SLA Second Language Acquisition

Neurolinguistic and Psycholinguistic Perspectives on SLA

Edited by Janusz Arabski and Adam Wojtaszek

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Part 2: Psycholinguistic Perspective

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Introduction

JANUSZ ARABSKI and ADAM WOJTASZEK

With the rapid development of modern technology and research procedures, undreamt of or too costly in the 20th century, neurolinguistics enables scientists to make increasingly intriguing and stimulating insights into the processes governing language acquisition, functioning and production in the human brain. It is a field of research that, more than any other within the broadly defined field of linguistics, has developed significantly within the past decade and where updating one's knowledge is therefore an unquestionable necessity.

Psycholinguistic studies, although not so intrinsically dependent on technological development, have also benefited from the availability of novel research methodologies. In spite of the increasing specialization of scientific investigation, the bonds and links between neurolinguistic and psycholinguistic studies are still very strong, at least in the mutual interdependencies of the implications of the findings. Psycholinguists very often draw upon the recent discoveries of neuroscientists in order to remodel their theories, and new data from psycholinguistic studies inspire the organization and procedures of neurolinguistic investigation.

The chapters presented in this volume discuss foreign language learning and second language acquisition (SLA) issues from the points of view of neurolinguistics and psycholinguistics. Given the breadth of the issues investigated in both fields, this collection presents a wide variety of topics, methodologies, language skills and languages studied in the acquisition process. At the same time, this collection does not claim to be exhaustive in its scope, which is only indicative of how diverse and multifarious the work of psycholinguists and neurolinguists has become.

The *Neurolinguistic Perspective* section of this volume consists of five chapters. The first two discuss the critical period hypothesis (CPH) in L2 from two different viewpoints and methodologies.

Van den Noort *et al.* focus on the functional and structural magnetic resonance imaging (MRI) technique applied to investigate CPH in L2 research. In particular, the chapter attempts to answer a number of intriguing questions investigating whether we can observe any structural plastic changes in the human brain during the process of SLA, whether there is a specific (second) language acquisition area or if recent neuroimaging findings explain recent linguistic data in which evidence has been found contradicting the (original) CPH.

The initial chapter is followed by a study on information structural processing among L2 subjects in connection with CPH. While many previous studies have used speakers' judgments of morphosyntactic errors to shed light on the effect of age of arrival, Reichle's study uses incompatibility between syntactic form and pragmatic function. The analysis examines the effect of age of arrival on acceptability judgments, with special attention paid to the timing and geometry of age effects and their implications for a critical period for SLA.

Nijakowska's contribution is the outcome of neuroanatomical research on the anatomical–psychological bases of specific difficulties in reading and writing. It concentrates on the issue of developmental dyslexia which requires interdisciplinary study and a consensus of neuroscience, cognitive science and learning theory, followed by their application in education. This is a very intriguing and controversial phenomenon, widely investigated from many different perspectives, including neuro-biological, psychological, linguistic and educational standpoints, and often causing intensive emotions in the parties involved – students, parents, teachers, researchers, policy-makers and non-dyslexics as well.

Gabryś-Barker's chapter, although predominantly neurolinguistic in its perspective, focuses on affectivity and emotions, initially studied mainly by psycholinguists. Various research projects demonstrate that information entering the brain is received first by the 'emotional brain' (the amygdala) and is filtered through it before reaching the cortical regions where it undergoes rational processing. So it may be assumed that success in learning (in this case of foreign languages where affectivity is clearly important) is all emotionally driven, and the affective basis for motivation in SLA can be viewed in terms of the stimulus appraisal system (Schumann, 1997), providing an account for individual variability in SLA from a neurobiological perspective.

The last contribution in this section investigates paralinguistic strategies applied by advanced learners of English. Ślęzak-Świat focuses on the subcortical regions underlying communication and the way their role can be accommodated to the theory of applied linguistics highlighting the concept of strategic competence.

The *Psycholinguistic Perspective* section consists of seven contributions. The opening chapter by Whyatt discusses the issue of language control in bilinguals during the process of translation, viewed within a postulated framework of mental effort management also referred to by Gile (1995) as essentially a divided attention task. A tentative conclusion of the think aloud protocols (TAP) study presented in the chapter, together with recent data from functional magnetic resonance imaging (fMRI) studies, points to the need to situate research into bilingual language control within a more general area of mental resources management.

Zalewski's contribution, more theoretical in its approach, evaluates the contribution of connectionist and enactivist theories of cognition to our understanding of learning writing as composing. The author rounds out the chapter with a collection of interesting implications of this novel perspective on the process of writing for classroom practice.

The third chapter in this section is predominantly methodological in its focus. Latkowska takes advantage of conceptual transfer in the bilingual mental lexicon to present and evaluate a number of research methods applied to date to investigate the problem, commenting on their suitability for the investigation of the phenomenon in question.

Language testing constitutes the focus of the fourth chapter. Based on the observation that collocational links are often unidirectional in the sense that the constituents of a collocation are not equally predictive of one another, Malec investigates the extent to which the direction of collocability is reflected in test performance, that is whether the choice of the more, or less, prominent collocate as the target word has an impact on the cognitive demand of a collocations test item.

Gender differences are usually studied within the sociolinguistic paradigm, but Piasecka attempts to offer psycholinguistic explanations for her experimental findings, where teenage girls were found to be better in L1 and L2 reading tasks than their male classmates.

Foreign language students in Poland can be described as an 'education language community.' In her study, Ewert uses students as subjects in a combined Russian and English degree programme at Adam Mickiewicz University, Poznań. The data were collected with the use of a self-report questionnaire, focusing on the four descriptors of bilingualism distinguished by Mackey (1972): degree, external and internal function, alternation and interference. It is argued that such a questionnaire is more appropriate for description of communities of L2 users than descriptions based solely on the measurement of degree of bilingualism or external functions whose purpose is different.

In the final chapter, Otwinowska-Kasztelanic makes references to Gibson's theory of affordances (1977). It investigates the potential of

awareness training given to advanced learners of English, who were encouraged to use cognate vocabulary exploitation as one of their strategies for learning.

The editors hope that the chapters presented herein will contribute to the development of interest in the neurolinguistic and psycholinguistic nature of foreign language learning and SLA, demonstrating at the same time the potential inherent in these two approaches.

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Part 1

Neurolinguistic Perspective

Chapter 1

Identifying the Neural Substrates of Second Language Acquisition: What is the Contribution from Functional and Structural MRI?

MAURITS VAN DEN NOORT, PEGGY BOSCH,
TARIK HADZIBEGANOVIC, KATRIEN MONDT,
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The Critical Period Hypothesis

In the language acquisition field, the proposition that there is a *critical* or *sensitive period* for language acquisition is an influential one. Penfield and Roberts (1959) and Lenneberg (1967) were among the first to hypothesize that there was a critical period for language acquisition. The idea of a critical period was originally inspired by research in biology referring to the phenomenon that certain skills, such as a particular type of birdsong, might only be acquired if adequate external stimulation is available during a certain temporal frame in the ontogenetic evolution of the organism. If this temporal frame is missed, acquisition of the specific skill becomes impossible or will at least end up as incomplete (Indefrey & Gullberg, 2006).

Since the 1960s, much ink has been spilt trying to explain the role of age in second and foreign language acquisition (Birdsong, 2006). Scientists often talk about 'the critical period for language acquisition' as if there were only one critical period for all features of language. It is, however, widely agreed that there are different critical phases for different linguistic subsystems, for example phonology and syntax (see e.g. Long, 1990; Seliger, 1978), and there is no unique sensitive period for all parts of language (Van Boxtel, 2005). In addition, the notion of different critical periods is consistent with current neurobiological views on critical periods in other contexts (Knudsen, 2004).

The negative correlation between age of learning onset and eventual asymptotic performance is best described by an 'earlier is better' rule. Much recent experimental data have accumulated supporting this generalization, largely offering a maturational account of age effects and indicating a particular sensitive period that limits both first language (L1) acquisition and second language (L2) acquisition (Bates *et al.*, 1992; Birdsong & Molis, 2001; Huttenlocher, 1990; Long, 1990).

If a critical period puts constraints on L2 acquisition, one would suppose that the observed performance should correlate negatively with the age at which L2 learning starts. Moreover, according to this hypothesis, the effect should already be visible in individuals who started L2 learning before the end of maturation. In addition, it should be impossible for all or at least most late learners to perform in the range of native controls. However, if constraints put on attainment are largely maturational in nature, then they should pertain to L2 acquisition in general. Following these lines of reasoning (Birdsong & Molis, 2001), Johnson and Newport (1989) proposed a maturational model of L2 attainment. Although the reported findings and corresponding interpretations of Johnson and Newport have been widely acknowledged, another line of evidence is directed against this model.

For instance, in several experimental studies, postmaturational age effects were reported (Bialystok & Hakuta, 1994, 1999; Birdsong, 1992; Flege, 1999). Moreover, many studies have found native-likeness results among late L2 learners (Birdsong, 2006), who tended to perform similarly to native speakers on a variety of language tasks (Bongaerts, 1999; Cranshaw, 1997; Van Boxtel, 2005). Taken together, a rather controversial idea about the existence of a critical period for language acquisition is still an unsolved and highly debated issue (Birdsong, 1999; Hyltenstam & Abrahamsson, 2001; Marinova-Todd *et al.*, 2000; Scovel, 2000; Singleton, 2001; Van Boxtel, 2005; Wartenburger *et al.*, 2003). As a consequence, we feel it is natural to ask what could functional magnetic resonance imaging (fMRI) and related non-invasive structural neuroimaging techniques add to this vivid discussion?

