedia.org/wiki/Runner%27s_World, date of query: 2010-11-02.

[3] http://www.delius-klasing.de/mediainformationen/surf, date of query: 2010-11-02.

[4] For more information on the cross-market network effect see Chaudhri (1998) and Chen (2007)

regarding competing products is given. In the latter case winners are selected and distinguished with seals like “best buy”, “five star item” or “editor’s choice”.

1.3 Research gap

Apart from purely descriptive contributions explaining how often test information is used during the consumer’s decision making process (Raffée, Schöler and Grabicke 1975; Raffée and Silberer 1981; Raffée 1984) there has been a gaping hole in marketing literature on the interplay between TPPRs and consumer behaviour (Silberer 1979; Silberer, Fritz, Hilger et al. 1981). Studies that examine the impact of test information on purchase and decision behaviour and in particular on the quality and value perception process are needed to contribute to closing the gap.

A lot of research has been devoted to the concepts of perceived quality, value, purchase intention and preference and the way the constructs are affected by cues. These cues mainly encompass price, country of origin and brand (e.g. Monroe and Krishnan 1985; Rao and Monroe 1989; Steenkamp 1989; Dawar and Parker 1994), while the cue character of TPPRs has rarely been studied. Thus the linkage to the effect of third-party product reviews (TPPR) has not been clearly established yet. But similar to price, country of origin and brand, TPPR may serve as cues, too. They are up to substitute or bundle other information that is important during the evaluation of a product (Kroeber-Riel and Weinberg 2003). Considering the growing number of TPPR that is available (not only because of the growing circulation of SIMs, but also because of the www), there is a need to deepen the knowledge on this matter in order to broaden the understanding of the customer and his/her purchasing decisions.

1.4 Epistemological classification

In an epistemological sense this thesis is empirically orientated and thus it follows the deductive theory-critical paradigm to reach understanding: Theories derive from human thinking. The hypotheses that will be tested logically as well as empirically are deduced from these theories beforehand. Experience does not serve as a brick in these theories, but as criterion (Eberhard 1987, 36).

The context of discovery deals with methods to gain new knowledge by creatively finding new hypotheses and models. The thesis follows Heinen’s decision-theoretic approach to business research (Heinen 1968). Marketing science as a part of this

discipline is recognized as an applied and interdisciplinary social science that aims at finding problem-orientated solutions to decision situations that are concerned with exchange relationships (Scheuch 1996). The decision-orientated approach to marketing is practical-normative. Problems are formulated due to logical categories of the decision process while the approach is practically orientated. In order to find realistic solutions the discipline has to start out from realistic premises and descriptively work on real decision behaviour. Thus it receives a behavioural explanation duty, too (Ulrich and Hill 1979).

The scientific context of justification is confronted with questions of how to reason new scientific cognition (Chmielewicz 1979). This work is committed to Popper's *"critical rationalism"* (Popper 1965; Popper 1966): The process of testing theories starts with a logical examination that encompasses the analysis of the notions used and their relations, followed by testing for tautologies and for consistency. Finally a comparison with established theories is drawn. The empirical examination starts with the formulation of the hypotheses to be tested. For this purpose Popper introduced falsification instead of verification, as every multiply verified proposition can turn out wrong at a moment's notice, thus being always provisional. Falsification is more rigorous as multiple attempts of falsification serve to eliminate and accordingly modify wrong theories. Theories resisting falsification are retained. Accordingly, refined theories contribute new knowledge to the scientific development (Popper 1965, 253ff; Popper 1966, 15f, 39ff, 54, 220f).

One of Popper's crucial assertions is that knowledge is never exhaustive. As knowledge is incessantly improved by enduring criticism, it is always provisional. Thus every theory of knowledge and science is connotative, i.e. it depends on its usage and cannot be accomplished. Theories within the social sciences and the humanities are confronted with an autopoetic reality and have to deal with diversity, heterogeneity and dynamics within the system (Schülein and Reitze 2002). These views serve as guiding principles for gaining new knowledge in this thesis.

1.5 Scientific and practical relevance

The importance of the research questions discussed above arises from several reasons. The quick availability of product-specific information heads to the continuous shift from offline towards online information and corresponding shopping behaviour.

TPPRs of SIMs are more and more available in the www. The TPPR's role in the pre-purchase information process has probably gained in importance now as TPPR offer consumer-orientated and product-specific information at low search costs also online. Thus it can be hypothesized that the role of the sales personnel as an information source is weakened whereby sources like TPPR are strengthened.

Firstly this thesis will help firms to understand the relevance of a test result for the buyer's behaviour on an individual level. TPPR could support the consumer's decision making process (also in shops) and decrease feelings of risk and dissonance prior to purchase.

Secondly it will be demonstrated how to avoid problems of rating scales in complex and in multi-attribute choice decisions. A Bradley-Terry model (1952) based on paired comparisons is applied to measure preferences. Rasch models and graphical chain models avoid rating scales when the complex structural interrelationships between the cues TPPR, price and brand and interesting constructs like perceived value, quality and purchasing intention are analysed.

Thirdly a potential way to broaden the applicability of discrete choice models within the field of marketing science will be shown. The thesis will demonstrate how such an approach could help to gain a deeper understanding of the consumer. The same is true for Rasch modelling and graphical chain models in order to understand direct and indirect influences between numerous variables without losing too much relevant information.

Finally, this work attempts to contribute to a closing of the *quality perception gap* with respect to quality cues. Understanding the consumer's perception of product quality is an essential step towards consumer-oriented products and thus to consumer satisfaction.

1.6 Course of investigation

This thesis is organised into a theoretical-conceptual and an empirical-analytical section. The former gives an insight into relevant theories from fields like marketing, social and media psychology and economics that suggest an impact of TPPRs on consumer behaviour. Consequently empirical works that have been conducted within the context of TPPR are reviewed. Thereafter different contexts of marketing research

that have dealt with TPPR are given special attention. These are the contexts of advertising, marketing strategy and cue research. The next step reviews the existing literature on the main constructs studied in this thesis. These constructs encompass perceived quality, preference, perceived value and purchase intention. In deduction of the theories examined hypotheses are put forward and finally the conceptual research model of this thesis is discussed.

The empirical-analytical section starts with the explanation of the course of experimentation. After generally examining the advantages and disadvantages of doing experiments in the context of the internet, the designs of the two experiments carried out are highlighted. Subsequently the composition and the characteristics of the two data sets are considered. The ensuing part gives a general idea of Rasch modelling before Rasch measurement models for the further analysis are developed. All the constructs used in the course of experimentation and their contexts are illuminated. Finally Rasch homogeneity tests make it possible to find proper measurement models of the latent constructs.

The next chapter studies the relevance of TPPR for product choice processes. It starts with an introduction to the Bradley-Terry model. Then the analysis of the online experiment one is carried out by fitting log-linear Bradley-Terry models for the two data sets collected. This task finishes with the interpretation of the results. The procedure of analysing the online experiment two that focuses on the impact of TPPR on purchase intention, value and quality is straightforward. After providing a general methodological discussion of graphical chain models, models are fitted. This procedure closes with an interpretation of the results and a comparison of the sample findings.

The last chapter of the thesis presents a summary of the results. Based on these findings scientific and managerial implications are derived. Following the reflections on the limitations of this work the potential future research agenda is debated. Finally the work closes with a summary and a conclusion.

2 Literature review

This chapter reviews the existing literature in the context of TPPR and focuses on theoretical as well as empirical works which suggest TPPR influences on consumer behaviour. Moreover, the key consumer behaviour constructs attended to this work are subject of a thorough discussion.

2.1 Third-party product reviews

Recommendations have exerted a considerable impact on marketing research. In this context it seems reasonable to differentiate research streams focusing (e)word-of-mouth from online product recommendations (Bloom and Szykman 1998; Senecal and Nantel 2004; Shahana and Dawn 2007; Chen and Xie 2008; Lee and Youn 2009), celebrity endorsement which mainly arises in advertising (Tripp, Jensen and Carlson 1994), and TPPR in advertisements (Dean 2000; Dean and Biswas 2001). In this thesis the focus on TPPRs that are primarily published in SIMs. Research gives evidence that also film and theatre critics and their reviews do have a significant effect on the success of a film and a play (Eliashberg and Shugan 1997; Reddy, Swaminathan and Motley 1998). This study showed that when choosing a movie one third of the audience sought for reviews (Simmons 1994). Another study revealed that 44% of the online consumers consulted review websites before purchasing goods (Riller 1999).

2.1.1 Theories explaining TPPR effects on consumer behaviour

The assumed capability of TPPR to effect quality perceptions can be derived from various theories within the field of social and media psychology, information processing theory and marketing. The specific theories are discussed in the following paragraphs.

2.1.1.1 Source credibility

According to media psychology the credibility of an information source is defined as the amount to which people regard a message as reliable and upright (Batinic 2008, 300). It includes the two dimensions “expertise” and “trustworthiness“. The first dimension refers to the communicator’s capability to put forward valid assertions, the second one to the credibility that is ascribed to a message from the receiver’s point of view (Hovland, Janis and Kelley 1953, 22). Credibility depends on *source factors* (expertise, competence, status and attractiveness), *recipient factors* (motivation, mood

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and need for cognition), *message factors* (e.g. complexity) and *channel factors* (e.g. type of media). The evaluation of a source's credibility frequently serves as a means of rating and screening for the recipient (Batinic 2008, 300).

Since credible sources are perceived as more detailed representations of reality, their influence is much more persuasive than that of less credible ones (Dholakia and Sternthal 1977; Eagly, Wood and Chaiken 1978; Sternthal, Phillips and Dholakia 1978).

For studying the effect of TPPR on consumer behaviour this line of research (for a detailed review see Sternthal, Phillips et al. 1978, 287) is of great importance. Trustworthy sources and expert arguments trigger more positive positions with respect to the opinion propagated (Hovland and Weiss 1951; Kelman and Hovland 1953; Watts and McGuire 1964; Whittaker and Meade 1968; Warren 1969; Schulman and Worrall 1970). Additionally, credible sources arouse more behavioural compliance than incredible sources (Crano 1970; Schulman and Worrall 1970; Crisci 1973; Ross 1973; Woodside and Davenport Jr 1974; Ohanian 1991).

These aspects suggest that source credibility serves as a valuable framework for studying TPPR effects on consumer behaviour.

2.1.1.2 Attribution theory

According to the discounting principle of attribution theory a communicator will be seen as biased by the recipient when the latter experiences that the message can be attributed to personal or situational causes; so consumers will discredit these product evaluations (Kelley 1973). In the case of TPPRs a biased perception can arise when consumers get the feeling that the experts carrying out the tests are related to some of the product's manufacturers or when SIMs are interested in preferring their most eminent advertisers by suppressing bad results or by overstressing average results. If so, it can be assumed that the reader's assessment of the information is that it is not credible. This implies that in such cases TPPR exert no or negative influences on product perception and preference (Senecal and Nantel 2004, 160).

2.1.1.3 Risk taking theory – uncertainty and risk reduction

Perceived risk in the context of buying decisions can be defined as the anticipation of negative consequences arising from a potential purchase (Bauer 1960; Cox 1967a).

Consumers have possibilities to reduce risk and the uncertainty associated. Information acquisition represents one possibility. The implementation of perceived risk models assumes particular product specifications. These are complex functions of the product (technological intransparency, high requirement for thorough explanation), a lack of divisibility and the impossibility of trial purchase, premium priced products with a high degree of innovation, a high ego-involvement of the customer with the specific product line or products that show little conformance with respect to social norms, connected with considerable public usage (Schweiger, Mazanec and Wiegele 1976, 94; Dholakia 2001).

All these attributes seem to be particularly true for products tested in special-interest-magazines (high-end mountain bikes, hifi-components, wines, running shoes, windsurfing equipment etc.). In such cases consumers seek for those chunks of information that are characterised by high problem relevance with respect to reducing perceived risks (Cox 1967a, 618ff). Here marketing science distinguishes between financial, functional, health, psychological, social and time related risks (for detailed discussions see Cox 1967a; Cunningham 1967; Panne 1977). As a warranty is capable of reducing product and financial risks (Shimp and Bearden 1982, 42ff), TPPR is believed to decrease perceived risks within the other dimensions, too.

Urbany, Dickson and Wilkie (1989) brought up the differentiation between knowledge uncertainty (i.e. the knowledge which products are accessible to fulfil the consumer's needs) and choice uncertainty (i.e. the question which product(s) to choose). As TPPRs discuss evaluative measures of products and compare product performance, they may raise both, knowledge and choice certainty.

2.1.1.4 Economics of information

Usually consumers have to make purchase decisions although they lack full information on the variety obtainable. According to Nelson (1970) this is due to the fact that consumer information search causes costs. As consumers differ in their need for relevant information and in their willingness to collect information, they are unequally informed.

Stigler (1961) claims that the expected savings from an information search process are positively related to the dispersion of prices. The degree of search is negatively related to the cost of search and the achievement of search is subject to diminishing returns

(Stigler 1961). Adapting Nelson's (1974) work on the informational character of advertising Dean (Dean 1999; Dean and Biswas 2001) proposes that TPPRs within ads may be perceived as highly informative chunks of information. Their marginal costs of obtaining are exceeded by their marginal benefit. This underlines the assumption that TPPRs providing information on credence and experience attributes are of vast importance in the quality perception process.

Gathering market and product information costs time and money. As buyers value the costs and the return of information search processes differently, we can act on the assumption that buyers are unequally informed. Accordingly sellers are able to charge higher prices from a number of customers. TPPRs have been shown to be able to dissolve or at least diminish these asymmetries in information (Faulhaber and Yao 1989; Lizzeri 1999).

2.1.1.5 Cognitive consistency and balance theory

Consistence theories deal with cognitive systems, i.e. the cognitions of an individual being interconnected. Attitude change by communication is often based on a situation in which the content of a message produces inconsistencies. This could be the case when a consumer reads a very positive TPPR about a product he/she regards minor in quality. As the individual seeks to reduce inconsistencies that cause tensions, the TPPR may increase the value of the attitude object (Herkner 2001).

Heider's balance theory (1958) encompasses the three elements individual and perception(s), attitude object and another person or object. TPPR can be one of these objects. A positive link can be established if the individual has a positive attitude towards the TPPR. In the case of a report praising one specific product, the second positive relation will be developed by the customer. With two positive relations already created, balance theory suggests that the consumer will seek balance and build up a positive attitude towards the product.

2.1.1.6 Signal theory

Consumers are often unsure of the quality attributes of the products they intend to purchase. Manufacturers try to reduce these feelings and their inherent risk perceptions by sending various signals. Warranty, price and the reputation of a manufacturer may serve as such signals (Shimp and Bearden 1980; Shimp and Bearden 1982; Boulding and Kirmani 1993).

To be trustworthy however these indicators have to include a "bonding" element (Ippolito 1990). This could be a possible spending of the sender of the signal, e.g. a reparation expenditure in the case of warranty. The "bonding" element in connection with TPPRs is the endorser's reputation that could get lost by faulty test publications. This might be another reason why TPPRs serve as signals for unobservable product quality.

2.1.2 Empirical evidence for TPPR effects on consumer behaviour

A lot of research has been carried out emanating from studies that deal with Consumer Unions' test publications. TPPRs in special interest magazines have received little interest so far.

Marketing research has predominantly focused on the role of test reviews in the consumer's pre-purchase information behaviour. With respect to long-living durables like home appliances, between 18 and 85% of the consumers consulted TPPRs prior to purchase (GfK 1974; N.N. 1975; Thorelli, Becker and Engledow 1975). 23% admitted that they gathered price and quality information for greater acquisitions via TPPRs in newspapers, 13% via TPPRs in publications of consumer unions, 80% in the shop and 17% via advertisements (N.N. 1976).

A large scale study by the European Commission found that nearly 30% changed their buying behaviour at least once as a result of reading TPPRs (EG-Kommission 1976). Similar to that Scherhorn and Wieken (1972) illustrated that 38% changed their petrol station operator and 50% the washing powder used. Au and Tse (1993) confronted customers of soft drinks and hair sprays with a negative TPPR, containing statements like "This product harms body and environment". As a consequence 33% used the product less frequently, 10% abandoned the product completely.

Fireworker and Friedman (1977) showed that experts' product recommendations could influence the costumers' product attitude significantly. Moreover consumers' price assessment of the products rated became significantly higher. Friedman and Friedman (1979) illustrated the ability of TPPR to reduce perceived risk and raise willingness-to-buy. These works serve as one of the cornerstones of this thesis. A comprehensive outline of these studies is given by Table 1.

Author/s and Citation	Question/s and research focus	Study descriptors (method, participants)	Kind of TPPR	Findings	Comments
(Scherhorn and Wieken 1972)	Purchase-based impact of neutral consumer information, distribution of education letters informing about high price and low quality differences; detergent and fuel brands Consumer behaviour and TPPR: Choice of shops and brands	---	Non-commercial	38% changed petrol station provider 50% changed detergent brand	Descriptive results only, no hypotheses testing
(GfK 1974)	How have you caught up on ... before buying? TPPR usage	Representative survey among customers, n=4378	Non-commercial	18% TPPR 30% discussions with relatives 32% shop window 64% sales advisory service TPPRs were mainly relevant in connection with major purchases (here: appliances)	Multiple answers were possible, no hints which source was mentioned first of all
(N.N. 1975)	How often have you consulted TPPRs when shopping? TPPR usage	Representative survey among readers of the consumer journal *"Test"*	Non-commercial	91% among subscribers 85% among single-issue purchasers	Unclear questioning, other TPPRs have not been considered
(Raffée, Schöler et al. 1975)	How helpful were journals publishing TPPRs (for the purchase of household appliances, audio and TV) Consumer behaviour and TPPR	Personal interviews n=150 urban n=150 rural	Non-commercial	Urban: 16.6% helpful vs. 49% no help Rural: 12.6% helpful vs. 54% no help	Sample size given very small, merely hints that TPPRs may support purchase decisions.

(Thorelli, Becker et al. 1975)	How often have you considered TPPRs in your purchase decision? Have you bought the product proposed by *„DM“*[5] and/or *„test“*[6]? Consumer behaviour and TPPR	n=325 „test“-subscribers and 285 „DM“-subscribers	Commercial & non-commercial	56% considered TPPRs at least once before major purchases (appliances) 45 % bought the product recommended	Small sample and unclear phrasing
(EG-Kommission 1976)	Would you say that your purchasing behaviour has changed since you got to know comparative TPPRs? Consumer behaviour and TPPR	Representative (older than 15) for Germany n=1002 and for the European Union n=9150	Non-commercial	I changed my purchase behaviour at least once: 40% Germany 28% European Union average	No explanation of measurement instrument
(N.N. 1976)	How do you catch up on price and quality when you intend to do major purchases? TPPR usage	---	Commercial & non-commercial	80% in the shop 23% TPPR in newspapers 17% advertisements 13% TPPR in the journal of the consumer union 8% customer advice	The list shown to the consumers was an incomplete list of potential information sources.
(Fireworker and Friedman 1977)	Impact of product endorsement claims (expert, celebrity and typical customer endorsement) on the decision process of customers. Product: new wine brand. Consumer behaviour and TPPR	n=200, face-to-face interviews	Commercial	Expert und celebrity endorse-ment showed a significantly positive effect on the attitude towards the product. Additionally, all three endorsements triggered significantly higher price estimates.	As students were engaged as interviewers there might have occurred considerable interviewer effects.

[5] A commercial journal that publishes TPPRs for several products.

[6] A journal issued by *Stiftung Warentest*, the German Consumer Union.

(Friedman and Friedman 1979)	Is the impact of particular advertisement containing TPPR (celebrity, experts and typical consumer) moderated by type of product? experimental design: 4 (celebrity, experts, typical consumer, none) x 3 (vacuum cleaner, cookies, jewels) between subjects factorial Consumer behaviour and TPPR	n=360 middle-class housewives	Different endorsements	Significant effects of the combinations celebrity/jewellery (psychological/social risk) and expert/vacuum cleaner (financial/performance/physical risk) and typical consumer/cookies (low overall risk) were found. These combinations trigger higher overall product attitudes, higher purchasing intentions and higher credibility, too.	Estimated value Estimated price TPPR (celebrity, experts, typical consumer, printed ads without TPPR)
(N.N. 1979)	How often have you been guided by TPPRs during shopping? Impact of TPPRs during purchase decision	n=601 customers, face-to-face interviews	Non-commercial TPPR	15% once 36% several times 48% never Consideration of TPPR rises with education and declines with age, “working” women devoted themselves more often to TPPRs than “only housewives”.	Imprecise and ambiguous questioning (e.g. to devote to), general problems of interviews like social desirability and asking beyond knowledge
(Silberer, Fritz et al. 1981)	Consideration of TPPRs during the purchase of consumer goods, socio-demographic structure of the users TPPR usage	representative for the German population (except for children), n=14358	Non-commercial TPPR	Usage of TPPR 20-40% with consumer durables 7-17% with consumer goods no socio-demographic differences found	Only descriptive findings, no hypotheses tested

(Olshavsky and Rosen 1985)	TPPRs as cues to simplify decision processes. Product: stereo equipment. TPPRs as cues	n= 40 students, laboratory experiments, purchase situation simulated by information display devices	Non-commercial TPPR	TPPRs do not only serve as sole information source prior purchase. People who requested brand-specific TPPR at first needed less attribute-specific information in all information sources and considered fewer brands. Thus TPPR simplified choice processes, reduced consideration sets and the amount of information on product attributes needed.	Small sample, only students, information display method: customers might show different behaviour compared to real life situations, only one product category studied
(Au and Tse 1993)	Consumers of hairspray and wellness drinks were provided with negative TPPR (the respective products "harm body and environment") Purchase decision and TPPR	n=200 students, convenience sample, face-to-face interviews with structured questionnaires	Non-commercial TPPR	Wellness drink: 8% changed brand, 66% did not change consumption behaviour, 33% drank less Hairspray: 68% kept using it, thereof 3% used even more, 33% less, the rest kept consumption level	No significant results, small sample size, convenience sampling

Table 1: TPPR influence on information, decision and consumer behaviour

The above-mentioned studies can be criticized for several reasons. Firstly, they were mainly carried out in the form of descriptive interviews. This makes it impossible to deduce causal relations between the effect of a TPPR and consumer characteristics and other constructs like perceived quality or willingness-to-buy. Secondly, some suffer from unclear and ambiguous phrasing like "How often have you addressed yourself to TPPR in shopping situations?" or "In how far was the TPPR helpful in a specific buying situation?" Thirdly, some studies did not face problems of social desirability and worked with small sample sizes only.

Moreover it has to be mentioned that these studies were carried out long before the advent of the internet. A study of information behaviour prior to purchase should also incorporate online sources like e-word-of-mouth (Lee and Youn 2009) or endorsements published in the internet.

2.1.3 TPPR and advertising

A related field of research gives special attention to the relevance of TPPRs integrated in advertisements. It could be illustrated that ads containing TPPR led to higher perceived information values of the ads than the same ads without TPPR (Dean and Biswas 2001).

Beyond that significantly better evaluations of perceived quality, enlarged values of product uniqueness and perceived manufacturer esteem for the same product were observed in an pre-purchase experiment with ads containing TPPR (Dean 1999).

Apart from that Dean (2000) experimentally compared the effect of TPPR with celebrity endorsements. The TPPR group had decisively higher scores on perceived quality, perceived product uniqueness and attitude towards the manufacturer than the celebrity group and the control group. The opposite effect was observed with respect to perceived risk.

The experimental approach including real TPPR (here taken from Consumer Digest) seems to assure external validity. The fact that the experiment was carried out with students only could be seen as a limitation. However, in summary, these two works can be seen as a valuable starting point when studying TPPRs in the context of purchase situations.

2.1.4 TPPRs and marketing strategy

Another related stream of research deals with the interaction of TPPRs and firms' marketing strategies. To put it into more detail this stream focuses on the connection between TPPR, pricing and advertising from a macro perspective (Archibald, Haulman and Moody 1983; Chen and Xie 2005). Chen and Xie (2005) give strategic recommendations based on a sophisticated model. They used data from the printer and running-shoe market to fit their model and to illustrate their findings. As a strategic variable in response to TPPR they recommend to use advertising first and not so much price when enough consumers value horizontal product attributes. Unexpectedly, they

also discovered that publishing the success of a winning product by review-endorsed advertising formats, i.e. ads with third-party award logos can even hurt the product.

2.1.5 TPPRs as cues in consumer behaviour research

Olshavsky and Rosen (1985) were the first authors to study the cue character of consumer unions' test publications. Such publications may facilitate the product choice process and minimize the number of the products evaluated. Apart from that the study revealed that the consumers gathered less product attribute information. Therefore TPPRs seldom act as sole information source prior to purchase but interact with other cues. These correlations will be studied in the empirical subsections.

2.2 Perceived quality research

Based on the discussion of different approaches to quality, the concept of perceived quality is derived. This part of the thesis also examines different models of the customer's perception process of quality. Studies that have focused the influence of different cues (price, brand, country-of-origin) on perceived quality are also reviewed.

2.2.1 The notion of "quality"

Literature has not brought up generally accepted definitions of quality concerning content and meaning. This is not surprising as the notion can be illuminated from different perspectives with different facets. However, there are some aspects that are quite accepted. So the notion "quality" is always used to characterize an object. It is size linked to a reference object and always present when the object is existent (Smith 1993, 236). There is no object without quality. Quality is not limited to products or services. Also a great landscape has its specific quality for instance. Generally speaking, the notion is neutral even though, colloquially, usually understood as excellence (Riegel 1975; Holbrook and Corfman 1985, 32).

In order to sufficiently understand this pluralism in meanings one has to take up different positions. Only a few authors refer to other possible approaches to the concept of quality (these include: Garvin 1988, 40ff; Steenkamp 1989, 40ff; Oess

1991, 31ff; Geiger and Kotte 2005, 63ff). Cowan (1964)[7] gets to the bottom of the matter when stating:

> *„Quality is a jewel with many facets, and it is important when using the term, to define, explicitly or implicitly, with which facet one is concerned."*

Quality is one of the key issues in this thesis. Therefore a thorough analysis of the notion follows. This analysis considers the domains specified in Figure 1.

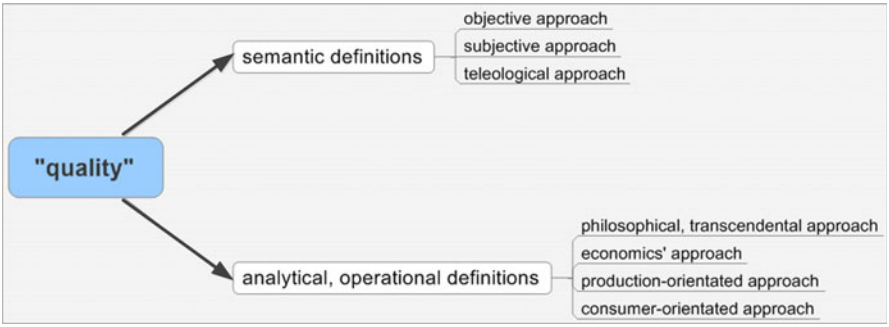

Figure 1: Approaches to the notion "quality", *source:* Fillip (1997, 24)

In order to highlight the different facets quality will be considered as a subjective, an objective and finally as a teleological construct. Afterwards the meaning of quality in the different scientific disciplines is questioned.

Disciplines like psychology, sociology or statistics contribute a lot to the scientific progress of marketing science. Therefore the following section will examine the notion "quality" from the perspective of different disciplines. Garvin (1987) differentiates between five approaches (transcendent, product-related, user-related, production- and value-orientated), while Steenkamp's classification comprises the philosophical, the economic, the production management and the perceived quality approach.

2.2.1.1 Subjective, objective and teleological quality

Quality in an **objective** sense refers to the totality of the attributes of an object and their specific degree of values in the sense of the property of the object (Linde 1977,

[7] cited in Holbrook (1983)

6). Here, objectivity is constituted in Popper's sense, namely being intersubjectively verifiable. Basically, objective justifications have to be checkable and visible by anyone (Popper 1966).

Product quality is regularly recognized as the appropriateness of purpose. Thinking of a means-end relationship, the purpose of a product serves as the end and the features that have to be measurable (physically or chemically) as means to reach the goals. Accordingly a proposition on means-end relationships is objective when every subject equipped with the same information (both on the means and the end) reaches the same conclusion when examining the proposition (Kawlath 1969, 17).

In a **subjective** view products are in demand because they have the ability to satisfy needs. Subjective quality is the extent to which an object satisfies the individual's need from an individual perspective (Riegel 1975, 61ff). Finally the subjective judgement of the individual is decisive.

The sum of the properties of an object makes up the objective condition of the object, or in other words, quality is the same as state or condition, the objective quality. This quality is free of relation and is extra-economic. Only subjectivity is able to turn a thing into an economical object (Lisowski 1928, 37, 40). Rieger (1962, 79) reaches the same conclusion: The notion of subjective quality is the appropriate one for a theory of quality competition.

Aspects of the two approaches can be found in a third one, i.e. the **teleological** interpretation of quality. It was brought up by Kawlath and recognizes quality as the *suitability for specific purposes*. The main focus lies on the intended purpose of the object for a subject. This purpose should be measured in order to be compared with the property of the object. Finally, following the comparison, statements about the quality of the objects are derived. This procedure attempts to transform a subjective quality statement into an objective one (Kawlath 1969, 50).

2.2.1.2 Philosophical / transcendental approach

The philosophical (Steenkamp) or transcendental (Garvin) approach can be seen as the oldest approach in quality research as it dates back to Greek and Chinese philosophers and their equation of quality with *"innate excellence"* (Tuchmann 1980; Garvin 1988; Steenkamp 1989).

In the words of Pirsig and Garvin (Pirsig 1974, 185, 213; Garvin 1988, 41), who hit the core of the approach accurately,

> *"Quality is neither mind nor matter, but a third entity independent of the two ... even though quality cannot be defined, you know what it is."*
>
> *"It is both absolute and universally recognizable, a mark of uncompromising standards and high achievement ... there is something timeless and enduring about works of high quality, an essence that rises above changes in tastes or styles ... quality cannot be defined precisely, that is a simple, unanalyzable property we learn to recognize only through experience."*

From these statements we can derive that quality is something absolute and universally recognizable. Unfortunately it is not possible to define the concept precisely (Steenkamp 1989). More than 2500 years ago the Chinese philosopher Lao Tzu stated in his Toa Te Ching (Garvin 1984b):

> *"The quality that can be defined is not the absolute quality."*

The philosophical approach exhibits similarities to Plato's conception of beauty (Garvin 1984b). In his *Symposium* Plato brings forward the argument that "beauty" is one of the forms and thus cannot be defined. That is to say we can understand "beauty" only through experience. The same is true for quality.

According to Aristotle's work *Categoriae* categories represent the highest form of entity. Quality is one of them. Quality is one of the circumstances that define an object further. That is the reason why quality cannot subsist outside substance. When thinking of red wine for instance, wine is the substance and red is the quality that specifies the substance further. Consequently quality cannot exist outside the substance (Steenkamp 1989). Four types of quality were distinguished by Aristotle. These are states and conditions, capacities and incapacities, affective quantities and affections and finally shape, external form, straightness, curvedness and alike (Pickel 1987).

A similar view was shared by the medieval scholars. According to Thomas Aquinus' *Summa Theologica*, abstractions are superior to reality. So it is often hard to get to the quality of specific objects, while the reality of the general concept of quality cannot be doubted. In the 17th century Descartes, Boyle and Locke argued that objects possess

objective and fundamental qualities that cannot be separated from the physical object like figure or solidity. From these qualities and emanating from the human perception, primary qualities are derived. Subsequently in the philosophy of the 19th and 20th century only little attention was paid to quality. This could be the result of a declined interest in metaphysical questions.

2.2.1.3 Development of the notion "quality" in economics

Wirz (1915) was one of the first economists who examined the concept of „quality". He characterized purposeful fitness as the core of the concept. Things per se do only have attributes. Via human goal-setting these attributes receive meaning and are upraised to qualities. Lisowski (1928, cited in Kawlath 1969) introduced the difference between objective and subjective quality (Kawlath 1969) and pointed out the relevance of the subjective approach for market adequacy. Vershofen (1959) described the notion as a comparative and relational concept as quality only exists in relation to other products and/or price. These two concepts find their way into the "economic notion" of quality created by Rieger (1962). Accordingly, a product is characterized by its quality and price, with quality being the subjective component.

2.2.1.4 The production-orientated approach

Quality in this view focuses on zero-defect manufacturing and thus on faultless products. The emphasis is put purely on the control of production. In medieval times this monitoring function was performed by the master tradesman within a specific guild. Another milestone was the introduction of statistical quality assessment in the nineteen-thirties and finally the beginning of today's strategic-orientated Total Quality Approach (Garvin 1988). According to Oess (1991) we can subsume this approach as *"conformance to requirements"*. Thus the better the product conforms to predefined specifications, the better the product's quality. Deviations mean minor quality (Steenkamp 1989).

There are four interrelated parameters that define and sustain product quality. Firstly *quality of design* should guarantee the focus on what quality means to the customer by identifying his/her quality needs and should create a product concept that is suited to fulfil this need. Moreover a list of criteria is created that guarantees that customers' needs are fulfilled when the product comes up to these criteria (Juran and Gryna 1993). The parameter *quality of production* subsumes all action undertaken to fulfil

design specifications during the process of production and to respond to faulty production efficiently.

These two parameters are relevant to non-durable manufactures. When speaking of durables however one has to consider two other parameters: *continuity of service* and *customer service after sale* (Juran and Gryna 1993). The former affects maintenance as well as reliability, i.e. the product working when required for a specified time within an operating environment. The latter parameter refers to promptness, know-how and integrity of the service offer after purchase.

When working on a high quality level in production and service, a company faces several types of costs coming up. These encompass prevention (to keep the chances of failure and appraisal cost low, i.e. by employee training and development), appraisal (costs coming up when measuring a firm's revenue compared to quality specifications, i.e. testing and inspection costs) and internal failure i.e. costs induced by faulty products which do not meet a firm's quality standards (Feigenbaum 1991). Steenkamp (1989) urgently stresses to add costs incurring when faulty products reach the customer. They lead to a loss of goodwill, declining future sales or warranty charges and they are denoted as external failure costs. Particularly in the long term they may prove significant and crucial for a firm's financial success (Steenkamp and Meulenberg 1985).

In the production-orientated approach quality is perceived as a quantifiable value. Only companies which are able to deliver highest product quality in respect of all the parameters at economically justifiable costs will succeed on today's crowded markets.

2.2.1.5 The consumer-orientated approach: perceived quality

Consumers have begun to make greater demands on the products they purchase (Leonard and Sasser 1982). The search for products of high quality represents one of the core developments in consumer behaviour (e.g. Parasuraman, Zeithaml and Berry 1985; Boonghee, Naveen and Sungho 2000). Nevertheless some marketing scholars have identified a "quality perception gap" (Morgan 1985), the divergence of the producer's perception of quality from the consumer's perception. This term implies that managers tend to focus on technical or process quality rather than struggle to understand quality from the customer's point of view.

There is evidence that enhanced product quality has negligible to no influence on consumer behaviour, as long as no perception arises that the quality has met or even exceeded specific criteria (Garvin 1984a; Garvin 1988). Thus what really drives purchasing decisions apart from other psychometric constructs is perceived quality (Kuehn and Day 1962; Takeuchi and Quelch 1983; Hansen 2005; Tsiotsou 2006).

Since the 1980s the objective-technical, measurable view of product quality has been transcended. It was revealed that "subjective" benchmarks are inevitably linked to technical quality indicators. Characteristics of "objective" functionalities have merely little in common with "empirical" consumer behavior. Hence Trommsdorff, Bleicker and Hildebrandt (1980, 70f) assume that the construct behind the notion "quality" is identical with that of "attitude" and accordingly, Weinberg and Behrens (1978) employ models of multi-dimensional attitude measurement during the operationalisation of quality.

In marketing science several definitions for perceived quality can be found. Their underlying common idea is that the origin of the notion "quality" has to start with the subject, i.e. the consumer (Kawlath 1969). Therefore they try to capture perceived quality from the consumer's perspective. Unfortunately, they usually do not state whether they refer to the consumer's quality perception pre- or post-purchase. Especially service quality measures do primarily consider the post-consumption perspective (Parasuraman, Zeithaml and Berry 1994; Zeithaml, Berry and Parasuraman 1996). In the context of products a pre-purchase view is important as well since it may crucially drive purchase decisions.

2.2.2 Cue research in respect of perceived quality

Perceived product quality is one of the key factors to successfully compete on today's crowded markets. In addition, perceived quality substantially affects other core concepts of consumer behaviour research like satisfaction and willingness-to-buy.

Among all issues concerning perceived quality, research in consumer behaviour has paid great attention to the way consumers evaluate a product's quality. Marketing scientists accepted that quality judgements rest upon several *cues* (e.g. Cox 1967a; Cox 1967b; Szybillo and Jacoby 1974; Jacoby and Olson 1985; Monroe and Krishnan 1985; Rao and Monroe 1989; Steenkamp 1990; Dawar and Parker 1994). The term *cue* traces back to Miller (1956) and is defined as an informational stimulus about or

relating to the product. It substitutes or bundles several other information chunks. Therefore cues are of distinct importance in the consumer's product evaluation process (Cox 1967b; Monroe and Krishnan 1985; Kroeber-Riel and Weinberg 2003, 284).

Knowing the product physically is not necessary as cues can also arise from information on the specific item. From an information processing perspective every product can be interpreted as an array of cues (Cox 1967b). A consumer uses cues from this array in order to evaluate the product's quality (Steenkamp 1990).

Studies focusing on information processing capacity suggest that humans are able to receive, process and remember four to seven cues on average (Miller 1956; Simon 1974). These numbers are also valid for the quality perception process of products (Jacoby, Szybillo and Busato-Schach 1977; Kupsch, Hufschmied, Mathes et al. 1978). Besides, the studies cautiously suggest that these numbers are slightly higher for durables compared to non-durables.

Literature includes numerous works on the relevance of different cues for a personal quality assessment. A lot of research has been carried out as single-cue approaches where the impact of only one cue is examined. In the following, literature from research fields closely related to this thesis is reviewed. A study's empirical effect will be considered significant when its p-value undercuts 0.05.

2.2.2.1 Single-cue studies

Laird (1932) was the first to work on a single cue's influence on quality from the consumers' perspective. He carried out an experiment with housewives probing and evaluating four pairs of stockings. The stockings were identical differing only in their scent. While less than 2.5 % of the participants recognized the different scents, 50 % rated the pair sweetened with narcissus scent as the best one, evaluating attributes like texture, feel, weight and so forth. This effect was called *subconscious sensory impressions* (Laird 1932).