Neuroimaging Research

Neuroimaging techniques seem to be very useful for investigating the issue of eventual neurophysiological modifications in the brain before the end of maturation that can account for the general tendency to attain a higher level of proficiency in early versus late learners. For instance, if late learners could be shown to process their L2 in different brain areas than

early learners, this would further support the Critical Period Hypothesis (CPH) for L2 acquisition (e.g. see Van Boxtel, 2005).

The question about how second and/or third languages are represented and maintained in the brain is not new and has been the focus of much previous neuroimaging and related research. One important proposal is that, in bilinguals and multilinguals, different languages are represented and processed in distinct brain regions, resulting thus in multiple and language-specific neural network systems. Some indirect support for this hypothesis comes from studies with bilingual and/or multilingual patients diagnosed with aphasia (Paradis, 1989). In some cases, it was found that only one of the acquired languages was affected (Albert & Obler, 1978; Paradis, 1995). Moreover, fairly often, it has been reported that different languages can recover to different degrees or even that there is an antagonistic pattern of recovery between L1 and L2 (Paradis, 1977). In addition, in other cases, neurosurgery was shown to have a selective impairment of only one language in bilinguals (Gomez-Tortosa *et al.*, 1995). Finally, the hypothesis that different languages are represented and processed in distinct brain regions is supported via findings uncovered in electrical stimulation studies. These findings demonstrated that in multilingual subjects, different languages may be disrupted selectively (Black & Ronner, 1987; Ojemann & Whitaker, 1978; Roux & Trémoulet, 2002).

In several event-related potential (ERP) studies, which have a high temporal resolution, it has been demonstrated that the temporal aspects of high-proficient L2 use are by and large comparable to those of L1 use, importantly, even when L2 acquisition was initiated at the age of 12 or after that (Hahne, 2001; Hahne & Friederici, 2001; Ojima *et al.*, 2005; Proverbio *et al.*, 2002; Stowe & Sabourin, 2005). The findings of the ERP studies demonstrated that as L2 proficiency increases, the ERP components in the L2 become more similar to L1 (Birdsong, 2006).

More recently, positron emission tomography (PET) and fMRI have enabled a more direct study of the neural representation of language in bilinguals and multilinguals since both PET and fMRI have a better spatial resolution than ERP. However, the overall results that have been reported in neuroimaging studies so far are not quite consistent. For instance, in some investigations (Dehaene *et al.*, 1997; Kim *et al.*, 1997; Mondt, 2007; Perani *et al.*, 1996; Van den Noort *et al.*, 2006c; Yetkin *et al.*, 1996) at least partially separate representations for different languages were detected. However, in other investigations (e.g. Hasegawa *et al.*, 2002; Hernandez *et al.*, 2001; Illes *et al.*, 1999; Klein *et al.*, 1995) no evidence was found, indicating that languages have been organized in distinct brain regions. But again, only in a few studies (Chee *et al.*, 1999; Klein *et al.*, 1999; Pu *et al.*,

2001; Vingerhoets *et al.*, 2003) common neural representations were reported (Van den Noort *et al.*, 2006a).

The problem with PET and fMRI approach to L2 acquisition and the associated age factor is that the current results are, as they stand, far from consistent, which can partially be explained by two major problems: (1) different research groups tend to use different kinds of experimental paradigms, making comparisons among bilingual and multilingual studies very difficult if not impossible and (2) the experimenters do not use the same selection criteria for the inclusion of their subjects. As a consequence, most of the emerging differences reported in PET and fMRI studies can be accounted for by differences of the related proficiency level, L2 onset and L2 exposure of the bilingual and multilingual subjects (Indefrey, 2006).

Nevertheless, reliable differences among the hemodynamic activation patterns in L1 and L2 language processing have been reported, but only for subgroups of bilingual speakers and largely in the direction of more pronounced activation patterns during L2 processing (Abutalebi *et al.*, 2001; Indefrey, 2006; Stowe & Sabourin, 2005). In particular, the relative effect of the three important factors (onset, proficiency and exposure) seems to vary between the employed experimental paradigms and between the language-processing components involved. In word-level production, all three factors seem to play an important role, whereas for word-level semantic processing in comprehension tasks, this does not seem to be the case. Here, L2 onset and exposure do not seem to represent major factors. On the other hand, L2 onset seems to be the most relevant factor for activation differences associated with syntactic processing in sentence comprehension tasks. With respect to this, however, it is necessary to note here that even in late L2 learners, pronounced L2 syntactic processing activation patterns only seem to become apparent when participants are asked to make explicit metalinguistic judgments (for a more detailed discussion, see Indefrey, 2006).

Additionally, it is important to note here that most neuroimaging investigations do not or only rarely focus on specific linguistic subsystems, like syntax, and as a consequence, the interpretation of the results in general is a rather difficult endeavor. For instance, we still have a rather incomplete picture about the exact function and interactions of brain areas involved in language production and perception. Moreover, it still remains unclear how exactly the brain works with respect to L1 and we know even less about the underlying neurological processes involved in L2 acquisition. Finally, it cannot be totally excluded that certain approaches may simply not be appropriate enough to reveal subtle differences (Van Boxtel, 2005).

Structural Brain Changes

Inferior parietal region

Recently, structural magnetic resonance imaging (MRI) has been used in L2 research as well (Van den Noort *et al.*, 2005). Could structural MRI provide more direct evidence on whether there are neuroanatomical changes in the brain prior to the end of maturation that can further explain why early L2 learners attain a higher level of proficiency than late L2 learners?

In a recent investigation by Mechelli *et al.* (2004), voxel-based morphometry (Ashburner & Friston, 2000; Good *et al.*, 2002) was employed to analyse structural plasticity in healthy right-handed English and Italian bilinguals and to assess the differences in the grey- and white-matter density between bilingual and monolingual subjects. In total, 83 subjects entered their study: 25 were monolingual who had little or no previous exposure to L2 and 25 were 'early' bilinguals, who had learned a second European language before the age of 5 and who had practised it regularly since. A total of 33 subjects were 'late' bilinguals who had learned a second European language between the ages of 10 and 15 and practised it regularly for at least 5 years. Moreover, all participants were native English speakers and factors like age and level of education were controlled for in this study.

Voxel-based morphometry showed that grey-matter density in one specific area in the brain, namely the inferior parietal cortex, was greater in bilinguals than monolinguals. This effect was significant in the left hemisphere and a trend was also observable in the right hemisphere. Although the observed increase of grey-matter density in the inferior parietal cortex was common to both early and late bilingual subjects, the effect was stronger in the early bilinguals in both hemispheres. However, no other significant effects were found in either grey or white matter.

In addition, Mechelli *et al.* (2004) were interested in the question whether there was a relation between brain structure and L2 proficiency and age of acquisition. In order to test this, 22 additional participants entered their study. All participants were native Italian speakers, who had learned English as an L2 when they were between 2 and 34 years old. L2 reading, writing, production and speech comprehension abilities were addressed using a battery of standardized neuropsychological tests. The results indicated that the overall proficiency, as indexed by principal component analysis (PCA), correlated negatively with age of acquisition. Quite remarkably, voxel-based morphometry further revealed that L2 proficiency correlated with grey-matter density in exactly the same brain area, namely the left inferior parietal region. Furthermore, grey-matter density

in this region correlated negatively with the age of L2 acquisition. Finally, no other significant effects were reported in either grey or white matter (Mechelli *et al.*, 2004).

Taken together, Mechelli *et al.* (2004) detected an increase in the density of grey matter in the left inferior parietal cortex of bilinguals relative to monolinguals, which is more pronounced in early rather than late bilinguals, and have additionally demonstrated that the density in this region increases with L2 proficiency but decreases as the age of acquisition increases. The reported findings could originate from a genetic predisposition to increased density, or from a structural experience-induced modification (Golestani *et al.*, 2002). It is most likely that early bilinguals acquire an L2 via social experience, rather than as a result of a genetic predisposition. According to the authors, the findings indicate that the structure of the human brain is altered by the experience of acquiring an L2. Previous L2 studies with fMRI had also shown activation in the inferior parietal region, for example during verbal-fluency tasks (Poline *et al.*, 1996; Warburton *et al.*, 1996). The results that Mechelli *et al.* (2004) reported are in line with the ever growing evidence that the human brain changes structurally in response to environmental demands as a function of learning in domains other than language (e.g. Draganski *et al.*, 2004; Maguire *et al.*, 2000). Mechelli *et al.* (2004) therefore concluded that the link between grey-matter density and performance which was observed in their study could be an instantiation of a more general structure–function principle that extends beyond the linguistic domain.

The corpus callosum

Another structural study on this issue was conducted by Coggins *et al.* (2004). In contrast with the study of Mechelli *et al.* (2004), they found structural variations between monolinguals and L2 learners not in the inferior parietal cortex, but in the corpus callosum. The possible role of the corpus callosum in L2 acquisition will now be further discussed (Van den Noort *et al.*, 2006a; also see Temple *et al.*, 1990).

During the process of L2 and/or third language (L3) acquisition, the human brain is subject to cortical adaptation to accommodate multiple languages either by employing existing areas used for the L1, or by establishing new cortical networks in distinct adjacent regions which are necessary to deal with certain functional aspects of the L2/L3 (Coggins *et al.*, 2004). However, irrespective of how the cortex happens to organize the circuitry that is required to deal with multiple languages, all non-reflexive behaviours (including cognition and communication) are

normally the result of unconscious coordination of activity between the left and right hemispheres via the cerebral commissures (Coggins *et al.*, 2004). The corpus callosum is the main fibre tract that links the two brain hemispheres, and consists of approximately 200–350 million fibres in humans (Aboitiz *et al.*, 1992a, 1992b; Nolte, 1998; Thompson *et al.*, 2000; Thompson *et al.*, 2002).

Several studies have shown that fibres from the language areas in the superior temporal gyrus (Wernickes' area, planum temporale) travel through a specific part of the corpus callosum, namely, the isthmus of the corpus callosum (Von Plessen *et al.*, 2002). Moreover, Dimond *et al.* (1977) reported that the body of the corpus callosum is specifically engaged in language processing. A substantial enlargement in the language cortex itself was found as well, suggesting a key maturational phase in brain areas that support the acquisition of novel languages.

As already briefly discussed, only one study has been conducted on corpus callosum variability between monolingual and bilingual subjects (Coggins *et al.*, 2004). In this investigation, 19 right-handed adult male and female subjects were involved. There were 12 bilingual and seven monolingual subjects and all of them were teachers. Individuals from the bilingual group reported to have advanced to superior levels of L2 proficiency according to the *ACTFL Proficiency Guidelines* (American Council for the Teaching of Foreign Languages, 1983). The average age of the bilingual subjects was 38 years (range 25–57) and there were seven females and five males. The seven monolingual subjects (five males and two females) reported no previous experience with an L2 and their average age was 45 years (range 29–59). In this study, MRI was used to obtain images of the corpus callosum. To be more specific, a mid-sagittal section of the corpus callosum was imaged and used for this study. Using a modification of Witelson (1989), the mid-sagittal corpus callosum snapshots were partitioned plane into five subregions: Region 1, anterior third; Region 2, anterior midbody; Region 3, posterior midbody; Region 4, isthmus; Region 5, splenium (for details, see Coggins *et al.*, 2004).

So far, it is too premature to draw any firm conclusions on whether the difference in the anterior midbody that was found is reliable and whether the larger posterior midbody to total corpus callosum mid-saggital area ratio and the larger isthmus to total corpus callosum mid-saggital area ratio will also be significant in a larger sample size. Based on this preliminary study, however, the first findings seem to be consistent with the hypothesis that structural changes in the corpus callosum are taking place during the process of L2 acquisition. Significant differences in the corpus callosum between the monolingual and the bilingual groups were found;

the anterior midbody to total corpus callosum mid-sagittal area ratio was significantly larger in the bilinguals compared to the monolinguals. However, these results should be interpreted cautiously due to the rather small sample size of the study (Coggins *et al.*, 2004).

General Discussion

Much (psycho)linguistic research has addressed the factor of age in L2/L3 acquisition (Birdsong, 2006). There is still a hot debate going on about the existence of a critical period. Moreover, the functional neuroimaging results on the factor of age in L2/L3 acquisition are still far from consistent and, as a result, could not really answer the raised questions and complete the debate. There are several explanations for these different functional neuroimaging findings, but the use of different experimental paradigms that are employed in the bilingual and multilingual studies and the differences in onset, proficiency and exposure of the selected participants seem to be the most important ones. Moreover, although in recent years important progression has been made, it cannot be categorically excluded that certain methods may not be fine grained enough, yet, to reveal subtle differences. This does not mean that no reliable differences between hemodynamic activation patterns during L1 and L2 language processing have been observed at all, but so far, they have only been found for subgroups of bilingual speakers and predominantly in the direction of stronger activation during L2 processing (Abutalebi *et al.*, 2001; Indefrey, 2006; Stowe & Sabourin, 2005).

Recently, structural MRI has been employed in L2 research, as well. Here, the main questions of interest are (1) Are there any structural plastic changes in the human brain during the process of L2 acquisition?, (2) Is there a specific region responsible for L2 acquisition? and (3) How structural plastic changes differ among young and older L2 learners?

Despite the fact that only two structural neuroimaging studies were conducted so far, the results of the structural neuroimaging as yielded in Mechelli *et al.* (2004) are in line with growing evidence that the human brain changes structurally in response to environmental demands. Mechelli *et al.* (2004) conclude that the degree of this structural reorganization in bilinguals is correlated with their L2 performance. However, the relationship between grey-matter density and performance that was found in the study by Mechelli *et al.* (2004) could be just a part of a more general structure–function principle that goes beyond the domain of language.

In other words, does this mean that there is no specific brain region in which structural changes can be observed during the process of L2

acquisition? The available data are not decisive about this point, but allow some room for speculation. In any case, more structural studies need to be done in future. At the end of this chapter, we discussed the possible role of another brain area, namely the corpus callosum, in which structural differences between monolingual subjects and learners of L2 were reported. So far, only one study on corpus callosum variability between monolinguals and bilinguals was conducted, showing that the anterior midbody to total corpus callosum mid-sagittal area ratio was significantly enlarged in the bilinguals relative to the monolingual subjects (Coggins *et al.*, 2004).

Conclusion

It seems that no functional neuroimaging investigation to date has provided data that can be used to distinguish between competing psychological theories (Coltheart, 2006); in our case, this would be for example the competition between the maturational accounts of the CPH (Bates *et al.*, 1992; Johnson & Newport, 1989) and the theories considering the role of learning costs following the end of the critical learning period and roughly the onset of the age of reproduction (e.g. Cecconi *et al.*, 1996). Future combination of functional and structural MRI studies on L2/L3 acquisition could eventually fill this gap and provide a better insight on the exact role of the inferior parietal region and the corpus callosum. Such combined studies could also provide a clearer picture about more specific language areas involved in the process of L2/L3 acquisition. However, until then, it is too premature to claim that the CPH is wrong.

Future research might also address another important question, namely how does the L2/L3 speakers control which language is in use (Crinion *et al.*, 2006; Friederici, 2006; Van den Noort *et al.*, 2006b)? Furthermore, these combined functional and structural MRI studies could answer the question whether the relationship between grey-matter density and L2/L3 performance is indeed only an example of a more general structure–function principle that extends beyond the linguistic domain. The other possibility is that it is more (L2/L3) language specific.

Finally, we note that no theory of L2 acquisition is going to be complete until it can fully incorporate the evolutionary aspects of language learning (Niyogi, 2006), its links to the emergence and development of other (especially memory-related) cognitive functions and other biological properties that may limit the language-learning capacity. For example, the emergence of more complex cognitive abilities and their neurobiological organization may interfere with the acquisition of language beyond the age of 13. From the evolutionary point of view, a stable

(critical) learning period does not seem to maximize the average fitness of the population in question, and if this period becomes too long, it reduces the reproduction rate in the population due to learning costs (Komarova & Nowak, 2001). On the other hand, too short learning periods result in an imperfectly acquired language knowledge, which again reduces the average fitness. In other words, if the critical learning period for (second) language acquisition truly exists, together with its underlying neural mechanisms, then mathematically, this period could represent an evolutionary stable strategy, or Nash equilibrium (Nash, 1950; for details, see Komarova & Nowak, 2001).

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Chapter 2

The Critical Period Hypothesis: Evidence from Information Structural Processing in French

ROBERT V. REICHLE

Introduction

In the area of psycholinguistics and language acquisition, age-related effects on second language (L2) acquisition have been the focus of intense prior research. Among other questions, previous work has examined the extent to which speakers of a second language can acquire an L2 to native-like proficiency (Flege *et al.*, 1999; Friederici *et al.*, 2002) and whether there is a critical period for acquiring subdomains of an L2, such as syntax, to native-like levels (Birdsong & Molis, 2001; Johnson & Newport, 1989).

While psycholinguistics has set its sights on many morphosyntactic phenomena in the existing body of research, for the most part it has ignored the intriguing area of information structure (IS). IS can be described as the interface between syntactic form and pragmatic function, or in other words, the way in which a speaker uses cues from sentence structure to guide a hearer toward knowing what is more or less important in a sentence. These relations between the more and less prominent take the form of topic, focus, presupposition and assertion relations between the constituents of an utterance. IS lies at the intersection of semantics (since pragmatics deals with the relations between real-world referents and how speakers choose to refer to those referents in speech) and syntax (since different IS configurations result in different word orders or syntactic constructions). French IS is an interesting case because, unlike English IS (which relies heavily on prosody and word accent to distinguish between topic and focus elements), French IS makes extensive use of syntactic constructions to express information structural distinctions. As such, French IS is well suited for investigation using visual presentation of stimuli.

Previous research on L2 acquisition has shown effects for age when subjects engage in grammaticality judgment tasks; however, tasks relating to violations of expected IS have so far been underrepresented in the body of research. This study uses behavioral data to address the following research question: Are there age effects in the explicit processing of IS errors among L2 subjects, and if so, does the geometry of these effects support a critical period for this facet of L2 acquisition?

Information Structure

Within the framework of IS, it is posited that the syntactic constructions and prosodic patterns employed in speech are dictated by the mental states of the interlocutors, that is they are determined by context (Lambrecht, 1994). To illustrate the relevance of information structural phenomena to French, some basic terms must first be defined.

IS can be briefly defined as the study of three parameters: the speaker's assumptions concerning the hearer's (1) knowledge or belief state; (2) his temporary state of consciousness; and (3) his state of interest in a given topic of conversation (Lambrecht *et al.*, 2006). The present study is mainly concerned with these parameters inasmuch as they relate to the notions of topic and focus.

Parameter 1 – the hearer's knowledge or belief state – is relevant to the speaker's pragmatic presuppositions (the propositions and referents that are assumed to be already known to the interlocutor) and pragmatic assertions (the propositions and referents that are assumed by the speaker to be known only as a result of the interlocutor's hearing the utterance). The speaker takes into account these beliefs about the hearer's state of knowledge and, in conjunction with his beliefs regarding the hearer's state of interest (i.e. Parameter 3), the speaker accords a degree of topic or focus to the constituents within the utterance. Focus can be defined as the 'element of information whereby the assertion differs from the presupposition' and topic as the constituent 'relative to which a predication is to be assessed as relevant information' (Lambrecht *et al.*, 2006). In other words, the focal element is granted a level of prominence greater than that of the rest of the proposition, and it is telling the hearer something new or different with regard to the topic, which is what the sentence is 'about'.