A considerable amount of studies followed. They focused on possible price effects on perceived quality, i.e. on the consumers' inference of a product's quality from price (Scitovsky 1945; Gardner 1970; Peterson 1970; Shapiro 1973; Woodside and Davenport Jr 1974; Olsson 1977). Others worked with brand names (Bellizzi, Hamilton, Krueckeberg et al. 1981; Rosen 1984), physical characteristics i.e. the

physical product as a cue (Woodside and Taylor 1978) and country of origin (Gaedeke 1973).

An overview of these single cue studies is given in Table 2 (*source*: adjusted and extended from Steenkamp 1989). The main effects and the interaction terms depicted have been found significant by the respective studies. The product context and the particular cues studied are also given in the table.

Author(s) and Citation	Product(s)	Cue(s)	Main effect	Interaction
(Laird 1932)	Stockings	Scent	yes[8]	-
(McConnell 1968a; McConnell 1968b; McConnell 1968c)	Beer	Price	no	-
(Gardner 1970)	Suits, shirts, toothpaste	Price Product type	yes	no
(Peterson 1970)	Soft drink concentrate	Price	yes	-
(Deering and Jacoby 1972)	Gasoline Slacks Shoes	Price level Price range	yes yes	yes
(Gaedeke 1973)	Products in general, electronic devices, textiles	Country of origin	yes	-
(Shapiro 1973)	Stockings, cologne, carpeting, sweaters, reclinings	Price	yes	-
(Woodside 1974; Woodside and Sims 1974)	Electric lunch box	Price	yes	-

[8] Laird (1932) did not report significance levels of his results. According to recalculations by Steenkamp (1989) the effect of the scent cue was significant at p=.001.

(Woodside and Taylor 1978)	Peanut butter	Physical product	yes	-
(Bellizzi, Hamilton et al. 1981)	Grocery products	Branding	yes	-
(Rosen 1984)	Grocery products	Branding	yes	-
(Obermiller and Wheatley 1985)	Margarine	Price Perceived quality differences	not tested not tested	yes
(Brooker, Wheatley and Chie 1986)	Potato chips (PC) Orange juice (OJ)	Price Information about quality differences (QD) Product experiences (PE)	yes (OJ) no (QD) no (PE)	no
(Petroshius and Monroe 1987)	Calculator (C) Type writer (T)	Price range (PR) Price differential (PD) Price position (PP)	yes (C) no (C) no (C)	PR x PD (C) PR x PP (C)
(Insch and McBride 2004) US (US) and Mexican (MEX) sample	Television (TV) Athletic shoes (AS) Mountain bike (MB)	Country of product design (COD) Country of assembly (COA) Country of parts (COP)	yes(US+MEX) yes(US+MEX) yes(US+MEX)	

Table 2: Single-cue effects on perceived quality

Some of these studies were thoroughly criticized. Due to Kroeber-Riel all influences apart from the cue studied were ignored by the experimental design and therefore not taken into consideration (1990, 307). Such designs lack external validity as they are too artificial and do not refer to real purchase situations. In real situations consumers are confronted with a number of cues. A study of separated single cues implies that they do not interact (Gardner 1971; Steenkamp 1989, 63). This might give rise to the suspicion that some of the studies also lack internal validity.

2.2.2.2 Multiple-Cue Studies

Multiple-cue studies focus on the simultaneous effects of different cues on perceived quality. Effects were found for the cues price, store name, brand name familiarity, physical product, product samples, store image, packaging, personal characteristics, country of origin and product information, including significant interactions of the cues mentioned. For comprehensive contributions and meta-analyses see further reviews (Diller 1982, 66ff; Wimmer 1987, 521; Zeithaml 1988, 10ff; Rao and Monroe

1989; Steenkamp 1989, 65). A detailed methodological discussion can be found in Olson (1977) and Monroe and Krishnan (1985). The most relevant studies including main and interaction effects of cues are depicted in Table 3 (*source*: adjusted and extended from Steenkamp 1989).

Author(s) and Citation	Product(s)	Cues	Main effect	Interaction
(Stafford and Enis 1969)	Carpet	Price (P) Store name (SN)	yes no	P x SN
(Gardner 1971)	Suits Shirts Toothpaste	Price (P) Brand name (BN) Product type (PT)	no yes no	B x PT
(Andrews and Valenzi 1971)	Sweaters Shoes	Price (P) Brand name familiarity (BF) Store name (SN)	yes yes yes	P x BF x SN
(Jacoby, Olson and Haddock 1971)	Beer	Price (P) Brand name (BN) Physical product (PP) Product samples (PS)	no no no yes	B x PS PP x PS P x B x PP x PS
(Szybillo and Jacoby 1974)	Nylon hose	Price (P) Store image (SI) Physical product (PP)	no yes yes	no
(Pincus and Waters 1975)	Ballpoint pens	Price (P) Packaging (PA) Physical product (PP)	no no yes	PA x PP
(Peterson and Jolibert 1976)	Soft drink concentrate	Price (P) Brand name (BN) Nationality (NA)	no yes yes	P x N P x B x N
(Render and O'Connor 1976)	Shirts (S) Radios (R) After shave (A)	Store name (SN) Brand name (BN) Price (P)	only for A no yes	P x B (A)
(Wheatley and Chiu 1977)	Carpet	Price (P) Store image (SI) Colour (CO) Income (IN) Education (ED)	yes yes yes yes yes	P x CO P x IN SI x IN P x CO x ED CO x IN x ED
(Wheatley, Walton and Chiu 1977)	Skis	Price (P) Brand name (BN) Product experience (PE)	yes yes	no

(Raju 1977)	Stereo receivers	Price (P) Brand name (BN) Product familiarity (PF)	yes yes no	P x BN
(White and Cundiff 1978)	Lift truck Dictation system Machine tool	Price (P) Country of origin (CO)	no yes	no
(Lambert 1981)	Dictation system (experts)	Price (P) Country of origin (CO)	no no	no
(Lambert 1981)	Dictation system (students)	Price (P) Country of origin (CO)	no no	yes
(Wheatley, Chiu and Goldman 1981b)	Carpet	Price (P) Physical product (PP)	yes yes	no
(Nevid 1981)	Carbonated bottled water	Brand name (BN) Physical product (PP)	no no	BN x PP
(Rexeisen 1982)	Carpet	Price (P) Store image (SI) Product information (PI) Order of prices (OP)	no no no yes	P x OP PI x OP
(Jun and Jolibert 1983)	Lighters (L) Batteries (B) Envelopes (E)	Price (P) Country of origin (CO) Physical product (PP)	yes (L,B) yes (L,B) yes (L,E)	no
(Stokes 1985)	Rice	Price (P) Packaging (PA) Brand name familiarity (BF) Familiarity with competitive brands (FC)	yes yes yes yes	P x FC PA x BF PA x BF x FC
(Davis 1985)	Skirts	Brand name (BN) Physical product (PP) Fashion awareness (FA)	yes yes yes	no
(Teas and Agarwal 2000)	Hand-held business calculator (C) Wristwatch (W)	Brand (B) Country of origin (CO) Store (S) Price (P)	yes (C, W) yes (C, W) yes (C, W) yes (C, W)	S x C (C) B x S (C) P x C (W)

Table 3: Multiple-cue effects on perceived quality

In view of the fact that these surveys usually employ inhomogeneous designs concerning stimuli, sample composition, products explored, type of experiment (between vs. within) and operationalization of the perceived quality construct applied, caution seems reasonable when comparing the outcomes in detail. Moreover, any generalization concerning other products and situations needs to be examined carefully. What is more, the mediating role of personal variables needs to be studied thoroughly. Nevertheless, in multiple-cue studies the examination of the effects of cues under specific conditions has led to interesting empirical findings.

2.2.2.3 Cues and quality attributes

Another focus of research has been directed towards the effects of cues on quality attributes as for instance the product's durability or its taste. According to Steenkamp (1989, 76) these contributions lack a clear theoretical base as well as a proper distinction between quality attributes and cues. The studies were mainly carried out with food and stimulants. As the quality attributes are highly product-specific, it is difficult to accomplish generalization.

These studies found for instance that the quality perception of coffee was effected by taste and brand name (Rigaux-Bricmont 1982). The quality cue brand name influenced facets of taste like strength and flavour in the case of cigarettes (Friedman and Dipple 1978). The taste of potato chips was inferred from packaging (McDaniel and Baker 1977) or beer taste was influenced by price and not by the physical product or the customer's product expertise (Cimbalo and Webdale 1973). With respect to butter taste was revealed to be connected with price and the physical product itself (Cimbalo and Webdale 1973). For a detailed review see Steenkamp (1989, 79f).

2.2.3 Models of the quality perception process

The crucial prerequisite on the way to a better understanding of the customer lies in an approach to measure and explain perceived quality that is precise, valid and reliable. Such an effort has to be theoretically grounded, too (Garvin 1988). So far, only a few models which try to explain the quality perception process from the consumer's perspective have been suggested. These models are reviewed in the subsequent sections.

2.2.3.1 The Shapiro model

Shapiro's (1970) model[9] focuses on basic variables and their interrelationships from a consumer choice perspective. The purchase likelihood that is influenced itself by the three groups of variables *price attitude*, *perceived quality* and *others* like immediacy of need serves as the dependant.

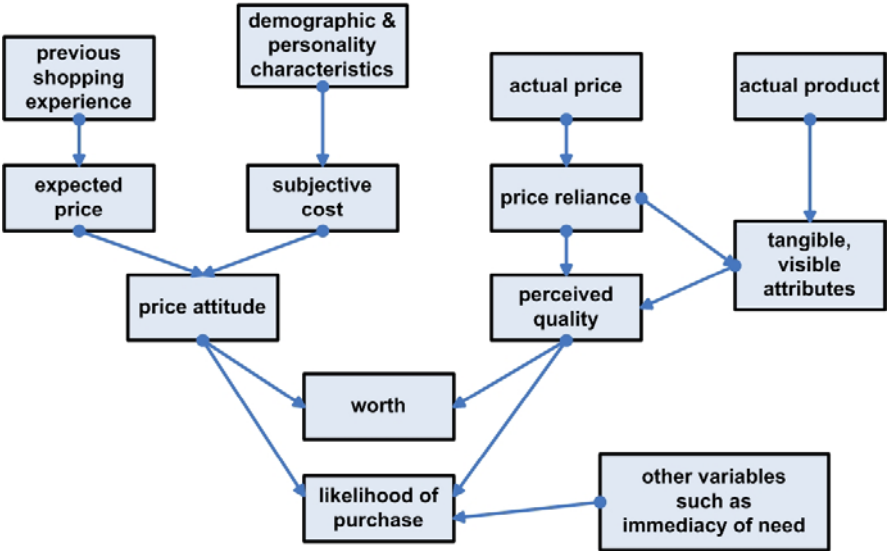

Figure 2: The Shapiro model, *source:* Olson (1972)

The model is based on empirical findings. Shapiro himself criticizes that some variables suffer from conceptual and operational weaknesses. Steenkamp (1989) claims that "actual product" was measured via "brand name" and "store-where-purchased". This seems to be too narrow in the sense that the "actual product" should incorporate "tangible, visible attributes". Moreover, Verhallen and Piters (1984) criticize that the model includes constructs like "subjective costs" that are immeasurable.

[9] Cited according to Olson (1972), as obtaining the original work was not possible.

2.2.3.2 The Olson model

Olson's model (Olson and Jacoby 1972) reverts to Cox (1967b) and enlarges his *sorting rule* approach. It aims at explaining cue selection and cue importance. According to the model consumers initially choose quality cues from an array of product-related cues. Secondly they integrate their cue assessment on an individual basis into an overall quality judgement. In doing so cues are always product-specific. The importance of a single cue derives from its predictive (PV) and its confidence value (CV). PV refers to the extent the consumer believes or perceives that the cue is related to or an indicator of product quality, CV to the extent the consumer is confident in his/her own ability to precisely perceive and judge the cue (Olson 1972, 67 and 69).

According to Olson (1972) a cue is likely to influence quality judgements only when its PV and CV are high. When either PV and CV or only one of them is low, the likelihood of cue usage and thus the effect on the quality judgement is low (Olson and Jacoby 1972, 82). These interrelationships are depicted in Figure 3.

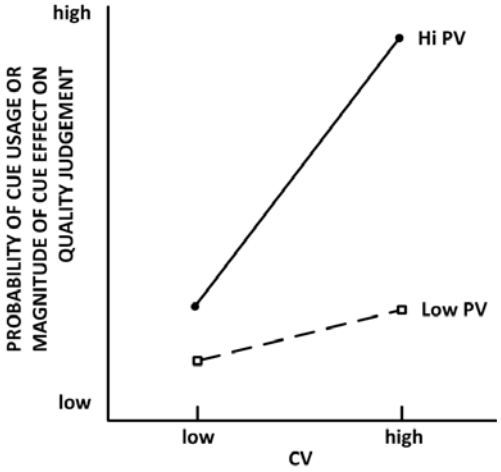

Figure 3: The Olson model - predicted PV x CV interaction, s*ource:* Olson (1972)

Another central assumption is the intrinsic-extrinsic cue dichotomy. Intrinsic cues like physical product features, e.g. taste or design, cannot be *"... changed or experimentally manipulated without also changing the physical characteristics of the product itself"*. Extrinsic cues are not part of the product itself but related to it, e.g. price,

packaging, brand name or country of origin. It is assumed that intrinsic ones have a greater effect on the quality judgements of consumers (Olson and Jacoby 1972, 169).

Figure 4 illustrates that the tendency of consumers to use extrinsic cues is high when the intrinsic ones receive a low PV and CV. When intrinsic cues are evaluated high concerning CV, the tendency to use extrinsic ones is low, but with intrinsic cues having a high CV and a low PV the tendency to use extrinsic ones is still high.

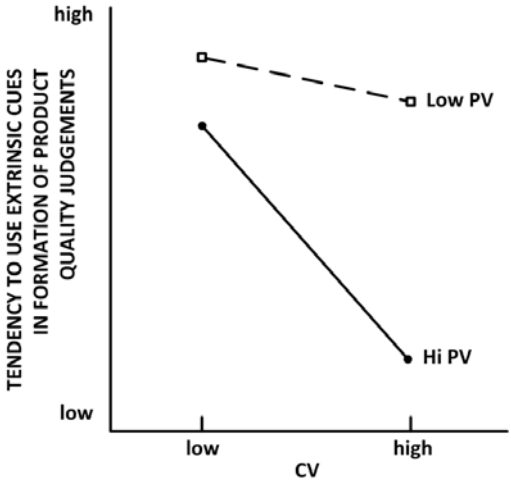

Figure 4: The Olson model - extrinsic cue usage, *source:* Olson (1972)

Generally speaking, intrinsic cues are used more often and have a greater quality effect when used than extrinsic ones (Olson and Jacoby 1972, 176). This evidence was supported by a substantial number of studies (Szybillo and Jacoby 1974; Pincus and Waters 1975; Wheatley, Chiu and Goldman 1981a; Jun and Jolibert 1983; Davis 1985; Stich 1997; Winkler 2000).

According to Steenkamp (1989) the Olson model suffers from some shortcomings. As Olson assumed that PV and CV do not interact and are independent, the model is only applicable to situations in which the cues do not interact. Secondly, the model does not account for quality attributes and gives no answer to the question why cues have a high PV in the light of perceived quality. Thirdly, Olson does not integrate crucial mediating constructs of the quality perception process like personal product experience, perceived risk or socio-economic characteristics (Steenkamp 1989, 90). At

the same time the model allows an empirical examination. Moreover, it is of substantial heuristic value for perceived quality research.

2.2.3.3 The Wimmer model

Wimmer's model (1975) originates from the information processing perspective and thus it focuses on cognitive processes only. But emotional ones play an important role as well. The outer framework represents stimuli that influence quality perception, the inner one is established by evaluations, personal motives, perception and attitudes. The perception and processing of information relevant to quality is due to the influence of personal motives and attitudes. The latter are connected to experience and expectations, and thus they do determine the *cognitive structure* and the *cognitive personality* of the consumer (Wimmer 1975).

Quality information encompasses quality attributes, intrinsic and extrinsic quality indicators. Quite contrary to Olson's model (1972) intrinsic indicators have a close connection but are not physically related to the product here (e.g. price, brand). Extrinsic indicators represent external sources like advertising or consumer magazines that provide information. Wimmer's quality attributes correspond to the intrinsic cues in Olson's model.

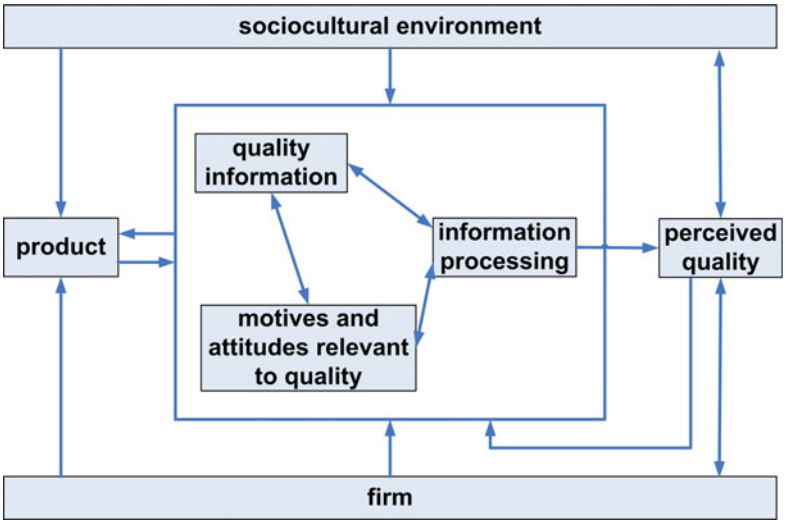

Figure 5: The Wimmer model, s*ource:* Wimmer (1975)

The model is established on a very general level. Thus it only postulates that individual perceptions of quality are established by processing quality information. The perceptions are subject to personal motives and attitudes. The connections of the concepts themselves are not specified in more detail. Wimmer's application of very general concepts hinders operationalization and empirical falsification. In fact falsification has never happened.

2.2.3.4 The Kupsch model

Kupsch *et al.* (1978) proposed a very comprehensive approach. The model combines the information processing perspective with multiattribute models and explains the formation of quality judgements starting from problem recognition. It consists of partial models that feature the *basis of information*, the *structure of information* and the *attitude towards the product*. Here the customer is seen as an information processing system affected by personal and situational dynamics.

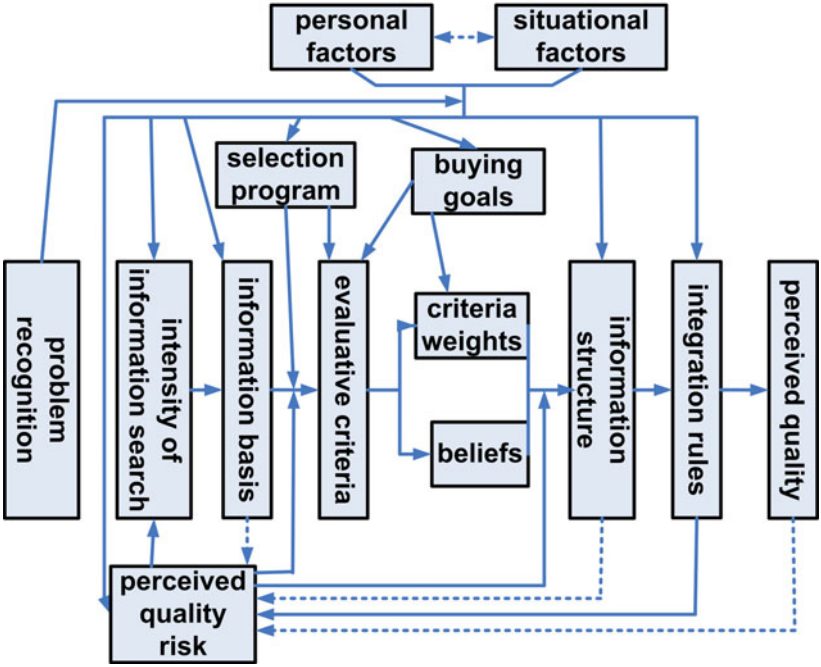

Figure 6: The Kupsch model, s*ource:* Kupsch *et al.* (1978)

A lot of intervening variables serve as means of explaining the functionality of the system. The interactions between the numerous variables are quite puzzling and thus hard to understand. This makes empirical testing virtually impossible. However, according to Kupsch *et al.* (1978) this was not the purpose of their model. Instead, they intended to develop a model that highlights important associations only, which can be empirically tested. Moreover, the model should make it possible to deduce important interrelations between the variables. Apart from this heuristic value the model was the first to incorporate the crucial construct of perceived quality. Another weakness according to Steenkamp (1989) is the model's orientation towards extensive purchasing decisions only.

2.2.3.5 The Steenkamp model

Steenkamp (1989) introduced a conceptual model that tries to overcome the weaknesses stated above. His model integrates research findings from the fields of information processing, cognitive and social psychology and economics. Steenkamp's approach and his major hypothesis sustained empirical falsification and thus proved suitable to explain the perception process of product quality.

Steenkamp's model (see Figure 7) illustrates how consumers form quality perceptions of products in purchase decisions.

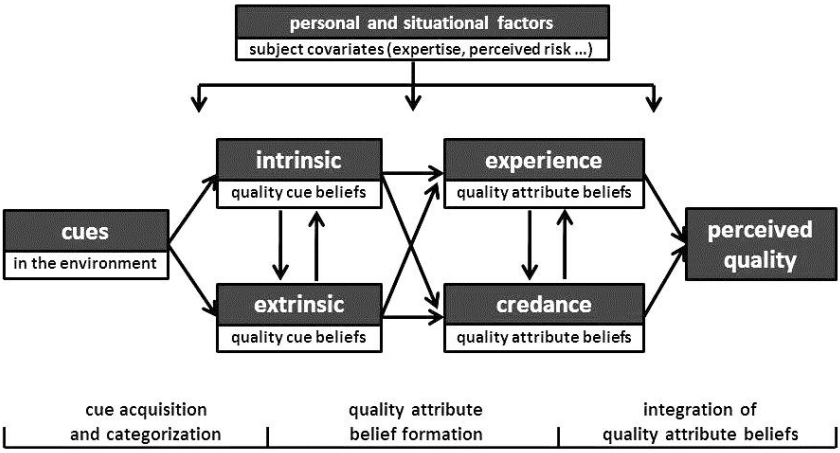

Figure 7: The Steenkamp model, s*ource:* Steenkamp (1989, 323)

Quality attribute beliefs can be established in a descriptive, informational and inferential way. This three-part division can be traced back to Fishbein and Ajzen (1975). Descriptive beliefs are formed through the direct observation of product characteristics. This does not include non-observable or credence attributes like the social benefit of fair trade products for instance. Information on the quality of products can be delivered by different sources like friends, advertisements or TPPR and can shape quality beliefs. A TPPR may contain direct information on a product (e.g. *Wine Advocate* praising the fruity taste of wine A). Then the source contains direct information on an attribute, which can either be accepted by the consumer or not.

Inference is the construction of meanings with regard to relationships and concepts not explicitly present in a person's informational environment (Herkner 2001). This process can arise with or without conscious analytical thinking (Pinson 1986) and comes up regularly in buying processes.

Inferential beliefs in quality perception processes are based upon the recognized relationship between a cue and an attribute (Steenkamp 1989, 111). Apart from such stimulus information usage, consumers also fall back upon a priori beliefs when they perceive cue-attribute relationships. The perseverance of these beliefs moderates the quality effect. The country of origin cue "Made in Germany" for example, which is usually perceived as high quality with respect to cars, might tell a consumer that the car he/she is looking at – a Mercedes – is of high technical quality. Such phenomena can be explained via Kelley's (1973) attribution theory. According to the discounting principle of the attribution theory a communicator will be seen as biased by the recipient when the latter experiences that the message can be attributed to personal or situational causes, e.g. high ratings for a manufacturer as a result of high advertising expenditure (Senecal and Nantel, 2004, 160). This could make readers discredit the product evaluations and the product itself.

The Steenkamp model postulates the perception process as a triad. In a first step, depending on the perceived confidence and predictive value, a few cues are chosen and categorized. This process is influenced by prior beliefs in cognition. If these beliefs are met by the cue patterns, the task will be carried out fast with minimal cognitive effort. If not, weaker inferences will occur (Fiske and Taylor 1984). Besides, the cues can be twisted or not taken into account. Additional cues can be acquired in order to resolve the possible facets of uncertainty (Lindsay and Norman 1972).

In a second step, based on these cues, beliefs about the quality attributes are developed. A single cue can be used to build up several attribute beliefs. Cues may also interact (Olson 1977). The importance of the cues depends on different situational and personal factors, the type of the cue (intrinsic vs. extrinsic) and the types of the quality attribute (experience vs. credence).

Finally as a result of the perception of the product an overall judgement is made. This judgement depends on the quality attributes and the perceived instrumentality concerning the consumption experience. The way the consumers integrate their quality attribute beliefs is again dependent on situational and personal factors (Steenkamp 1990).

Consumers seem to use non-compensatory ways of integrating attribute beliefs when the number of product alternatives is high (Lussier and Olshavsky 1979) or when they lack sufficient time for judgement (Wright 1974). When the judgement situation is uncertain or when the attributes are correlated negatively, a compensatory approach seems to be appropriate. However, research on these integration rules does not show clear results (Steenkamp 1989).

2.3 Customer value

The decision-orientated paradigm of business economics and the behavioural scientific view of marketing research may serve as explanatory background for the theoretical underpinnings of customer value. According to this approach (Heinen 1971) business economics makes a point of explaining human decision behaviour with the help of descriptive theories. Thus, explanatory models allow the prediction and evaluation of the alternatives and their consequences. In doing so markets, consumer behaviour as well as competition can be analysed thoroughly. Moreover, these models facilitate structured actions in complex business situations. By adding judgment criteria decision models can be introduced to support decision taking related to typical marketing problems like product design, communication or promotion (Heinen 1971; Boetsch 2008).

The behavioural scientific paradigm of marketing research facilitates the analysis and the explanation of individual purchasing behaviour. Research employs numerous behavioural constructs in order to explore an individual's subjective reality. These constructs encompass perceived value, perceived quality, preference and choice

among others. Some of them will be employed in this thesis in order to explain the nature and the effects of TPPR on consumer behaviour. Except for perceived quality that was explicated in 2.2, the others are discussed in the subsequent sections (see 2.4 and 2.5).

Utility and value are among these fundamental constructs. So far research has not revealed agreement as far as definition and measurement of customer value are concerned.

Numerous approaches can be found as customer value appears in different contexts with altered purposes (Boetsch 2008):

- Customer value can be read as the value of a customer from the business point-of-view. Accordingly the concept shows similarities to customer lifetime value and to customer equity in the sense of the value of all customers for the company (Rudolf-Sipötz 2001; Günter and Helm 2006).

- Emanating from the customer's perspective customer value can be understood as the perceived cost-benefit ratio of products. Such a perceived value of products or services might be operationalized as a measure to develop products and services offering maximal benefit for the customers (Gale 1994; Woodruff 1997; Matzler 2000; Huber, Herrmann and Morgan 2001; Pechlaner, Smeral and Matzler 2002).

- Customer value is often associated with relationship value. Hence it focuses on the value of the relationship between customers, suppliers and the company (Ravald and Grönroos 1996; Payne and Holt 2001). A similar approach is the Value-Creating Networks concept (Kothandaraman and Wilson 2001).

- Within the threefold segmenting-targeting-positioning environment customer value may serve as a source of value-orientated strategic positioning of a company (Slater 1997; Slywotzky 1997, whose work is more practically orientated).

- Beyond that customer value might be seen as a complement to the classic shareholder value concept. Customer value integrates the company's performance from the customer point-of-view and thus influences the success of a company (Laitamäki and Kordupleski 1997).

- Finally, customer value may also be seen as a holistic management approach which comprehends not only the value of the customer for the company, but also the value for the customer (Belz and Bieger 2004).

What researchers agree on is that the concept comes from the economics-based view of value. This view goes back to Bernoulli. According to his publication in 1738 human decisions can be explained as strict utilisation maximising behaviour, differentiating between expected values and a value model under insecurity. Apart from introducing value as a central economic concept he also established the law of the diminishing marginal value (Bernoulli 1738). These ideas were developed within the field of political economy. Neumann and Morgenstern (1947) captured these ideas and applied the theory to decision theoretic considerations. Moreover they formulated the theory probabilistically in order to better account for decisions under uncertainty.

Adopted to marketing the theory implies that customers aim at maximising the value of their individual basket of goods: "... customers spend their income so as to maximize the satisfaction they get from their products" (Payne and Holt 2001, 160). This view is reflected by Zeithaml's view, namely a "customer's overall assessment of the utility of a product based on perceptions of what is received and what is given" (Zeithaml 1988). Based on the various definitions four important properties of the customer value concept have to be accounted for (Boetsch 2008):

- Customer Value is a construct of individual perception. As the amount of customer value of a product reflects the fulfilment of personal needs, it cannot be quantified objectively. The size varies from customer to customer.

- Customer value is a relative size that cannot be observed by standardized reference entities like IQ-scores or kilogrammes. Thus there is no reference value that indicates high or low customer values. The customer evaluates the value of a product relative to its available alternatives.

- Customer value is dynamic. Purchase experiences by the customer, external experiences as well as personal values and objectives change over time. Learning and personal routines also shape the importance and the composition of the value components. So value components differ according to person, situation and to the stage of the purchasing process.

- The customer value generated by a product represents an individual measure, as it is the subjective degree of the performance of a need. This individuality is one of the huge challenges when measuring the construct.

- The value of a product usually encompasses more than one attribute that differentiates the product against its alternatives. These attributes can be rational, emotional, social or ecological. In other words, the construct is of a multi-dimensional nature.

For a thorough and more comprehensive discussion of the nature of customer value see Boetsch (2008).

2.4 Attitude, preference and choice

Attitudes are among the most fiercely discussed concepts in social psychology as well as in consumer behaviour research. The latter harks back to established concepts and theories from social psychology. An agreement in principle can be found in a good number of definitions. Accordingly attitudes are seen as willingness or disposition to show characteristic ways of behaviour vis-à-vis specific objects. These behaviours stem from direct and indirect experiences with the specific object and usually display cognitive (opinions on the object), emotional (emotional positions vis-à-vis the object) and connotative (disposition for a behaviour vis-à-vis the object) aspects (Rosenstiel and Ewald 1979, 150).

Attitude research occupies an even more important position in product policy. In particular, the research on product placement has only become possible by combining attitude research and consumer behaviour. The position of a product on the market must be seen relative to its competitors, based on subjective evaluations of the customers. In short: It is about the customer's attitude towards the product/s and not the objectively measurable properties. The properties, which are subjectively assigned to the products, are of crucial importance. The impressions ascribed to the stimulus (generally the product) constitute the perceived character of the product and are thus in the focus of interest (for details see Hammann and Erichson 1990, 258).

Positioning approaches are based on two concepts: The *„Psychological Scaling"* concept by Coombs (1950) and Spiegel's (1961) *„Psychologisches Marktmodell"* (i.e. the psychological market model). Especially the latter has received great diffusion

within the field of German business economics (Coombs 1950; Spiegel 1961, 145ff). These concepts brought up the idea to recognize products as objects of beliefs within the context of the social field.

2.4.1 Preference from an attitude point of view

Preference and its preceding action choice (or no-choice) should be examined from the perspective of attitude research in marketing. This line of research fathoms why decision makers behave specifically in different purchasing situations. The basic assumption is that behaviour can be explained by attitudes. Attitudes cannot be observed. Thus they are hypothetical constructs. The existence of attitudes cannot be proven, but the conjecture seems to be justified when the forecast and the explanation of human behaviour succeed better with the help of the construct than without (Gierl 1995).

Attitude research in marketing has been considerably influenced by Kroeber-Riel (1992). Here a threefold view of attitudes is postulated. Causal attitudes can be conceived as the result of target-oriented human impellent processes. The extent to which an individual believes that an object/product is capable of achieving his/her objectives constitutes a teleological perception of the concept. According to the final view attitudes refer to the dispositions to behave specifically and robust in certain situations. Attitudes consist of cognitive components like goal-orientation and object perception as well as of activating components like drive and emotion (Kroeber-Riel 1992).

2.4.2 Product preference

In marketing science “preference” denotes the strength of a positive attitude (Gierl 1995). Thus the relationship between preference research and attitude becomes apparent. Product preference as a notion of subjective evaluation comes up in ambiguous definitions within the marketing discipline. Before working on the notion “preference” the meaning of “product” will be clarified for this work.

Literature has defined manifold meanings of the notion. For further discussion see Brockhoff (1993). Generally speaking, there is a difference between the substantial, the extended and the generic notion of the product (Gutsche 1995; Kotler, Keller and Bliemel 2010). The substantial view of product focuses on objectively verifiable and delimitable purchasing objects that can be described physically, chemically or

technically. This view surrenders services as products. The extended conception also incorporates services, but only those directly connected to a specific product, i.e. a plant buying an engine and the installation work by specialists of the producer. Finally, the generic view assumes that products do not only procure core benefits but also an added value. A car for instance does not only provide a driving or transportation capability, but also social (e.g. prestige) or aesthetical value. For this thesis the generic view of product is chosen to capture a holistic picture of purchasing situations.

In order to come up to these facets the following broad view of product is chosen (Brockhoff 1993, 15): A product is conceived as a bundle of attributes, that serve as means for satisfying the expected needs of known or unknown users. The bundle of attributes is expected to become the exchange object. The equivalent of the barter contributes to the fulfilment of the entitlement of the supplier.

In the following a definition for preference as it is used in this work is developed.

As far as the definition of preference is concerned, marketing literature is characterized by ambiguous approaches. What they have in common is the recognition that preference can only develop when at least two alternatives are compared by means of relevant criteria and/or attributes during decision situations (Gutsche 1995). Thus preferences demand a relativisation through alternatives (Bauer 1989, 132).

Several authors define preference as a kind of relative profitability of alternatives without the consideration of restrictive purchasing factors (Srinivasan 1982; Böcker 1986; Balderjahn 1993; Backhaus 2003). Preference is seen as an individual's one-dimensional indicator representing the amount of probability to choose an evaluation object during a specified period of time (Böcker 1986, 556), or similarly, a one-dimensional mental variable, representing the relative advantageousness/superiority of alternatives (Backhaus 2003, 641).

Balderjahn (1993, 29) speaks of a tendency to boost an action which is developed from the perception and evaluation of product attributes that are independent of resources. These approaches are subsumed by the generic term of unconstrained preference (Zeithaml 1988). Others include purchasing restrictions like price and time (constrained preference). Trommsdorff, Bleiker and Hildebrandt (1980, 270) for instance interpret preference as the dichotomous (i.e. yes/no) or gradual result of a value comparison. Here value includes the potential constraint factor price. This view

is shared by Nieschlag, Dichtl and Hörschgen (1985, 140), who point out that the constructs preference and purchase intention do at least partially accommodate for situational and personal purchasing restrictions. Finally, it should be emphasised that preference and benefit are often used synonymously in literature (Hausruckinger 1993).

This thesis will be in line with the exponents of constrained preference defining it as quite similar to choice. Thus preference is the result of a comparison action that includes at least two products. The net value from the customer's perspective serves as target criterion. It is a one-dimensional construct and is built up by the perceived trade-off between value-generating aspects like expected product quality, design and other positive product features and the costs for the product as well as those for procurement. Preference results from the relative profitability of the alternatives (Kotler, Keller et al. 2010) and is seen as a one-dimensional mental variable representing the relative advantageousness/superiority of alternatives (Backhaus 2003, 641).

2.4.3 Preference and purchase behaviour

Models in consumer behaviour research strive for the analysis, explanation and forecast of customers' purchasing actions. Typically, one central construct like perceived value or perceived risk takes centre stage. The constructs taken into consideration should feature a high prognosis validity for actual purchases and as high as possible and good opportunities for operationalisation (Gutsche 1995). According to a wide-spread view among scientists preference comes fairly up to these demands (Schweikl 1985; Bauer 1989).

There are several reasons for that: Firstly, preferences are characterized by direct proximity to daily purchasing situations. Consumers are virtually always confronted with choice decisions when shopping and thus preference data usually yield high prognosis validity. Secondly, preference does not focus on specific product attributes but accounts for all attributes of the objects. Thirdly, research has brought up elaborated statistical methods that allow thorough analyses of empirical preference data (i.e. all kinds of conjoint approaches).

However, preferences can only be interpreted as purchase probabilities for specific alternatives as customers might postpone the purchase (Schweikl 1985). In fact

purchase decisions are also influenced by situational parameters and financial constraints that are not captured by the models.

2.5 Purchase intention

Purchase intention is widely used in marketing practice and research. Concept tests using purchase intentions help managers decide which concept of a new product is worth being followed up. Product tests are carried out to evaluate whether or not to launch the product. Intentions can also be used to assess geographic and demographic segmentation procedures before the product is launched (Urban and Katz 1983).

For existing products forecasts based on intention data allow estimating their future demand (Juster 1966; Morrison 1979; Urban and Hauser 1993). Furthermore, appropriate production levels, sales force demand and price decisions may be supported by intention data (Morwitz, Steckel and Gupta 2007). Apart from that advertising and promotion campaigns can be tested before being employed (Bird and Ehrenberg 1966).

Marketing research has devoted considerable attention to purchase intentions. They serve as measures of purchase activities. What is more, they often represent the basis of theories and the appropriate models in consumer behaviour research. Influential scholars like Fishbein and Ajzen (1975, 368-369) claimed the construct's usefulness long ago:

> *"... if one wants to know whether or not an individual will perform a given behaviour, the simplest and probably the most efficient thing one can do is to ask the individual whether he intends to perform that behaviour."*

Bagozzi (1983, 145) takes a similar position *"Intentions constitute a wilful state of choice where one makes a self-implicated statement as to a future course of action."* Intent can serve as an intervening variable between attitude and choice. Intentions are often considered to be better correlated to behaviour than beliefs or any other cognitive constructs (Howard and Sheth 1969; Engel, Kollat and Blackwell 1978; Warshaw 1980).

This positive influence of intention on behaviour has received empirical evidence by several authors (e.g. Manski 1990; Bemmaor 1995; Newberry, Klemz and Boshoff

2003). However, these findings are criticized for theoretical and empirical inconsistencies, too. The main argument is that various buyers are in fact non-intenders and act spontaneously on instinct without intending to make specific decisions. Nevertheless it is possible to avoid specific biases and reduce variability in order to meet measurement requirements. On the basis of two meta-analyses Wright and MacRae (2007) state that there is no need to correct for bias in the scales used. As variations around the means showed a normal distribution with small dispersions, imprecision might rather be ascribed to sample size than to scale properties.

Apart from that the correlations between intention and behaviour vary in the studies cited above. According to the meta-analysis carried out by Morwitz, Steckel et al. (2007) this variation can be traced back to different moderating variables. Thus intentions yield a better prediction of actual behaviour when the decision problem is not too complicated. That is true for short time horizons and for customers who are familiar with the product, as well as for higher-involvement purchase decisions. Correlations between intention and behaviour measured for established products among 18 studies showed highly significant values (r=.751, at p<.01). Measuring the purchase intention among 17 studies in a comparative way (i.e. between products) also yielded highly significant results (r=.530, at p<.01). These findings are considered in the conception of the two experiments carried out in the context of this dissertation.

This thesis will perceive the construct as the customer's forecast of which brand he/she will actually buy. It comprises not only the customer's forecast but also his/her anticipated inhibitors. Thus it is a response short of actual purchase behaviour, though an indicator of the actual behaviour (Howard and Sheth 1969).

3 Empirical approach and conceptual models

This chapter provides an overview of the empirical procedure. Initially, attention is drawn to applicability matters as well as to the advantages and disadvantages of online experiments. Afterwards a thorough insight is given into the designs of the two online experiments that are carried out in line with this dissertation. This section also includes the development of conceptual research models and the hypotheses. Finally, the online access panel sample as well as the student sample data are described and undergo a descriptive analysis.

3.1 Experiments in the context of the internet

An **experiment** is a **research strategy to assess observations under systematically variegated and controlled conditions**. The researcher manipulates at least one test variable and controls for confounding ones (Zimbardo, Gerrig and Graf 2004). So variations in the dependent variables can be traced back to the influence of the independent ones. When experiments are carried out in the context of the internet they are called web experiments. Generally speaking, web experiments constitute the counterpart to traditional laboratory experiments while online field experiments are the web counterpart of traditional field experiments (Döring 2003).

This thesis employs two web experiments. The participants are invited in an email and access the experiment via the internet and carry it out on their screens. The experimental course and the randomized assignment into the treatment groups are predetermined and happen automatically. Thus this procedure is similar to computer tests in classical laboratory testing frequently used in psychological research (Musch and Reips 2000). The difference however lies in the checkability of the environment, as the experiment is carried out in the private or vocational surrounding of the participant (for details see Gnambs and Strassnig 2007).

Such an approach offers promising advantages compared to offline methods (Reips 2002): Web experiments enable the researcher to gain access to a large number of demographically and culturally heterogeneous participants, but also populations that are rare and specific. The online approach provides better generalization to more settings and situations. Time constraints of the interviewees do not limit the number of

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participants. The interviewees usually show a high propensity to participate and interviewer effects are reduced.

Web experiments also facilitate the study of international samples within a short period of time (Brengman, Geuens, Weijters et al. 2005). The survey period is typically shortened as the interviewees take part within the first three days or refuse completely (Shannon and Bradshaw 2002). In addition, non-reactive data can be obtained via log files, which makes a drop out analysis with respect to response behaviour and session length possible (Reips 2002). Adaptive and dynamic designs and a variation of the items are possibly the biggest advantages compared to classic experimental methods (Gnambs and Strassnig 2007).

However, online experiments generally face higher drop-out rates and the possibility of multiple submissions. This can be controlled by collecting personal identification items or by handing out passwords (Reips 2002). As web experiments are characterized by limited interaction between the interviewer and the participants, thorough pre-testing and feedback opportunities become essential. External validity is often limited by the dependence on computers so that some research, e.g. studying the behaviour of populations not using the internet, cannot be done online. However, comparisons between the results of classic and web experiments show consistent findings (Krantz and Dalal 2000). For a comprehensive methodological review see Gnambs and Strassnig (2007) and Reips (2002).

3.2 Online experiment one: TPPRs and the product choice process

This experiment aims at studying the influence of TPPRs on product choice processes. The theoretical sections revealed that every product can be interpreted as an array of cues (Cox, 1967b) and that the consumer processes cues from this array in order to infer choice decisions (Steenkamp, 1990). TPPRs might act as cues, too. According to Olshavsky and Rosen (1985) test publications can facilitate the product choice process and minimize the number of the products evaluated. Therefore, the product attribute TPPR is studied among the other central cues brand and price (Figure 8).

The cue influences are moderated by subject specific covariates. These covariates allow deviating from the assumption that all subjects have the same preferences. The moderators encompass perceived product class purchase risk (Campbell and Goodstein 2001), product class expertise (Roehm and Sternthal 2001), trustworthiness of TPPR,

the perceived expertise of the person/organisation that carries out the test (Tripp, Jensen et al. 1994; Goldsmith, Lafferty and Newell 2000; Shamdasani, Stanaland and Tan 2001) and product class involvement (Beatty and Talpade 1994).

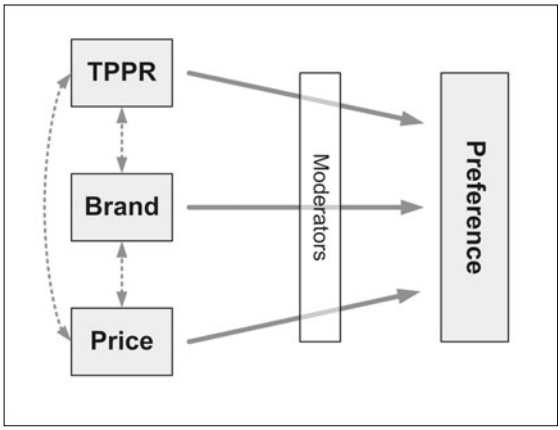

Figure 8: Factors influencing preference

Beyond that socio-demographic variables like education, age (N.N. 1979) and income (Wheatley and Chiu 1977) are expected to serve as moderators, too.

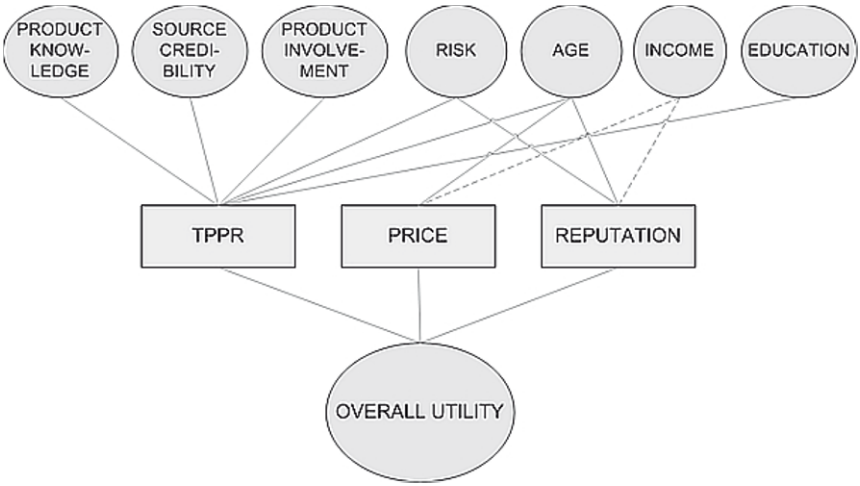

Figure 9: Conceptional model TPPRs and choice

Figure 9 depicts the hypothesized structural relationships derived from the theoretical sections.

Here the product is seen in terms of utility. Price, brand and a potential TPPR constitute the path worths that sum up to the overall utility provided by a product. The moderators introduced above in line with Figure 8 exert influence on the single subject covariates. The solid lines indicate hypothesized influences derived from the empirical studies, while the associations given by dashed lines suggest weaker relationships indicated by other publications.

In the most straightforward way rating scales asking for the importance of brand, price and TPPR would be applied. This approach could have been implemented easily. However, in more complex choice situations validity and reliability are regularly threatened as interviewees are predisposed to rate every cue as important. Moreover, consumers face huge problems when rating product attributes separately (Salzberger 2009).

Emanating from these potential threats for a proper experimental design a choice modelling approach is chosen. Such an approach with fictitious wines is selected in order to avoid radiation effects from already established brand images in the mind of the interviewees. As a consequence the respondents only received the brand information high reputation or low reputation winery.

In the present design the cues price, brand and TPPR explain the characteristics of the fictitious products so that the effects on the subjects' preferences can be measured. A focus group was assembled to assess the cues' levels for the experiment. Talking about the most common and popular red wines from Austria led to the selection of unoaked Zweigelt wines. The focus group specified a retail price range from € 5 to €14 for these wines. Then the participants were confronted with selected TPPRs[10] on Zweigelt wines taken from the most famous Austrian wine journals *Falstaff* and *A la Carte*. They were asked to select three "good" and three "bad" Zweigelt TPPRs.

[10] TPPRs on wines in Austria usually contain a numerical rating (up to 100 points, between 80 and 94 in the category unoaked Zweigelt), and a verbal description. Apart from that wines are also praised by "editor's choice" seals.

The following TPPR levels were selected and employed in experiment one:

"good" TPPR	"Dark berry jam, hints of mocha and vanilla, spicy herbs, cherries, lush and elegant texture, nice extract sweetness, delicate finish with dark chocolate, long lasting finish, sweet fruit in the aftertaste, good development potential. Rating: 92 out of 100"
"bad" TPPR	"Nice cherries, elderberry that acts a bit volatile, biting tannins, angular and hard, no charm, little richness, earthy notes in the finish, not funny. Rating: 85 out of 100."
editor's choice	"Wine of the week", A la Carte magazine

Table 4: TPPR levels in experiment one, translated from German

Consequently a 2 (brand, high/low reputation) x 4 (TPPR, good, bad, editor's choice, none) x 2 (price level, € 6 and € 10) orthogonal design that consisted of 8 cards was developed by PASW Orthoplan (PASW 2009) as shown in Table 5. The cards are cue bundles that serve as fictitious products. A conjoint exercise is applied in order to estimate the importance or utility of the single cues and their interactions for the product choice process.

card id	1	2	3	4	5	6	7	8
brand	high reputation	low reputation	low reputation	low reputation	high reputation	low reputation	high reputation	high reputation
TPPR	editor's choice	bad	none	editor's choice	bad	good	good	none
price	€ 10,-	€ 6,-	€ 10,-	€ 6,-	€ 10,-	€ 10,-	€ 6,-	€ 6,-

Table 5: Product bundles used in experiment one

The interviewees were asked to do 10 (online access sample) or 14 randomly (students sample) assigned paired comparisons to keep survey time short. This was permissible as large sample sizes were expected. 14 comparisons are half of the 8x7/2=28 possible comparisons. The questionnaire used is depicted in Appendix A.

3.3 Online experiment two: TPPRs, quality, purchase intention and value

In order to study the relevance of TPPRs for perceived quality, perceived value and purchase intention a 2 (brand) x 4 (TPPR) x 2 (price) between subjects factorial design was applied.

This resulted in 16 treatment groups to which the participants were randomly assigned (Table 6).

	low reputation brand		high reputation brand	
	€ 6,-	**€ 10,-**	**€ 6,-**	**€ 10,-**
positive TPPR	1	5	9	13
editor's choice	2	6	10	14
negative TPPR	3	7	11	15
no TPPR	4	8	12	16

Table 6: Treatment groups of experiment two

In contrast to experiment one real wine brands could be used as each customer was assigned to one out of the sixteen treatment groups. One high-reputation and one low-reputation winery for the product unoaked Zweigelt was selected from focus group results. As the data collection of both experiments was carried out within one questionnaire, other examples of good, bad and editor's choice TPPRs were incorporated here (Table 7).

"good" TPPR	"Spicy dark berry fruit, gentle cherries and blackberries, pleasant chocolate touch, high in finesse, very elegant, fine tannins, salty and mineral-backed cherry fruit, very long, multi-faceted wine with character, a fine and dark fruit on the finish, classic varietal and good future. *Rating: 92 out of 100".*
"bad" TPPR	"Densely interwoven, a touch of cherry, apple skin, wide on the palate, generally rather diffuse, less harmony, less contour, desiccating *and headstrong* finish, very little charm. *Rating: 92 out of 100".*
editor's choice	"best buy", Falstaff magazine

Table 7: TPPR levels in experiment two, translated from German

The measures for the outcome variables perceived quality (Buchanan, Simmons and Bickart 1999), perceived value (Dodds, Monroe and Grewal 1991; Sweeney and Soutar 2001) and purchase intention (Baker and Churchill 1977) were derived from existing and tested scales in marketing research.

For the hypothesized structural relationships among the constructs see Figure 10. This model draws on the works of Teas and Agarwal (2000, 279) and Dodds, Monroe and Grewal (1991, 308). In addition, the influence of the subject-specific variables was deduced from the theories described in 2.1.1 and remain the same as in experiment one.

The brand name often serves as an indicator for quality inference. The impact of this "shorthand" cue price (Zeithaml 1988) can be understood in terms of "affect-referral" processes (Wright 1975). The consumer does not examine the brand attributes every time. Instead, the choice decision is based on summary information like brand attitudes. Empirical evidence for this **brand – quality** relationship is provided by Dodds, Monroe and Grewal (1991) and Teas and Agarwal (2000).

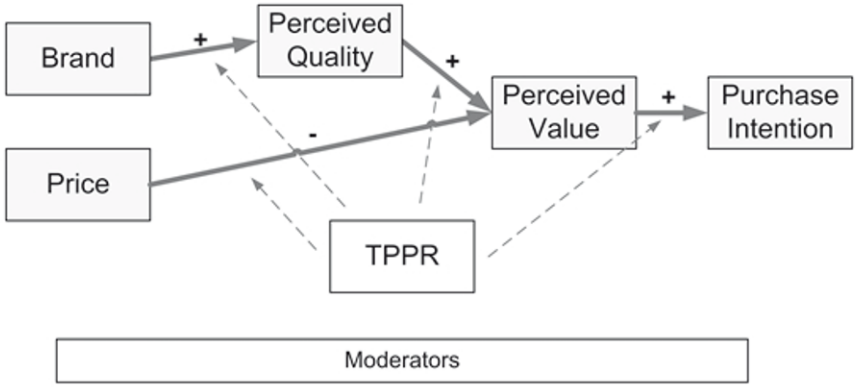

Figure 10: Conceptional model TPPRs, quality, value and purchase intention

Producing high quality products is generally more expensive than producing low quality ones. Market competition prevents firms from charging high prices for products low in quality (Lichtenstein, Ridgway et al. 1993). Consequently it can be assumed that **price** acts as a signal of **quality**.

Apart from indicating quality, price is also the amount of a monetary sacrifice in order to buy a specific product. Therefore a lot of researchers implemented the construct of perceived sacrifice into their models (Zeithaml 1988; Dodds, Monroe et al. 1991; Lichtenstein, Ridgway et al. 1993; Teas and Agarwal 2000). In this thesis sacrifice is integrated into perceived value and a direct influence of **price on value** is thus expected.

The link **quality – value** can be understood in terms of the acceptable price range concept. Customers have a set of potential prices in mind. If the retail price is too high, they tend to avoid the purchase. Interestingly, when prices are too low, purchase can

be abandoned as a result of bad quality perceptions. The customers then infer that the purchase offers small or no net value (Monroe and Krishnan 1985; Dodds, Monroe et al. 1991).

The strong positive **perceived value – purchase intention** influence has been brought out by several studies (Richardson, Jain and Dick 1996; Sweeney, Soutar and Johnson 1999). In the present case this relationship establishes the last element of the structural model.

Finally, the same subject specific covariates as in experiment one are integrated. For an explanation see Chapter 3.2.

3.4 Hypotheses

The assumed capability of TPPR to affect consumer behaviour was derived from various theories like source credibility (Hovland, Janis et al. 1953, 22; Dholakia and Sternthal 1977; Eagly, Wood et al. 1978; Batinic 2008, 300), risk taking theory (Cox 1967a; Nicosia 1969; Schweiger, Mazanec et al. 1976, 94; Dholakia 2001), cognitive consistency (Herkner 2001), signal theory (Shimp and Bearden 1980; Shimp and Bearden 1982; Boulding and Kirmani 1993) and the theory of the economics of information (Stigler 1961).

Figure 9 and Figure 10 were developed on the hypotheses described below. Hypothesis abbreviations marketed “ab” concern both – the preference context of experiment one and the quality, value and purchase intention context of experiment two (i.e. $H5_{ab}$). Those hypotheses with only “a” or “b” concern the particular context, with “a” indicating experiment one (i.e. $H4_a$) and “b” experiment two (i.e. $H1_b$).

Consumers often hark back to “chunks” or “cues” during their purchase situations. TPPR might act as such a “cue” in purchase situations (Kroeber-Riel and Weinberg 2003). Thus it is assumed that good TPPRs exert a positive effect on purchase intention (**$H1_b$**), perceived value (**$H2_b$**), perceived quality (**$H3_b$**) and preference (**$H4_a$**). Bad TPPR work the other way around.

Trustworthy sources and expert arguments trigger more positive positions with respect to the opinion propagated (Hovland and Weiss 1951; Kelman and Hovland 1953; Watts and McGuire 1964; Whittaker and Meade 1968; Warren 1969; Schulman and

Worrall 1970). Additionally, credible sources arouse more behavioural compliance than incredible ones (Crano 1970; Schulman and Worrall 1970; Crisci 1973; Ross 1973; Woodside and Davenport Jr 1974; Ohanian 1991). It is thus hypothesized that the perceived TPPR trustworthiness (**$H5_{ab}$**) and expertise (**$H6_{ab}$**) affect consumer behaviour.

Consumers with a high product knowledge have attribute information available which they use in choice situations (Roehm and Sternthal 2001; Cowley and Mitchell 2003). Consequently, the probability that they are influenced by endorsements is smaller (Biswas, Biswas and Das 2006). By contrast consumers with less knowledge show greater confidence in peripheral cues (Rao and Monroe 1988). So it is predicted that knowledge influences the reliance on TPPR and in consequence, choice and attitude towards the product (**$H7_{ab}$**).

Product-class involvement is associated with the motivation to process product-specific information like TPPR. Perceived risk in the context of buying decisions can be seen as the anticipation of negative consequences arising from purchases (Bauer 1960; Cox 1967a). Consumers try to reduce risk and associated uncertainty by means of information acquisition. As TPPRs offer attribute-specific product information it is hypothesized that involvement (**$H8_{ab}$**) and perceived purchase risk (**$H9_{ab}$**) interact with TPPR and act upon choice and attitude towards the product.

Some empirical works (N.N. 1979; Silberer 1984) give weak evidence that the consideration of TPPRs rises with education (**$H10_{a}$**) and declines with age (**$H11_{a}$**). So this connection and its relevance for choice behaviour will be tested.

- **$H12_{b}$**: The better the perception of a specific brand's reputation, the higher the perceived quality assessment.
- **$H13_{b}$**: Price acts upon quality, i.e. high prices provoke high values of perceived quality and vice versa.
- **$H14_{b}$**: Price influences perceived value.
- **$H15_{b}$**: Perceived quality is positively connected to perceived value.
- **$H16_{b}$**: High values of perceived value accompany purchase intention. Low values result in low purchase intention.

For the theoretical and empirical explanation of the hypotheses above see the last part of Section 3.3.

3.5 Sampling

This chapter gives a description of the experimental data collected. The first part introduces the dataset collected with the help of a commercial online access panel, the second one gives an insight into the dataset gathered among students of the Vienna University of Business and Economics.

Emails invitations with the link to the online experiment were sent to potential participants. As an incentive two bottles of *Dom Pérignon 2000* were raffled among all participants. It was assured that the participants only take part once in the experiment via IP-address checks. Only those who accomplished the experiments properly could take part in the lottery.

3.5.1 Descriptive statistics online access panel sample

These sample data were drawn from an Austrian online access panel that comprises around 18.000 registered participants. The panel "represents" the Austrian population aged between 16 and 65 concerning age structure, gender, household income and principal residence among others. A random quota sample of n=500 was drawn from this panel. The quotas encompass the attributes age, gender, household income and state of principal residence and are subsequently tested for representativeness among the Austrian population between 16 and 65.

age group	population relative	population absolute	sample
16 - 19	7.20%	36	26
20 - 29	19.00%	95	104
30 - 39	20.40%	102	113
40 - 49	24.80%	124	113
50 - 59	19.00%	95	97
60 - 65	9.60%	48	48
	100.00%	500	501

Table 8: Age structure

Table 8 depicts the age structure of the Austrian population aged between 16 and 65[11] and the composition of the sample respectively. The result of a χ^2 homogeneity test (χ^2 = 5.821, df = 5, p = .324) gives evidence that the sample does not deviate from the known population data for Austria (p = .324). Thus we can conclude that the sample drawn represents the Austrian population as far as age is concerned.

The gender distributions of the sample and the Austrian population[12] are described in Table 9.

gender	population relative	population absolute	sample
male	48.70%	243.5	250
female	51.30%	256.5	251
	100.00%	500	501

Table 9: Gender distribution

The χ^2 test (χ^2 = .393, df = 1, p = .531) again gives evidence that both samples stem from the same population.

net hh-income	population relative	population absolute	sample
below 1.199 €	12.90%	65	53
1.200 - 1.799 €	17.80%	89	94
1.800 € - 2.699 €	31.40%	157	152
2.700 € - 3.299 €	15.80%	79	88
3.300 € - 3.999 €	10.40%	52	56
over 4.000 €	11.70%	59	58
	100.00%	501	501

Table 10: Distribution net household income

Table 10 reflects the distribution of the net household income[13]. The sample conforms to the population with χ^2 = 4.005, df = 5, p = .549.

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[11] Calculated from http://www.statistik.at/web_de/statistiken/bevoelkerung/bevoelkerungsstruktur/bevoelkerung nach_ alter_geschlecht/ 023428.html, data status: yearly average 2009, date of query: 2010-05-06.

[12] http://www.statistik.at/web_de/statistiken/bevoelkerung/bevoelkerungsstruktur/bevoelkerung_nach_alter_geschlecht/0 23428.html, data status: yearly average 2009, date of query: 2010-05-06.

[13] Media-Analyse 2008 – „Jahresbericht 2008“; Herausgeber: Verein Arbeitsgemeinschaft Media-Analysen; Wien 2009; http://www.media-analyse.at, data status: September 2010, date of query: 2010-05-06.

state	population relative	population absolute	sample
Vienna	20.60%	103	115
Burgenland	3.40%	17	16
Carinthia	6.80%	34	34
Lower Austria	19.20%	96	93
Upper Austria	16.60%	83	77
Salzburg	6.20%	31	31
Styria	14.60%	73	72
Tyrol	8.40%	42	43
Vorarlberg	0.042%	21	20
	100.00%	500	501

Table 11: Principal residences

The last quota defined was the principal residence[14]. Again, the χ^2 test evidences ($\chi^2 = 2.063$, df = 8, p = .979) the sample's conformity to Austria's population (Table 11).

The answering times for the two experiments ranged between 2'9" and 51' with a mean equal of 9'23'' and a standard deviation of 4'56''. During the pretesting stage it was revealed that a serious accomplishment took at least 5'. Thus all observations that showed processing times shorter than 5' were excluded from analysis in order to improve data quality. This led to a final dataset with n=445. The mean age was 41.22 years with a standard deviation of 13.16 and the mean household size was 2.5 with a standard deviation of 1.22. Concerning vocation the sample consists of around 43% company employees, followed by 14.5% pensioners, 12% students/pupils, 9.5% self-employed and 9% blue-collar workers. 33% have some certificate of secondary education or compulsory school, 28% the final exam "Matura" and 20% a university degree.

3.5.2 Descriptive statistics student sample

All students from the Vienna University of Business and Economics were invited via email to take part in *"an experiment on wine purchase behaviour"*. 1113 test subjects started the experiment while 898 finished. This corresponds to a completion rate of more than 80%, which is fairly good for large scale online experiments.

14 http://www.statistik.at/web_de/statistiken/bevoelkerung/volkszaehlungen_registerzaehlungen/bevoelkerungsstand/023290.html, data status: yearly average 2009, date of query: 2010-05-06.

Pretesting revealed a minimum answering time for a serious accomplishment of 7'. Consequently, all responses below were excluded to assess data quality. Considering the remaining 831 persons only, the average response time was 12' with a standard deviation of 8'.

48% women and 52% men with a mean age of 26 and a standard deviation of 6.63 years remained in the dataset. 9.6% claimed to possess net household incomes below € 500, 18.2% between € 500 and € 1000, 22.4% between € 1001 and € 2000, 21.2% between € 2001 and € 3000, the rest was above. 27.3% said they lived in a one-person-household, 37.7% shared their home with another person, 17.3% with two others. 17.7% lived in four-person households or more. 64% of the interviewees had finished their a-levels, 31% had gained a university degree. As far as their vocational situations is concerned, it was hardly surprising for a student sample that 66% were students while 26% worked as employees.

4 Rasch modelling, scale development and paired comparisons

Emanating from the classical test theory (CTT) this chapter gives a theoretical introduction to the principles of Rasch modelling. This serves as the basis for the conduction of the Rasch homogeneity tests and the model selection with regard to the constructs used in the experiments. Moreover the constructs, their aims and their origin undergo a closer consideration.

4.1 Classical test theory and the fundamentals of probabilistic Rasch modelling

Classical test theory (CTT) is the predominant paradigm in marketing research and in psychological testing. Today 95% of the psychological tests follow this approach (Rost 1999, 140). CTT acts on the assumption that the test score of a single person varies between different points of time. This is due to systematic (i.e. training and transfer effects) and non-systematic influences (i.e. fatigue, lack of concentration or other external influences).

CTT assumes that the observed test score of a person (X) consists of a constant true score (T) and an error term (E). T is defined as the mean over an infinite number of observed test scores of a person under similar test conditions. E contains all unsystematic and uncontrolled influences. The mean of E over an infinite number of test scores of a person, a population or a sub-population is 0. Furthermore CTT supposes that there is no correlation between E and T, no correlation between an error of a test A (E_A) and an error of a test B (E_B) and finally that E_A is not dependent on the true score of test B (T_B). CTT is only defined for test scores that are at least interval scaled.

CTT has been criticised for several reasons. Among others the theory does not cover systematic errors like training and transfer effects. These occurrences cannot be characterized as unsystematic influences. These effects systematically influence the test performance of a person and thus distort the capability measured (Fischer 1974, 28). Moreover the independence of the T and E and the stability of T over different measurement repetitions can be questioned. Social desirability matters can also blur the true score of a person's ability. CTT is not capable of detecting these influences on the true score (Stumpf 1996, 415). In cases of extreme ability levels CTT often

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provides an inaccurate measurement (Fischer 1974, 144) that is furthermore dependent on the sample (Bühner 2006).

Probabilistic test theory (PTT) questions these assumptions and especially that of interval scaled test scores as raw scores generally possess ordinal scale properties only. Accordingly, PTT examines whether the summed scores of the items are a valid measure of the persons' abilities.

4.1.1 The Rasch model

The Rasch model represents one of the most widely used and well accepted PTT applications. The value of a person on the latent variable is assessed by estimating person parameters (Θ). Item parameters (σ) characterize the difficulties of the single items. The relationship between Θ and σ is established by the Rasch model (Rasch 1960) and formulated here in the logit form (Bühner 2006, 318):

$$p(X_{vi} = x) = \frac{exp\,[x_{vi}(\theta_v - \sigma_i)]}{1+\exp(\theta_v - \sigma_i)},\ \text{x=0,1} \qquad \textbf{(1) Rasch model}$$

Though $p(X_{vi} = x)$ denotes the probability that person v chooses response category x when answering item i. X_{vi} gives the value of person v on the item i, in the dichotomous case 0 for "wrong solution" or "no" and 1 for "right solution" or "yes". The more θ_v exceeds σ_i the higher the probability that the person v solves item i and vice versa. Quite contrary to CTT a specific prediction of the individuals' capabilities becomes possible given θ and σ.

PTT represents a model-based measurement of trait level estimates that depend on the persons' responses and on the properties of the items. Applying PTT models to data yields important advantages to classical approaches. Generally speaking, the Rasch model allows an objective measurement of latent traits. Subsequently, the most important advantages based on the mathematical properties of the model are discussed.

Sufficient statistics contain the entire information on an unknown parameter of a sample. Such statistics make it possible to obtain the relevant information on an unknown parameter like an expected value without knowing the entire data. Instead, the whole information the data give on an unknown parameter is summarized in one value. The Rasch model contains sufficient statistics for every unknown parameter. So the margin row sums include all information on the person parameters θ and the

margin column sums up all information about the item parameters σ (Strobl 2010). Accordingly, the estimation of a person's abilities does not require knowledge on which items have been solved, but only on how many.

Rasch (1960) postulated that psychological tests have to fulfil **specific objectivity**. Firstly, comparisons between persons have to be invariant up to specific items and the measures used. Secondly, comparisons between the items have to be invariant up to the persons used to calibrate the items. In contrast to general objectivity, specific objectivity refers to differences between measuring only and not to the total scores. Thus the difference between persons is given by the difference between their trait scores. Invariant item characteristics are on hand when the differences between the items are independent of the people used to compare the items (Embretson and Reise 2000). Specific objectivity is assessed by parallel item characteristic curves (ICCs) in the Rasch model.

Here in the dichotomous case an ICC is a mathematical function linking the probability of answering an item with "yes" or "agree" to the trait (i.e. the product class knowledge) measured by the item set that contains it. It can also be considered as the nonlinear regression function of the item score on the latent trait measured by the construct. In the case of the dichotomous Rasch model the curves differ only by a translation along the latent dimension (Hambleton and Swaminathan 1990). Thus the items differ only as far as their difficulty is concerned.

Considering Figure 11 and assuming that items one to three measured purchasing intention, the "easiest" item is No. 1 (i.e. "I would like to try this wine", solid line), followed by No. 2 ("I would buy the wine if I happened to see it in a store", dashed line) and No. 3 ("I would patronize this wine", right curve). Let us suppose a person with high purchase intention has a score of 2 and a person with a low intention has -2. In the ICCs we can see that a score of 2 corresponds to a probability of about 90% for answering item 1 with "yes", while for the low intention person the probability is around 15%.

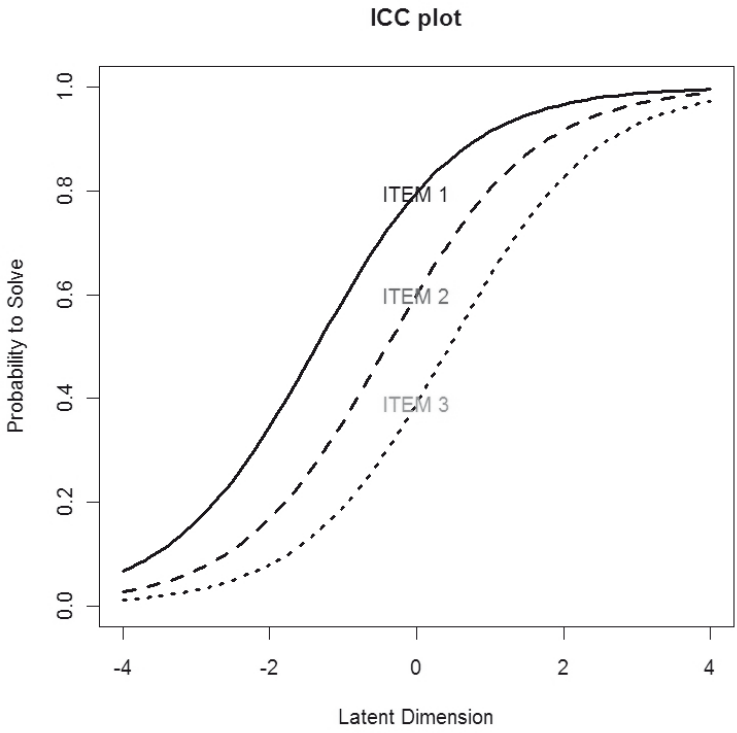

Figure 11: Item characteristic curves

4.1.2 The mixed Rasch model

The mixed Rasch model goes back to Rost (1990) and combines Rasch modelling with latent class analysis. Technically speaking, the mixed model is the joint superior model of the Rasch and the class model (Rost 2004, 174). These models assume the existence of different classes of people that the Rasch model holds for. The mixed model quantifies by determining the trait characteristics of a person, but it also qualifies by determining the class membership of a person. By evaluating response patterns, those with a maximum in difference are searched for and persons are classified according to these patterns. The item parameters are set in such a way that they allow maximal differentiation between the classes. A mixed Rasch model which "fits" the data implies different solution strategies or different properties within the class members when answering the items. Moreover, the model can identify different types of answering strategies among the respondents.

The response probability condition for a person being in a specific class, i.e. the probability of a class specific answer, is defined by the logistic answer function of the Rasch model (Rost 2004).

$$p(X_{vi} = 1) = \sum_{g=1}^{G} \pi_g \frac{exp\,(\Theta_{vg} - \sigma_{ig})}{1+\exp(\Theta_{vg} - \sigma_{ig})} \qquad \textbf{(2) Mixed Rasch model}$$

Again $p(X_{vi} = 1)$ denotes the probability that person *v* chooses response category *x* when answering item *i*. π_g is the class size parameter. Index g shows that the person v and the item i receive the specific parameter only in case they belong to the g^{th} class. The number of classes *G* is not a parameter that is estimated. *G* is set before the analysis and ideally based on theoretical pre-consideration on the construct which is measured. Θ and σ can be understood analogously to the simple Rasch model (1).

The mixed model weakens the restrictive assumption that the same item parameters hold for all persons in the population tested, i.e. constant item difficulties. The widening is achieved by permitting different item difficulties for different groups of people (Rost 2004).

4.1.3 Assessing Rasch model fit and model selection

Employing Rasch models demands Rasch homogenous data. The subsequent sections give a concise insight into the theoretical background of testing for homogeneity and Rasch model fit as well as into the selection of alternative Rasch models.

4.1.3.1 Model test

A **likelihood ratio test against a saturated model** compares the likelihood of the data assuming that the Rasch model holds for the sample with the likelihood of a saturated model. A saturated model perfectly describes the data. The likelihood of the saturated model can be calculated as follows (Bühner 2006):

$$L_{sat} = \prod_{\underline{x}} (\frac{n(\underline{x})}{N})^{n(\underline{x})}, with\ df = m^k - 1 \qquad \textbf{(3) Likelihood saturated model}$$

Here $n(\underline{x})$ denotes the frequency of a specific answer pattern in the sample, *N* the number of observed patterns with *m* categories and *k* items. Consequently, a χ^2 test statistic is calculated from the likelihood ratio multiplied by the constant (Bühner 2006):

$$\chi^2 = -2log(\frac{L_{Rasch}}{L_{sat}})$$ **(4) χ2 test statistic**

According to Rost (2004, 324) this approach establishes the most rigid and thus reasonable test procedure. In case the fitted model does not show significant deviances from the saturated model, one can conclude that the model's explanation of the data is just as accurate as one's own interpretation of the pattern frequencies would be.

Another approach to the model fit evaluation is comparing the observed answer patterns with those that would be expected under the Rasch model (von Davier 1997). The **Pearson χ^2** statistic stays non-significant when the deviances between the frequencies expected and those observed are small.

It is calculated as follows:

$$\chi^2 = \sum_{\underline{x}} \frac{o_{\underline{x}} - e_{\underline{x}}}{e_{\underline{x}}}, \text{ with df} = m^k - n_p - 1$$ **(5) Pearson χ2 test statistic**

The **Cressie-Read** statistic focuses on the same purpose and is denoted as follows:

$$\chi^2 CR = 1.8 \sum_{\underline{x}} o_{\underline{x}} (\frac{o_{\underline{x}} - e_{\underline{x}}}{e_{\underline{x}}})^{\frac{2}{3}} - 1$$ **(6) Cressie-Read test statistic**

In these two equations (5 and 6) $o_{\underline{x}}$ stands for the observed answer patterns, $e_{\underline{x}}$ for those expected, m for the number of answer categories, k for the number of patterns and n_p for the number of model parameters. The likelihood ratio test and the χ^2 test statistic assume that every possible answer pattern should appear at least once in the observed data. Regrettably this requirement is very rarely met (Rost 2004, 336). In general model testing by means of the parametric bootstrap procedure that is implemented in WINMIRA (von Davier 2001) represents the most efficient way.

The **parametric bootstrap** routine calculates person and item parameters for the observed data. Rasch homogeneous item answers for a specific number of samples are simulated with person and item parameters obtained beforehand. In the next step item and person parameters are estimated for each simulated sample. Finally, a test statistic like the Pearson χ^2 or the Cressie-Read statistic is calculated for each sample (von Davier 1997).

The dispersion of χ^2 values of the simulated samples is developed on datasets in conformity with the Rasch model. Then the empirical χ^2 value is compared with the

dispersion of the simulated ones. If the empirical χ^2 value belongs to the highest 5% of the dispersion, the data are considered disproved in the respect of Rasch homogeneity (Bühner 2006).

4.1.3.2 Model selection

The **comparison of competing Rasch models** can be elaborated by means of the χ^2 test for differences or by means of information-theoretic measures. χ^2 may only be used when nested models are to be judged. This is the case when one of the models is a real superior model and when no parameter of the restricted model has been set to zero. Additionally, the superior model should have proved Rasch conformity in model testing (Rost 2004, 332). Comparing a Rasch model with mixed models of two to five classes does not comply with the first requirement as such models are not nested.

Therefore this part of the analysis employs information-theoretic measures that can deliver answers to the questions which model to choose among competing ones. Generally speaking, more complex models have a greater probability to describe the data accurately. Information criteria consider a model's complexity by considering the likelihood and the number of parameters respectively. Thus more parsimonious models are preferred by lower measures given the same likelihood (Bühner 2006).

These criteria mustn't be interpreted as absolute indicators of whether a model fits or not. They do not tell the deviation from a saturated model. Hence they only serve as a means of comparing the appropriateness of different models for the data.

Subsequently, the most common information theoretic criteria are discussed and used for model comparisons later.

$$\text{Akaike Information Criterion (AIC)} = -2\log L + 2n_p \quad \textbf{(7) AIC}$$

$$\text{Bayes Information Criterion (BIC)} = -2\log L + (\log N)\, 2n_p \quad \textbf{(8) BIC}$$

$$\text{Consistent AIC (CAIC)} = -2\log L + (\log N)\, n_p + n_p \quad \textbf{(9) CAIC}$$

The number of parameters in the model is given by n_p. N denotes the sample size and L the likelihood. BIC and CAIC also account for the sample size. Rost (2004, 344) proposes to use the AIC for small item numbers with big pattern frequencies while the BIC should be used for big item numbers with small pattern frequencies.