Cross-linguistically, languages use a variety of methods to allow for the marking of a constituent as focal. French has several constructions at its disposal for this purpose, most of which rely on clefting, dislocation or some other variation from canonical word order to indicate different types of focal relations (Lambrecht, 1994). The most relevant of these to the

present study is the *c'est* cleft. A cleft construction expresses a simple proposition by way of biclausal syntax; in French, this typically consists of a copula clause and a relative clause that share a coindexed referent (Lambrecht, 2001). Compare the following sentences, which both express the proposition of a piece of pizza being located on a table (pitch accent in English is represented by capital letters):

(1a) *La pizza se trouve sur la table*
'The pizza is located on the table'
(1b) *C'est la pizza qui se trouve sur la table*
'The PIZZA is located on the table'

Both sentences communicate an identical spatial relationship between the referents of *la pizza* and *la table*, but they convey different configurations of IS parameters. Sentence (1a) exemplifies the canonical French sentence, and as such illustrates the unmarked IS configuration, where *la pizza* (the grammatical subject) functions as the topic constituent, and the predicate *N se trouve sur la table* is the focal element. This kind of configuration is known as a predicate-focus sentence, and is considered the unmarked method of commenting on a topic that is the grammatical subject of a sentence (Lambrecht, 1994). Sentence (1b), on the other hand, is an argument-focus sentence. The cleft construction puts the argument *la pizza* in focus, while the proposition *N se trouve sur la table* is the topic constituent. For a sentence like (1b) to be uttered, there must be a previously existing context asserting the presence of some object on the table. Once the proposition *N se trouve sur la table* has been asserted, its topicality is now presupposed, allowing the speaker of sentence (1b) to place focus on the referent that is located on the table, rather than placing focus on the fact that there is some object on the table as in sentence (1a). Consider the exchange in (2), spoken in the presence of a piece of pizza on a table:

(2a) **X:** *C'est quoi qui se trouve sur la table?*
'WHAT'S on the table?'
(2b) **Y:** *C'est la pizza qui se trouve sur la table.*
'The PIZZA is on the table.'
(2c) **Y:** #*C'est sur la table que se trouve la pizza.*
'The pizza is on the TABLE.'

Speaker X's turn in (2a) establishes the proposition that something is located on the table; furthermore, it places argument focus on the unknown item on the table as opposed to placing predicate focus on the proposition 'something is on the table'. Speaker Y's response in (2b) is an appropriate follow-up – Y keeps the focus on the previously unknown item, and retains

the proposition of something being on the table as a topical element. The response in (2c), however, is not contextually appropriate. Here the speaker treats the previously unknown item as a topic, despite the fact that its identity has not yet been asserted or established as a topic. In addition, (2c) inappropriately treats 'sur la table' as a focus constituent, even though (2a) established it as a topic. Note that there is nothing semantically wrong with (2c) – the sentence accurately reflects the spatial relations of the referents – nor are there any syntactic errors. (2c) is anomalous strictly from an information structural/pragmatics point of view.

Previous Critical Period Research

Lenneberg (1967) popularized the idea of a critical period for language acquisition ending around puberty, claiming that after this period, first language (L1) acquisition would be impossible and L2 acquisition would be fundamentally different. This original version of the critical period hypothesis related to L1 acquisition only; however, the theory has since been extended to L2 acquisition, in part because of the great difficulty in finding direct evidence for or against such a theory when restricted to first languages. According to the strong version of what has become known as the critical period hypothesis for L2 acquisition, speakers who acquire an L2 after puberty would exhibit a substantial deficit in production and comprehension accuracy compared to L2 speakers who acquire the language before the end of the proposed critical period. However, if the period during which cognitive and maturational changes take place has already passed, all L2 learners who acquire the language after the critical period should be equally poor at acquiring it. So, while one would expect to see age effects between pre and postcritical period groups, one would not expect to see a *continuous* age effect for those who were first exposed to an L2 *after* the end of the critical period. Such postmaturational age effects would be seen as evidence against a strong version of the critical period hypothesis for L2 acquisition.

A critical period can be defined in a general sense according to its geometry and timing, and the geometric characteristics of the learner's sensitivity to the L2 plotted against age of arrival play a role in showing the existence of any putative critical period. Birdsong (2005) defines a critical period as

> . . . the temporal span during which an organism displays a heightened sensitivity to certain environmental stimuli, the presence of which is required to trigger a developmental event. Typically, there is

> an abrupt onset or increase of sensitivity, a plateau of peak sensitivity, followed by a gradual offset or decline, with subsequent flattening of the degree of sensitivity. (Birdsong, 2005: 111)

The notion of a plateau in sensitivity, followed by a decrease and eventual flattening, has come to motivate much of the psycholinguistic research on age effects. Various behavioral measures (e.g. grammaticality judgments, measurements of reaction time) can be used to index performance with age of arrival. With a sufficiently large pool of subjects with various ages of arrival, one can plot performance against age of arrival to look for this type of geometry.

Figure 2.1 illustrates two possible interpretations of what is meant by a critical period. In Figure 2.1(a), the critical period includes only the peak in sensitivity. Once the gradual decline in sensitivity begins, the critical period has already passed. This is an unconventional view of the putative critical period as it relates to language acquisition; a more common definition is the one illustrated in Figure 2.1(b), where the critical period includes all periods of heightened sensitivity, including the onset and offset, if present (Birdsong, 2005). While the general definition of a critical period includes an onset, we can ignore this when speaking specifically about language acquisition because sensitivity to language acquisition is generally considered to be at or near its peak shortly after birth (hence the relative ease of child language acquisition). Therefore, a critical period for language acquisition would start at the peak level of sensitivity and include any decline and subsequent reduced level of sensitivity that follows. This representation of a critical

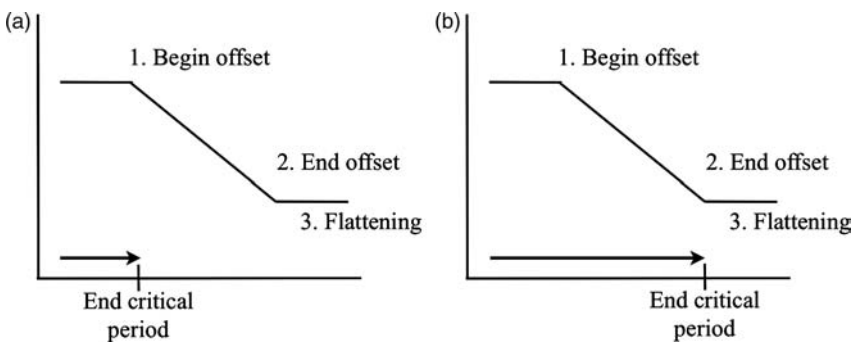

Figure 2.1 (a) An unorthodox representation of a critical period lasting only during the peak of sensitivity; (b) an orthodox representation of a critical period including both the onset and offset of sensitivity (adapted from Birdsong, 2005 by permission of Oxford University Press, Inc.)

period, containing discontinuities of linearity only between peak and offset and between offset and floor, is referred to as the 'stretched Z' representation by Birdsong.

Contrast the stretched Z of Figure 2.1(b), with its two discontinuities, with the three alternative representations in Figure 2.2. As Birdsong points out, these are logical possibilities for age effects on language acquisition; however, they do not qualify as true critical periods.

Figure 2.2(a) shows an age effect; however, it cannot be due to maturation since it only begins once maturation has ended. Additionally, the decline in sensitivity is unbounded because it never hits floor level, and it therefore cannot be considered a 'period'. Figure 2.2(b) shares this trait of unboundedness, keeping it from being a true 'period'; however in this case the age effect is a maturational effect, since it begins before maturation ends. The representation in Figure 2.2(c) is neither bounded nor does it contain any discontinuity at all. Rather, sensitivity is highest at birth and continually declines from that moment.

The geometry and timing of behavioral performance plotted against age of acquisition can provide evidence for or against a critical period. A pattern of data reflecting the 'stretched Z' would support a critical period for language acquisition; a pattern of data showing an unbounded decline, or one without a discontinuity shifting between a peak and an offset, would contradict the critical period hypothesis.

Of the many studies showing a negative correlation between an L2 learner's age at the time of arrival in the target environment and their ability in the L2, some have provided geometric evidence for, and others against, a critical period for L2 acquisition. Johnson and Newport (1989) administered grammaticality tests to Korean and Chinese L1s who had acquired English as an L2. Their results showed a negative correlation between age and grammaticality judgment accuracy leading up to puberty,

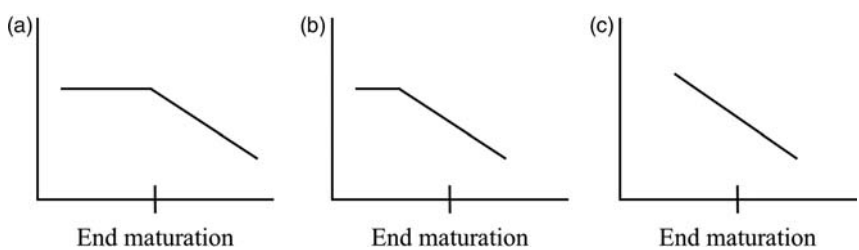

Figure 2.2 Age functions with (a) discontinuity at the end of maturation, (b) discontinuity before the end of maturation, and (c) a linear decline (adapted from Birdsong 2005 by permission of Oxford University Press, Inc.)

at which point there was a discontinuity in the linearity of the data, leading to what the authors interpreted as a leveling-off of proficiency after puberty; this was taken as evidence for a critical period.