4.2 Constructs employed in the experiments

The scales employed in the two experiments were derived from well-established studies within the field of marketing research. They have proved to be reliable and valid by CTT procedures in several research papers. In the case of the two experiments carried out and described within this thesis, all the items are dichotomous and comprise the response options "(rather) YES" and "(rather) NO".

Initially existent scales were transferred to the wine context. After a thorough translation into German the scales were exhibited to a German speaking panel. Comprehensibility and clarity of phrasing was ensured by a personal pretesting among a sample of 10 wine lovers and 10 persons who were not that familiar with wines. The scales and the respective translated and adapted versions are depicted below. The following sections start off with the explained variables of the experiments and continue with the explanatories. Henceforth the individual items will be referred to as declared in the column "internal item identifier".

4.2.1 Perceived quality

Perceived quality aims at measuring a person's attitude towards the quality of a specific product.

Original scale	Scale developed	Internal item identifier
good / poor quality	Ich glaube, dass dieser Wein über eine hervorragende Qualität verfügt.	quality_high
superior / inferior product	Bei diesem Wein handelt es sich um ein gutes Produkt.	good_prod
better / worse than the average	Dieser Wein ist besser als der Durchschnitt.	better_than_aver
exceptional / ordinary merchandise	Dieser Wein ist außer-gewöhnlich.	exceptional
durable / flimsy construction	---	---
a lot of / very little attention to details	Bei diesem Wein stimmt alles - bis ins letzte Detail.	all_right
very poor / good fabric	---	---
will / won't last a long time	Der Wein verfügt über ein hervorragendes Reifepotential.	potential_to_mature

Table 12: Perceived quality scale (perc_qual)

The initial scale (see Table 12) by Buchanan, Simmons and Bickart (1999; see also Bruner and Hensel 2001) includes eight seven-point semantic differentials. The authors reported an $\alpha = .91$ (for the reliability coefficient Alpha see Cronbach 1951).

4.2.2 Perceived value

The perceived value scale intends to measure the amount to which a potential customer experiences a product to be good value for money, given that he/she knows the respective price.

Original scale	Scale developed	Internal item identifier
The product is a: very poor / good value for money	Der Wein verfügt über ein hervorragendes Preis-Leistungsverhältnis.	price_performance
The product is considered to be a good buy: strongly agree / disagree	Der Wein scheint ein guter Kauf zu sein.	good_purchase
The product appears to be a bargain: strongly agree / disagree	Zu diesem Preis muss man den Wein eigentlich kaufen.	must_buy
At the price shown the product is: very uneconomical / economical	Der Wein ist etwas zu teuer.	little_expensive_r
The price shown for the product is: very unacceptable / acceptable	Der Wein ist einfach nur überteuert.	too_expensive_r

Table 13: Perceived value scale (perc_value)

The original scale was developed by Dodds, Monroe et al. (1991) and revised by Sweeney, Soutar and Johnson (1999). The latter used bi-polar phrases. Dodds, Monroe et al. discovered an $\alpha = .91$ and inter-item correlations of .73 and .72, Sweeney, Soutar et al. an $\alpha = .85$. Teas and Agarwal (2000) ascertained the items' uni-dimensionality by factor analysis.

4.2.3 Purchase intention

The scale purchase intention purposes measures a person's inclination or affection to buy a specified good. The scale was developed by Baker and Churchill (1977) as a seven point rating scale and is widely used in marketing.

Original scale	Scale developed	Internal item identifier
Would like to try this _____?	Ich würde diesen Wein gerne probieren.	want_to_try
Would you buy this _____ if you happened to see it in a store?	Wenn ich diesen Wein zufällig in einem Geschäft sehen sollte, würde ich ihn kaufen.	buy_see_incidentally
Would you actively seek out this _____ in a store in order to purchase it?	Ich würde im Geschäft bzw. im Internet gezielt nach diesem Wein suchen.	seek_targeted
I would patronize this _____.	Ich könnte mir vorstellen, diesen Wein könnte ich regelmäßig kaufen.	buy_periodical

Table 14: Purchase intention scale (purch_intent)

Reliability values referred to by several authors ranged from α = .73 to α = .91 (for details see Bruner and Hensel 2001, 438).

4.2.4 Perceived purchase risk

Campell and Goodstein's general scale was taken for measuring the extent to which persons perceive risk in relation to a specific stimulus (i.e. product, service). The scale was conceptualized as a nine-point semantic differential. The scale for this thesis was developed as follows:

Original scale	Scale developed	Internal item identifier
	Diesen Wein zu kaufen würde ich als _____ empfinden:	
not at all /extremely risky	riskant	risky
not at all / highly concerned	beunruhigend	worrying
very important/unimportant	wichtig	important
not at all / very worried	Besorgnis erregend	distressing

Table 15: Perceived purchase risk scale (perc_purch_risk_best_prod)

The authors reported reliability values from two studies ranging from α = .86 and α = .91 (Campbell and Goodstein 2001).

4.2.5 Product class involvement

This scale aims at assessing a person's interest for a pre-specified product category. It was composed by Beatty and Talpade (1994) as a five-point rating scales. Different works brought reliability values ranging from α = .74 and α = .93 (for details see Bruner and Hensel 2001). The wine-version of the scale is depicted below.

Original scale	Scale developed	Internal item identifier
In general I have stong interest in this product category.	Grundsätzlich bin ich am Thema Wein interessiert.	interested
This product category is very important to me.	Wein ist mir wichtig.	important
I get bored when other people talk to me about this product category. (r)	Ich finde es langweilig, wenn in meiner Gesellschaft über Wein gesprochen wird.	bored_r
---	Ich diskutiere gerne über Weine, Weinstile, Hersteller und Herkunftsgebiete.	discussion
---	Freunde haben mir schon einmal zu verstehen gegeben, dass ich nicht immer über Wein sprechen soll.	shouldnt_speak
This product category matters a lot to me.	---	---
The product category is very relevant to me.	---	---

Table 16: Product class involvement scale (perc_purch_risk_best_prod)

The retesting procedure suggested that high involvement wine consumers tend to discuss thoroughly about wines, styles, producers and regions. Consequently, the two items *discussion* and *shouldnt_speak* were added.

4.2.6 Product knowledge

The scale initially developed by Roehm and Sternthal (2001) aims at assessing a person's experience and familiarity with a particular brand. They calculated a scale reliability of α = .89 and used seven-point rating scales. According to the authors uni-dimensionality of the items was guaranteed by factor analysis. Items that seemed to be redundant were left out, while two wine specific ones were added.

Original scale	Scale developed	Internal item identifier
How often do you use _____ ?	Trinken Sie regelmäßig Wein?	drink_regularly
---	Hat Sie schon einmal jemand in Zusammenhang mit Wein um Rat gebeten?	consulted
How much of a _____ expert would you call yourself?	Würden Sie sich als Weinexperte/in bezeichnen?	are_expert
---	Verfolgen Sie die Medienberichterstattung (Print, Online, TV) zum Thema Wein?	media_report
---	Haben Sie schon einmal eine Weinmesse (VieVinum, Vinova…) besucht?	fairs
How familiar do you consider yourself with _____ ?	---	---
How well-acquainted with _____ are you?	---	---
How regularly do you use _____?	---	---

Table 17: Product knowledge scale (prod_knowl)

In addition **two multiple-choice quiz questions** that aim at gauging de-facto wine knowledge of the interviewees were developed. These two items are – as all the others – dichotomous. Each of them incorporates one right answer and four wrong ones. The first item deals with *Rosé* wines (item identifier: *rose*); the second one provides statements concerning *Cuvees* (item identifier: *cuvee*).

4.2.7 Source credibility

This scale was developed to measure the perceived credibility of the information source TPPR. It is based on semantic differential scales that were created to measure the credibility of celebrity endorsements (Tripp, Jensen et al. 1994), the trustworthiness and expertise of a company (Goldsmith, Lafferty et al. 2000) and that of a website (Shamdasani, Stanaland et al. 2001). Reliability values as reported by the respective authors were $\alpha = .88$ (Tripp, Jensen et al. 1994) and $\alpha = .94$ (Shamdasani, Stanaland et al. 2001). Goldsmith, Lafferty and Newell (2000) reported an $\alpha = .85$ for the subscale trustworthiness and an $\alpha = .88$ for the subscale expertise.

Original scale	Scale developed	Internal item identifier
insincere / sincere	T1 wirklich seriös	serious
dishonest / honest	T2 ehrlich	honest
not trustworthy / trustworthy	T3 vertrauenswürdig	trustable
not credible / credible	T4 ziemlich glaubwürdig	believable
---	T5 etwas befangen	prejudiced
untruthful / truthful	T6 absolut wahr	true
biased / not biased	T7 beeinflusst / verzerrt	biased
not an expert / expert	E1 absolute Experten	experts
inexperienced / experienced	E2 langjährig erfahren	experienced
unskilled / skilled	E3 ziemlich sachkundig	skilled
---	E4 sehr kompetent	competent
unqualified / qualified	E5 qualifiziert	qualified

Table 18: Source credibility scale

An assessment of the scales' dimensionality has not been accomplished. Goldsmith, Lafferty and Newell (2000) among others reported that their items loaded an two dimensions, namely trustworthiness and expertise. Accordingly the scale developed here focuses on these two dimensions of source credibility (trustworthiness = T, expertise = E).

4.2.8 Brand popularity

Here the perceived popularity of a specific brand is measured. The scale is based on the seven-point semantic differential scale by Mishra, Umesh and Stem (1993), which revealed product specific reliability values of $\alpha = .89$ (beer), $\alpha = .93$ (cars) and $\alpha = .95$ (television sets). Correspondingly this scale here evaluates the popularity of the respective wine brand.

Original scale	Scale developed	Internal item identifier
not industry leader / industry leader	Glauben Sie, dass dieser Erzeuger einer der führenden Produzenten in Österreich ist?	leadin_produc
not at all popular / very popular	Glauben Sie, dass der Hersteller sehr bekannt ist?	known

not widely accepted / widely accepted	Ist der Hersteller weithin akzeptiert?	accepted
few like it / many like it	Glauben Sie, dass viele Konsumenten den Hersteller mögen?	like_weinmaker

Table 19: Brand popularity scale (popularity)

The results of the Rasch homogeneity tests of the items are depicted in Table 20 and in Table 21.

4.3 Rasch homogeneity tests and model selection

Following the description of the scales used the results of the Rasch modelling approach are discussed. Firstly, Rasch homogeneity of the respective model is assessed by theoretical consideration as well as the parametric bootstrap estimates for goodness of fit. Pearson χ^2 and the Cressie-Read statistic are calculated via a parametric bootstrap procedure with 500 samples. For constructs where these statistics turn significant, the model is expected to be disapproved. In cases where both the mixed and the Rasch model hold, information criteria are used to choose the "better" model. These values are summarized in the appendix (see Appendix F).

On the one hand item fit is examined by the Q-index (for the formula see Rost 2004, 373; Bühner 2006, 366). This test for significance follows a z-distributed test statistic and checks whether an answer pattern deviates from a pattern that is expected under the Rasch Model.

On the other hand, all remaining items are diagnosed in terms of their difficulties. The remaining items establish the constructs. The person parameters given by the models represent the test scores of the persons on the latent variables. Therefore some of them are later used in the paired comparison model as subject specific covariates (involvement, risk, product knowledge, trustworthiness and expertise of endorser) and all of them are used as variables in the graphical chain model. Here the Rasch model establishes the measurement model while the chain model stands for the structural model.

The following table summarizes the results of the bootstrap procedure for the student data set. The p-values for the Cressie-Read and the Pearson χ^2 statistic indicate the probability that the Rasch model holds for all constructs tested. The items in the last

column are removed from the analysis on the basis of significant z-statistics at 5% probability of error (Q-index).

Construct	Model	*p* (Cressie-Read)	*p* (Pearson χ^2)	Removed items
Perceived quality	RM	.083	.170	better than average, exceptional
Perceived value	RM	.133	.030	-
Purchase intention	RM	.203	.333	-
Perceived purchase risk	RM	.220	.223	important
Product class involvement	RM	.195	.385	shouldnt_speak
Product knowledge	RM	.195	.455	-
Source credibility: Expertise	RM	.120	.128	experts
Source credibility: Trustworthiness	RM	.168	.168	prejudiced
Brand popularity	RM	.160	.170	leadin_produc

Table 20: Bootstrap test statistics and removed items for student sample

The rigid and restrictive Rasch model does not demonstrate validity for all constructs of the panel sample (Table 21). In such cases mixed Rasch models are fitted. As mentioned above these models give up the assumption of unidimensionality and indicate that different properties or answer strategies within the two classes exist. According to the lowest values of AIC, BIC and CAIC (see Appendix 0) mixed models with two classes are preferred for the quality, the value and the risk construct in the panel sample.

Again, all test statistics remained insignificant apart from the Cressie-Read statistic for the construct brand popularity. As the Pearson χ^2 statistic remained insignificant the Rasch model was accepted for brand popularity, too.

Construct	Model	*p* (Cressie-Read)	*p* (Pearson χ^2)	Removed items
Perceived quality	Mixed 2class	.075	.133	better than average
Perceived value	Mixed 2class	.225	.293	-
Purchase intention	RM	.213	.235	-
Perceived purchase risk	Mixed 2class	.382	.334	important

Construct	Model	*p* (Cressie-Read)	*p* (Pearson χ^2)	Removed items
Product class involvement	RM	.158	.242	bored, shouldnt_speak
Product knowledge	RM	.620	.715	-
Source credibility: Expertise	RM	.058	.112	-
Source credibility: Trustw.	RM	.056	.196	prejudiced, biased
Brand popularity	RM	.044	.056	leadin_produc

Table 21: Bootstrap test statistics and removed items for panel sample

Analogously to the student sample, the person parameters are used for the paired comparison and the graphical chain modelling approach described in the subsequent sections.

5 Analysis online experiment one

Product design finally aims at producing goods that the consumer prefers to those of the opponents. Thus one central endeavour of marketing science is the explanation of consumers' choice decisions (Salzberger 2009).

The importance of quality cues and quality attributes from the consumer's perspective represents the core of this thesis. As every product can be interpreted as an array of cues (Cox 1967b), the consumer has to process cues from this array in order to infer quality perceptions (Steenkamp 1990). Usually a straightforward approach with rating scales asking for the importance of cues and attributes is applied. From a survey point of view, this approach can be implemented easily.

However, validity and reliability are often threatened in more complex choice decisions as interviewees tend to rate every attribute as important. Apart from that, consumers face huge problems in rating attributes separately (Salzberger 2009).

5.1 Methodological introduction to conjoint design paired comparison models

The limitations described above can be overcome by directly modelling choice situations. The Bradley-Terry model (1952) represents a sophisticated approach to analyse such problems. Moreover, problems stemming from questionable metric properties of rating scale responses are avoided as this thesis employs a paired comparison approach.

Interviewees will be confronted with bundles of quality cues and attributes that represent different fictive products (i.e. "objects"). That means a conjoint exercise will be applied in order to estimate the importance or utility of the single cues and attributes for perceived quality. Beforehand Bradley-Terry models are discussed theoretically.

5.1.1 The Bradley-Terry model

In the basic notation the Bradley-Terry model (BT) is defined by

$$\Pi_{(jk)j} = \frac{\pi_j}{\pi_j + \pi_k} \qquad \textbf{(10) Bradley-Terry model}$$

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where $\Pi_{(jk)j}$ is the probability that object j (O_j) is preferred to object k (O_k) within the comparison of O_j and O_k. The location of the objects on the preference scale is described by the non-negative parameters π_j and π_k (Bradley and Terry 1952). It makes sense to introduce the side condition $\sum_i \pi_j = 1$ in order to standardize all π's between 0 and 1. Therefore consistency between Formula 10 and 13 is given.

The BT model may be fitted by employing ordinary methods for logit models (e.g. Agresti 2002). Beyond that, it can be fitted in the form of a log-linear model, too (Fienberg and Larntz 1976; Sinclair 1982).

Given J objects, $\binom{J}{2}$ different paired comparisons become possible between the objects. $n_{(jk)}$ is considered to be the number of comparisons between object j and k. $Y_{(jk)j}$ denotes the number of preferences for j and $Y_{(jk)k}$ the number of preferences for k. The result can be interpreted as a $\binom{J}{2} x\, J$ incomplete, two-dimensional *object pair* x *decision for object j* contingency table. An example of such a table for three objects is depicted in Table 22.

comparison	decision for object 1	decision for object 2	decision for object 3	total number of comparisons
objects (12)	$y_{(12)1}$	$y_{(12)2}$		$n_{(12)} = y_{(12)1} + y_{(12)2}$
objects (13)	$y_{(13)1}$		$y_{(13)3}$	$n_{(13)} = y_{(13)1} + y_{(13)3}$
objects (23)		$y_{(23)2}$	$y_{(23)3}$	$n_{(23)} = y_{(23)2} + y_{(23)3}$

Table 22: Exemplary reference matrix for three objects

The random variables $Y_{(jk)j}$ and $Y_{(jk)k}$ are expected to be Poisson-distributed. The expected number of preferences of object j to k is defined as $m_{(jk)j}$ and given by $n_{(jk)}\pi_{(jk)j}$.

Using the respecification for $\Pi_{(jk)j}$ as suggested by Sinclair (1982) and the standard notation for log-linear models for contingency tables, the log-linear Bradley-Terry model (LLBT) can be described by:

$$\ln m_{(jk)j} = \mu_{(jk)j} + \lambda_j^O - \lambda_k^O \quad \text{and}$$

$$\ln m_{(jk)j} = \mu_{(jk)k} - \lambda_j^O + \lambda_k^O$$

(11) Log-linear Bradley-Terry model

where the nuisance parameters $\mu_{(jk)j}$ and $\mu_{(jk)k}$ show which objects appear in a specific paired comparison. They can be taken as interaction parameters that give the comparison and the marginal distribution, i.e. the number of comparisons between *j* and *k* (the n_{jk}'s). The object parameters (λ_j^O's) are connected to the π_j's by

$$\ln \pi_{(j)} = 2\lambda_j^O, j = 1,2, \dots J.$$

(12) Object parameters

The relationship between the λ's and the "worth" parameters is described as follows:

$$\pi_{(j)} = \frac{\exp\{2\lambda_j^O\}}{\sum_i \exp\{2\lambda_j^O\}}, j = 1,2, \dots J.$$

(13) Worth parameters

The LLBT incorporates important advantages over the classic BT (Hatzinger and Mazanec 2007). Firstly it is possible to deal with situations where no decisions are taken. Secondly, the LLBT allows a simultaneous estimation of objects ("cue and attribute bundles"), object covariates ("cues" and "attributes") and subject covariates ("consumers' characteristics"). Thirdly, their interactions can be taken into consideration in order to estimate different object characteristics according to subject variables (e.g. gender, product group expertise or a TPPR's perceived source credibility).

5.1.1.1 Subject covariates

Subject covariates allow deviating from the assumption that all subjects (i.e. judges) have the same preferences. So it is possible that the object parameters vary according to a certain subject characteristic (e.g. gender). We assume that the subjects are grouped according to the categorical covariate S with $l = 1,2, \dots L$.

It is assumed that $m_{((jk)j|l}$ represents the expected number of preferences for object *j* when compared to *k* for subject covariate class *l*. Such an extended LLBT is defined by the equations:

$$\ln m_{((jk)j|l)} = \mu_{(jk)l} + \lambda_j^O - \lambda_k^O + \lambda_l^S + \lambda_{jl}^{OS} - \lambda_{kl}^{OS} \quad \text{and}$$

(14) Bradley-Terry model

$$\ln m_{((jk)k|l)} = \mu_{(jk)l} - \lambda_j^O + \lambda_k^O - \lambda_l^S - \lambda_{jl}^{OS} - \lambda_{kl}^{OS}$$ **including a subject covariate**

The set of nuisance parameters λ_l^S stands for the main effects measured on the *l*-th level of the subject covariate and are not interpreted. The parameters λ_{jl}^{OS} and λ_{kl}^{OS} represent the subject-object interaction and describe the effect of the observed subject covariate on category *l* on the preference level of object *j* and object *k*. For each level of *L* a separate contingency table is established.

This procedure leads to a $\binom{J}{2} x\ J\ x\ L$ dimensional contingency table, i.e. *number of comparisons x number of objects* x *number of levels of the subject covariates*. The entry of additional subject covariates is conceptually straightforward (Hatzinger 2009).

5.1.1.2 Object covariates

A further extension of the LLBT is to incorporate covariates that explain the characteristics of the objects (e.g. price or brand of a product) in order to measure their effects on the subjects' preferences.

For this purpose the object-related parameters λ_j^O of the LLBT are reparameterized as a linear combination of *P* covariates $X_1, ..., X_p$. They correspond to the *P* properties of the objects:

$$\lambda_j^O = \sum_{p=1}^{P} x_{jp}\beta_p^X,$$ **(15) Object-related parameters**

with x_{jp}representing the p-th property of object j (covariate) and β_p^X the unknown regression parameters.

A LLBT with at least one subject and one object covariate is called Extended Bradley-Terry Model (EBTM, Hatzinger and Mazanec 2007) and given by

$$\ln m_{(jk)j|l} = \mu_{(jk)jl} + \lambda_l^s + \beta_l^X(x_{jl} - x_{kl}) + \beta_{jl}^{XS}(x_{jl} - x_{kl})$$ **(16) Bradley-Terry model including a subject and an object covariate**

5.1.1.3 Excursus: Paired comparison pattern models

The BT and the EBT assume independent comparisons. For the thesis at hand this is the case as the comparison of two fictive products is not dependent on the other comparisons. Learning effects are not likely and thus the results should not be blurred.

If the judges were supposed to compare the items twice (in t_0 and in t_1) or if there were learning effects between the comparisons, a paired comparison pattern model which considers dependence in the comparisons would be needed. In order to give a comprehensive discussion this chapter attends to pattern models that account for these dependences.

Coming from the classic Bradley Terry model a new notation has to be introduced to consider the probability of the preference for an object when two objects (*ij*) are compared. The explanations given below follow Dittrich and Hatzinger (2009). The variable Y_{ij} denotes which object is preferred with the values Y_{ij}=1 when O_i is chosen and $Y_{ij} = -1$ when O_j is chosen:

$$\Pi_{(ij)i} = P\{Y_{ij} = 1 \mid \pi_i, \pi_j\} = \frac{\pi_i}{\pi_i + \pi_j},$$

(17) Pattern model

$$\Pi_{(ij)i} = P\{Y_{ij} = -1 \mid \pi_i, \pi_j\} = \frac{\pi_i}{\pi_i + \pi_j}.$$

In doing so $\prod(ij)i$ represents the probability that O_i is chosen when compared to O_j and analogically j that O_j is chosen. Comparing three objects with two response categories (here 1 and -1) for instance leads to 8 possible response patterns $(s1, \ldots, s8)$.

The matrix of these patterns **Y** in the arrangement (1,2), (1,3) and (2,3) is:

1	1	1
1	1	-1
1	-1	1
1	-1	-1
-1	1	1
-1	1	-1
-1	-1	1
-1	-1	-1

The first pattern s_1=(1,1,1) for example means that O_1 is preferred to O_2, O_1 preferred to O_3 and O_2 preferred to O_3.The probability for s_1 is given by

$$p(s_1) = p(1,1,1) = \frac{\pi_1}{\pi_1+\pi_2}\frac{\pi_1}{\pi_1+\pi_3}\frac{\pi_2}{\pi_2+\pi_3}. \qquad \textbf{(18) Probability of answer pattern}$$

Dependence of two responses in pairs is assumed when they are based on overlapping sets of object pairs (for further details and theoretical background see Dittrich, Hatzinger and Katzenbeisser 2002). Dependence is introduced by parameter θ .

Using Sinclair's (1982) respecification again the probability of s_1 can now be denoted as:

$$p(y_{12}, y_{13}, y_{23}) = C^*\left(\frac{\sqrt{\pi_1}}{\sqrt{\pi_2}}\right)^{y_{12}}\left(\frac{\sqrt{\pi_1}}{\sqrt{\pi_3}}\right)^{y_{13}}\left(\frac{\sqrt{\pi_2}}{\sqrt{\pi_3}}\right)^{y_{23}} \qquad \textbf{(19) Respecification}$$

$$\text{x}\exp\left\{\theta_{1,23}y_{12}y_{13} + \theta_{2,13}y_{12}y_{23} + \theta_{3,12}y_{13}y_{23}\right\},$$

with C^* denoting a constant to make the probabilities sum to one. When giving a log-linear representation of equation (19) with $\gamma = \ln C^*$, the dependence parameters θ can be interpreted as log-odds ratios:

$$\begin{aligned}\ln m(y_{12}, y_{13}, y_{23}) &= \gamma + (y_{12}+y_{13})\lambda_1 \\ &+ (y_{23}+y_{12})\lambda_2 + (-y_{13}-y_{23})\lambda_3 \\ &+ \theta_{1,23}y_{12}y_{13} + \theta_{2,13}y_{12}y_{23} + \theta_{3,12}y_{13}y_{23}\end{aligned} \qquad \textbf{(20) Log-linear representation}$$

A special case of dependence is that of time in longitudinal comparisons. Among other phenomena this can be due to changes in the judgements over time, when the same objects are compared by the same judges more than once (Dittrich, Francis and Katzenbeisser 2008).

5.1.1.4 Applications and suitability

The BT-model (Bradley and Terry 1952) represents a classic approach to analyse discrete decisions, particularly paired comparisons. It has been applied to a wide range of research problems. Apart from the research field of statistics, it was used in leisure research among others to estimate the part worth of the mode of transport within a trip

package (Hatzinger and Mazanec 2007), furthermore to assess the relationship of person-environment fit and job satisfaction in vocational psychology (Eggerth 2004) and to evaluate product line design decisions in marketing (Schön 2010). Moreover, the model was applied to evaluate the ranking of economics journals (Stigler, Stigler and Friedland 1995), citation patterns (Stigler 1994) and to estimate odds ratios for one scientific journal citing another (Liner and Amin 2004). In addition it was also used to evaluate sports rankings (Agresti 2002; Caudill 2009).

The model is notably suited for situations in which the probability of choice is proportional to some latent utility parameter. Thus it seems really appropriate for psychological marketing research. The model is attractive because of its relative simplicity (Train 2003, 43). However, when generalized to situations where more than two alternatives have to be compared simultaneously, the model received severe criticism (Louviere, Hensher and Swait 2000, 160). Apart from that, the model is scientifically well accepted (Graßhoff and Schwabe 2008).

5.2 Paired Comparison Modelling

The next chapter starts with a discussion of the paired comparison analysis of the panel data, followed by a section on the analysis of the student data set. The hypotheses are tested by a two-way interaction model for the student data set only. The rationale behind that decision is the higher number of observations, which allows a more accurate estimation of the subject covariate influences in the model.

5.2.1 Main effects model: panel sample

In experiment one answering times below five minutes had not proved to be reliable in the course of pretesting. Accordingly, 45 respondents were excluded because of an answering time below five minutes. This procedure led to a final size of 454 respondents. The creation of the design matrix was executed within *R* by the package *prefmod* (Hatzinger 2010). Model fit procedures were done by the *gnm* package (Turner and Firth 2010) in *R*. The basis model is fitted by

```
gnm(y ~ o1 + o2 + o3 + o4 + o5 + o6 + o7 + o8, eliminate = mu,
family = poisson, data = des1)
```

with o1:o8 denoting the cards (i.e. the fictitious products, see Table 5) and y the frequencies of the preferences. The model estimated is log-linear and considered to be Poisson-distributed.

```
    Estimate Std. Error z value Pr(>|z|)          Worth
o1  0.23936    0.04879   4.905 9.32e-07 ***      0.1499
o2 -0.03536    0.04875  -0.725 0.468244          0.0865
o3 -0.23497    0.04981  -4.718 2.39e-06 ***      0.0581
o4  0.22657    0.04898   4.626 3.73e-06 ***      0.1461
o5 -0.17001    0.04991  -3.406 0.000659 ***      0.0661
o6  0.28403    0.04948   5.740 9.48e-09 ***      0.1639
o7  0.46716    0.05077   9.201  < 2e-16 ***      0.2364
o8  0.00000         NA      NA       NA          0.0929
```

Table 23: Parameter estimates and worth parameters: objects, panel

The parameters depicted above represent the estimates for the objects (λ^{O}) and illustrate the latent preference values for the fictive product bundles. For a graphical representation see Figure 12. It becomes evident that o7 (high reputation winery, good TPPR and a price of € 6,-) is most strongly preferred, followed by o6 and finally o3 (low reputation winery, no TPPR and € 10,-) with the lowest value. When calculating the parameter estimates and the corresponding standard errors, *gnm* (Turner and Firth 2010) sets the last object as a reference to zero. All estimates apart from o2 have turned out significant.

In the next step the cards are replaced by object covariates. Dummy coding allows the replacement of the eight objects by five object covariates as follows:

	high_rep	high_price	good	bad	ed_choice
[o1]	1	1	0	0	1
[o2]	0	0	0	1	0
[o3]	0	1	0	0	0
[o4]	0	0	0	0	1
[o5]	1	1	0	1	0
[o6]	0	1	1	0	0
[o7]	1	0	1	0	0
[o8]	1	0	0	0	0

Table 24: Dummy coding for object covariate reparametrization

A likelihood ratio test between the basic model with eight objects and a new model with five object covariates gives evidence that the reparameterization is permissible ($p = 0.0812$).

	Estimate	Std. Error	z value	Pr(>|z|)		Worth
high_rep	0.07509	0.02484	3.023	0.00250	**	0.1518
high_price	-0.13366	0.02474	-5.402	6.58e-08	***	0.1000
good	0.49349	0.03602	13.699	< 2e-16	***	0.3504
bad	0.01543	0.03464	0.445	0.65610		0.1347
ed_choice	0.35035	0.03498	10.016	< 2e-16	***	0.2632

Table 25: Parameter estimates and worth parameters: object covariates, panel

Apart from the parameter "bad TPPR" all estimates demonstrate significance and thus exert influence on the preference of the interviewees. The estimates show the differences to be gained by switching from the reference level to the other level / the other levels of a product attribute (Hatzinger and Mazanec 2007). The level not shown in the output serves as the reference level, i.e. low reputation, low price and no TPPR are set to zero. Accordingly, a change in the reputation of wine from low to high entails a significant value of .0751, changing the price from € 6,- to € 10,- a negative preference value of -0.134 or a change from no TPPR to good TPPR a gain of 0.493. As the model is log-linear, comparisons should be understood in terms of odd ratios. So the odds of preferring good TPPR to not good TPPR are 1.628 times (=exp 0.49349) higher than preferring no TPPR vs. not no TPPR. The parameters are plotted in Figure 13.

Accordingly, the good TPPR exerts the highest influence on the preferences, followed by editor's choice and the winery's reputation. The parameter bad does not turn out significant and thus should not be interpreted. The high price is the only attribute causing negative preference values.

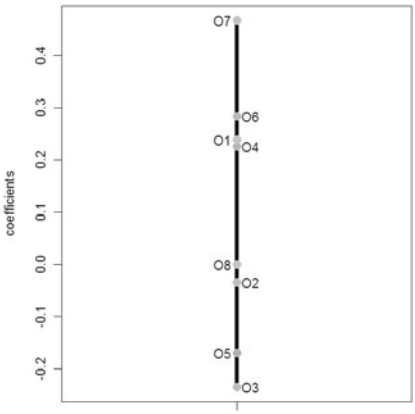


Figure 12: Coefficients of the objects: panel

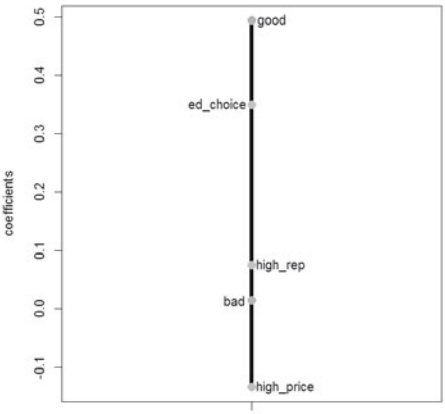
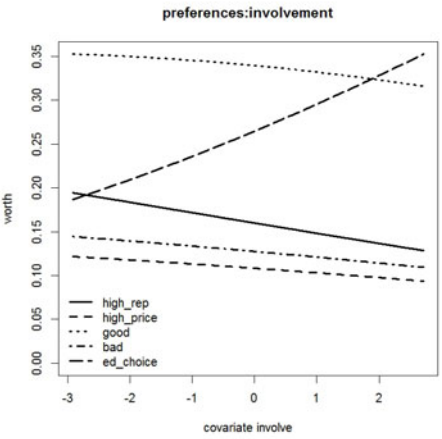


Figure 13: Coefficients of the object covariates: panel

The following part of the analysis is concerned with the single subject covariates' influence on the preferences. Here the assumption that all subjects have the same preferences is dismissed. Consequently, the influence of covariates such as involvement, product knowledge or perceived risk on the interviewees' preferences is studied. It is for instance examined whether the importance of a good product test or a high brand reputation is higher for customers who perceive high risk or for those being more knowledgeable.

Again the first level of each object covariate serves as reference and is set to zero. In order to assure comparability between the levels of the covariates, the estimates/coefficients of the objects (λ) are transformed into worth parameters π that sum up to one. For the calculation see Formula 13.

The model summaries of the subsequent plots (Figure 14 to Figure 22) can be found in Appendix A. As non-significant parameters may not provide reliable evidence, they should be considered cautiously.



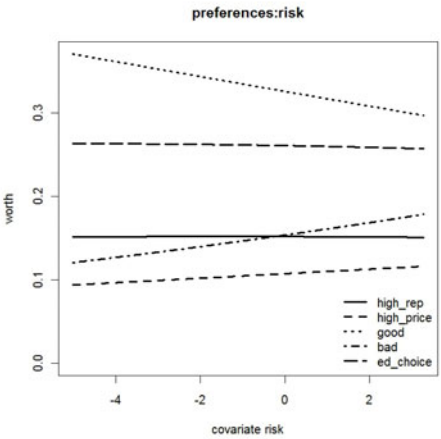


Figure 14: Influence of involvement: panel

Figure 15: Influence of perceived risk: panel

The figure on the left displays the path worths dependent on the subject covariate involvement (i.e. the person parameters given by the Rasch model product class involvement). According to the main effects model with one subject covariate only the term *good:involve* is significant. It follows that the influence of a good TPPR depends on involvement. Highly involved persons ascribe higher preference values to good product tests.

When considering the influence of perceived risk (top right) the interactions with good TPPR and reputation show significance. The negative estimates are an indicator of an inverse relationship. The higher the score of a person on the latent dimension risk, the lower the importance of the reputation of a brand and the lower the influence of a good TPPR. These findings contradict the hypothesized interrelation. Drawing on the existing literature it was expected that a brand's reputation and a good TPPR are capable of reducing perceived risks. Quite surprisingly, this is the other way around here. The rationale hereof will be discussed later.

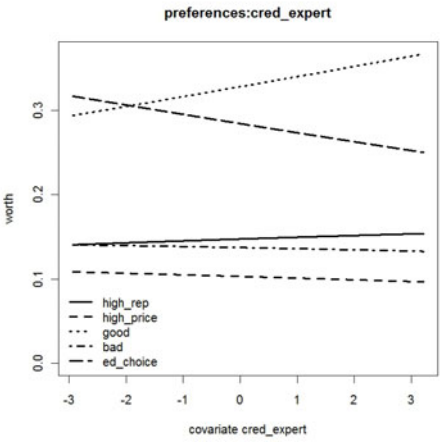


Figure 16: Influence of perceived expertise: panel

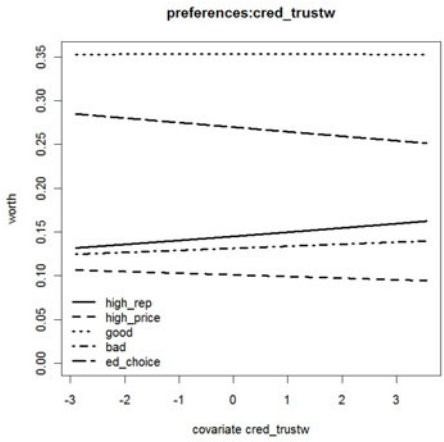
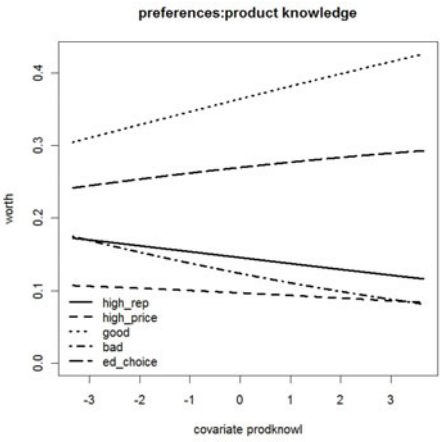


Figure 17: Influence of perceived trustworthiness: panel

The perceived expertise of the TPPR's endorser demonstrates significance in respect of a brand's reputation and in respect of good TPPR. Thus it can be concluded that the endorser's expertise radiates to the reputation of a brand. Apart from that, expertise is interconnected with the positive effect of good product tests. Perceived trustworthiness of the TPPR also influences the reputation of a brand. Apparently there is a vibrancy effect that extends from the trust in a TPPR to the perceived reputation of brands. This effect still needs more research to be clarified.

Product knowledge (Figure 18) shows a significant interaction with good TPPR only. This means that customers with higher values of knowledge can be better supported by the positive product test. Considering the covariate age (Figure 19) reveals significant parameters for the interaction effect of the good and the bad product test, even though the interaction between the bad test and age is rather minor. For the good product test however, it can be concluded that the older interviewees are more cautious when dealing with a positive test result.



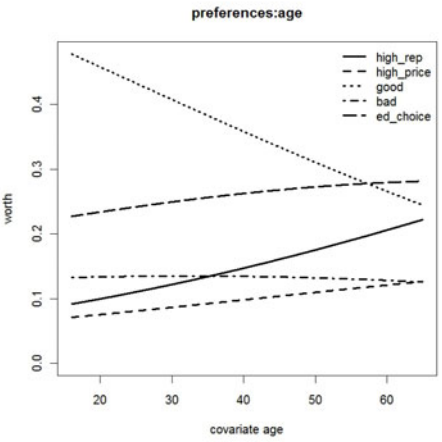
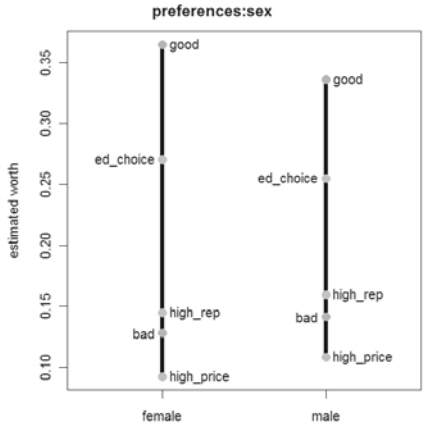


Figure 18: Influence of product knowledge: panel

Figure 19: Influence of age: panel

As far as the model with gender is concerned, all object parameter interactions turn out to be insignificant. Thus it can be concluded that there is no gender difference with respect to the importance of the attributes. This is further supported by the Figure 20 that shows no difference in the preference rank order of the attributes.



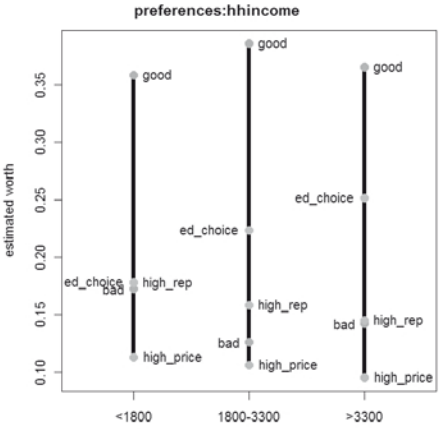


Figure 20: Influence of gender: panel

Figure 21: Influence of net household income: panel

Figure 21 depicts the preference dependent on the subject covariate household income. Apart from a significant interaction between reputation and the highest income group it does not reveal extensive differences in the preferences. Consequently it can be assumed that household incomes do not shape the importance of the attributes. The only exception is the group earning over € 3300,- per month. These people ascribe more importance to the wine brand's reputation.

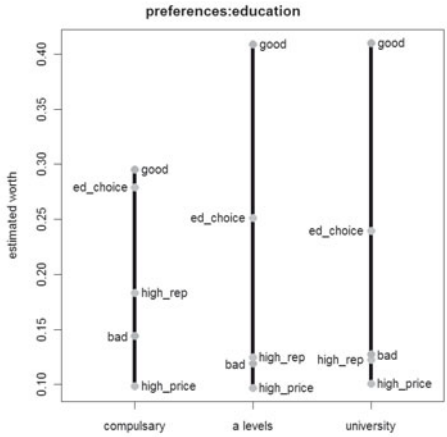


Figure 22: Influence of education: panel

Considering the influence of the subject covariate education produces no significant differences in the attribute preferences of the interviewees. Therefore the assumption that education has no influence on the preferences seems to suggest itself.

5.2.2 Main effects model: student sample

The procedure of the analysis of the student sample is the same as the one of the panel sample. Hence the descriptions in this chapter are kept shorter. Data cleansing procedures on the basis of answering times yielded a final sample size of 831. A basis model for the eight fictitious products is fitted as follows.

The estimates represent the preference values of the fictitious product bundles (details on the composition of the bundles can be obtained from Table 5). Similar to the panel sample o7 (high reputation winery, good TPPR and a price of € 6,-) is most strongly preferred and o3 (low reputation winery, no TPPR and € 10,-) is most strongly

opposed. All estimates apart from o4 are significant. The last column gives the worth parameters (π's). These non-negative numbers are calculated according to Formula (14) and describe the location of the objects on the preference scale. They cumulate to one for comparison reasons.

	Estimate	Std. Error	z value	Pr(>|z|)		Worth
o1	-0.12944	0.02810	-4.607	4.08e-06	***	0.091
o2	-0.77223	0.03024	-25.537	< 2e-16	***	0.025
o3	-0.96555	0.03183	-30.331	< 2e-16	***	0.017
o4	-0.02796	0.02810	-0.995	0.3197		0.111
o5	-0.90698	0.03127	-29.001	< 2e-16	***	0.019
o6	-0.05951	0.02814	-2.115	0.0345	*	0.104
o7	0.73847	0.03440	21.466	< 2e-16	***	0.515
o8	0.00000	NA	NA	NA		0.118

Table 26: Parameter estimates and worth parameters: objects, students

The objects (o1:o8) are replaced by object covariates according to Table 24. The new model is fitted with these covariates.

	Estimate	Std. Error	z value	Pr(>|z|)		Worth
high_rep	0.38790	0.01563	24.82	<2e-16	***	0.207
high_price	-0.50515	0.01593	-31.70	<2e-16	***	0.035
good	0.83113	0.02379	34.94	<2e-16	***	0.502
bad	-0.35869	0.02140	-16.76	<2e-16	***	0.046
ed_choice	0.39749	0.02073	19.18	<2e-16	***	0.211

Table 27: Parameter estimates and worth parameters: object covariates, students

All parameter estimates demonstrate significance. Consequently it can be assumed that the three attributes TPPR, price and reputation exert influence on the preference of the interviewees. Again the level of the attribute not displayed in the output serves as reference level and is set to zero. Accordingly, the good TPPR exerts the highest influence on the preferences, followed by editor's choice and the winery's reputation. The high price attribute causes the highest negative preference values, followed by the negative product test.

From the estimates we can gather that switching from a price of € 6,- to € 10,- entails a negative value of -0.51. Switching from no TPPR to the negative TPPR yields a value of -0.36, to the editor's choice a value of 0.40 and finally to the good TPPR a value of 0.83. Changing the reputation results in a positive value of 0.39. It can be concluded that the good product test compensates the price rise of € 4,- or speaking in terms of odds ratios the chance of preferring good TPPR to not good TPPR is 2.30 times (=exp 0.83113) higher than preferring no TPPR to not no TPPR. The chance of preferring the

€ 10,- price to not preferring it is 0.6 times lower than the odds of preferring € 6,- vs. not preferring € 6,-.

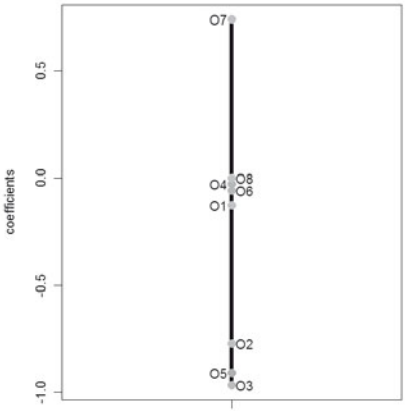


Figure 23: Coefficients of the objects: students

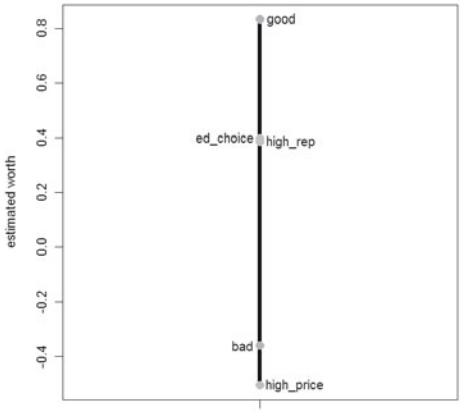


Figure 24: Coefficients of the object covariates: students

The figure on the left displays the estimates for the eight products (i.e. the overall utility of the fictitious wines) while the figure on the right displays the path worth of the respective wine attributes (i.e. object covariates).

The subsequent section studies the influence of the single subject covariates on the preferences of the customers. Subject covariates like involvement or product knowledge are not consistent with the assumption that all subjects have the same preferences. The question is whether these covariates interact with the object covariates and thus influence preference values. The subsequent plots are based on the respective model statistics depicted in Appendix E.

The first figure (Figure 25) displays the connection between the product attributes and the person's score on the latent dimension involvement. According to the model statistic, involvement shows significant interaction terms with the good and the bad product test as well as with the reputation of the product. The preference worth rises with the customer's involvement. This implies that higher involved tend to ascribe more preference value to good TPPR. An inverse, though slightly weaker effect can be

observed in connection to a bad TPPR. In terms of a brand's reputation, there is evidence that people with a higher involvement are more cautious when dealing with highly reputable brands. They might presume that valuable wines are not necessarily highly reputable.

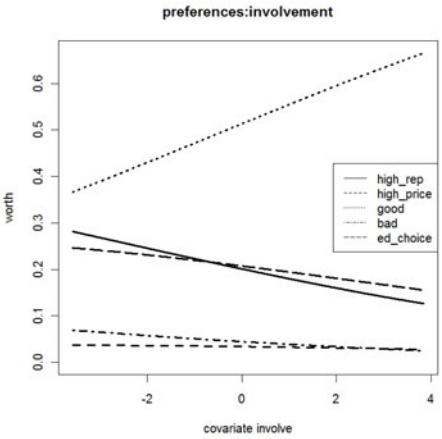


Figure 25: Influence of product class involvement: students

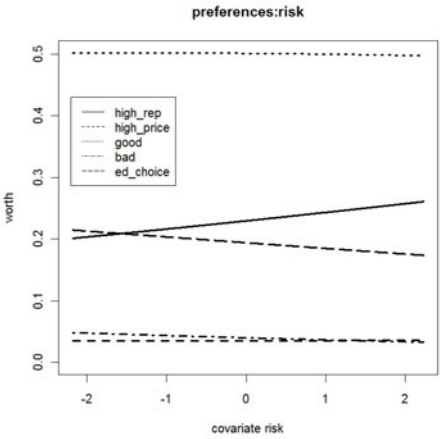


Figure 26: Influence of perceived risk: students

The model with the subject covariate risk (Figure 26) produces one significant interaction, namely *reputation:risk*. This effect suggests that customers perceiving high risk admit high preference values to the reputation of the brand. So in turn the reputation of the brand supports the reduction of purchase risks.

With regard to the influence of the perceived expertise a significant effect has been detected with good TPPR. The more expertise the endorser communicates, the more preference-relevant is the product test. The same applies to the perceived trustworthiness of good and editor choice TPPRs. Significant interactions can be found for these two TPPR characteristics. Interestingly enough, these effects are not found for bad TPPR. Consequently, the conclusion can be drawn that source credibility is a preference-relevant topic for the customers only in connection with positive test results. The utility of negative TPPR is not shaped by source credibility concerns.

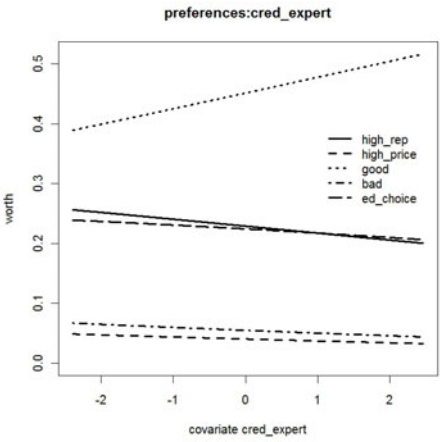


Figure 27: Influence of perceived expertise: students

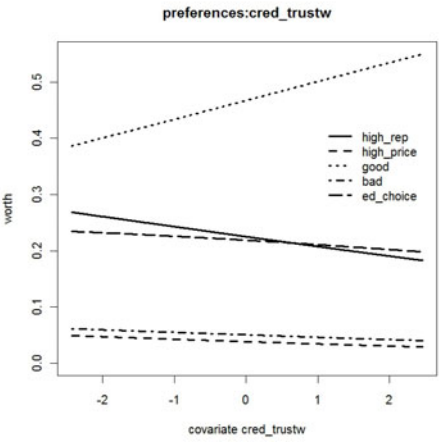


Figure 28: Influence of perceived trustworthiness: students

A model with the covariate product knowledge (Figure 29) grants the following significant interactions. Higher knowledge on the product class reduces the individual's trust in the brand's reputation.

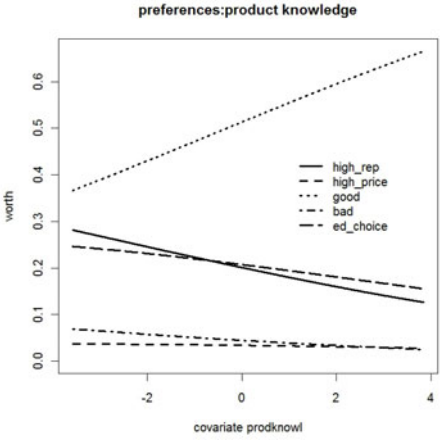


Figure 29: Influence of product knowledge: students

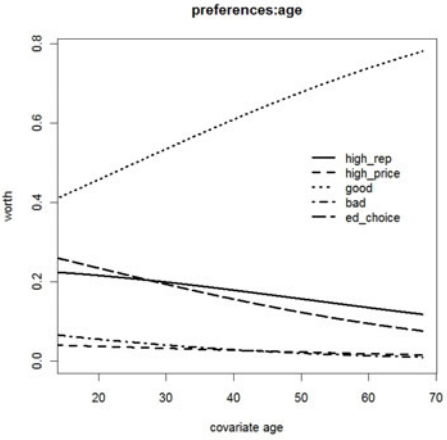


Figure 30: Influence of age: students

Similar to highly involved customers, highly knowledgeable ones rely less on the fame of a brand and thus seem less influenced. Higher product knowledge also strengthens the positive impact of good product test results and increases the negative effects of bad test results.

The model with a covariate age (Figure 30) reveals significant effects with all three levels of TPPR. The path utility of the good TPPR rises with age, while the utility of the bad test declines. Even though the coefficient *ed_choice:age* is significant, the effect can be disregarded because of its very small value of -0.006. In summary, one can say the older the people the more they direct themselves to positive and negative TPPRs. The positive TPPR strengthens preference, while the negative one weakens it. As far as editor's choice is concerned the influence the influence of age can be neglected.

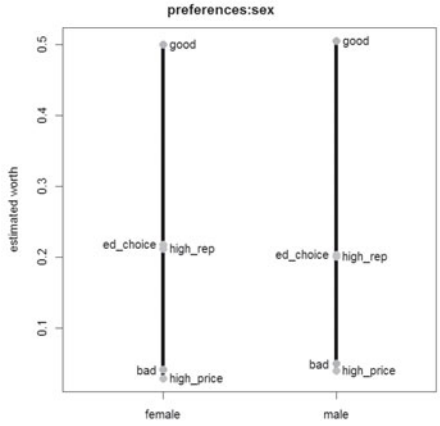


Figure 31: Influence of gender: students

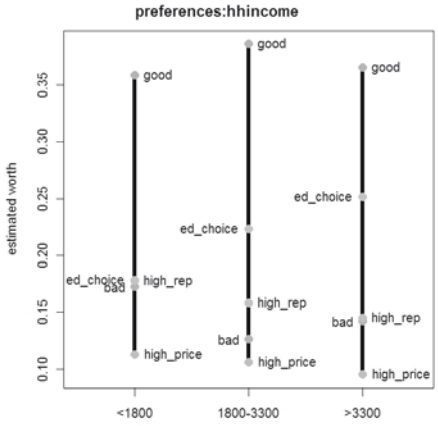


Figure 32: Influence of net household income: students

The model with the covariate gender reveals no significant interaction term (Figure 31). It can thus be concluded that there are no gender differences with respect to the utility of the attributes. When it comes to the influence of household incomes the only significant term *high_rep:income_grp3* indicates that a high brand reputation is more preference-relevant for the customer group with monthly household incomes exceeding € 3000,- (Figure 32).

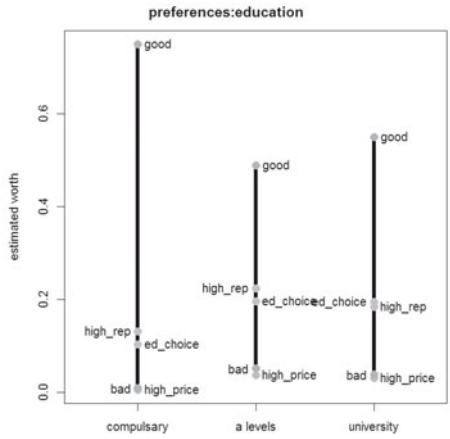


Figure 33: Influence of education: students

The last covariate studied is education (Figure 33). The model does not reveal any significant interaction effect with the attributes. Therefore it can be assumed that the importance of TPPRs as well as the perception of price and reputation remain untouched by the customer's education.

5.2.3 Two-way interaction effects model and hypotheses testing

The following model output (Table 28) reflects the final model incorporating the estimates for the product attributes (coefficients 1:5), the estimates of the one-way interactions with one subject covariate (6:13) and finally the two-way interaction terms with two subject covariates (14:28). Likelihood ratio tests between the main effects and the one-way interaction model and between the one-way interaction and the two-way interaction model both turned out significant. Consequently, it can be assumed that the two-way interaction model describes the data more accurately. Due to interpretation and computer performance matters higher interaction models were not fitted.

	Estimate	Std. Error	z value	Pr(>|z|)	
high_rep	0.2898011	0.0797638	3.633	0.000280	***
high_price	-0.5172286	0.0162528	-31.824	< 2e-16	***
good	0.4707012	0.1007636	4.671	2.99e-06	***
bad	-0.3862600	0.0435179	-8.876	< 2e-16	***
ed_choice	0.3337380	0.0416331	8.016	< 2e-16	***
high_rep:cred_trustw	0.1110221	0.0378143	2.936	0.003325	**
high_rep:prodknowl	-0.0903538	0.0405087	-2.230	0.025716	*
high_rep:age	0.0053281	0.0031245	1.705	0.088147	.
good:involve	0.0289221	0.0096407	3.000	0.002700	**
good:age	0.0060424	0.0036498	1.656	0.097816	.
bad:cred_expert	0.1825224	0.0477457	3.823	0.000132	***
bad:prodknowl	-0.2052867	0.0534971	-3.837	0.000124	***
ed_choice:cred_expert	0.1102616	0.0440730	2.502	0.012357	*
high_rep:involve:					
cred_expert	0.0103179	0.0051045	2.021	0.043245	*
high_rep:prodknowl:involve	-0.0097532	0.0039357	-2.478	0.013208	*
high_rep:age:involve	-0.0012165	0.0005042	-2.413	0.015835	*
high_rep:cred_trustw:age	-0.0040657	0.0014229	-2.857	0.004274	**
high_rep:prodknowl:age	0.0032926	0.0015432	2.134	0.032877	*
high_price:prodknowl:					
cred_expert	-0.0319310	0.0080599	-3.962	7.44e-05	***
high_price:prodknowl:age	0.0026700	0.0006651	4.015	5.95e-05	***
good:cred_expert:risk	-0.0153038	0.0078585	-1.947	0.051485	.
good:cred_trustw:					
cred_expert	0.0457616	0.0061889	7.394	1.42e-13	***
good:prodknowl:age	0.0013353	0.0005882	2.270	0.023208	*
bad:prodknowl:risk	-0.0462252	0.0124189	-3.722	0.000198	***
bad:age:cred_expert	-0.0068926	0.0016338	-4.219	2.46e-05	***
bad:prodknowl:age	0.0034178	0.0018251	1.873	0.061111	.
ed_choice:cred_trustw:					
cred_expert	0.0178171	0.0056156	3.173	0.001510	**
ed_choice:age:cred_expert	-0.0038716	0.0014665	-2.640	0.008288	**

Table 28: One- and two-way interaction model

The highly significant coefficients *good* (0.471), *bad* (-0.386) and *ed_choice* (0.334) imply that TPPRs exert a considerable influence on the customers' preferences. These results confirm $H4_a$.

It is further revealed that a TPPR's trustworthiness ($H5_a$) and credibility ($H6_a$) affect the customer's behavioural compliance. The two-way interactions *good:cred_trustw:cred_expert*, *ed_choice:cred_trustw:cred_expert* and *ed_choice: cred_expert* suggest that the preference relevance of a good and an editor's choice TPPR is higher when the customer experiences the endorser as skilled and trustworthy. Moreover, trustworthy TPPRs interact with the reputation of a wine brand and bear value.

$H7_a$ postulated an influence of the customer's product class knowledge on the perception of TPPRs. The coefficient for the *bad:prodknowl* interaction points out that

the negative impact of a bad test is much stronger for high knowledge customers. This confirms $H7_a$. Apart from that high knowledge customers do not strongly rely on a winery's reputation (*high_rep:prodknowl*). They rather seem to use other attributes like price as an indicator of preference.

Involvement reveals an interaction term with the good test (*good:involve*). Consequently, a highly involved customer is better supported than a customer with low involvement. Thus $H8_a$ is holds up empirically.

Customers perceiving high purchase risks seem to be more cautious when dealing with TPPR. This effect appears in line with product knowledge concerning bad TPPR (*bad:prodknowl:risk*) and with endorsers' expertise concerning good TPPR (*good:cred_expert:risk*). When confronted with TPPRs customers with a good wine knowledge tend to feel fewer risks related to the potential acquisition. The same phenomenon comes with high expertise endorsers. Therefore $H9_a$ is treated as empirically confirmed.

$H11_a$ presumed that both the consideration of TPPRs and the impact of TPPRs on preference decline with age. Surprisingly, the good test result was of higher value for the older interviewees (*good:age*) and the bad test, given it was credible, produced in turn a more negative value for the preference when the age was higher (*bad:age:cred_expert*). Accordingly, $H10_a$ is abandoned. Apart from that reputation was also more preference-relevant for older customers. This is supported by the significant coefficient *high_rep:age*. Due to computation capabilities the covariates education and household income were excluded from the model shown in Table 28. Nevertheless Figure 33, which is based on the model with the subject covariate education only, shows no significant effect. As a result, $H10_a$ can be abandoned. Figure 32 depicts the preference values dependent on household incomes. No significant TPPR effects are revealed and consequently, $H12_a$ is considered as disproved, too.

6 Analysis online experiment two

This chapter gives a theoretical introduction to graphical and further to graphical chain models. Subsequently chain models are fitted for the student and the panel sample. The section closes with an interpretation of the results and an examination of the hypotheses.

6.1 Methodological foundations of graphical chain models

Complex multivariate association structures cannot always be analysed by standard procedures without the risk of losing too much information. Approaches like contingency tables and multivariate regression models disregard indirect influences and crucial association structures among the explanatory variables (Blauth and Pigeot 2000). Structural equation models (SEMs) do account for these interdependencies but are not fully able to handle continuous, binary and multicategory response variables simultaneously (see Smith, Berrington and Sturgis 2009). Path models can only handle continuous variables and univariate responses (Caputo, Heinicke and Pigeot 1999).

Most multivariate methods are not capable of considering association structures among a multitude of variables. Moreover, most procedures lack the ability to work out indirect influences among sets of variables. That is the case when some explanatories effect other explanatories with the latter influencing the responses (Blauth, Pigeot and Bry 2000). The most sophisticated way to account for these challenges is to employ graphical approaches.

6.1.1 Graphical models

Generally speaking, graphical models unite statistical models for multivariate random observations with graph theory. They depict the independence structure of the variables in a graph.

A graph $G = (\mathcal{V}, \mathcal{E})$ is defined as a structure comprising a finite set of $\mathcal{V}$ vertices (also called nodes) and a finite set of $\mathcal{E}$ edges (also called arcs). When all edges (here 1 to 6) are undirected, the graph is called undirected graph (Figure 34), otherwise directed (Figure 35). We speak of directed acyclic graphs (DAGs, Figure 36) when there are only directed edges and no circle (a circle exists between edge 1, 2 and 3 in Figure 35). Accordingly, DAGs represent asymmetric association structures (Edwards 2000).

W. Ziniel, *Third Party Product Reviews and Consumer Behaviour,*
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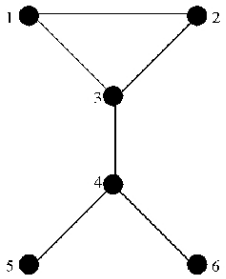

Figure 34: Undirected graph

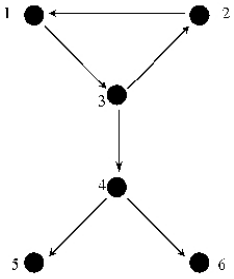

Figure 35: Directed graph

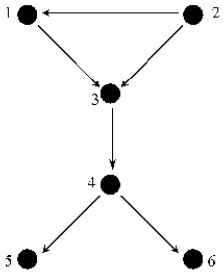

Figure 36: Directed acyclic graph

Graphs displaying marginal independencies are referred to as covariance graphs, those displaying conditional independencies are called concentration graphs (Blauth, Pigeot et al. 2000). Here the focus will be on concentration graphs. Compared to other statistical approaches like regression analysis, graphical modelling takes the whole association structure among the variables into consideration – this also includes the structure among the explanatories. Moreover, graphical models can be easily represented in a graph. So the researcher can capture the latent dependence structure of the data. The usage of graphical models also allows a simplification of testing and estimation techniques (Blauth 2000).

The basic premise of graphical models is that missing edges between variables represent conditional independencies characterized by Markov properties (for information on Markov properties in chain graphs see Cox and Wermuth 1993). These properties result in a factorization of the multivariate density and consequently in a decomposition into several smaller models. These models are described by the cliques of the graph and represent maximally complete subsets of vertices. The cliques fulfil the property that the variables within the clique are connected by an undirected edge and that adding another variable would lead to the reversal of this characteristic (Blauth 2000).

6.1.2 Graphical chain models

Chain or block recursive graphs combine undirected graphs with DAGs and were brought up and discussed by the authors Frydenberg, Lauritzen, Wermuth and Cox (Frydenberg and Lauritzen 1989; Lauritzen and Wermuth 1989; Frydenberg 1990;

Wermuth and Lauritzen 1990; Cox and Wermuth 1993). The graph follows a dependence chain based on subject-matter knowledge and theories. This chain usually features a causal or temporal structure and provides the split-up of the variables into an ordered list of blocks. The variables within a specific block have symmetrical association structures and they are concurrent, i.e. without order. This relationship is usually clarified by lines, while two variables from different blocks are concatenated by arrows always pointing from the lower-numbered to the higher-numbered block (Edwards 2000).

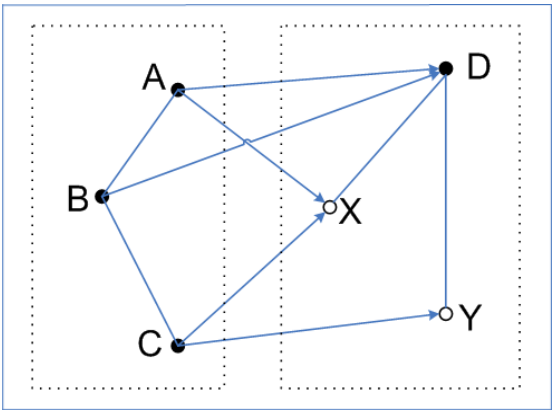

Figure 37: Graphical chain or block recursive model

Variables in the lowest-numbered block are pure explanatories (A to C), whereas those in the highest-numbered block depict pure responses (D, X and Y). All the blocks in between indicate intermediaries (note that there are no intermediaries in Figure 37). When there is no line between two vertices in the same block (A and C) or no arrow between two vertices in different blocks (B and X), these variables are conditionally independent of all prior and concurrent – relative to the later variable - variables (Edwards 2000). This is due to the pairwise Markov property that is thoroughly discussed in Lauritzen (1996).

The recursive structure described by the dependence chain decomposes the joint likelihood into a product of conditional distributions. Each distribution corresponds to all the variables on one recursive level conditional upon all variables at all lower levels. The formal deduction of this factorization can be found in Wermuth and

Lauritzen (1990). Graphical models may be seen as a sequence of multivariate regression models, with each one illustrating the single conditional distributions.

The fitting of the graphical chain model is executed by the computer programme *GraphFitI* (Blauth 2000). It calculates a system of univariate regressions. Binary responses are handled by logit models, polytomous responses by multinomial logit models and normally distributed responses by regression models. Graphical chain models assume different distributions. If the outcome variable is discrete, the multinomial distribution is assumed, for continuous ones the multivariate normal distribution is assumed and finally, for mixed graphical models the conditional Gaussian distribution.

Graphical chain models have been introduced to overcome the problems described above. They are stochastic models described by mathematical graphs that include nodes and edges which allow the specification of causality. Nodes represent the variables, edges the asymmetric relationships between the variables, i.e. one anticipating the other by direct edges/arrows (Lauritzen and Wermuth 1989; Wermuth and Lauritzen 1990; Cox and Wermuth 1993).

6.1.3 Applications and suitability

Graphical chain models provide convincing statistical properties to reasonably analyse high-dimensional data sets. Nonetheless their usage in scientific applications is still scarce. This is mainly due to the massive computational effort to fit such models and to a lack of specific software. *GraphFitI* (Blauth 2000) provides a solution as it is a sophisticated, user-friendly software to fit such models.

The applications cannot only be found in the field of the social sciences, although most applications can be assigned to these disciplines. Chain models were successfully adopted in order to illuminate the professional success of sociologists by considering biographical, university and job attributes (Caputo, Heinicke et al. 1999). Foraita, Klasen and Pigeot (2008) fitted a sophisticated chain model to dissect structural correlates concerning undernutrition among children in Benin and Bangladesh. This could help to improve policy interventions in both countries.

Apart from that, chain models were employed to investigate among others gene-gene interactions in different biological models (Foraita, Bammann and Pigeot 2008), to

forecast traffic flows dynamically (Whitlock and Queen 2000) and to provide a better understanding of complex genetic diseases like hypertension (Di Serio and Vicard 2005).

6.2 Graphical chain modelling

This section discusses the results of experiment two for the panel and the student sample. Graphical chain models are used here as they are especially appropriate for empirical research problems with a multitude of involved variables, regardless of their scale properties. Classic regression approaches for instance can explain the influence of some explanatories on a dependant. When the researcher is interested in the complete association structure among all variables, including indirect and direct relationships, chain modelling is the method of choice. The procedure here follows the programme structure of *GraphFitI* (Blauth and Pigeot 2000).

Firstly, the data collected via experiment two (see chapter 3.3) are examined. The Rasch models fitted (chapter 4.3) serve as measurement models of the constructs, while the chain model establishes the structural model. The Rasch person parameters express the attainment level of the person assessed and represent continuously scaled test scores of the subjects on the latent variables. A high person parameter of involvement, for instance, indicates that the specific person is highly involved in the product category wine and vice versa with a low parameter respectively. At the same time high scores on risk indicate that such a person estimates the purchase risks attached to the specific brand of wine as high. In the graphs (Figure 38 and Figure 39) these parameters are presented by circles.

Secondly, based on established theoretical, empirical and subject-matter knowledge (discussed in the theoretical sections above) the dependence chain is constructed. It is built by boxes that reflect the underlying association structure of the data. The boxes represent the chain elements (see Figure 38 and Figure 39).

Variables belonging to the lowest box are considered to be pure explanatories. These are the psychographic variables *trust* (=trustworthiness of TPPR endorser), *exper* (=expertise of TPPR endorser), *popul* (=brand popularity), *risk* (=purchase risk), *invol* (=product class involvement) and *knowl* (=product knowledge).

The upper box depicts the variable *inten* (purchase intention) that is an absolute dependent variable. The three boxes in between show the intermediaries. The second box from above represents perceived value *(value)*, the third perceived quality *(qual)*. The fourth shows the product attributes *brand*, *price* and *tppr*, which served as experimental conditions, too.

This formation presents the underlying association structure and determines in which ways associations between the variables are possible. An intermediary can be explanatory for all variables in the box(es) above and response to all variables in the box(es) below. Variables in the same boxes are symmetrically associated and on an equal footing with each other.

Thirdly, the graph is developed by fitting block-recursive regressions (Wermuth 1992). The multivariate regression problem is thus divided into a system of univariate regressions. Each variable is regressed on the other responses in the same box and on all explanatories from lower boxes.

Today the Cox-Wermuth (1994) selection strategy, that is implemented in *GraphFitI*, is the only procedure capable of handling large numbers of continuous and discrete variables at the same time. Forward selection starts with the independence model and adds non-linearities and interaction terms to the regressors as far as their p-values are below 0.01. In the case of the regressand *inten* (purchase intention), for instance, the interaction *value_involve* and the non-linear term *value^2* are added to the model (Table 32).

Backward selection strategy is applied to the initial set of variables. These are the interaction and the non-linear terms from the previous step plus all variables in the same box and those in the lower boxes. In every step the variable with the lowest $|t|$-value is removed. A new model is calculated with the variables remaining. This procedure continues until only coefficients with $|t| > 2$ are left. This value corresponds to a p-value of 0.05. In the case of the regressand *purchase intention* the regressors *value*, *quality*, *tppr*, *brand*, *trust*, *involve* and the interaction term *value_involve* as well as the non-linear term *value^2* endure the selection process and thus significantly explain purchase intention. After executing backward selection for all variables, a graph that reflects all structural relationships of the variables is plotted. These routines

do not adjust to multiplicity. Thus, strictly speaking, one should not think of statistical significance in its narrow sense, but rather in an exploring sense (Blauth 2000).

6.2.1 Student sample analysis

In the subsequent section the results of the chain modelling approach for the student sample are discussed. The analysis is based on the adjusted student data set that comprises 831 observations. In a first step the grouped means of the person parameters for the levels of the experimental condition TPPR are discussed. The results for the other two experimental conditions brand and price can be obtained from Appendix I. Then the regressions on the main constructs purchase intention, value and quality are interpreted. Finally, the graph allows an accurate identification of antecedents, intervening variables, interactions and non-linearities.

Table 29 depicts the means of the person parameters grouped according to the experimental factor TPPR. (A grouping according to the other experimental groups is depicted in appendix I.) This permits a first assessment of a potential TPPR influence on the customer.

	intent	value	quality	expert	trust	risk	invol	knowl	popular
pos.tppr	-1.147	1.096	0.518	2.016	1.163	-1.960	1.316	-0.175	1.256
ed.choice	-1.681	0.740	-0.147	1.850	0.945	-1.717	1.603	-0.182	1.014
neg.tppr	-2.334	-0.471	-0.973	1.870	1.104	-1.545	1.622	-0.025	0.856
no.tppr	-1.606	0.472	-0.248	2.031	1.266	-1.768	1.467	-0.275	1.100

Table 29: Means of grouped person parameters: students

An effect of TPPRs can be assumed as the positive TPPR group shows the highest scores of purchase intention, value and quality, while the negative TPPR group revealed the lowest scores in these continua. Logically, the individual's perceived expertise and trustworthiness of TPPR, the product involvement and the product knowledge remain untouched by the TPPR type as the interviewees were randomly assigned to the experimental conditions including TPPR. Positive TPPRs also seem to lower the perceived purchase risks, even though the difference is fairly small.

The following table gives the $\widehat{\beta}$ and the t-values of the regressions on intention, value and quality. Only |t|-values > 2.00 are depicted. They display the final results of the graphical chain model, significant at $p < 0.05$. Appendix H allows an inspection of the regressions on all other variables.

intention	$\hat{\beta}$	t-value	value	$\hat{\beta}$	t-value	quality	$\hat{\beta}$	t-value
Intercept	-1.3727		Intercept	-1.9881		Intercept	-0.9675	
value	0.3978	9.59	quality	0.2153	5.37	tppr_1	0.5453	2.13
quality	0.2094	4.00	tppr_1	0.3232	1.32	tppr_2	0.0724	0.28
price_ 1	-0.4548	2.23	tppr_2	0.3617	1.47	tppr_3	-0.6453	2.54
involve	0.0962	2.44	tppr_3	-0.4425	1.82	price_1	-0.5649	3.13
quality x price_ 0	0.2258	3.29	price_1	2.5223	14.58	risk	-0.5198	4.51
quality x involve	0.0378	2.78	risk	-0.3054	3.17	involve	-0.1305	3.68
involve^2	-0.0517	3.41	expertise	0.2354	2.78	trust	0.1631	3.06
			popularity	0.1940	3.20	popularity	0.4107	4.63
						risk x involve	-0.0857	2.07
						risk x popularity	-0.1506	2.74
						popu-larity^2	-0.1215	2.68

Table 30: Coefficients on intention, value and quality: students

Perceived value and quality are the most important positive influences on *intention*, while the higher price is inversely related to intention. This price (€ 10,-) weakens the purchase intention. A considerable positive interaction effect is activated by *quality x price_0*. Thus it can be concluded that the low price (€ 6,-) combined with a good quality perception of the wine raises purchase intentions. The influence of the *quality x involve* interaction and the non-linearity *involve^2* remains smaller.

Surprisingly, the largest influence on value emanates from the higher price (€ 10,-). Apparently a higher price signals customer value in the context of quality wines. *tppr* demonstrates to be value-relevant, too. *tppr_1* (good) and *tppr_2* (editor's choice) show a positive influence, while *tppr_3* (bad) lowers the perceived value. The same is true for perceived risk. Popular brands and TPPRs that promise high expertise significantly contribute to a rise in value.

TPPRs also contribute substantially to the explanation of customers' quality perceptions. *tppr_1* (good) has exerted a considerable positive impact while *tppr_3* (bad) influences quality in a negative way. *tppr_2* (editor's choice) has a weak positive impact. Furthermore, the trustworthiness of the endorser and the wine's popularity play a substantial role. Understandably, purchase risk is negatively linked to quality. It is quite surprising that the *price_1* (higher price) does not work as quality signal, even though this is often claimed in connection with premium products and especially with quality wines.

The following graph displays the chain model. All relationships that have |*t*|-values < 2.58 are left out in order to raise the clarity of the plot. This implies that the associations plotted are significant at $p = 0.01$. A comprehensive view of all coefficients and |t|-values can be gained from Appendix G).

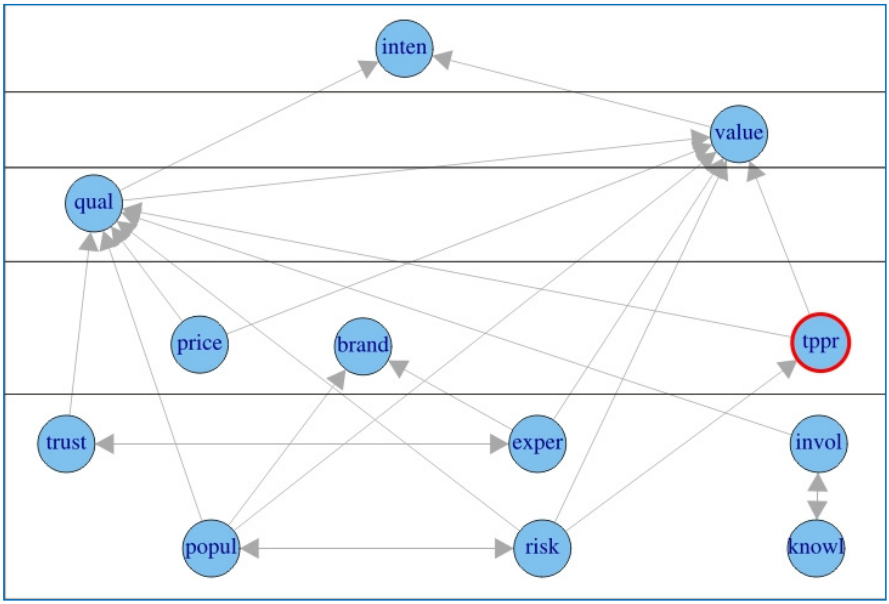

Figure 38: Chain graph: students

Only for reasons of clearness TPPR is marked by a red circle. Missing edges/arrows between two circles indicate that these two variables are conditionally independent given all other preceding variables. Consequently, it can be concluded that a TPPR has no direct influence on purchase intention, but an indirect one via quality and via value. The perception of TPPRs is indirectly influenced by brand popularity and directly linked to risk. The attributes positive TPPR and editor's choice are inversely linked to risk ($\hat{\beta}$ = -0.41 and -0.12) and bad TPPR ($\hat{\beta}$ = 0.12). Thus it can be concluded that a positive TPPR lowers the perceived risk. The perception of the brand's reputation is influenced by the brand's popularity (*popul*) as well as the perceived expertise (*exper*) of a TPPR's endorser. Apart from that, a non-linearity can be found for risk ($\hat{\beta}$ = -0.43), implying that the inverse relationship is exponential.