However, in a replication of this study, Birdsong and Molis (2001) found conflicting results. In replicating the study with Spanish L1s, they saw a negative correlation between age and accuracy that continued after the critical period. They also claimed that these results could be continuous with the results of early-AoA (age of arrival) L2 speakers (whose accuracy results were near perfect) due to a ceiling effect on the early-AoA group. Another noteworthy result of Birdsong and Molis was evidence supporting the claim that late-AoA L2 learners can in fact reach a state of native-like proficiency; by their estimates, between 5% and 20% of L2 speakers reach this state. Along similar lines, Flege *et al.* (1999) conducted a study with Korean L1s that provided partial evidence against a critical period. Their results showed a discontinuity in the effect of AoA on accuracy for tests of phonological production; this discontinuity did not coincide with the end of the proposed critical period. In tests of syntactic production, however, Flege *et al.* did observe a discontinuity that coincided with the end of the putative critical period. Taken together, these (and other) studies show mixed evidence for a critical period for various morphosyntactic and phonological aspects of language acquisition.

Behavioral Study

A behavioral study was formulated to test the following hypothesis: Postmaturational age effects will be seen in explicit and implicit IS processing, which would serve as evidence against a strong version of the critical period hypothesis as it relates to the acquisition of IS in the L2.

Subjects

In this study, late-stage L2 speakers of French were asked to judge the acceptability of 60 exchanges containing a variety of syntactic constructions used to communicate IS in French.

Control subjects ($N = 44$) were adult native speakers of French. Subjects in the experimental group ($N = 26$) were end-state speakers of French as an L2, with the L1 being English. All subjects were at least 18 years of age. End state was defined as having lived in a Francophone country, and having used French as their primary language, for four or more years. The length of residency ranged from four to 32 years; the mean length of residency was 10 years. Nine subjects in the experimental group submitted

incomplete surveys, and were eliminated from the analysis; thus, in the final analysis of the L2-speaker group, $N = 17$.

Procedure

Via e-mail, subjects received a link to an online biographic questionnaire and a 60-item survey. Subjects were asked questions pertaining to their language use; in particular, they were asked to estimate the percentage of the time they hear and speak French at work, at home and with friends, as well as to rate their own knowledge of French vocabulary, syntax and pronunciation on a scale of 1 to 10. Information on the subjects' language history (languages spoken, countries of residence) was also collected. L2 subjects were asked to provide information regarding their age at the time of arrival in a francophone environment and the duration of residence there.

Stimuli were presented in 10 blocks of six exchanges. Each block was presented in conjunction with an onscreen image providing a context for the exchanges. Each exchange contained a question and a response relating to the image. Subjects rated each exchange as acceptable or unacceptable.

The stimuli included three different types of IS anomalies. Stimuli under the rubric of Anomaly 1 begin with the question *C'est quoi qui se trouve sur la table?* ('WHAT is on the table?'). The cleft construction *c'est quoi qui* places focus on *quoi* ('what'), leading to the expectation that the constituent whose referent is coindexed with *quoi* will also be in focus in the response. In the control stimuli this is the case, as the response contains a felicitous IS configuration (3a); in the other half of the stimuli, the IS configuration is inappropriate in that it unexpectedly places focus on *la table* (3b).

(3a) (expected IS configuration):
C'est quoi qui se trouve sur la table? 'WHAT is on the table?'
C'est un marteau qui se trouve sur la table. 'A HAMMER is on the table.'

(3b) (infelicitous IS configuration):
C'est quoi qui se trouve sur la table? 'WHAT is on the table?'
#C'est sur la table que se trouve un marteau. 'A hammer is on the TABLE.'

With Anomaly 2, we see a question of the type *Il est où le marteau?* ('WHERE is the hammer?'), in which *où* ('where') is focal. The expected response is *Le voilà, le marteau* ('THERE is the hammer'), in which the location of the hammer is focal (4a). In the anomalous condition, a cleft construction in the response leads *le marteau* ('the hammer'), otherwise the expected topic, to be focal (4b), rather than its location.

(4a) (expected IS configuration):
Il est où le marteau? 'WHERE is the hammer?'
Le voilà, le marteau. 'THERE is the hammer.'
(4b) (infelicitous IS configuration):
Il est où le marteau? 'WHERE is the hammer?'
#C'est le marteau qui est là. 'The HAMMER is there.'

Under Anomaly 3, a brand-new referent is treated as a topic. Following the question *Qu'est-ce qu'il y a sur la photo?* ('What's in the photo?'), the reader might expect a presentational *il y a* construction to introduce a brand-new referent, as in (5a). In the anomalous response, the item in the photo is treated as a topic, which is infelicitous given it ought to be treated as brand new (5b).

(5a) (expected IS configuration):
Qu'est-ce qu'il y a sur la photo? 'What's in the photo?'
Il y a un marteau qui est sur la table. 'There's a HAMMER on the table.'
(5b) (infelicitous IS configuration):
Qu'est-ce qu'il y a sur la photo? 'What's in the photo?'
Il est sur la table, le marteau. 'The hammer is on the table.'

Analysis

Judgment task scores for the expected and infelicitous IS configurations for each of the three anomalies were calculated for all participants. A *t*-test showed a statistically significant difference in performance between the two subject groups ($p = 0.0035$). An analysis of variance (ANOVA) was then performed to look for interaction effects between the subject group and the type of IS configuration tested. The ANOVA showed a non-significant *p*-value of 0.069 for the interaction of subject group and type of IS construction on score. However, an inspection of the interaction line plot for score shows that some of the IS constructions in question evoked significant differences in responses between the two subject groups (Figure 2.3).

One possible explanation for the differences in performance between the types of IS constructions is that, for speakers of French as an L2, some of the IS anomalies are more shocking than others. The L2 subjects performed similarly to the L1 subjects for the control and condition stimuli for the first type of IS anomaly (see Example 3) and the control cases of the third type of IS anomaly (see Example 5a). The L2 subjects' scores suggest that the control stimuli for these IS constructions were transparently grammatical, and that they had little trouble judging their acceptability. Along

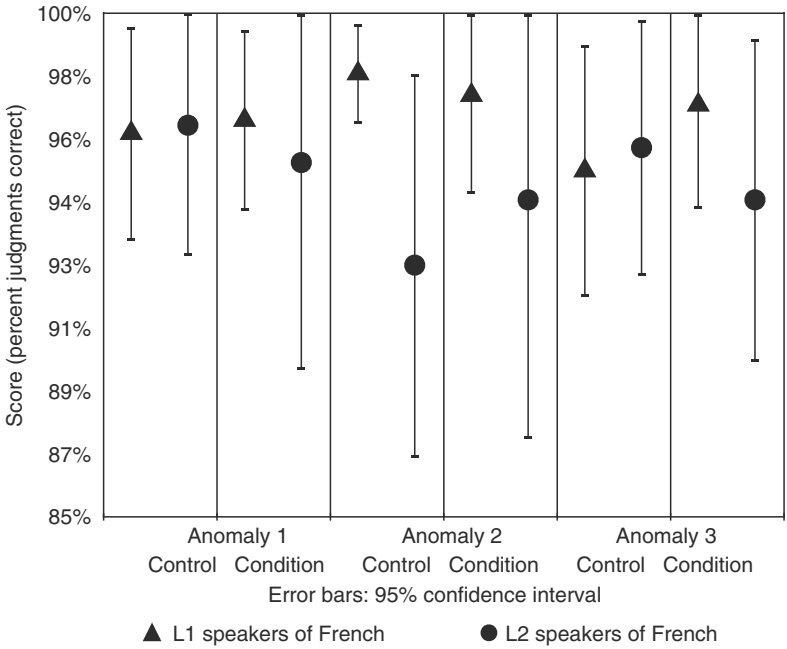

Figure 2.3 Interaction line plot for score

the same lines, the near-native-like performance on the condition stimuli for Anomaly 1 suggests that L2 speakers of French can readily see the unacceptability of these types of IS anomalies, and perform within the range of nativelikeness in judging their unacceptability.

A second possibility for the differences between IS constructions is that L1 respondents judged the acceptability of some of the constructions based on the principles of normative grammar, despite being instructed not to do so. Native speaker informants affirmed that the control sentences would be acceptable in spoken French, but given the social conditions under which French schoolchildren learn about grammar, subjects might rate them as unacceptable due to strong normative attitudes toward the written language. On this basis, responses from subjects who appeared to reject the premise of the question and judged entire categories of control stimuli as unacceptable were removed from the analysis.

Correlations between performance and L2 subjects' ratings of self-proficiency were calculated. All measures of self-assessment showed

statistically significant, though weak, correlations with performance. The correlations for self-ratings of vocabulary ($r = 0.338$, $p = 0.0007$), syntax ($r = 0.223$, $p = 0.0287$) and pronunciation ($r = 0.414$, $p < 0.0001$) indicate that there is a relationship between an L2 learner's self-image of proficiency and their actual proficiency in the area of IS.

The correlation between age of arrival in the L2 environment and performance on the judgment task was calculated, as measured by each subject's averaged scores for the control and condition stimuli for each type of IS anomaly (Figure 2.4). A weak negative correlation between AoA and performance was observed that fell just short of significance ($r = -0.460$, $p = 0.063$). A visual inspection of the data shows a cone-shaped distribution pointing downward from ceiling level and widening with later AoA. While many subjects exhibited ceiling-level performance, the greater number of lower-performing scores for higher-AoA subjects is in line with a general trend of age effects after maturation.