The relationship of the variables in the boxes is concurrent, i.e. there is no ordering and the arrows (in both directions) indicate symmetrical association structures. In this way involvement (*invol*) and knowledge (*knowl*) are strongly interconnected, implying that highly involved customers usually show more product knowledge and the other way around. The association between *popul* and *risk* points out that strong and popular brands lower purchase risks. Finally, the connection between *trust* and *exper* underlines the hypothesized demand for endorsers of TPPRs to convey experience in what they are doing and at the same time trustworthiness in how they are working.

6.2.2 Hypotheses testing

This chapter focuses on the examination of the hypotheses connected to experiment two, i.e. the graphical chain model for the students data set. All $\hat{\beta}$ comprehended in the model output (see Appendix G) and the chain graph (Figure 38) are significant at $p < 0.01$.

It was assumed that good TPPRs exerted a positive impact on purchase intention while negative ones lowered intentions to buy. In experiment two only indirect influences can be found, namely of TPPR via perceived quality and via perceived value on intention. Consequently, $H1_b$ is retained.

It was further supposed that TPPRs affected the value of wine as perceived by the customer. According to the chain model the good endorsement exerts a considerably positive influence ($\hat{\beta} = 0.32$). The same is true for editor's choice ($\hat{\beta} = 0.36$). The bad TPPR impairs the value to a $\hat{\beta}$ of -0.44). Therefore hypothesis $H2_b$ is corroborated.

TPPRs were also expected to shape the product quality as perceived by the customers. Again the positive and the editor's choice TPPR are beneficial for quality ($\hat{\beta} = 0.55$ and 0.07), while the bad TPPR diminishes quality ($\hat{\beta} = 0.65$). These results support $H3_b$.

It was hypothesized that perceived TPPR trustworthiness ($H5_b$) and perceived expertise of endorser ($H6_b$) affected consumer behaviour. The model reveals that trust increases perceived quality ($\hat{\beta} = 0.16$) and that expertise sways the perception of the wine's reputation ($\hat{\beta} = 0.26$) and value ($\hat{\beta} = 0.24$). As both source credibility constructs affect purchase intention, $H5_b$ and $H6_b$ are maintained.

Product class knowledge ($H7_b$) and involvement ($H8_b$) were predicted to influence the reliance on TPPRs and the attitude towards the product. The model evidences a strong relationship between the two constructs ($\hat{\beta}$ = 1.02 and 0.50). Involvement directly works on quality ($\hat{\beta}$ = -0.13), while knowledge has an indirect effect via involvement. This suggests that highly involved and knowledgeable customers are more cautious in the respect to wine quality. $H7_b$ and $H8_b$ are thus supported.

According to $H9_b$ the perception of TPPRs is influenced by perceived risk and then acts upon the attitude towards a product. Positive TPPRs are inversely connected to risk and thus act as risk relief (good TPPR: $\hat{\beta}$ = -0.41 and editor's choice $\hat{\beta}$ = -0.12). A bad TPPR amplifies the customer's uncertainties prior purchase ($\hat{\beta}$ = 0.13). Consequently, $H9_b$ must not be rejected.

$H12_b$ hypothesized that a better perception of brand reputation leads to higher quality assessments. As the model contains neither direct nor indirect associations between the constructs, $H12_b$ has to be rejected.

Moreover, price was expected to act upon quality, i.e. high prices provoke high values of perceived quality and vice versa. Due to an inverse relationship ($\hat{\beta}$ = -0.56) $H13_b$ has to be rejected. The higher price does not serve as an indicator of quality in the experiment but rather as a strong indicator of value ($\hat{\beta}$ = 2.52). This result supports $H14_b$ as price positively influences perceived value. $H15_b$ assumed that perceived quality was positively connected to perceived value. This hypothesis seems to be confirmed by a significant $\hat{\beta}$ of 0.22.

Finally, high values of perceived value were expected to accompany purchase intentions. It was assumed that low scores on value resulted in a low purchase intention. Here a $\hat{\beta}$ of 0.40 indicates that value can explain and drive purchase intentions. Thus $H16_b$ is confirmed although the price difference of + € 4,- weakens purchasing intentions ($\hat{\beta}$ = - 0.45).

6.2.3 Panel sample

This chapter focuses on the graphical chain modelling approach in the panel sample. The adjusted final data set comprises 454 observations. The proceeding is straightforward. A descriptive inspection of the grouped means will give a first insight into possible TPPR effects on the constructs. This is followed by an examination of the

regression results on the three main constructs. Finally, the chain model is plotted and discussed.

	intent	value	qual	expert	trust	risk	involve	knowl	popular
pos.tppr	-0.453	1.175	0.982	2.009	1.247	-2.892	0.252	-0.693	0.877
ed.choice	-1.212	0.852	0.837	1.986	1.572	-2.836	0.717	-0.513	0.410
neg.tppr	-1.948	-0.523	-0.402	1.941	1.048	-2.652	0.046	-0.877	0.295
no.tppr	-1.537	0.355	0.611	1.923	1.204	-2.872	0.356	-0.923	0.269

Table 31: Means of grouped person parameters: panel

The means of the person parameters dependent on the experimental condition TPPR are given in Table 31 (The means grouped according to price and reputation are given in Appendix 0). The highest person parameters on intention, quality and value were measured in the good TPPR group, followed by those in the editor's choice group. Additionally, the positive TPPR group also shows the highest brand popularity ratings. Again, this serves as an indicator for a TPPR effect.

intention	$\widehat{\beta}$	t-value	value	$\widehat{\beta}$	t-value	quality	$\widehat{\beta}$	t-value
intercept	-2.2344		intercept	-1.1574		Intercept	-0.9591	
value	0.4569	10.71	quality	0.0019	0.02	tppr_1	-0.1926	0.72
quality	0.2494	6.04	tppr_1	0.1822	0.49	tppr_2	0.0996	0.38
tppr_1	0.6245	2.18	tppr_2	0.1995	0.55	tppr_3	-0.8313	3.15
tppr_2	-0.2101	0.74	tppr_3	0.5243	0.86	price_1	-0.9101	3.43
tppr_3	0.2225	0.78	price_ 1	1.1489	5.48	brand_1	-0.5083	2.16
brand_1	-0.4807	2.35	brand_ 1	-0.5128	2.64	expertise	0.2004	2.93
trust	0.1058	2.17	expertise	0.3523	4.72	trust	0.2032	3.46
involve	0.3514	7.20	popularity	0.5295	4.63	popularity	0.5497	12.11
value x involve	0.0370	2.38	quality x tppr_0	0.4346	3.14	risk	-0.4315	6.07
value^2	0.0430	3.60	quality x tppr_1	0.3234	2.50	popular x risk	0.1153	4.85
			quality x tppr_2	0.2642	2.03	trust^2	0.0538	2.51
			tppr x price_0	-0.5432	2.46	risk^2	0.1085	4.62
			tppr x price_1	-0.5432	2.46			
			tppr x price_2	-0.5432	2.46			
			price x brand_0	1.7936	6.79			
			price_0 x popul.	-0.3079	2.41			
			quality^2	-0.0413	2.61			

Table 32: Coefficients on intention, value and quality: panel

The results of the regressions on the main variables are depicted in the table below. The results of the chain model significant at $p < 0.05$ are shown. The regressions on all the other variables are given in Appendix H.

Examining the regressions on the purchasing intention yields *tppr_1* (good product test) as the most important coefficient ($\hat{\beta}$ = 0.62), followed by perceived value, product class involvement and quality. Quite interestingly, the brand with the higher reputation (*brand_1*) exerts a negative influence. This could be due to the fact that the winemaker who was chosen for the highly reputable brand is currently omnipresent in society magazines on the Austrian television. This might negatively affected the trust in the products but regrettably, this cannot be answered by the data.

The same is true for the regression on perceived value. The higher reputable product (*brand_1*) exercises negative influence ($\hat{\beta}$ = 0.51) on value. The higher price *(price_1*) and the interaction effect of the brand with the lower reputation (*brand_0*) together with the price influence score positively. Again high values of endorser's expertise and popularity of the brand contribute positively to value. All TPPR alternatives have proved to be positively related to value, even though the impact is little. Even though they interact with perceived quality, they exert a much stronger positive influence on value ($\hat{\beta}$ ranging from 0.43 to 0.26).

When regressing on perceived quality, high values of perceived risk, bad TPPR and high prices have negative consequences. Interestingly, in this chain model the high price is not determining the quality although this is regularly assumed in marketing literature. Positive influences emanate from the perceived popularity of a brand and the source credibility of the endorser of the test publication. Some of the surprising results in these data might be traced back to minor data quality in online panels. As panel members are often invited to take part in several studies within a short period of time this could serve as an explanation for the inconsistencies.

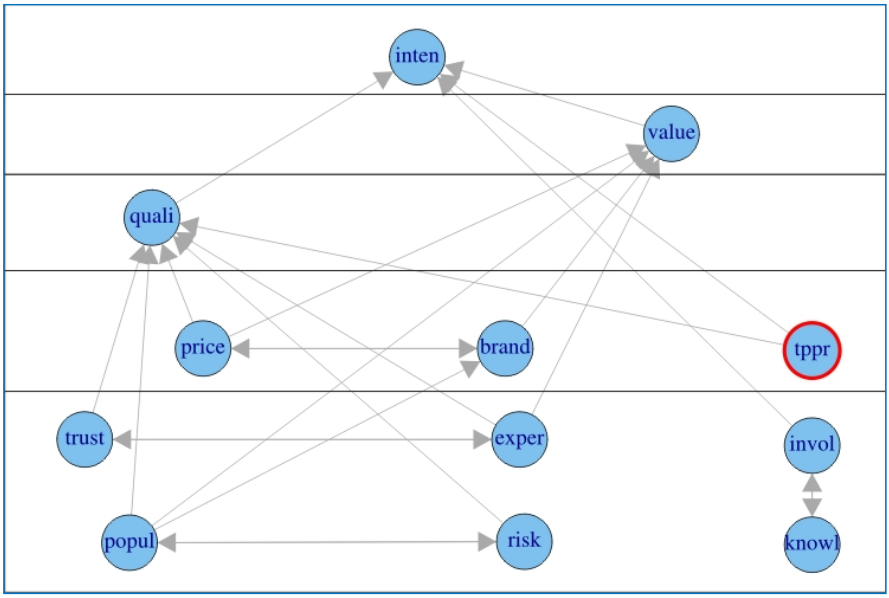

Figure 39: Chain graph: panel

The structural relationships between the constructs are exhibited in Figure 39. The regressions on the upper three boxes have already been discussed according to Table 32. The following part of part of the analysis focuses on the associations stemming from the variables within the lower two boxes.

Similarly to the student sample, brand popularity and risk are inversely connected. Customers showing high scores on brand popularity exhibit low scores on perceived risk and vice versa. Thus we can conclude that popular brands lighten purchase risks. The perceived trust in an endorser is strongly and directly connected to the perceived expertise. This is supported by source credibility literature which claims that these two dimensions are the most important ones of the construct. The next symmetrical association can be found between involvement and product knowledge as more knowledgeable customers are also more involved in specific product categories.

Finally, the perceived popularity of a wine brand significantly contributes to customer value. Consequently, it can be assumed that popular brands provide higher degrees of perceived value for the customers.

The in-depth hypotheses testing procedure concerning to experiment two is not carried out for the panel dataset. There are manifold reasons for that. Firstly, this data collection was of a slight pre-test character and thus led to minor changes in the course of experimentation. These changes encompass a raise of the randomly assigned paired comparisons from seven to ten in experiment one and further to minor changes in the phrasing of the items in experiment two. The data set was mainly used for a final evaluation of the statistical methodology employed. Furthermore data quality and sample size exposed rather small in the light of the complexity of the models fitted and the results are by far not as clear as those of the student data set. Consequently, as far as the hypotheses are concerned we have to rely on the clear results discussed in the preceding section and on potential replication studies respectively.

7 Discussion and conclusion

The final chapter provides a conclusive summary of this research. Important implications for both research and practice are deduced from the focal results. In addition, crucial limitations of the research on hand are outlined. Based on the discussion of possible shortcomings potential directions of future research efforts are proposed. Finally, a conclusion of the whole work is given.

7.1 Summary of the results

The profound and theory-based empirical analysis of the interrelationships between TPPRs and consumer behaviour is established by the experiments carried out. It is revealed that – besides price and brand reputation - TPPR can explain consumer behaviour.

Experiment one is centred on the influences on product preference in choice situations concerning fictitious products. When TPPRs are present we can assume that good and editor's choice TPPRs bear a significant value for the customer and thus act upon choice. This effect is strengthened by the buyer's product class involvement.

Bad test results in turn yield negative preference values. These negative signals are stronger for high-knowledge customers than for low-knowledge customers. High purchase risk shoppers are much more cautious with regard to their behavioural compliance. It can also be revealed that those coming with high degrees of subject-specific knowledge feel fewer risks prior to a potential acquisition. The same occurrence is observed with customers who attach high expertise to the TPPR's endorsers. Generally speaking, the source credibility constructs employed demonstrate validity in respect of moderating a positive TPPR's effect on preference. Moreover, trustworthiness interacts with a brand's reputation and leads to higher degrees of preference.

Apart from that, product-class involvement also contributes to explaining the influence of good TPPR. Thus highly involved customers are better supported by good TPPR than low-involvement customers.

The graph chain developed in experiment two aims at disentangling the complex association structures between TPPRs and consumer behaviour. To be more precise it

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focuses on the structural relationships between TPPRs, perceived quality, value, purchasing intention and psychographic constructs like involvement or product expertise among others. A sound measuring is assured by applying dichotomous Rasch models as measurement models for the constructs.

Once it is revealed that TPPRs play an important role during the formation of value and quality perceptions as well as when it comes to purchase intentions. These intentions are indirectly influenced via value and quality. The latter two are directly associated with TPPR, with good and editor's choice TPPRs raising value and quality. The opposite effect is true for negative reviews.

Highly involved and knowledgeable customers are more cautious with respect to the wine's quality, while the perceptions of better brand reputation raise quality assessments. The higher price does not signal quality in the experiment, but it reveals strong value relevance. Positive TPPRs can act as risk relief as well. They are accompanied by lower scores of perceived purchasing risk, while bad TPPRs provoke higher scores on the risk construct.

The source credibility dimensions trustworthiness and expertise of TPPR endorsements also affect consumer behaviour. While the perceived trust in a TPPR is positively related to perceived quality, perceived expertise sways the value and the perception of a product's reputation.

The influence of price on quality was hypothesized as high prices are believed to shape quality perceptions. This effect is rejected by the model. Instead, price serves as a strong sign of value. A further influence turns up from quality to value. This supports a widespread view of marketing research which claims that quality works as an antecedent of value. The ability of value to explain and positively influence purchasing intention is upheld by the model, too.

7.2 Scientific and managerial implications

This work approaches TPPRs from the perspective of the consumers' decision making processes. It provides a deeper understanding of the relevance of TPPRs for choice behaviour on an individual level. Thus it contributes to the body of knowledge in marketing research by explaining TPPRs in the context of the key marketing constructs preference, quality, value and purchase intention. It deepens the awareness

of the customers' needs and demands for the products they intend to purchase. The consideration of TPPR interactions with subject- and object specific covariates dissects the customers' cognitive processes when they are confronted with endorsements.

From a more methodological perspective the thesis points out thriving and auspicious ways of modelling complex and multi-attribute choice decisions on the basis of dichotomous choice sets. It reduces the cognitive effort of the interviewees and answering times and thus leads to higher data quality. The Bradley-Terry model with an orthogonal conjoint design being implemented reveals great applicability for modelling discrete choices that are characterized by close proximity to the customers' daily choice decisions.

Graphical chain modelling offers substantial advantages when working on the direct and indirect influences among a multitude of constructs. Moreover, graphical chain models are able to simultaneously handle metric, ordinal and dichotomous variables in a statistically proper manner.

Apart from that the appropriateness of Rasch models for marketing research could be illustrated. Besides offering other advantages these models make it possible to compare the items independent of the persons and the persons independent of the items. Rating scales and their questionable metric properties are avoided as Rasch models deliver metric person scores.

The findings of this thesis can also serve as practical recommendation: TPPRs provide a suitable tool to reduce feelings of risk and dissonance prior to purchase and can support the buyer's decision process. Consequently, TPPRs should be included in product placements at the point of sale and in other product offerings in order to provide additional information that is perceived as highly purchase-relevant for the customer.

As the negative effects of bad TPPRs turned out to be smaller than the positive effects of good and editor's choice results, manufacturers should regularly hand in their products to TPPR testing institutions. If the quality of their products is high they will benefit from being reviewed in most cases.

7.3 Limitations and future research

Certainly, the research on hand suffers from some limitations, too. A strict and efficient experimental design is applied in order to assure internal validity and a strong theory-guided statistical measurement. Therefore only a few cues (TPPR, price, and reputation) are studied. Other possible cues like country-of-origin, taste or packaging are skipped. Based on a proper and efficient estimation of the models only a small number of cue attributes serve as experimental conditions.

A further limitation can be found in the fact that the experiments were carried out in the context of quality wines only. Therefore any consideration or generalization of the significant causal relationships found has to be undertaken with caution.

Future research efforts should focus on a wider range of product groups in order to facilitate generalization matters. This research attaches special importance to internal validity. In order to raise external validity future experiments should be carried out in a real purchase context, i.e. directly at the point of sale. In doing so, both buyers and non-buyers should be studied with respect to their TPPR usage.

Additionally longitudinal approaches are needed in order to study the changes of TPPR effects in the course of time. Such approaches can facilitate inferences on the cognitive memory of the buyers and the purchase relevance of TPPRs.

What seems most fundamental for marketing research is the attempt to the different research streams which consider endorsements. Comparisons between the effects of personal recommendations, electric word-of-mouth, celebrity endorsements and TPPRs could then be drawn. They would open up opportunities to arrive at a deeper understanding and support of the customer.

7.4 Conclusion

Finally, it can be concluded that all the research questions posed in the introduction were sufficiently answered by the experiments. Thus further light was shed on the role of TPPRs in consumer behaviour and a multitude of crucial relationships could be disentangled by the methodology applied.

Appendix

A. Screenshots online experiments

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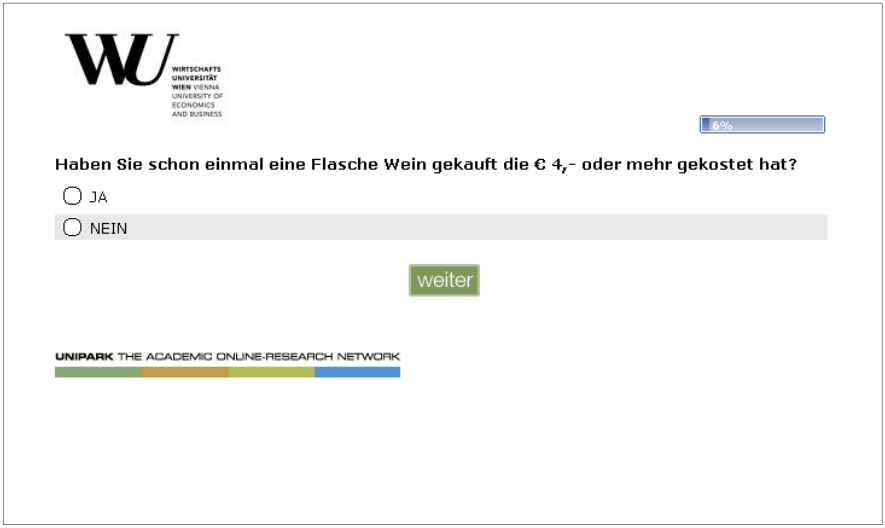
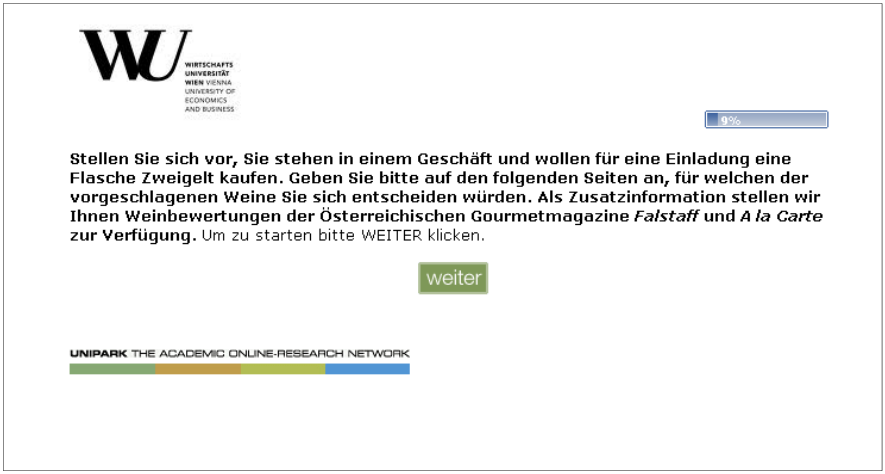

WU
WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
6%
Haben Sie schon einmal eine Flasche Wein gekauft die € 4,- oder mehr gekostet hat?
JA
NEIN
weiter
UNIPARK THE ACADEMIC ONLINE-RESEARCH NETWORK


WU
WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
9%
Stellen Sie sich vor, Sie stehen in einem Geschäft und wollen für eine Einladung eine Flasche Zweigelt kaufen. Geben Sie bitte auf den folgenden Seiten an, für welchen der vorgeschlagenen Weine Sie sich entscheiden würden. Als Zusatzinformation stellen wir Ihnen Weinbewertungen der Österreichischen Gourmetmagazine Falstaff und A la Carte zur Verfügung. Um zu starten bitte WEITER klicken.
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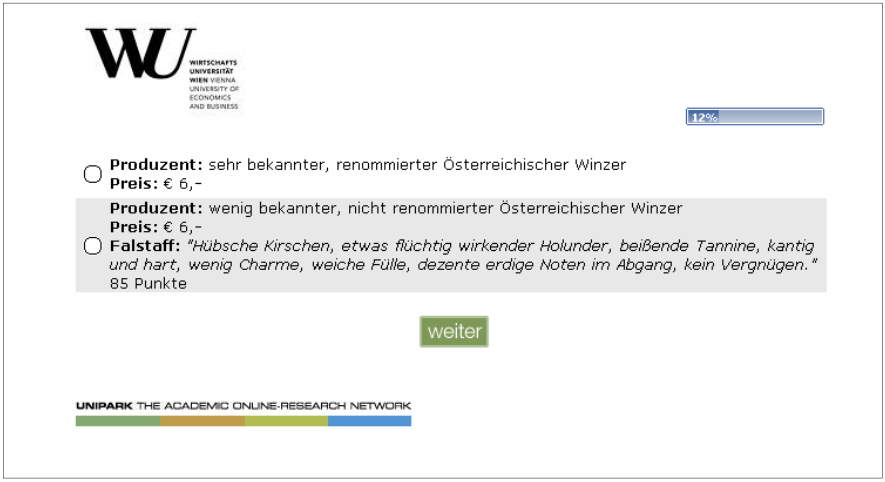
WU WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
12%
Produzent: sehr bekannter, renommierter Österreichischer Winzer
Preis: € 6,-
Produzent: wenig bekannter, nicht renommierter Österreichischer Winzer
Preis: € 6,-
Falstaff: "Hübsche Kirschen, etwas flüchtig wirkender Holunder, beißende Tannine, kantig und hart, wenig Charme, weiche Fülle, dezente erdige Noten im Abgang, kein Vergnügen."
85 Punkte
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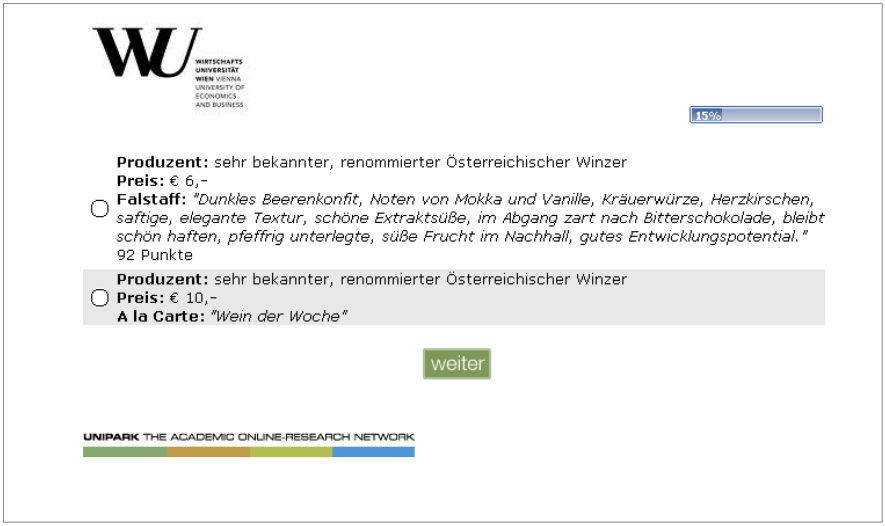
WU WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
15%
Produzent: sehr bekannter, renommierter Österreichischer Winzer
Preis: € 6,-
Falstaff: "Dunkles Beerenkonfit, Noten von Mokka und Vanille, Kräuerwürze, Herzkirschen, saftige, elegante Textur, schöne Extraktsüße, im Abgang zart nach Bitterschokolade, bleibt schön haften, pfeffrig unterlegte, süße Frucht im Nachhall, gutes Entwicklungspotential."
92 Punkte
Produzent: sehr bekannter, renommierter Österreichischer Winzer
Preis: € 10,-
A la Carte: "Wein der Woche"
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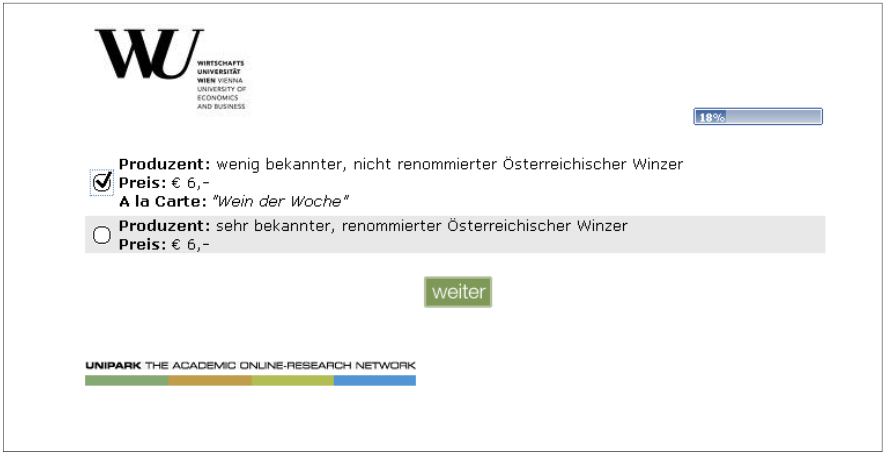
UNIPARK THE ACADEMIC ONLINE-RESEARCH NETWORK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WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
18%
Produzent: wenig bekannter, nicht renommierter Österreichischer Winzer
Preis: € 6,-
A la Carte: "Wein der Woche"
Produzent: sehr bekannter, renommierter Österreichischer Winzer
Preis: € 6,-
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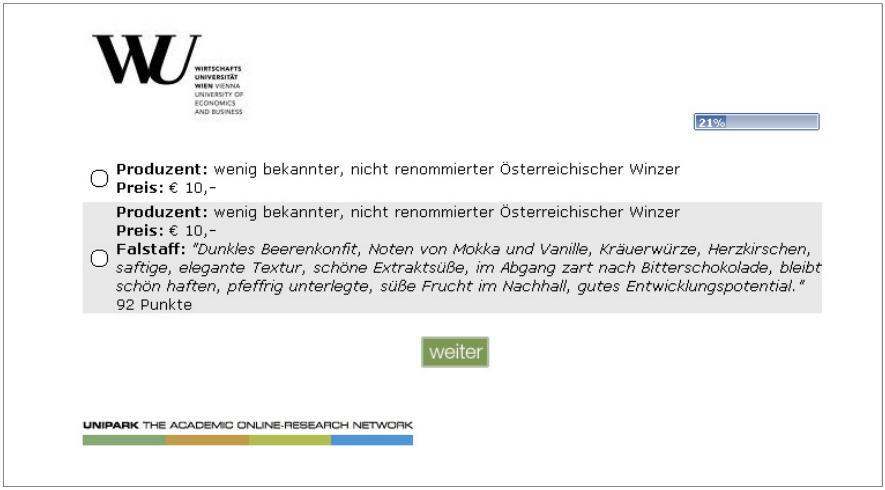
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WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
21%
Produzent: wenig bekannter, nicht renommierter Österreichischer Winzer
Preis: € 10,-
Produzent: wenig bekannter, nicht renommierter Österreichischer Winzer
Preis: € 10,-
Falstaff: "Dunkles Beerenkonfit, Noten von Mokka und Vanille, Kräuerwürze, Herzkirschen, saftige, elegante Textur, schöne Extraktsüße, im Abgang zart nach Bitterschokolade, bleibt schön haften, pfeffrig unterlegte, süße Frucht im Nachhall, gutes Entwicklungspotential."
92 Punkte
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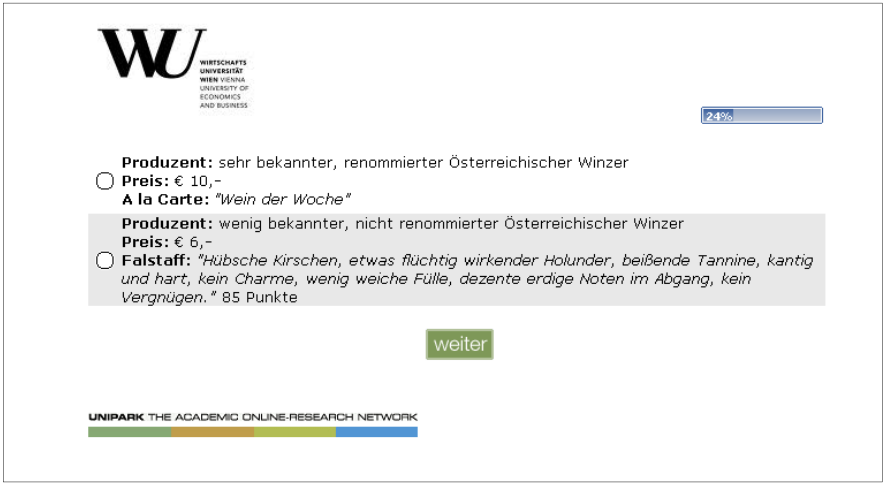
24%
Produzent: sehr bekannter, renommierter Österreichischer Winzer
Preis: € 10,-
A la Carte: "Wein der Woche"
Produzent: wenig bekannter, nicht renommierter Österreichischer Winzer
Preis: € 6,-
Falstaff: "Hübsche Kirschen, etwas flüchtig wirkender Holunder, beißende Tannine, kantig und hart, kein Charme, wenig weiche Fülle, dezente erdige Noten im Abgang, kein Vergnügen." 85 Punkte
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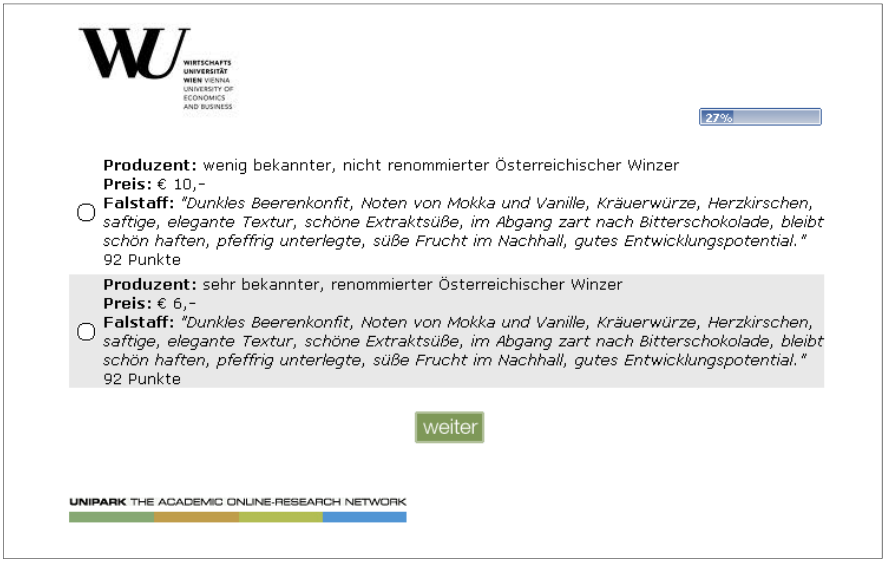
27%
Produzent: wenig bekannter, nicht renommierter Österreichischer Winzer
Preis: € 10,-
Falstaff: "Dunkles Beerenkonfit, Noten von Mokka und Vanille, Kräuerwürze, Herzkirschen, saftige, elegante Textur, schöne Extraktsüße, im Abgang zart nach Bitterschokolade, bleibt schön haften, pfeffrig unterlegte, süße Frucht im Nachhall, gutes Entwicklungspotential." 92 Punkte
Produzent: sehr bekannter, renommierter Österreichischer Winzer
Preis: € 6,-
Falstaff: "Dunkles Beerenkonfit, Noten von Mokka und Vanille, Kräuerwürze, Herzkirschen, saftige, elegante Textur, schöne Extraktsüße, im Abgang zart nach Bitterschokolade, bleibt schön haften, pfeffrig unterlegte, süße Frucht im Nachhall, gutes Entwicklungspotential." 92 Punkte
weiter
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30%
Produzent: sehr bekannter, renommierter Österreichischer Winzer
Preis: € 6,-
Falstaff: "Dunkles Beerenkonfit, Noten von Mokka und Vanille, Kräuerwürze, Herzkirschen, saftige, elegante Textur, schöne Extraktsüße, im Abgang zart nach Bitterschokolade, bleibt schön haften, pfeffrig unterlegte, süße Frucht im Nachhall, gutes Entwicklungspotential."
92 Punkte
Produzent: wenig bekannter, nicht renommierter Österreichischer Winzer
Preis: € 6,-
Falstaff: "Hübsche Kirschen, etwas flüchtig wirkender Holunder, beißende Tannine, kantig und hart, wenig Charme, weiche Fülle, dezente erdige Noten im Abgang, kein Vergnügen."
85 Punkte
weiter
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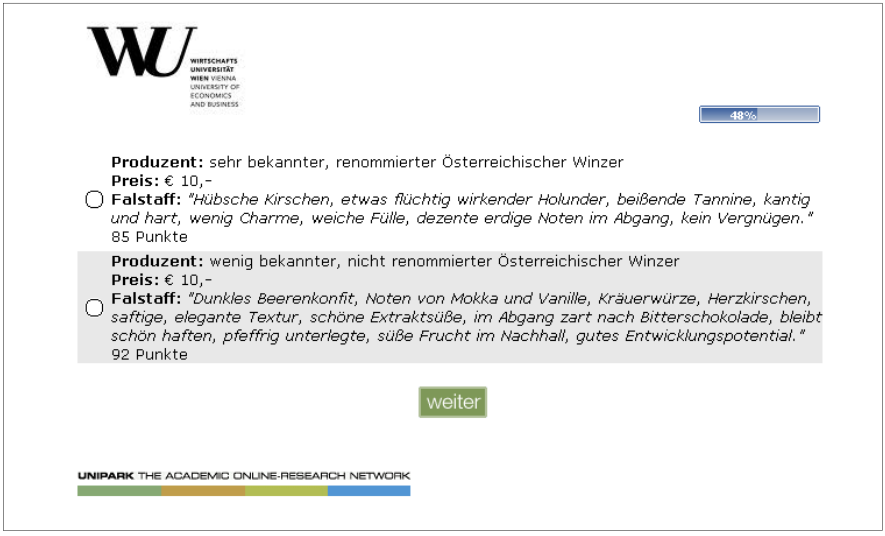
48%
Produzent: sehr bekannter, renommierter Österreichischer Winzer
Preis: € 10,-
Falstaff: "Hübsche Kirschen, etwas flüchtig wirkender Holunder, beißende Tannine, kantig und hart, wenig Charme, weiche Fülle, dezente erdige Noten im Abgang, kein Vergnügen."
85 Punkte
Produzent: wenig bekannter, nicht renommierter Österreichischer Winzer
Preis: € 10,-
Falstaff: "Dunkles Beerenkonfit, Noten von Mokka und Vanille, Kräuerwürze, Herzkirschen, saftige, elegante Textur, schöne Extraktsüße, im Abgang zart nach Bitterschokolade, bleibt schön haften, pfeffrig unterlegte, süße Frucht im Nachhall, gutes Entwicklungspotential."
92 Punkte
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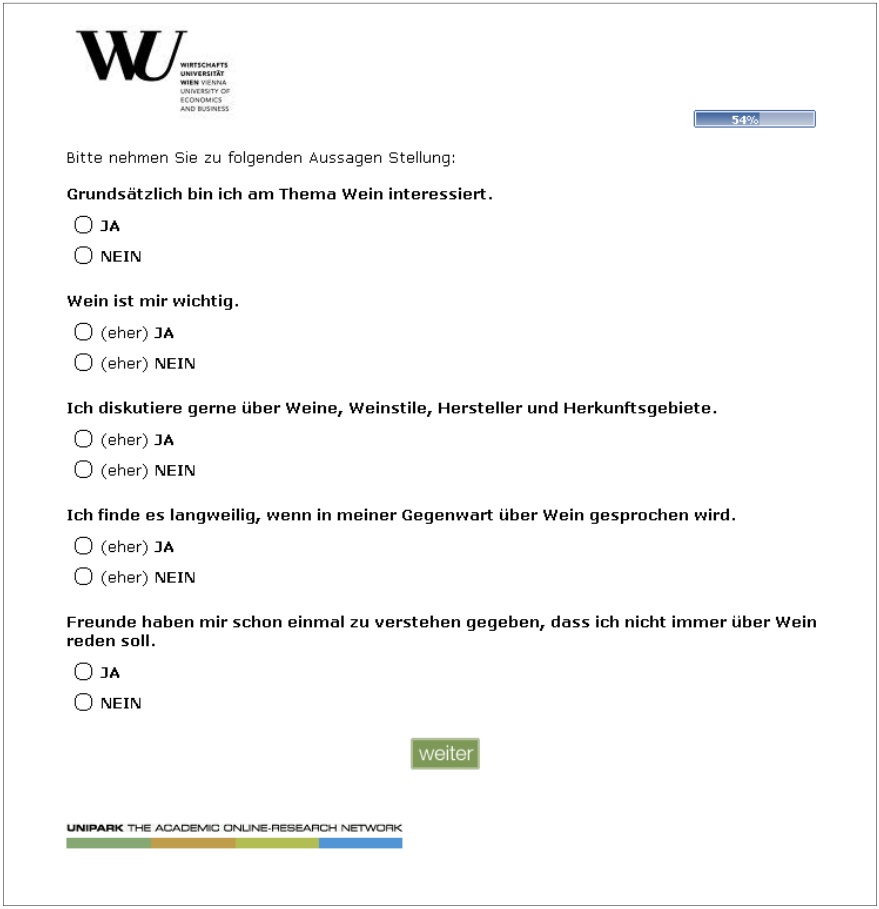
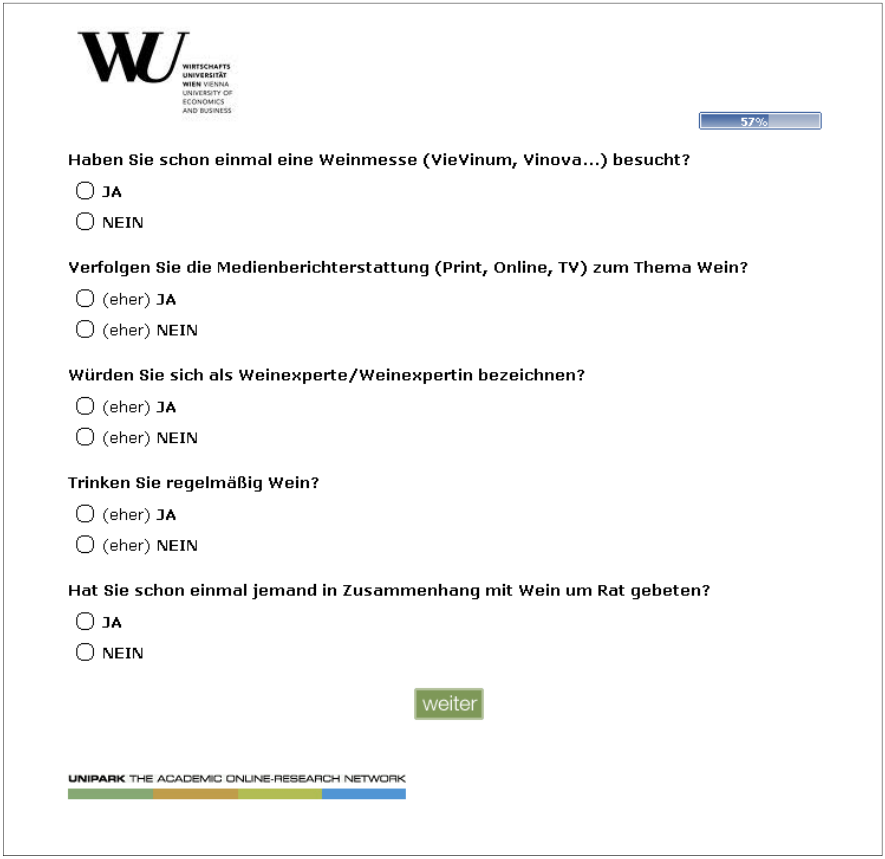
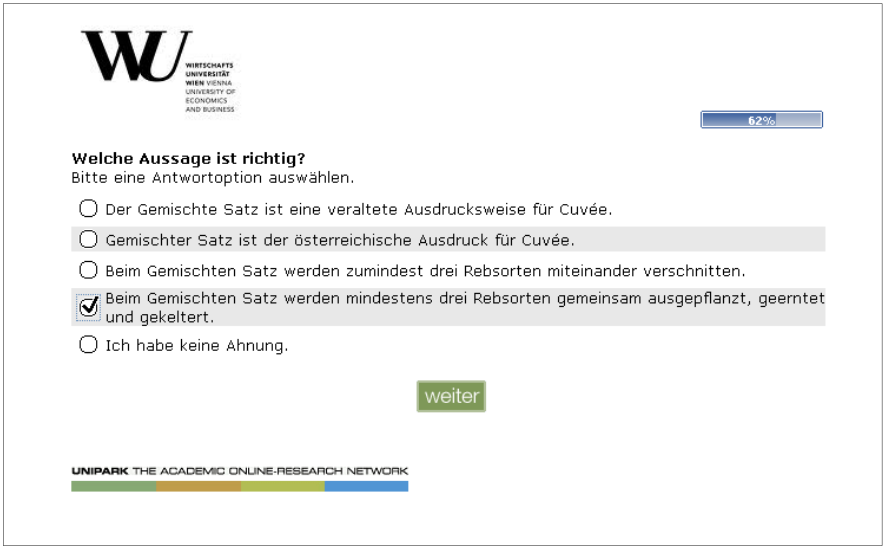

WU
WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
54%
Bitte nehmen Sie zu folgenden Aussagen Stellung:
Grundsätzlich bin ich am Thema Wein interessiert.
JA
NEIN
Wein ist mir wichtig.
(eher) JA
(eher) NEIN
Ich diskutiere gerne über Weine, Weinstile, Hersteller und Herkunftsgebiete.
(eher) JA
(eher) NEIN
Ich finde es langweilig, wenn in meiner Gegenwart über Wein gesprochen wird.
(eher) JA
(eher) NEIN
Freunde haben mir schon einmal zu verstehen gegeben, dass ich nicht immer über Wein reden soll.
JA
NEIN
weiter
UNIPARK THE ACADEMIC ONLINE-RESEARCH NETWORK


WU
WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
57%
Haben Sie schon einmal eine Weinmesse (VieVinum, Vinova...) besucht?
JA
NEIN
Verfolgen Sie die Medienberichterstattung (Print, Online, TV) zum Thema Wein?
(eher) JA
(eher) NEIN
Würden Sie sich als Weinexperte/Weinexpertin bezeichnen?
(eher) JA
(eher) NEIN
Trinken Sie regelmäßig Wein?
(eher) JA
(eher) NEIN
Hat Sie schon einmal jemand in Zusammenhang mit Wein um Rat gebeten?
JA
NEIN
weiter
UNIPARK THE ACADEMIC ONLINE-RESEARCH NETWORK


59%
Nun zwei Quizzfragen zum Thema Wein:
Was versteht man unter Rosé-Weinen?
Bitte eine Antwortoption auswählen.
Eine Mischung aus Rot- und Weisswein.
Roséweine stammen aus dem französischen Roségebiet.
Helllfarbige Weine aus roten Trauben, die wie Weißwein vinifiziert werden.
Roséweine heißen deshalb Roséweine weil sie stets aus der Rosétraube gekeltert werden.
Ich habe keine Ahnung.
weiter
UNIPARK THE ACADEMIC ONLINE-RESEARCH NETWORK


62%
Welche Aussage ist richtig?
Bitte eine Antwortoption auswählen.
Der Gemischte Satz ist eine veraltete Ausdrucksweise für Cuvée.
Gemischter Satz ist der österreichische Ausdruck für Cuvée.
Beim Gemischten Satz werden zumindest drei Rebsorten miteinander verschnitten.
Beim Gemischten Satz werden mindestens drei Rebsorten gemeinsam ausgepflanzt, geerntet und gekeltert.
Ich habe keine Ahnung.
weiter
UNIPARK THE ACADEMIC ONLINE-RESEARCH NETWORK

WU WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

64%

Bitte sehen Sie sich diese Seite in Ruhe an. Klicken Sie dann auf WEITER (erscheint in 5 Sekunden) um mit Fragen zum Produkt fortzusetzen.

Produkt: Zweigelt 2009
Hersteller: Weingut [redacted]
Herkunft: Burgenland
Preis: € 10,99
A la Carte: *Dicht verwoben, ein Hauch Kirschen, Apfelschalen, am Gaumen breit, insgesamt etwas diffus, wenig Harmonie, wenig Kontur, im Abgang leicht austrocknend, eigenwilliges Finish, wenig Charme.* 85 Punkte.

weiter

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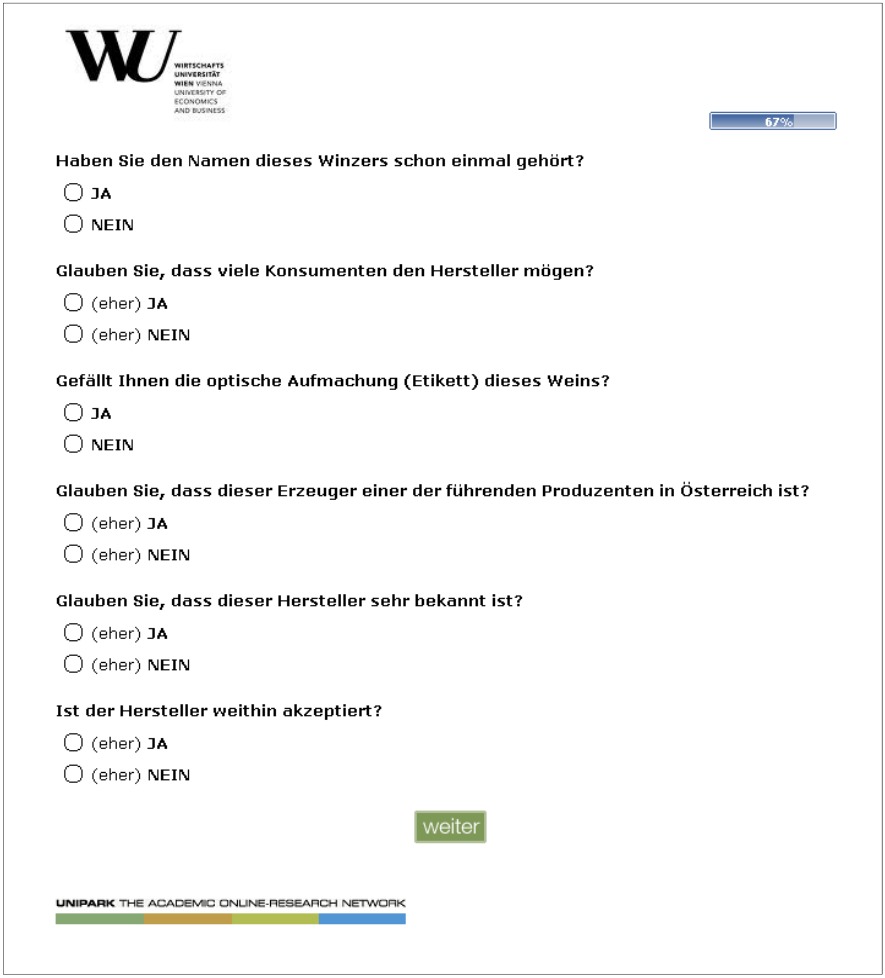
WU
WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
67%
Haben Sie den Namen dieses Winzers schon einmal gehört?
JA
NEIN
Glauben Sie, dass viele Konsumenten den Hersteller mögen?
(eher) JA
(eher) NEIN
Gefällt Ihnen die optische Aufmachung (Etikett) dieses Weins?
JA
NEIN
Glauben Sie, dass dieser Erzeuger einer der führenden Produzenten in Österreich ist?
(eher) JA
(eher) NEIN
Glauben Sie, dass dieser Hersteller sehr bekannt ist?
(eher) JA
(eher) NEIN
Ist der Hersteller weithin akzeptiert?
(eher) JA
(eher) NEIN
weiter
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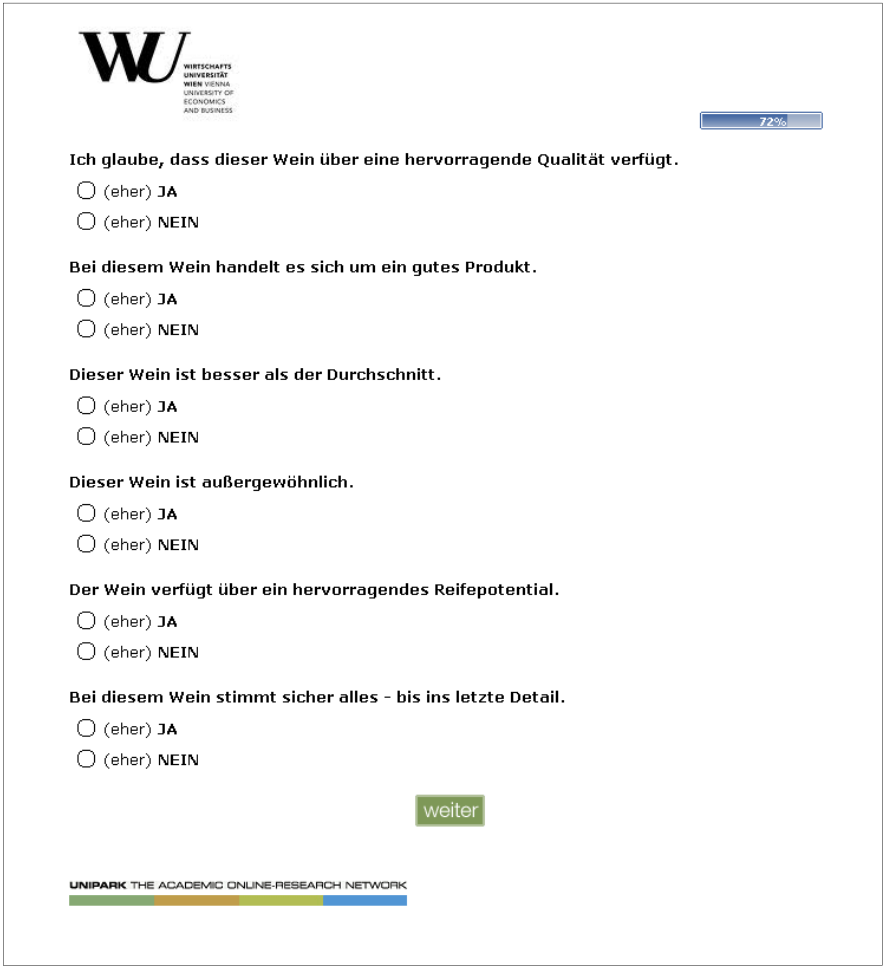
69%
Nehmen Sie bitte zu folgender Aussage Stellung!
Diesen Wein zu kaufen würde ich als _____ empfinden:
sehr riskant
(eher) JA
(eher) NEIN
beunruhigend
(eher) JA
(eher) NEIN
wichtig
(eher) JA
(eher) NEIN
Besorgnis erregend
(eher) JA
(eher) NEIN
weiter
UNIPARK THE ACADEMIC ONLINE-RESEARCH NETWORK


WU
WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
72%
Ich glaube, dass dieser Wein über eine hervorragende Qualität verfügt.
(eher) JA
(eher) NEIN
Bei diesem Wein handelt es sich um ein gutes Produkt.
(eher) JA
(eher) NEIN
Dieser Wein ist besser als der Durchschnitt.
(eher) JA
(eher) NEIN
Dieser Wein ist außergewöhnlich.
(eher) JA
(eher) NEIN
Der Wein verfügt über ein hervorragendes Reifepotential.
(eher) JA
(eher) NEIN
Bei diesem Wein stimmt sicher alles - bis ins letzte Detail.
(eher) JA
(eher) NEIN
weiter
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WU WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

74%

Hier noch einmal der Wein. Es fehlen nur noch ein paar Fragen bevor Sie Umfrage abgeschlossen haben. Bitte WEITER (erscheint in 5 Sekunden) klicken.

Produkt: Zweigelt 2009
Hersteller: Weingut[redacted]
Herkunft: Burgenland
Preis: € 10,99
A la Carte: *Dicht verwoben, ein Hauch Kirschen, Apfelschalen, am Gaumen breit, insgesamt etwas diffus, wenig Harmonie, wenig Kontur, im Abgang leicht austrocknend, eigenwilliges Finish, wenig Charme.* 85 Punkte.

weiter

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WU
WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
77%
Stimmen Sie den folgenden Aussagen zu?
Zu diesem Preis muss man den Wein eigentlich kaufen.
(eher) JA
(eher) NEIN
Der Wein ist etwas zu teuer.
(eher) JA
(eher) NEIN
Der Wein ist einfach nur überteuert.
(eher) JA
(eher) NEIN
Der Wein verfügt über ein hervorragendes Preis-Leistungsverhältnis.
(eher) JA
(eher) NEIN
Der Wein scheint ein guter Kauf zu sein.
(eher) JA
(eher) NEIN
weiter
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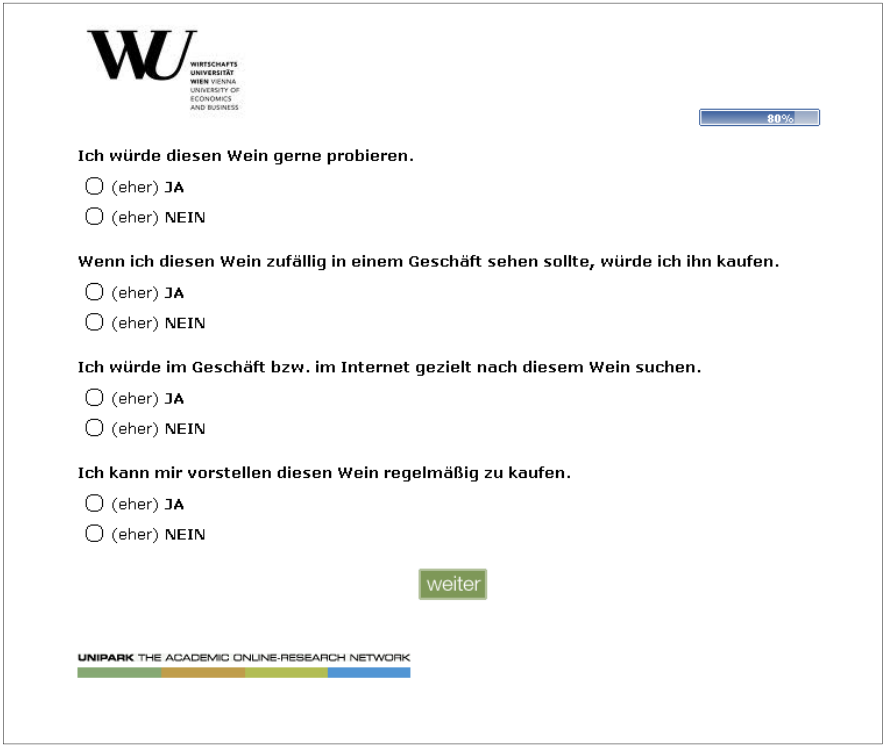
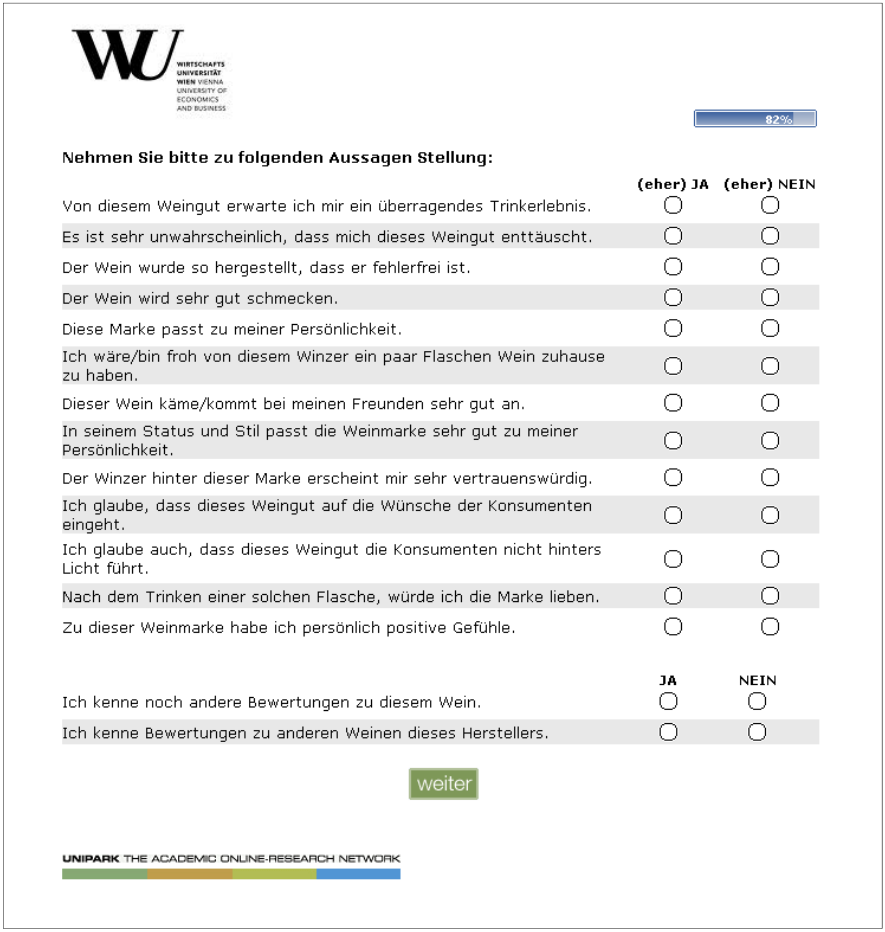

WU
WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
80%
Ich würde diesen Wein gerne probieren.
(eher) JA
(eher) NEIN
Wenn ich diesen Wein zufällig in einem Geschäft sehen sollte, würde ich ihn kaufen.
(eher) JA
(eher) NEIN
Ich würde im Geschäft bzw. im Internet gezielt nach diesem Wein suchen.
(eher) JA
(eher) NEIN
Ich kann mir vorstellen diesen Wein regelmäßig zu kaufen.
(eher) JA
(eher) NEIN
weiter
UNIPARK THE ACADEMIC ONLINE-RESEARCH NETWORK



WU WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

82%

Nehmen Sie bitte zu folgenden Aussagen Stellung:

	(eher) JA	(eher) NEIN
Von diesem Weingut erwarte ich mir ein überragendes Trinkerlebnis.	○	○
Es ist sehr unwahrscheinlich, dass mich dieses Weingut enttäuscht.	○	○
Der Wein wurde so hergestellt, dass er fehlerfrei ist.	○	○
Der Wein wird sehr gut schmecken.	○	○
Diese Marke passt zu meiner Persönlichkeit.	○	○
Ich wäre/bin froh von diesem Winzer ein paar Flaschen Wein zuhause zu haben.	○	○
Dieser Wein käme/kommt bei meinen Freunden sehr gut an.	○	○
In seinem Status und Stil passt die Weinmarke sehr gut zu meiner Persönlichkeit.	○	○
Der Winzer hinter dieser Marke erscheint mir sehr vertrauenswürdig.	○	○
Ich glaube, dass dieses Weingut auf die Wünsche der Konsumenten eingeht.	○	○
Ich glaube auch, dass dieses Weingut die Konsumenten nicht hinters Licht führt.	○	○
Nach dem Trinken einer solchen Flasche, würde ich die Marke lieben.	○	○
Zu dieser Weinmarke habe ich persönlich positive Gefühle.	○	○

	JA	NEIN
Ich kenne noch andere Bewertungen zu diesem Wein.	○	○
Ich kenne Bewertungen zu anderen Weinen dieses Herstellers.	○	○

weiter

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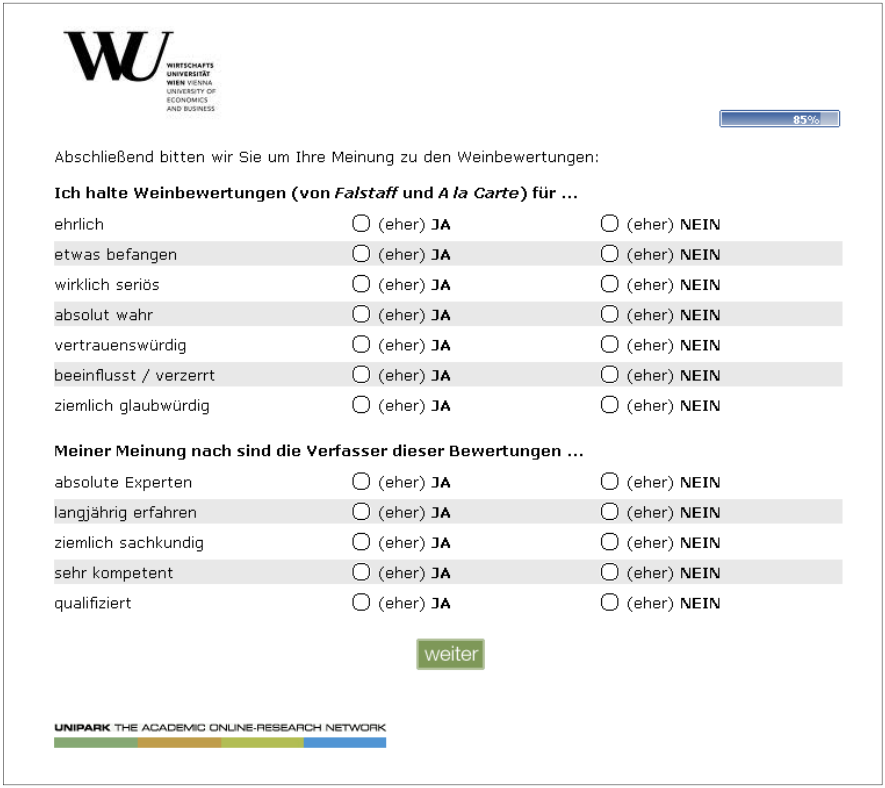

WU Wirtschaftsuniversität Wien Vienna University of Economics and Business

85%

Abschließend bitten wir Sie um Ihre Meinung zu den Weinbewertungen:

Ich halte Weinbewertungen (von *Falstaff* und *A la Carte*) für ...

ehrlich	◯ (eher) **JA**	◯ (eher) **NEIN**
etwas befangen	◯ (eher) **JA**	◯ (eher) **NEIN**
wirklich seriös	◯ (eher) **JA**	◯ (eher) **NEIN**
absolut wahr	◯ (eher) **JA**	◯ (eher) **NEIN**
vertrauenswürdig	◯ (eher) **JA**	◯ (eher) **NEIN**
beeinflusst / verzerrt	◯ (eher) **JA**	◯ (eher) **NEIN**
ziemlich glaubwürdig	◯ (eher) **JA**	◯ (eher) **NEIN**

Meiner Meinung nach sind die Verfasser dieser Bewertungen ...

absolute Experten	◯ (eher) **JA**	◯ (eher) **NEIN**
langjährig erfahren	◯ (eher) **JA**	◯ (eher) **NEIN**
ziemlich sachkundig	◯ (eher) **JA**	◯ (eher) **NEIN**
sehr kompetent	◯ (eher) **JA**	◯ (eher) **NEIN**
qualifiziert	◯ (eher) **JA**	◯ (eher) **NEIN**

weiter

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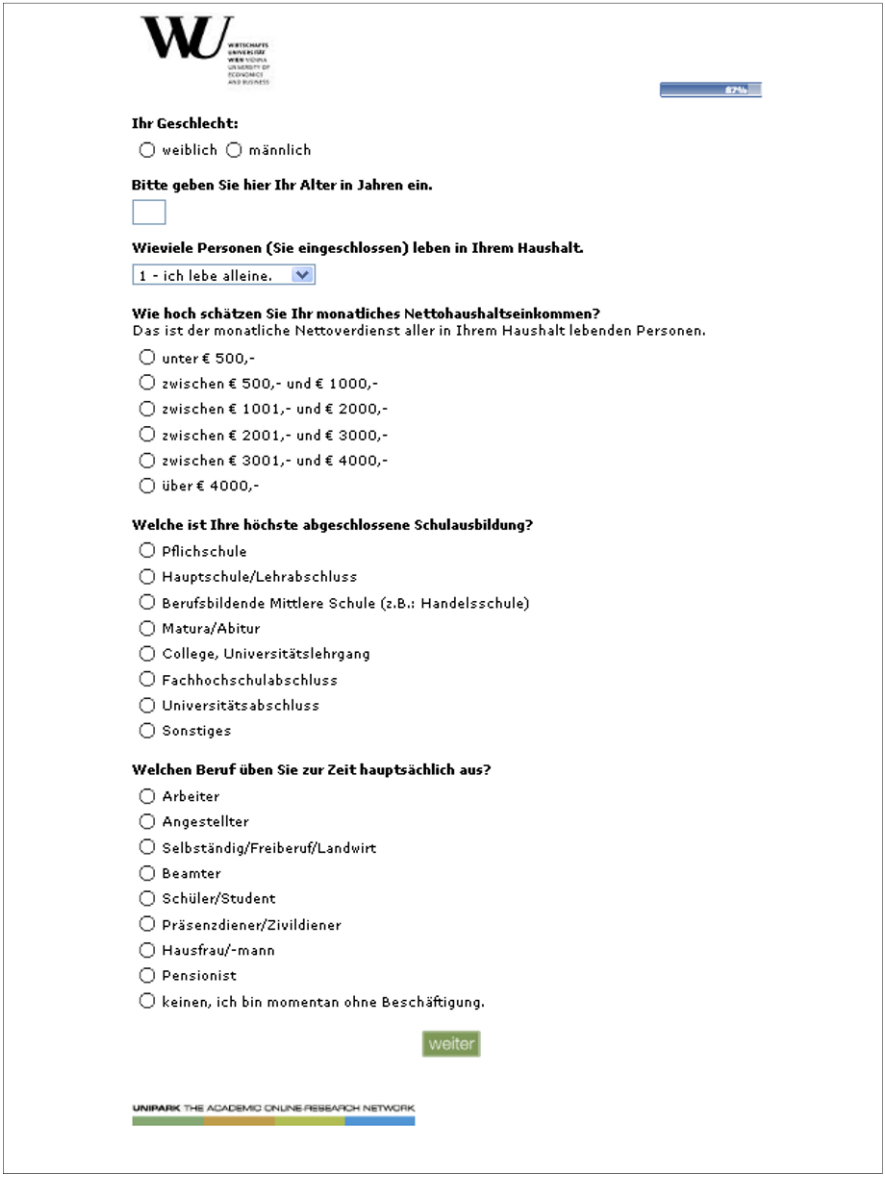

Ihr Geschlecht:

○ weiblich ○ männlich

Bitte geben Sie hier Ihr Alter in Jahren ein.

Wieviele Personen (Sie eingeschlossen) leben in Ihrem Haushalt.

1 - ich lebe alleine.

Wie hoch schätzen Sie Ihr monatliches Nettohaushaltseinkommen?
Das ist der monatliche Nettoverdienst aller in Ihrem Haushalt lebenden Personen.

○ unter € 500,-
○ zwischen € 500,- und € 1000,-
○ zwischen € 1001,- und € 2000,-
○ zwischen € 2001,- und € 3000,-
○ zwischen € 3001,- und € 4000,-
○ über € 4000,-

Welche ist Ihre höchste abgeschlossene Schulausbildung?

○ Pflichschule
○ Hauptschule/Lehrabschluss
○ Berufsbildende Mittlere Schule (z.B.: Handelsschule)
○ Matura/Abitur
○ College, Universitätslehrgang
○ Fachhochschulabschluss
○ Universitätsabschluss
○ Sonstiges

Welchen Beruf üben Sie zur Zeit hauptsächlich aus?

○ Arbeiter
○ Angestellter
○ Selbständig/Freiberuf/Landwirt
○ Beamter
○ Schüler/Student
○ Präsenzdiener/Zivildiener
○ Hausfrau/-mann
○ Pensionist
○ keinen, ich bin momentan ohne Beschäftigung.

weiter

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Nun zu Ihrer Gewinnchance: Wollen Sie an der Verlosung teilnehmen?

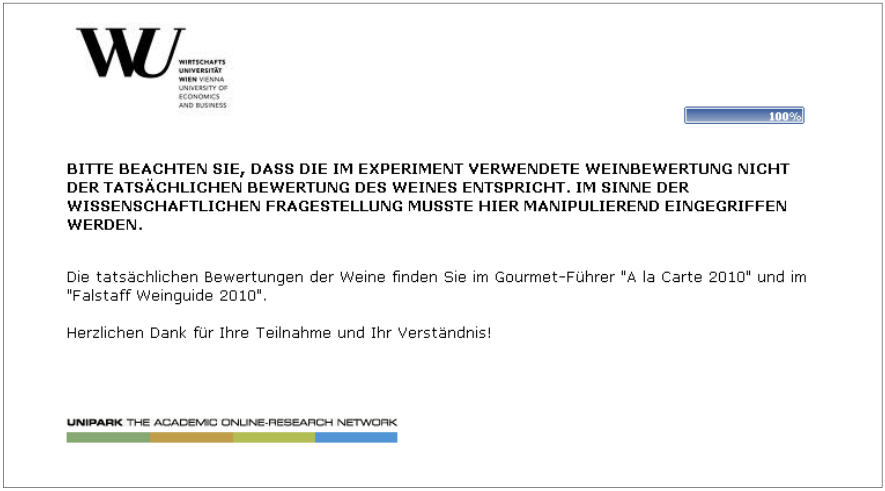
- ◯ Ja, ich will eine Flasche **Dom Pérignon Vintage 2000** gewinnen.
- ◯ Nein danke, ich will an dieser Verlosung nicht teilnehmen.

Sie haben nun auch noch die Möglichkeit Zweigelt 2009 zu gewinnen. Wählen Sie bitte EINE Gewinnchance:

- ◯ Ich will **2** Flaschen **Zweigelt 2009 à € 10,99 vom Weingut** [redacted] gewinnen.
- ◯ Ich will **4** Flaschen **Zweigelt 2009 à € 5,49 vom Weingut** [redacted] gewinnen.
- ◯ Nein danke, ich will bei der Zweigelt Verlosung nicht teilnehmen.