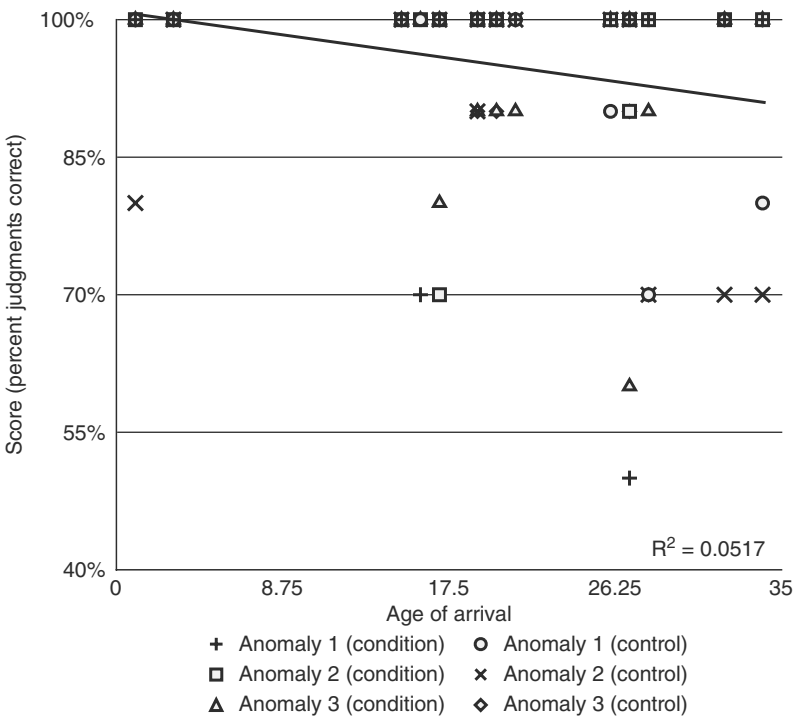

Figure 2.4 Scatter-plot of AoA versus performance on acceptability judgment task.

The presence of ceiling-level performance, followed by an unbounded age effect extending well into adulthood, matches the basic geometry of Figures 2.2(a) or 2.2(b). As this geometry is not compatible with the 'stretched Z' of Figure 2.1(b), the results of this study appear to be incompatible with the notion of a critical period for the acquisition of these information structural configurations for native speakers of English acquiring French as an L2.

Conclusion

The statistically significant results outlined above show that there are observable differences between L1 and L2 speakers of French when looking at their performance in tasks relating to IS. Despite the somewhat weak correlation, there is evidence for a decline in L2 speakers' ability to judge the acceptability of ill-formed information structural configurations as age of arrival in the L2 environment increases. The relationship between judgment task proficiency and age of arrival continues to decline past the years of physical and cognitive maturation and well into adulthood, unlike the 'stretched Z' of a putative critical period. Thus, the hypothesis that postmaturational age effects would be observed for L2 speakers is supported by the geometry of this correlation. This acts as evidence against a strong version of the critical period hypothesis for L2 acquisition regarding the acquisition of IS in French. The results also show a relationship between speakers' self-ratings of proficiency and their ability to make judgments regarding French IS; the influence of these factors on the processing of IS in the L2 warrants further investigation.

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Chapter 3

*On Neuroanatomical Substrates of Dyslexia: With Some Implications for Foreign Language Acquisition**

JOANNA NIJAKOWSKA

Introduction

Dyslexia extorts an interdisciplinary study and consensus of neuroscience, cognitive science and learning theory, quite naturally inviting their application in education. It seems to be a very intriguing and controversial phenomenon, widely investigated from many diverse standpoints. Over the past few decades, a considerable amount of research has been devoted to identifying the probable causes of specific reading disability–developmental dyslexia. Admittedly, an outstanding progress in such scientific fields associated with dyslexia as neuroscience, brain imaging and genetics has revealed several previously unknown facts indicating polyetiology of dyslexia (Bogdanowicz & Adryjanek, 2004). The complexity of the phenomenon of dyslexia, largely brought about by its multiple behavioral manifestations, has given rise to numerous and, indeed, at times controversial etiological theories of the disorder which nevertheless have gained substantial interest and generated a great deal of research in recent years. The contemporary theories attempt to delineate the areas of dyslexic difficulties that can be looked upon from many perspectives depending on the specific discipline that undertakes the analysis. In order to avoid confusion in dyslexia research, a need for consensus is highlighted since, obviously enough, understanding such a complicated condition would require a complex, interdisciplinary cooperation leading to the

*The present paper is part of a larger study on the phenomenon of developmental dyslexia (Nijakowska, 2010).

formulation of a causal theory of dyslexia. Such a theory, as it stands, should be capable of explaining the symptoms, their underlying causes as well as an optimal therapeutic and support system (Fawcett & Nicolson, 2001; Nicolson, 2001; Reid & Fawcett, 2004).

Developmental dyslexia has been classically defined as a severe specific difficulty in acquiring the faculty of reading and writing, which is unexpected as regards other cognitive abilities, social and educational opportunities as well as sensory acuity (Bogdanowicz, 1994). The discrepancy between dyslexic potential and scholastic achievement is indisputably evident. The failure is incontestable despite conventional teaching methods that proved effective as relates to other individuals. Dyslexic difficulties are largely attributable to phonological deficit (Bradley & Bryant, 1983; Snowling, 1981) that has obtained the strongest support from the functional imaging[1] studies, repeatedly indicating that the areas engaged in phonological processing (e.g. left perisylvian cortex, left middle and inferior temporal cortex) tend to demonstrate malfunction in dyslexic brains (Silani *et al.*, 2005). Unsurprisingly, there are considerable individual differences determining the ease and pace of the acquisition of the phonological awareness as well as the ability to read and spell. Ramus *et al.* (2003) support the view that the most pronounced cognitive problem in dyslexia reflects low-grade phonological skill. However, this does not preclude the occurrence of reading disorders where problems are not provoked by poor phonological skills. Thus dyslexic difficulties may be prompted by other deficits that might be totally independent of phonological abilities, for example, the dysfunction of the visual and auditory magnocellular pathways (Stein, 2001; Stein & Talcott, 1999; Stein *et al.*, 2000a, 2000b, 2001; Talcott *et al.*, 1999, 2000), or the cerebellar disorder (Fawcett & Nicolson, 1999, 2001, 2004; Fawcett *et al.*, 1996), both of which have also gained some underpinning from functional imaging investigations.

A thorough discussion of etiological theories of dyslexia, with reference to biological, cognitive and behavioral level, is out of the scope of the present article; hence, its focus is solely on the neuroanatomical correlates of developmental dyslexia, with some implications for foreign language (FL) acquisition.

Following is a comprehensive presentation of select research findings regarding the neuroanatomical substrates in dyslexia.

Neuroanatomical Substrates in Developmental Dyslexia

The concept of specific developmental reading disorder originated from the background of acquired brain disease (Borkowska, 1997). Firstly,

striking similarities were observed between the symptoms of acquired reading disabilities in adult patients being the result of brain damage and inherent or inborn reading difficulties (Bogdanowicz, 1989, 2003; Bogdanowicz & Adryjanek, 2004). Dyslexic individuals demonstrate distinct differences in the brain anatomy, brain activity and function from non-dyslexic individuals. Moreover, the abovementioned differences have been assigned the responsibility for the occurrence of the specific learning difficulty encountered by dyslexics. Hence in the organic theory it is maintained that dyslexia may be caused by the malfunction or minimal brain damage (MBD) to these areas of the brain that are responsible for language processing due to activity of various pathogenic factors on the central nervous system in prenatal and perinatal life.

Areas in the upper posterior part of the left temporal lobe, in particular, planum temporale[2] have been claimed to be critically involved in phonological processing. Thus, naturally enough, attempts to explain impairments in phonological processing concentrated on abnormal or non-existent brain laterality in these areas as well as on the structural anomaly of the planum temporale (Hugdahl *et al.*, 2003). Several researchers have investigated reduced or reversed leftward asymmetry of planum temporale; unfortunately, the results they have obtained varied. For instance, the postmortem analyses of dyslexic brains have demonstrated substantial evidence for the lack of typical structural asymmetry as regards planum temporale, which is normally bigger in the left hemisphere, while in people with dyslexia it is of a similar size in both cerebral hemispheres (Galaburda *et al.*, 1978; Galaburda, 1985, 1993). In addition, several magnetic resonance (MR) imaging studies of the brain structure in dyslexic individuals have indicated reduced or reversed asymmetry of language areas in the temporal lobe. Still, this view seems to be challenged by some more recent studies of the planum temporale.[3] For example, Heiervang *et al.* (2000) in their study hypothesized that reduced asymmetry of planum temporale and/or smaller left planum temporale in dyslexic children would be connected with reduced right ear advantage (REA) on the dichotic listening task.[4] The study addressed an apparently crucial issue whether deviant structure of the brain areas engaged in speech sound perception and processing equals functional deficit. Such functional investigation as regards left hemisphere speech sound processing involves a dichotic listening test. However, what the researchers have demonstrated was both normal structural asymmetry assessed by the size of planum temporale and functional asymmetry indicated by the dichotic listening ear advantage in dyslexic subjects participating in the study. No significant differences were spotted in planum temporale asymmetry between

dyslexics and controls; both groups demonstrated a mean leftward asymmetry of the area in question. Moreover, dyslexics and controls alike showed a normal REA on the dichotic listening task. However, a small (10%) reduction of the planum temporale size was signified in dyslexics, while it was apparently absent in controls. Additionally, planum temporale asymmetry and reading in dyslexics were not correlated, while a positive correlation between these two variables was shown in the control group, thus it would seem that leftward asymmetry as regards planum temporale may be connected with normal reading but not with impaired reading. Finally, deviant shape or morphology of the planar area was demonstrated in dyslexics. Thus, altogether the study has shown that subtle developmental abnormalities may indeed be associated with dyslexia.

Another study conducted by the same group of researchers (Hugdahl *et al.*, 2003) provided support for their previous findings, namely, again the results were that left planum temporale was significantly larger than the right one in dyslexics and controls. Still, left planum temporale appeared significantly smaller (9%) in the dyslexic group, whereas right planum temporale was similar in size in both groups. Again, both groups demonstrated a significant REA; however, right ear scores in dyslexic group were reduced as compared to controls, while the left ear score resembled the scores gained by the control group. It has been suggested that normal REA in dyslexic subjects, despite smaller left planum temporale, means that planum temporale is not unique for phonological processing. All in all, Leonard *et al.* (2006) perceive the view that dyslexic children are characterized by symmetrical planum temporale as a long-lasting misconception. They further report that findings in their sample run counter to the idea of existence of an association between planum temporale asymmetry and several reading and language variables which were previously indicated in other studies.

A different set of findings refers to anomalies of cell migration (ectopias and dysplasias) reported to exist in the perisylvian cortex of dyslexic brains, principally in the left hemisphere. Ectopias are defined as small areas of inadequately placed neurons clustered around the temporoparietal junction; they consist of about 50–100 neurons that missed their target in the cortex during the course of neural migration (Ramus, 2004). Dysplasias, described as the focal malformations of the architecture of the cortex, have been shown to be bilaterally located; nevertheless, their number was greater in the left hemisphere in all the examined brains. Ectopias and dysplasias are claimed to result from the focal lesions to the maturing brain which take place during the migration of neurons to the cortex at about the fifth month of the fetal life (Borkowska, 1997; Stein,

2001). It is claimed (Borkowska, 1997) that the cortical lesions to the left hemisphere acquired before birth may lead to increase in the size of the right hemisphere, which in turn can result in the abnormal structural symmetry observed in dyslexic brains.

Yet another anatomical difference concerns the corpus callosum – the tissue connecting two cerebral hemispheres, allowing for communication and flow of information between them – the largest neural pathway connecting two cerebral hemispheres. It is built of several parts connecting particular areas of the left and right cerebral cortex. It has been indicated that the corpus callosum, and in particular its back part called splenium, which connects the parts realizing language functions, are considerably larger in dyslexics (Bloom & Hynd, 2005; Galaburda, 1993; Preis *et al.*, 2000). As indicated by Bloom and Hynd (2005), most studies report certain abnormalities in the size of corpus callosum, they are probably directly connected with reduced cortical asymmetry. However, the evidence regarding the size of the corpus callosum in developmental dyslexia is conflicting: both smaller and larger corpus callosi have been found in dyslexics. Thus, taking into account the anatomical data, it might be hypothesized (Bednarek, 1999; Stein, 2001) that dyslexia is connected with the failure to establish a hemispheric specialization. It is further implied (Bednarek, 1999) though that it is difficult to define the activity of the brain organized in that particular way and to qualify the influence it has on the process of reading.

The most direct evidence that many dyslexics may have impaired development of the visual magnocellular system comes from the postmortem examination of dyslexic brains. This finding has been further confirmed by electrophysiological studies and functional imaging studies (fMRI). It has been found that the magnocellular layers of the lateral geniculate nucleus (LGN) of the thalamus were disordered and the neurons were about 30% smaller in the area as compared to non-dyslexic brains. These abnormalities are known to arise during the early development of the brain, as is the case of ectopias, during the phase of rapid neuronal growth and migration during the fourth or fifth month of fetal life (Galaburda & Livingstone, 1993; Ramus, 2004; Stein, 2001).

Fawcett and Nicolson (2001, 2004) believe that problems suffered by dyslexic people may come down to the cerebellar deficit.[5] Cerebellum is a subcortical brain structure at the back of the brain. Indeed, certain structural abnormalities have been reported in cerebella of dyslexic brains. The abnormality is characterized by greater cell size (Fawcett & Nicolson, 2004). Relatively more large neurons and fewer small neurons were found in the cerebella of dyslexic brains, which might suggest problems in the

input to the cerebellum (Fawcett & Nicolson, 2001). Additionally, a morphological postmortem anatomical analysis has singled out a significantly larger mean cellular area in the medial posterior and in the anterior lobe of the cerebellar cortex in dyslexic brains (Finch *et al.*, 2002). Moreover, the cerebellar hemispheres in dyslexic brains have been found to be symmetrical, while non-dyslexic controls had a larger right hemispheric cerebellar cortical surface (Rae *et al.*, 2002).

As far as brain activation is concerned, it was monitored in dyslexics and control adults during the performance of a pre-learned sequence and during learning a novel sequence of finger presses, known to result in substantial activation in the cerebellum with non-dyslexic adults (Nicolson *et al.*, 1999). As predicted by the cerebellar deficit hypothesis, dyslexics activated their cerebella less during motor learning as far as pre-learned (automatic) and novel sequences were concerned. Moreover, greater activation in their frontal lobes was shown in learning a novel sequence, suggesting that they were bypassing the cerebellum to some extent and relying on conscious strategies (Fawcett & Nicolson, 2001).

Additionally, it is implied that normally greater density of white matter in the left hemisphere is reduced in dyslexics (Klingberg *et al.*, 2000). Studies also report reduced gray matter in the orbital portion of the left inferior frontal gyrus and superior temporal gyrus, but also outside language regions (Brown *et al.*, 2001). Silani and colleagues (2005) provide support for the claim that changed activation noted within the reading system is associated with altered density of gray and white matter of certain brain regions such as left middle and inferior temporal gyri and the left arcuate fasciculus. They further voice an opinion that their evidence is in accord with the view that dyslexia is associated with local gray matter dysfunction and altered connectivity among phonological/reading areas. Also Temple (2002) supports the claim of the neurobiological etiology of dyslexia pointing out that dyslexic individuals, regardless of age, language and methodology adopted in the study, demonstrate disruptions in temporo-parietal brain responses as regards phonological demands and in left frontal brain responses to rapid auditory processing tasks. In addition, dyslexics show unusual organization of white matter connecting temporo-parietal cortex to other cortical areas, and the degree of this faulty organization correlated with reading ability, indicating an important role it plays in reading. However, apparently enough, more attention should be devoted to the issue of causality and determination of the relationship between the abovementioned disruptions in brain structure and function and the etiology of developmental dyslexia.

The findings of the postmortem examination and brain imaging analyses of dyslexic brains indicate the complexity of the underlying neuroanatomical basis of dyslexia that cannot be reduced to a single area of the brain (Galaburda *et al.*, 2006). Leonard *et al.* (2006) highlight the fact that recent studies have revealed a puzzling range of anatomical differences between dyslexics and controls. The neuroanatomical substrates of dyslexia that are pointed out include reduction in temporal lobe, frontal lobe, candate, thalamus and cerebellum, insula, anterior superior neocortex and occipital cortex; additionally, subtle changes in callosal morphology, inferior frontal gyrus and cerebellum have been observed. Similarly, Ramus (2004) enumerates several differences between dyslexic and control brains that have been documented by recent studies, for example in the left perisylvian cortex, the underlying white matter, the thalamus, the corpus callosum and the cerebellum. However, it is stressed again that the functional significance of the abovementioned brain differences requires decent explication.

One of the oldest attempts to explain the causes of developmental dyslexia presupposes the connection between the occurrence of developmental dyslexia and inherited anatomical and functional features of the central nervous system determining the existence of difficulties in reading and writing. A tendency for the specific reading disorder to run in families was first reported at the turn of the last century (Bogdanowicz, 1989). Convincing evidence for the hereditary hypothesis comes from the family and twin studies (DeFries *et al.*, 1987; Jaklewicz, 1982; Olson *et al.*, 1989; Pennington, 1989; Pennington *et al.*, 1986; Pennington & Smith, 1988; Stein, 2001).

Admittedly though, according to Nicolson (2001), it is unlikely that dyslexia be caused by a single gene but rather through the interaction of multiple genes. In the same vein, Vellutino *et al.* (2004) imply that genetic studies do not indicate the existence of specific genes responsible for dyslexia. Similarly, it is acknowledged by Fisher and Smith (2001) that no single gene of dyslexia has yet been identified, though the approximate positions of the number of loci have been mapped. Fisher and Smith (2001) mention three chromosomal regions that have been implicated by a number of studies as being likely to contain genes predisposing for dyslexia – the regions are on the chromosomes 15, 6 and 2. The linkage to the chromosomes 1, 2, 6 and 15 as far as dyslexia is concerned has also been typified by Stein *et al.* (2001). Four candidate dyslexia susceptibility genes that are involved in developmental processes including neuronal migration have been indicated by Galaburda *et al.* (2006).

Obviously enough, establishing transparent connections between genes and behavior as well as genetic mutations and behavioral disorders seems crucial. In their research, Galaburda *et al.* (2006) indicate a speculative route between genetic effect, developmental brain changes and perceptual and cognitive impairments characterizing dyslexia. Similarly, according to Fisher and Smith (2001), the isolation of gene variants that might possibly be responsible for dyslexia remains a major challenge for research, having great potential benefits for early diagnosis of individuals at risk for dyslexia.

Implications for FL Acquisition

Significantly enough, the phonological processing impairments responsible for the specific reading disability in the native language may similarly impede the acquisition of FLs. This line of explanation provides for the difficulties experienced by many poor foreign language learners (Sparks, 1995). Thus, foreign language learning difficulties of dyslexics are connected to problems with native language learning. It is believed that second or foreign language learning is the equivalent of the first language learning capacity and that children who develop faster in their first language also score higher on FL aptitude tests. Thus, intact native language skills constitute the condition for successful foreign language learning, and FL acquisition can be blocked by any physiological or biological limitations that hinder the learning of one's native language (Sparks *et al.*, 1995). It follows that skills of an individual in the native language components of linguistic coding – phonological, syntactic and semantic – are the cornerstone of a successful foreign language learning (FLL) process. Crucial to this process, as well as the most problematic, is phonemic awareness, which involves the ability to isolate and consciously manipulate the sounds of a language and to relate them to the appropriate written symbols (Ganschow *et al.*, 1998; Sparks, 1995; Sparks *et al.*, 1989, 1998). Naturally enough, a huge bulk of research as regards the relation between developmental dyslexia and faulty language processing has been generated, leading to a general conclusion that problems with phonological processing are responsible for creation of incomplete or inaccurate phonological representations of words in one's mental lexicon, which makes up a key to the reading difficulties experienced by dyslexic learners (Bogdanowicz, 1989; Borkowska, 1997; Krasowicz, 1997; Lundberg & Hoien, 2001; Sparks, 1995). Evidence for the phonological core deficit in dyslexia comes from three main behavioral symptoms, namely specific disruptions in the representation, storage

and/or retrieval of speech sounds. The above difficulties in turn impede the acquisition of the grapheme–phoneme correspondences that form the foundation for reading in alphabetic systems (Galaburda *et al.*, 2006; Ramus *et al.*, 2003).