Falls Sie an zumindest einer der beiden Verlosungen teilnehmen hier E-Mail Adresse eintragen. Ihre Mail Adresse dient lediglich der Verständigung im Falle Ihres Gewinnes. Nach der Verlosung werden alle Adressen gelöscht.

weiter


WU
WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS
100%
BITTE BEACHTEN SIE, DASS DIE IM EXPERIMENT VERWENDETE WEINBEWERTUNG NICHT DER TATSÄCHLICHEN BEWERTUNG DES WEINES ENTSPRICHT. IM SINNE DER WISSENSCHAFTLICHEN FRAGESTELLUNG MUSSTE HIER MANIPULIEREND EINGEGRIFFEN WERDEN.
Die tatsächlichen Bewertungen der Weine finden Sie im Gourmet-Führer "A la Carte 2010" und im "Falstaff Weinguide 2010".
Herzlichen Dank für Ihre Teilnahme und Ihr Verständnis!
UNIPARK THE ACADEMIC ONLINE-RESEARCH NETWORK

B. Main effects model - students

```
Call:
gnm(formula = y ~ (high_rep + high_price + good + bad + ed_choice) + (high_rep +
high_price + good + bad + ed_choice):(involve + isk + cred_expert + cred_trustw +
prodknowl + age) - high_rep:involve - high_rep:cred_expert - high_rep:cred_trustw -
 high_rep:age - high_price:involve - high_price:cred_trustw - good:risk -
ed_choice:cred_expert - ed_choice:risk - bad:involve - bad:cred_expert -
bad:cred_trustw - ed_choice:involve - ed_choice:prodknowl - high_price:cred_expert
- high_price:risk - good:cred_expert - high_price:prodknowl - bad:risk -
high_price:age, eliminate = mu:CASE, family = poisson, data = des1)

Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.4084685  -0.0271489  -0.0004097   0.0013476   2.7651356

Coefficients of interest:
                     Estimate Std. Error z value Pr(>|z|)
high_rep             0.457298   0.033336  13.718  < 2e-16 ***
high_price          -0.513887   0.016096 -31.927  < 2e-16 ***
good                 0.557228   0.101184   5.507 3.65e-08 ***
bad                 -0.100107   0.091716  -1.091  0.27506
ed_choice            0.541231   0.088882   6.089 1.13e-09 ***
high_rep:risk        0.039959   0.016695   2.393  0.01669 *
high_rep:prodknowl  -0.028140   0.009075  -3.101  0.00193 **
good:involve         0.028292   0.009722   2.910  0.00361 **
good:cred_trustw     0.079595   0.012011   6.627 3.43e-11 ***
good:prodknowl       0.037034   0.015685   2.361  0.01822 *
good:age             0.006576   0.003780   1.740  0.08193 .
bad:prodknowl       -0.034990   0.011470  -3.051  0.00228 **
bad:age             -0.010393   0.003431  -3.029  0.00245 **
ed_choice:cred_trustw  0.028332   0.010790   2.626  0.00864 **
ed_choice:age       -0.006494   0.003296  -1.970  0.04880 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 11248 on 23225 degrees of freedom
AIC: 80998

Number of iterations: 8
```

C. Two-way interaction model - students

```
Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.4087559  -0.0214065  -0.0004096   0.0008110   2.7834471

Coefficients of interest:
                                    Estimate Std. Error z value Pr(>|z|)
high_rep                           0.2898011  0.0797638   3.633 0.000280 ***
high_price                        -0.5172286  0.0162528 -31.824  < 2e-16 ***
good                               0.4707012  0.1007636   4.671 2.99e-06 ***
bad                               -0.3862600  0.0435179  -8.876  < 2e-16 ***
ed_choice                          0.3337380  0.0416331   8.016  < 2e-16 ***
high_rep:cred_trustw               0.1110221  0.0378143   2.936 0.003325 **
high_rep:prodknowl                -0.0903538  0.0405087  -2.230 0.025716 *
high_rep:age                       0.0053281  0.0031245   1.705 0.088147 .
good:involve                       0.0289221  0.0096407   3.000 0.002700 **
good:age                           0.0060424  0.0036498   1.656 0.097816 .
bad:cred_expert                    0.1825224  0.0477457   3.823 0.000132 ***
bad:prodknowl                     -0.2052867  0.0534971  -3.837 0.000124 ***
ed_choice:cred_expert              0.1102616  0.0440730   2.502 0.012357 *
high_rep:involve:cred_expert       0.0103179  0.0051045   2.021 0.043245 *
high_rep:prodknowl:involve        -0.0097532  0.0039357  -2.478 0.013208 *
high_rep:age:involve              -0.0012165  0.0005042  -2.413 0.015835 *
high_rep:cred_trustw:age          -0.0040657  0.0014229  -2.857 0.004274 **
high_rep:prodknowl:age             0.0032926  0.0015432   2.134 0.032877 *
high_price:prodknowl:cred_expert  -0.0319310  0.0080599  -3.962 7.44e-05 ***
high_price:prodknowl:age           0.0026700  0.0006651   4.015 5.95e-05 ***
good:cred_expert:risk             -0.0153038  0.0078585  -1.947 0.051485 .
good:cred_trustw:cred_expert       0.0457616  0.0061889   7.394 1.42e-13 ***
good:prodknowl:age                 0.0013353  0.0005882   2.270 0.023208 *
bad:prodknowl:risk                -0.0462252  0.0124189  -3.722 0.000198 ***
bad:age:cred_expert               -0.0068926  0.0016338  -4.219 2.46e-05 ***
bad:prodknowl:age                  0.0034178  0.0018251   1.873 0.061111 .
ed_choice:cred_trustw:cred_expert  0.0178171  0.0056156   3.173 0.001510 **
ed_choice:age:cred_expert         -0.0038716  0.0014665  -2.640 0.008288 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 11170 on 23212 degrees of freedom
AIC: 80946

Number of iterations: 8
```

D. Influence of single subject covariates: panel

```
Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.2940410  -0.0003450  -0.0002896  -0.0002397   1.3988555

Coefficients of interest:
                    Estimate Std. Error z value Pr(>|z|)
high_rep             0.07856    0.02510   3.129  0.00175 **
high_price          -0.13475    0.02508  -5.372 7.78e-08 ***
good                 0.48187    0.03651  13.199  < 2e-16 ***
bad                  0.01847    0.03522   0.524  0.59997
ed_choice            0.34385    0.03545   9.699  < 2e-16 ***
high_rep:involve    -0.01029    0.01182  -0.870  0.38407
high_price:involve -0.00828    0.01173  -0.706  0.48013
good:involve         0.04755    0.01687   2.818  0.00483 **
bad:involve         -0.01278    0.01631  -0.784  0.43324
ed_choice:involve    0.02255    0.01656   1.362  0.17327
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 4048.7 on 12702 degrees of freedom
AIC: 35849

Number of iterations: 8

Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.2945002  -0.0003453  -0.0002896  -0.0002409   1.4010448

Coefficients of interest:
                  Estimate Std. Error z value Pr(>|z|)
high_rep          0.001847   0.045177   0.041 0.967392
high_price       -0.171634   0.046336  -3.704 0.000212 ***
good              0.383398   0.066779   5.741 9.39e-09 ***
bad               0.007677   0.062735   0.122 0.902609
ed_choice         0.272272   0.065621   4.149 3.34e-05 ***
high_rep:risk    -0.026396   0.013655  -1.933 0.053236 .
high_price:risk -0.013356   0.013932  -0.959 0.337742
good:risk        -0.039544   0.020503  -1.929 0.053760 .
bad:risk         -0.002621   0.019168  -0.137 0.891220
ed_choice:risk   -0.027632   0.019849  -1.392 0.163881
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 4055 on 12702 degrees of freedom
AIC: 35855

Number of iterations: 8
```

```
Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.2852312  -0.0003425  -0.0002896  -0.0002433   1.3581393

Coefficients of interest:
                        Estimate Std. Error z value Pr(>|z|)
high_rep                0.024932   0.036591   0.681   0.4956
high_price             -0.154159   0.037204  -4.144 3.42e-05 ***
good                    0.424957   0.051447   8.260  < 2e-16 ***
bad                    -0.010531   0.051155  -0.206   0.8369
ed_choice               0.353380   0.053206   6.642 3.10e-11 ***
high_rep:cred_expert    0.026701   0.014028   1.903   0.0570 .
high_price:cred_expert  0.009912   0.014226   0.697   0.4860
good:cred_expert        0.037399   0.019816   1.887   0.0591 .
bad:cred_expert         0.014795   0.019631   0.754   0.4511
ed_choice:cred_expert   0.000129   0.020336   0.006   0.9949
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 4056 on 12702 degrees of freedom
AIC: 35856

Number of iterations: 8

Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.2917134  -0.0003437  -0.0002896  -0.0002423   1.3878645

Coefficients of interest:
                        Estimate Std. Error z value Pr(>|z|)
high_rep                0.036215   0.028462   1.272  0.20323
high_price             -0.144205   0.028668  -5.030  4.9e-07 ***
good                    0.481654   0.040620  11.858  < 2e-16 ***
bad                    -0.013006   0.039146  -0.332  0.73970
ed_choice               0.346826   0.040543   8.554  < 2e-16 ***
high_rep:cred_trustw    0.031720   0.011215   2.828  0.00468 **
high_price:cred_trustw  0.006232   0.011203   0.556  0.57801
good:cred_trustw        0.015529   0.015995   0.971  0.33162
bad:cred_trustw         0.024411   0.015461   1.579  0.11436
ed_choice:cred_trustw   0.005880   0.015819   0.372  0.71013
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 4053.6 on 12702 degrees of freedom
AIC: 35854

Number of iterations: 8
```

```
Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.2835685  -0.0003471  -0.0002896  -0.0002397   1.3507141

Coefficients of interest:
                     Estimate Std. Error z value Pr(>|z|)
high_rep              0.071892   0.028748   2.501   0.0124 *
high_price           -0.131204   0.028789  -4.557 5.18e-06 ***
good                  0.530231   0.042055  12.608  < 2e-16 ***
bad                  -0.009022   0.039685  -0.227   0.8202
ed_choice             0.380281   0.040892   9.300  < 2e-16 ***
high_rep:prodknowl   -0.005780   0.018568  -0.311   0.7556
high_price:prodknowl  0.004881   0.018091   0.270   0.7873
good:prodknowl        0.046464   0.026933   1.725   0.0845 .
bad:prodknowl        -0.032140   0.025602  -1.255   0.2093
ed_choice:prodknowl   0.036226   0.026257   1.380   0.1677
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 4053.9 on 12702 degrees of freedom
AIC: 35854

Number of iterations: 8

panel subjcovs - metrical

Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.3185285  -0.0003483  -0.0002896  -0.0002384   1.5266146

Coefficients of interest:
                Estimate Std. Error z value Pr(>|z|)
high_rep       -0.0245335  0.0828688  -0.296  0.76719
high_price     -0.1006803  0.0828707  -1.215  0.22440
good            1.0561964  0.1246015   8.477  < 2e-16 ***
bad             0.3143198  0.1161048   2.707  0.00679 **
ed_choice       0.5395486  0.1197347   4.506 6.60e-06 ***
high_rep:age    0.0024350  0.0019100   1.275  0.20235
high_price:age -0.0007295  0.0018905  -0.386  0.69960
good:age       -0.0134497  0.0028112  -4.784 1.72e-06 ***
bad:age        -0.0071602  0.0026539  -2.698  0.00698 **
ed_choice:age  -0.0044216  0.0027330  -1.618  0.10570
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 4037.3 on 12702 degrees of freedom
AIC: 35837

Number of iterations: 8
```

```
Deviance Residuals:
      Min         1Q     Median         3Q        Max
-2.702308  -0.614562   0.002911   0.512756   3.122131

Coefficients of interest:
                Estimate Std. Error z value Pr(>|z|)
high_rep         0.080210   0.035032   2.290   0.0220 *
high_price      -0.143692   0.034761  -4.134 3.57e-05 ***
good             0.543455   0.050956  10.665  < 2e-16 ***
bad              0.019487   0.049024   0.397   0.6910
ed_choice        0.393537   0.049052   8.023  < 2e-16 ***
high_rep:sex2   -0.009861   0.049728  -0.198   0.8428
high_price:sex2  0.020777   0.049526   0.420   0.6748
good:sex2       -0.099846   0.072140  -1.384   0.1663
bad:sex2        -0.008758   0.069317  -0.126   0.8995
ed_choice:sex2  -0.087968   0.070057  -1.256   0.2092
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 128.74 on 46 degrees of freedom
AIC: 832.18

Number of iterations: 3

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-4.0599  -1.1024  -0.3581   0.7746   4.4750

Coefficients of interest:
                     Estimate Std. Error z value Pr(>|z|)
high_rep              0.33972    0.14270   2.381  0.01728 *
high_price           -0.43968    0.14163  -3.104  0.00191 **
good                  1.13111    0.24202   4.674 2.96e-06 ***
bad                  -0.05342    0.18383  -0.291  0.77135
ed_choice             0.23031    0.18909   1.218  0.22323
high_rep:edu_3kat2    0.03632    0.14400   0.252  0.80088
high_rep:edu_3kat3    0.08874    0.14542   0.610  0.54168
high_price:edu_3kat2 -0.07474    0.14303  -0.523  0.60129
high_price:edu_3kat3 -0.06493    0.14436  -0.450  0.65285
good:edu_3kat2       -0.32336    0.24380  -1.326  0.18474
good:edu_3kat3       -0.23546    0.24573  -0.958  0.33794
bad:edu_3kat2        -0.33474    0.18578  -1.802  0.07158 .
bad:edu_3kat3        -0.25749    0.18753  -1.373  0.16973
ed_choice:edu_3kat2   0.16275    0.19084   0.853  0.39378
ed_choice:edu_3kat3   0.19599    0.19255   1.018  0.30874
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 2112.6 on 909 degrees of freedom
AIC: 5364

Number of iterations: 4
```

```
Deviance Residuals:
    Min       1Q   Median       3Q      Max
-7.3868  -2.7613  -0.5203   1.9643   6.8836

Coefficients of interest:
                       Estimate Std. Error z value Pr(>|z|)
high_rep                0.37250    0.02946  12.646   <2e-16 ***
high_price             -0.48139    0.03010 -15.996   <2e-16 ***
good                    0.83860    0.04474  18.743   <2e-16 ***
bad                    -0.35491    0.04060  -8.742   <2e-16 ***
ed_choice               0.43755    0.03874  11.293   <2e-16 ***
high_rep:incom_3grp2   -0.01270    0.03754  -0.338   0.7351
high_rep:incom_3grp3    0.09981    0.04314   2.313   0.0207 *
high_price:incom_3grp2 -0.02569    0.03848  -0.668   0.5044
high_price:incom_3grp3 -0.06513    0.04350  -1.497   0.1343
good:incom_3grp2       -0.01339    0.05731  -0.234   0.8153
good:incom_3grp3        0.02937    0.06513   0.451   0.6520
bad:incom_3grp2         0.02927    0.05178   0.565   0.5719
bad:incom_3grp3        -0.06336    0.05846  -1.084   0.2784
ed_choice:incom_3grp2  -0.05039    0.04985  -1.011   0.3121
ed_choice:incom_3grp3  -0.05261    0.05620  -0.936   0.3492
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 10763 on 909 degrees of freedom
AIC: 14014

Number of iterations: 4
```

E. Influence of single subject covariates: students

```
Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.3972427  -0.0552075  -0.0004097   0.0059185   2.3492803

Coefficients of interest:
                     Estimate Std. Error z value Pr(>|z|)
high_rep            0.4091124  0.0179761  22.759  < 2e-16 ***
high_price         -0.5197256  0.0183681 -28.295  < 2e-16 ***
good                0.7717485  0.0267312  28.871  < 2e-16 ***
bad                -0.3309046  0.0245993 -13.452  < 2e-16 ***
ed_choice           0.3986198  0.0239303  16.658  < 2e-16 ***
high_rep:involve   -0.0136871  0.0060744  -2.253   0.0242 *
high_price:involve  0.0077653  0.0061907   1.254   0.2097
good:involve        0.0453261  0.0091404   4.959 7.09e-07 ***
bad:involve        -0.0204851  0.0083157  -2.463   0.0138 *
ed_choice:involve   0.0008496  0.0080782   0.105   0.9162
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 11340 on 23230 degrees of freedom
AIC: 81080

Number of iterations: 8
```

```
Deviance Residuals:
      Min          1Q      Median          3Q         Max
-1.3973589  -0.0528720  -0.0004096   0.0054156   2.3521171

Coefficients of interest:
                Estimate Std. Error z value Pr(>|z|)
high_rep         0.454212   0.034877  13.023   <2e-16 ***
high_price      -0.485283   0.034201 -14.189   <2e-16 ***
good             0.844927   0.052675  16.040   <2e-16 ***
bad             -0.421312   0.047145  -8.937   <2e-16 ***
ed_choice        0.370325   0.045113   8.209   <2e-16 ***
high_rep:risk    0.037624   0.017573   2.141   0.0323 *
high_price:risk  0.011460   0.017296   0.663   0.5076
good:risk        0.007356   0.026536   0.277   0.7816
bad:risk        -0.035649   0.023751  -1.501   0.1334
ed_choice:risk  -0.015813   0.022836  -0.692   0.4887
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 11403 on 23230 degrees of freedom
AIC: 81143

Number of iterations: 8

Deviance Residuals:
      Min          1Q      Median          3Q         Max
-1.3943299  -0.0596611  -0.0004096   0.0069479   2.2830946

Coefficients of interest:
                         Estimate Std. Error z value Pr(>|z|)
high_rep                 0.3540181  0.0320942  11.031  < 2e-16 ***
high_price              -0.5115644  0.0324289 -15.775  < 2e-16 ***
good                     0.6929698  0.0466637  14.850  < 2e-16 ***
bad                     -0.3588715  0.0438545  -8.183  < 2e-16 ***
ed_choice                0.3437530  0.0423524   8.116  < 2e-16 ***
high_rep:cred_expert     0.0179490  0.0146279   1.227 0.219806
high_price:cred_expert   0.0028318  0.0147719   0.192 0.847978
good:cred_expert         0.0724694  0.0213764   3.390 0.000699 ***
bad:cred_expert         -0.0000691  0.0199698  -0.003 0.997239
ed_choice:cred_expert    0.0282290  0.0192722   1.465 0.142988
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 11397 on 23230 degrees of freedom
AIC: 81137

Number of iterations: 8
```

```
Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.3979994  -0.0539766  -0.0004097   0.0056531   2.3680555

Coefficients of interest:
                          Estimate Std. Error z value Pr(>|z|)
high_rep                  0.377091   0.018277  20.632  < 2e-16 ***
high_price               -0.506303   0.018734 -27.026  < 2e-16 ***
good                      0.741957   0.026874  27.609  < 2e-16 ***
bad                      -0.369073   0.025067 -14.723  < 2e-16 ***
ed_choice                 0.362806   0.024238  14.968  < 2e-16 ***
high_rep:cred_trustw      0.012778   0.009090   1.406  0.15981
high_price:cred_trustw -0.002075   0.009339  -0.222  0.82418
good:cred_trustw          0.087992   0.013485   6.525 6.79e-11 ***
bad:cred_trustw           0.009084   0.012474   0.728  0.46648
ed_choice:cred_trustw     0.034831   0.012043   2.892  0.00382 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 11364 on 23230 degrees of freedom
AIC: 81104

Number of iterations: 8

Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.4041215  -0.0427989  -0.0004096   0.0034959   2.5562575

Coefficients of interest:
                        Estimate Std. Error z value Pr(>|z|)
high_rep                0.383751   0.015803  24.284  < 2e-16 ***
high_price             -0.507027   0.016130 -31.433  < 2e-16 ***
good                    0.852233   0.024351  34.997  < 2e-16 ***
bad                    -0.369403   0.021702 -17.021  < 2e-16 ***
ed_choice               0.399058   0.020913  19.082  < 2e-16 ***
high_rep:prodknowl     -0.028125   0.009173  -3.066 0.002168 **
high_price:prodknowl    0.006743   0.009383   0.719 0.472345
good:prodknowl          0.066103   0.014282   4.629 3.68e-06 ***
bad:prodknowl          -0.042105   0.012579  -3.347 0.000816 ***
ed_choice:prodknowl    -0.005182   0.012141  -0.427 0.669543
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 11331 on 23230 degrees of freedom
AIC: 81071

Number of iterations: 8
```

```
Deviance Residuals:
       Min          1Q      Median          3Q         Max
-1.4060216  -0.0210377  -0.0004097   0.0007836   2.6353300

Coefficients of interest:
                Estimate Std. Error z value Pr(>|z|)
high_rep         0.418275   0.067324   6.213 5.20e-10 ***
high_price      -0.405936   0.066687  -6.087 1.15e-09 ***
good             0.555988   0.104025   5.345 9.05e-08 ***
bad             -0.030277   0.091161  -0.332 0.739794
ed_choice        0.568131   0.088627   6.410 1.45e-10 ***
high_rep:age    -0.001112   0.002545  -0.437 0.662199
high_price:age -0.003912   0.002506  -1.561 0.118577
good:age         0.010768   0.003964   2.717 0.006595 **
bad:age         -0.012708   0.003438  -3.697 0.000218 ***
ed_choice:age   -0.006555   0.003331  -1.968 0.049071 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 11371 on 23230 degrees of freedom
AIC: 81111

Number of iterations: 8

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-6.8279  -2.8776  -0.6203   1.9679   7.9375

Coefficients of interest:
                Estimate Std. Error z value Pr(>|z|)
high_rep         0.37575    0.02005  18.738   <2e-16 ***
high_price      -0.52824    0.02026 -26.068   <2e-16 ***
good             0.84550    0.02971  28.455   <2e-16 ***
bad             -0.35076    0.02778 -12.628   <2e-16 ***
ed_choice        0.37251    0.02718  13.705   <2e-16 ***
high_rep:sex2    0.03332    0.02475   1.346    0.178
high_price:sex2  0.03797    0.02467   1.539    0.124
good:sex2       -0.01151    0.03489  -0.330    0.741
bad:sex2        -0.01361    0.03497  -0.389    0.697
ed_choice:sex2   0.05824    0.03478   1.675    0.094 .
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 11371 on 970 degrees of freedom
AIC: 14500

Number of iterations: 4
```

```
Deviance Residuals:
    Min       1Q   Median       3Q      Max
-7.3868  -2.7613  -0.5203   1.9643   6.8836

Coefficients of interest:
                       Estimate Std. Error z value Pr(>|z|)
high_rep                0.37250    0.02946  12.646   <2e-16 ***
high_price             -0.48139    0.03010 -15.996   <2e-16 ***
good                    0.83860    0.04474  18.743   <2e-16 ***
bad                    -0.35491    0.04060  -8.742   <2e-16 ***
ed_choice               0.43755    0.03874  11.293   <2e-16 ***
high_rep:incom_3grp2   -0.01270    0.03754  -0.338   0.7351
high_rep:incom_3grp3    0.09981    0.04314   2.313   0.0207 *
high_price:incom_3grp2 -0.02569    0.03848  -0.668   0.5044
high_price:incom_3grp3 -0.06513    0.04350  -1.497   0.1343
good:incom_3grp2       -0.01339    0.05731  -0.234   0.8153
good:incom_3grp3        0.02937    0.06513   0.451   0.6520
bad:incom_3grp2         0.02927    0.05178   0.565   0.5719
bad:incom_3grp3        -0.06336    0.05846  -1.084   0.2784
ed_choice:incom_3grp2  -0.05039    0.04985  -1.011   0.3121
ed_choice:incom_3grp3  -0.05261    0.05620  -0.936   0.3492
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 10763 on 909 degrees of freedom
AIC: 14014

Number of iterations: 4

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-4.0599  -1.1024  -0.3581   0.7746   4.4750

Coefficients of interest:
                      Estimate Std. Error z value Pr(>|z|)
high_rep               0.33972    0.14270   2.381  0.01728 *
high_price            -0.43968    0.14163  -3.104  0.00191 **
good                   1.13111    0.24202   4.674 2.96e-06 ***
bad                   -0.05342    0.18383  -0.291  0.77135
ed_choice              0.23031    0.18909   1.218  0.22323
high_rep:edu_3kat2     0.03632    0.14400   0.252  0.80088
high_rep:edu_3kat3     0.08874    0.14542   0.610  0.54168
high_price:edu_3kat2  -0.07474    0.14303  -0.523  0.60129
high_price:edu_3kat3  -0.06493    0.14436  -0.450  0.65285
good:edu_3kat2        -0.32336    0.24380  -1.326  0.18474
good:edu_3kat3        -0.23546    0.24573  -0.958  0.33794
bad:edu_3kat2         -0.33474    0.18578  -1.802  0.07158 .
bad:edu_3kat3         -0.25749    0.18753  -1.373  0.16973
ed_choice:edu_3kat2    0.16275    0.19084   0.853  0.39378
ed_choice:edu_3kat3    0.19599    0.19255   1.018  0.30874
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for poisson family taken to be 1)

Residual deviance: 2112.6 on 909 degrees of freedom
AIC: 5364

Number of iterations: 4
```

F. Information criteria of alternative Rasch models for the panel sample

Construct	Criterion	RASCH	2 Class	3 Class	4 Class	5 Class
perc_qual	AIC	2740.66	2662.12	2656.44	2664.16	2681.23
	BIC	2785.96	2748.60	2784.10	2833.00	2891.25
	CAIC	2796.96	2769.60	2815.10	2874.00	2942.25
perc_value	AIC	2178.82	2153.35	2161.68	2173.95	2189.77
	BIC	2215.89	2223.35	2264.64	2309.85	2358.61
	CAIC	2224.89	2240.35	2289.64	2342.85	2399.61
purch_intend	AIC	1580.19	1584.65	1596.70	1608.03	1620.01
	BIC	1609.01	1638.19	1674.95	1710.98	1747.68
	CAIC	1616.01	1651.19	1693.95	1735.98	1778.68
involve	AIC	1486.43	1487.87	1495.86	1503.86	1511.86
	BIC	1507.02	1524.93	1549.39	1573.87	1598.34
	CAIC	1512.02	1533.93	1562.39	1590.87	1619.34
prod_knowl	AIC	3490.91	3493.37	3499.62	3506.48	3524.71
	BIC	3544.45	3596.32	3651.99	3708.26	3775.91
	CAIC	3557.45	3621.32	3688.99	3757.26	3836.91
popularity	AIC	1765.99	1763.37	1774.71	1786.63	1798.51
	BIC	1794.82	1816.90	1852.95	1889.59	1926.17
	CAIC	1801.82	1829.90	1871.95	1914.59	1957.17
risk	AIC	1465.65	1432.39	1442.55	1454.51	1466.52
	BIC	1494.47	1485.92	1520.79	1557.46	1594.18
	CAIC	1501.47	1498.92	1539.79	1582.46	1625.18
source cred trustw ohne biased u prejudiced	AIC	1947.84	1957.76	1963.52	1976.47	1991.48
	BIC	1984.90	2027.77	2066.47	2112.37	2160.33
	CAIC	1993.90	2044.77	2091.47	2145.37	2201.33
source cred expertise	AIC	1588.68	1584.54	1596.07	1608.36	1621.93
	BIC	1625.74	1654.55	1699.02	1744.26	1790.77
	CAIC	1634.74	1671.55	1724.02	1777.26	1831.77

G. Graphical chain modelling output - students

```
Target: intention
Influences: [value, qual, price, involve, qual_price, qual_involve, involve^2]

Act t-value 9.59 value
Act t-value 4.00 qual
Act t-value 2.23 price_D_1
Act t-value 2.44 involve
Act t-value 3.29 qual_price_D_0
Act t-value 2.78 qual_involve
Act t-value 3.41 involve^2

Results of the univariate regression / Regression coefficients:
INTERCEPT    -1.3727
value  0.3978
qual   0.2094
price_D_1    -0.4548
involve      0.0962
qual_price_D_0      0.2258
qual_involve 0.0378
involve^2    -0.0517
--------

Target: value
Influences: [qual, tppr, price, risk, expertise, popularity]

Act t-value 5.37 qual
Act t-value 1.32 tppr_D_1
Act t-value 1.47 tppr_D_2
Act t-value 1.82 tppr_D_3
Act t-value 14.58 price_D_1
Act t-value 3.17 risk
Act t-value 2.78 expertise
Act t-value 3.20 popularity

Results of the univariate regression / Regression coefficients:
INTERCEPT    -1.9881
qual   0.2153
tppr_D_1     0.3232
tppr_D_2     0.3617
tppr_D_3     -0.4425
price_D_1    2.5223
risk   -0.3054
expertise    0.2354
popularity   0.1940
--------

Target: qual
Influences: [tppr, price, risk, involve, trust, popularity, risk_involve,
  risk_popularity, popularity^2]

Act t-value 2.13 tppr_D_1
Act t-value 0.28 tppr_D_2
Act t-value 2.54 tppr_D_3
Act t-value 3.13 price_D_1
Act t-value 4.51 risk
Act t-value 3.68 involve
Act t-value 3.06 trust
Act t-value 4.63 popularity
Act t-value 2.07 risk_involve
Act t-value 2.74 risk_popularity
Act t-value 2.68 popularity^2

Results of the univariate regression / Regression coefficients:
INTERCEPT    -0.9675
```

```
tppr_D_1     0.5453
tppr_D_2     0.0724
tppr_D_3     -0.6453
price_D_1    -0.5649
risk   -0.5198
involve      -0.1305
trust  0.1631
popularity   0.4107
risk_involve -0.0857
risk_popularity     -0.1506
popularity^2 -0.1215
--------

Target: tppr
Influences: [risk]

Act t-value 2.61 risk

Results of the multivariate logit regression / Regression coefficients:
INTERCEPT    -0.7182      -0.2527      0.2544
risk   -0.4086      -0.1245      0.1275
--------

Target: brand
Influences: [risk, knowledge, expertise, popularity, risk_popularity,
  knowledge_popularity, expertise_popularity, risk^2, knowledge^2]

Act t-value 1.27 risk
Act t-value 0.48 knowledge
Act t-value 2.60 expertise
Act t-value 9.71 popularity
Act t-value 2.23 risk_popularity
Act t-value 2.16 knowledge_popularity
Act t-value 3.28 expertise_popularity
Act t-value 2.83 risk^2
Act t-value 2.65 knowledge^2

Results of the multivariate logit regression / Regression coefficients:
INTERCEPT    1.2999
risk   0.3289
knowledge    0.0317
expertise    0.2598
popularity   -0.9352
risk_popularity     -0.2713
knowledge_popularity      0.1093
expertise_popularity      -0.2065
risk^2 -0.4285
knowledge^2  0.0701
--------

Target: price
Influences: []

No variables left in regression
--------

Target: risk
Influences: [knowledge, popularity]

Act t-value 2.15 knowledge
Act t-value 6.98 popularity

Results of the univariate regression /Regression coefficients:
INTERCEPT    -1.5415
knowledge    0.0479
popularity   -0.1698
```

```
--------

Target: involve
Influences: [knowledge, knowledge^2]

Act t-value 21.26 knowledge
Act t-value 4.30 knowledge^2

Results of the univariate regression / Regression coefficients:
INTERCEPT    1.8682
knowledge    1.0228
knowledge^2  -0.0873
--------

Target: knowledge
Influences: [involve, involve^2]

Act t-value 19.56 involve
Act t-value 3.52 involve^2

Results of the univariate regression / Regression coefficients:
INTERCEPT    -1.1256
involve      0.4958
involve^2    0.0346
--------

Target: expertise
Influences: [trust, trust^2]

Act t-value 7.21 trust
Act t-value 3.28 trust^2

Results of the univariate regression / Regression coefficients:
INTERCEPT    1.8601
trust  0.2373
trust^2      -0.0499
--------

Target: trust
Influences: [expertise, popularity]

Act t-value 14.48 expertise
Act t-value 2.44 popularity

Results of the univariate regression / Regression coefficients:
INTERCEPT    -0.7251
expertise    0.8741
popularity   0.0944
--------

Target: popularity
Influences: [risk, knowledge, trust, knowledge_trust]

Act t-value 7.00 risk
Act t-value 1.88 knowledge
Act t-value 2.99 trust
Act t-value 2.16 knowledge_trust

Results of the univariate regression / Regression coefficients:
INTERCEPT    0.1185
risk   -0.4777
knowledge    0.0697
trust  0.1134
knowledge_trust     -0.0449
```

H. Graphical chain modelling output - panel

```
Target: intention
Influences: [value, quality, tppr, brand, trust, involve, value_involve,
 value^2]

Act t-value 10.71 value
Act t-value 6.04 quality
Act t-value 2.18 tppr_D_1
Act t-value 0.74 tppr_D_2
Act t-value 0.78 tppr_D_3
Act t-value 2.35 brand_D_1
Act t-value 2.17 trust
Act t-value 7.20 involve
Act t-value 2.38 value_involve
Act t-value 3.60 value^2

Results of the univariate regression / Regression coefficients:
INTERCEPT    -2.2344
value  0.4569
quality      0.2494
tppr_D_1     0.6245
tppr_D_2     -0.2101
tppr_D_3     0.2225
brand_D_1    -0.4807
trust  0.1058
involve      0.3514
value_involve0.0370
value^2      0.0430
--------

Target: value
Influences: [quality, tppr, price, brand, expertise, popularity, quality_tppr,
 tppr_price, price_brand, price_popularity, quality^2]

Act t-value 0.02 quality
Act t-value 0.49 tppr_D_1
Act t-value 0.55 tppr_D_2
Act t-value 0.86 tppr_D_3
Act t-value 5.48 price_D_1
Act t-value 2.64 brand_D_1
Act t-value 4.72 expertise
Act t-value 4.63 popularity
Act t-value 3.14 quality_tppr_D_0
Act t-value 2.50 quality_tppr_D_1
Act t-value 2.03 quality_tppr_D_2
Act t-value 2.46 tppr_price_D_0
Act t-value 2.46 tppr_price_D_1
Act t-value 2.46 tppr_price_D_2
Act t-value 6.79 price_brand_D_0
Act t-value 2.41 price_popularity_D_0
Act t-value 2.61 quality^2

Results of the univariate regression / Regression coefficients:
INTERCEPT    -1.1574
quality      0.0019
tppr_D_1     0.1822
tppr_D_2     0.1995
tppr_D_3     0.5243
price_D_1    1.1489
brand_D_1    -0.5128
expertise    0.3523
popularity   0.5295
quality_tppr_D_0    0.4346
quality_tppr_D_1    0.3234
```

```
quality_tppr_D_2    0.2642
tppr_price_D_0      -0.5432
tppr_price_D_1      -0.5432
tppr_price_D_2      -0.5432
price_brand_D_0     1.7936
price_popularity_D_0       -0.3079
quality^2    -0.0413
--------

Target: quality
Influences: [tppr, price, brand, expertise, trust, popularity, risk,
popularity_risk, trust^2, risk^2]

Act t-value 0.72 tppr_D_1
Act t-value 0.38 tppr_D_2
Act t-value 3.15 tppr_D_3
Act t-value 3.43 price_D_1
Act t-value 2.16 brand_D_1
Act t-value 2.93 expertise
Act t-value 3.46 trust
Act t-value 12.11 popularity
Act t-value 6.07 risk
Act t-value 4.85 popularity_risk
Act t-value 2.51 trust^2
Act t-value 4.62 risk^2

Results of the univariate regression:
Regression coefficients:
INTERCEPT    -0.9591
tppr_D_1     -0.1926
tppr_D_2     0.0996
tppr_D_3     -0.8313
price_D_1    -0.9101
brand_D_1    -0.5083
expertise    0.2004
trust  0.2032
popularity   0.5497
risk   -0.4315
popularity_risk     0.1153
trust^2      0.0538
risk^2 0.1085
--------

Target: tppr
Influences: [knowledge, popularity]

Act t-value 2.30 knowledge
Act t-value 2.07 popularity

Results of the multivariate logit regression / Regression coefficients:
INTERCEPT    -0.0525      0.1182 -0.0123
knowledge    0.1343 0.2263 0.0263
popularity   0.1255 0.0311 0.0055
--------

Target: price
Influences: [brand]

Act t-value 431.55 brand_D_1

Results of the multivariate logit regression / Regression coefficients:
INTERCEPT    28.5094
brand_D_1    -28.5181
--------

Target: brand
```

```
Influences: [price, popularity]

Act t-value 461.00 price_D_1
Act t-value 3.65 popularity

Results of the multivariate logit regression:
Regression coefficients:
INTERCEPT    26.6185
price_D_1    -27.2239
popularity   -0.1919
--------

Target: expertise
Influences: [trust, trust^2]

Act t-value 11.86 trust
Act t-value 3.43 trust^2

Results of the univariate regression / Regression coefficients:
INTERCEPT    1.6890
trust  0.4098
trust^2      -0.0495
--------

Target: trust
Influences: [expertise, expertise^2]

Act t-value 12.38 expertise
Act t-value 2.83 expertise^2

Results of the univariate regression / Regression coefficients:
INTERCEPT    -0.7777
expertise    0.9328
expertise^2  0.0700
--------

Target: involve
Influences: [trust, knowledge]

Act t-value 2.33 trust
Act t-value 14.00 knowledge

Results of the univariate regression / Regression coefficients:
INTERCEPT    0.8777
trust  0.0870
knowledge    0.8537
--------

Target: knowledge
Influences: [involve, involve^2]

Act t-value 13.93 involve
Act t-value 2.27 involve^2

Results of the univariate regression / Regression coefficients:
INTERCEPT    -1.0359
involve      0.3783
involve^2    0.0338
--------

Target: popularity
Influences: [trust, risk, risk^2]

Act t-value 2.15 trust
Act t-value 6.84 risk
Act t-value 5.07 risk^2
```

```
Results of the univariate regression / Regression coefficients:
INTERCEPT    -1.3695
trust  0.0987
risk   -0.4702
risk^2 0.1202
--------

Target: risk
Influences: [popularity]

Act t-value 4.53 popularity

Results of the univariate regression / Regression coefficients:
INTERCEPT    -2.7380
popularity   -0.1639
```

I. Descriptive analysis of person parameters - students

			€ 6,-			€ 10,-
low reputation brand	**intention**	**value**	**quality**	**intention**	**value**	**quality**
pos.tppr	-0.745	2.513	0.301	-1.629	-0.42	0.699
editor's choice	-1.489	1.967	-0.717	-1.813	-0.151	-0.396
neg.tppr	-2.692	0.31	-1.545	-2.995	-1.92	-1.515
no tppr	-1.379	1.31	-1.11	-1.975	-0.948	-0.177
high reputation brand						
pos.tppr	-0.667	2.069	0.254	-1.595	0.103	0.856
editor's choice	-1.648	1.707	-0.042	-1.773	-0.558	0.551
neg.tppr	-1.91	0.812	-0.626	-1.795	-1.18	-0.255
no tppr	-1.17	1.915	0.059	-1.929	-0.482	0.343

			€ 6,-			€ 10,-
low reputation brand	**expertise**	**trust**	**risk**	**expertise**	**trust**	**risk**
pos.tppr	2.198	1.388	-2.097	1.994	1.279	-1.824
editor's choice	1.839	1.092	-1.908	1.751	0.802	-1.679
neg.tppr	2.083	1.118	-1.206	2.081	1.211	-1.553
no tppr	1.763	0.76	-1.86	1.947	1.177	-1.57
high reputation brand						
pos.tppr	1.855	0.841	-1.783	2.01	1.131	-2.15
editor's choice	1.875	0.92	-1.397	1.932	0.967	-1.888
neg.tppr	1.667	1.123	-1.753	1.669	0.971	-1.664
no tppr	2.187	1.582	-1.913	2.266	1.611	-1.721

			€ 6,-			€ 10,-
low reputation brand	**involve**	**knowl**	**popular**	**involve**	**knowl**	**popular**
pos.tppr	1.552	0.137	0.667	1.179	-0.425	0.514
editor's choice	1.313	-0.367	0.492	1.569	0.151	0.102
neg.tppr	1.912	0.239	-0.369	1.386	-0.014	0.113
no tppr	1.643	-0.246	0.237	1.46	-0.088	0.519
high reputation brand						
pos.tppr	1.109	-0.239	2.119	1.43	-0.181	1.812
editor's choice	2.217	-0.008	1.74	1.305	-0.499	1.694
neg.tppr	1.533	-0.083	1.822	1.644	-0.236	1.78
no tppr	1.231	-0.317	1.876	1.517	-0.463	1.894

J. Descriptive analysis of person parameters - panel

			€ 6,-			€ 10,-
low reputation brand	**intention**	**value**	**quality**	**intention**	**value**	**quality**
pos.tppr	-0.521	2.361	-0.041	-0.755	0.151	1.123
editor's choice	-1.047	1.770	-0.04	-1.733	-0.024	1.744
neg.tppr	-2.322	-0.755	-1.764	-1.996	-0.852	-0.398
no tppr	-1.415	1.718	0.284	-2.869	-1.896	0.398
high reputation brand						
pos.tppr	0.36	1.894	1.857	-0.902	0.298	0.985
editor's choice	-0.353	1.984	0.724	-1.75	-0.396	0.955
neg.tppr	-0.997	0.369	0.005	-2.362	-0.755	0.413
no tppr	-0.884	2.027	-0.096	-0.918	-0.307	1.797

			€ 6,-			€ 10,-
low reputation brand	**expertise**	**trust**	**risk**	**expertise**	**trust**	**risk**
pos.tppr	1.982	1.547	-2.65	2.017	1.556	-2.301
editor's choice	1.285	0.864	-2.468	2.017	2.146	-2.763
neg.tppr	1.756	1.343	-2.465	2.142	1.47	-2.386
no tppr	2.267	1.328	-2.955	1.865	1.235	-2.546
high reputation brand						
pos.tppr	2.375	1.558	-3.905	1.65	0.28	-2.728
editor's choice	2.574	2.42	-2.743	2.072	0.853	-3.387
neg.tppr	1.772	0.51	-2.752	2.051	0.853	-2.97
no tppr	1.693	1.22	-3.136	1.833	1.031	-2.876

			€ 6,-			€ 10,-
low reputation brand	**involve**	**knowl**	**popular**	**involve**	**knowl**	**popular**
pos.tppr	-0.054	-0.38	-0.389	0.449	-0.649	0.725
editor's choice	0.814	-0.546	0.145	0.712	-0.606	0.103
neg.tppr	0.513	-0.784	-0.319	0.705	-0.733	0.141
no tppr	0.379	-0.918	0.137	0.485	-0.881	-0.057
high reputation brand						
pos.tppr	0.367	-0.806	1.57	0.239	-0.95	1.637
editor's choice	0.584	-0.607	0.664	0.761	-0.287	0.728
neg.tppr	-0.38	-0.884	0.744	-0.599	-1.082	0.588
no tppr	-0.056	-0.965	-0.217	0.575	-0.933	1.171

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