Sparks (1995) provides several reasons why phonological processing may have an adverse effect on FL learning. He mentions the fact that a student may have difficulties perceiving and producing novel phonological strings as well as comprehending spoken language. What is more, poor native language reading skills will generalize to poor reading in an FL, which in turn negatively influences listening comprehension, oral expression, reading comprehension, syntax, general knowledge and verbal memory.

The intensity of dyslexic difficulties depends on the nature of a language and the range of skills required for reading in that language. Reliability of the letter-sound mappings is crucial: the more transparent or shallow a language, the fewer difficulties are encountered by dyslexics learning to read in it. There is a greater prominence of the causal relationship between problems in word identification and deficits in phonological skills in dyslexics learning to read in inconsistent orthographies such as English (Vellutino *et al.*, 2004). On the other hand, the core phonological deficit in dyslexics is harder to detect and not so persevering in more transparent languages (e.g. Italian, Spanish, or Greek) with regular relationships between letters and sounds (Reid & Fawcett, 2004; Snowling, 2001). Impaired fluency and speed in word identification and text processing that lead to reading comprehension difficulties are claimed to be the key markers for dyslexia in such languages (Vellutino *et al.*, 2004). Several potential areas of difficulty for dyslexic students might be enumerated even in highly transparent and regular orthographies. Hungarian, for example, may pose problems connected with visual processing (diacritic marks) and with auditory short-term memory due to its agglutinative nature. Theoretically, given enough time, a child should be able to read a particular word by translating each of the graphemes into the corresponding sounds. However, in the case of Hungarian, very slow speed of processing responsible for poor access of the meaning seems to be a better predictor of a reading failure (Smythe & Everatt, 2000). As mentioned above, orthographic features may be conducive to diverse occurrence and manifestations of dyslexia in different scripts. Interestingly, Chinese dyslexic children, apart from visual-orthographic deficit considered more specific to reading problems in Chinese, encounter phonological processing deficits similarly to their alphabetic counterparts. Furthermore, bearing in mind the peculiar characteristics of the two scripts, Chinese children learning English as a second language demonstrate generally low-grade

phonological processing in both languages. What follows is the presumed existence of multiple factors contributing to dyslexic difficulties in Chinese children, additionally, both common and specific causes responsible for reading difficulties in Chinese and English can be specified (Ho *et al.*, 2000; Ho & Fong, 2005).

To sum up, the outcome of the neuroanatomical research, even though at times contradictory and hence inconclusive mostly due to methodological differences, suggests that there exist the anatomical–physiologial bases of specific difficulties in reading and writing. Furthermore, these native language learning deficits later translate into impairments in FL acquisition. Depending on the nature of the language and writing system, different types of difficulties lead to poor literacy skills.

The scale and scope of research devoted to discovering the underlying cause of dyslexia is beyond doubt impressive. Complicated and variable neurobiological patterns have been revealed. Apparently enough, diversity of behavioral indications of dyslexia does add to the complexity of the nature of the neurological and cognitive basis of the disorder. It seems obvious that massive amount of research findings, quite frequently controversial, involving anatomical, physiological and behavioral investigations requires integrating with evidence of genetic and cultural influences as well. Altogether, it seems that a comprehensive causal explanation of dyslexia, incorporating the huge bulk of scientific facts, remains a matter of the future.

Notes

1. Functional neuro-imaging techniques that have been used to determine any differences in the functional organization of the dyslexic brain compared to normal brain are positron emission tomography (PET) and functional magnetic resonance imaging (fMRI). Obviously, other techniques are also utilized in collecting neuroanatomical data in dyslexia research, for example, the post-mortem investigations.
2. Planum temporale is a region located in the superior temporal gyrus between Heschl's sulcus anteriorly and the end of the Sylvian fissure posteriorly (Hugdahl *et al.*, 2003).
3. The abovementioned discrepancies in the results regarding the hemispheric asymmetry of temporal regions in dyslexia might have been brought about by the methodological differences between studies.
4. The dichotic listening test constitutes a functional measure of phonological processing, allowing for evaluation of the auditory processing of verbal input in the temporal lobe. It entails simultaneous presentation of two different competing auditory stimuli, one to each ear. Typically, an REA indicates left hemisphere dominance for phonological processing. In other words, when reporting what they have heard, individuals with left-hemisphere language

lateralization more accurately repeat verbal stimuli presented to the right ear. Several studies have pointed out the existence of reduced or absent REA in dyslexics encountering phonological difficulties (Bloom & Hynd, 2005; Heiervang *et al.*, 2000).

5. Cerebellar deficit hypothesis put forward by Fawcett and Nicolson (2001, 2004) is a biological-level hypothesis that is well described at the cognitive level as the dyslexic automatization deficit hypothesis.

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Chapter 4

Emotion versus Cognition, or What Psycho and Neurolinguistics Tell us about Affectivity in Second Language Acquisition

DANUTA GABRYŚ-BARKER

Emotion is that which leads one's condition to become so transformed that his judgement is affected, and which is accompanied by pleasure and pain
Aristotle, 384–322 BC

Introduction

Affectivity in educational contexts, such as in the foreign language classroom for example, has been considered one of the major variables in successful outcomes of teaching and learning processes for a long time now. Numerous mostly psychological studies reporting on the role of motivation and goal-orientedness, and generally, affective personality factors (self-confidence and esteem, attitudes, etc.), highlight the fact that the affective domain has to be the centre of interest both of teachers trying to create conditions conducive to learning and of learners themselves, in order to make them recognize their own affectivity and how it influences their success or determines their failure. This psychological perspective on significance of affectivity is given in purely descriptive terms. However, more exploratory and explanatory questions need to be asked: what are the mechanisms involved in affectivity and why is it so significant in learning outcomes?

It can be stated without any doubt that affectivity or, in other words, emotions have a neural basis, since they are demonstrated by certain physio-anatomical symptoms of bodily behavior and reactions. For example, when angry or anxious, our body tells us, and others, that we are angry

(a red face, flushes, trembling hands, loud voice, etc.). Neurolingustics, with its focus on investigation of the brain structure and ways of activation in different contexts for different purposes, may shed light on the way affectivity works and show what the connections of the so-called 'emotional brain' (LeDoux, 1996) and the cognitive functioning of an individual, the so-called 'thinking brain', are like. The use of neuroimaging techniques has allowed scientists to observe that there are specific areas of the brain responsible for forming and processing emotions, the amygdala (a part of limbic system), and separate ones responsible for cognitive functions, the prefrontal cortex. Various research projects (among them LeDoux, 1996) demonstrate that there is interaction between 'the two brains' and that further more, the information entering the brain is received first by the emotional brain and filtered through it. So it may be assumed that success in learning (in this case of foreign languages where affectivity is clearly important) is all emotionally driven (Schumann, 1997). I would like to present in this chapter Schumann's theory of the stimulus appraisal system as the affective basis for motivation in second language acquisition, which can account for individual variability in SLA from a neurobiological perspective.

Emotion-related Research

Emotion-related research has always been one of the main areas of language learning/acquisition and educational research, focusing on the influence of emotion and subjective experience on acquisition/learning outcomes in terms of academic achievement and motivation (Table 4.1).

There have only been a few examples of empirical studies published focusing on possible correlations between affectivity and learning and teaching effectiveness and achievement (an extensive overview of such studies is given in *Learning and Instruction Journal* 15, 2005).

These studies

> ... highlight the relevance and importance of multiple forms of affect in learning situations, their situatedness to the person – context interface, and their dynamic nature at different stages of the learning process. (Efklides & Volet, 2005: 377)

Affectivity functions as a stimulus for an action and type of approach taken as well as a monitor and controller of cognitive processing, grounded in an individual learning situation, as learning is

> ... a process influenced by person and task-characteristics, by the context in which it takes place, and by individual on-going evaluation of the learning process and outcome ... Emotions and feelings are

Table 4.1 Selected studies on emotions in a learning/instructional context

Study	*Focus*	*Results*
Scherer (1984)	Cognitive and motivational aspects of emotions	Subjective and idiosyncratic qualities of emotions
Brophy and Good (1986)	Teacher-centered instruction	Negative effects on emotional and affective aspects of learning
Hattie (1992)	Self-concept	Negative expectations in relation to achievement create anxiety
Slavin (1995)	Cooperative learning	Positive influence on learning achievement
Boekaerts *et al.* (2000)	Emotions in self-regulation processes in learning	Self-regulation creates positive emotions versus negative ones which originate in external regulation
Diener (2000)	Cognitive and emotional evaluation of a learning context (school experiences)	Positive evaluation correlates with school achievement
Hidi *et al.* (2002)	Role of interest in a learning task	Emotions are domain specific
Pekrun *et al.* (2002)	Information processing	Emotions influence significantly information processing at each stage
Glaser-Zikuda and Mayring (2003)	Appraisal systems	Value systems influence an appraisal type, the role of pleasure and interest in task performance
Hascher (2003)	Didactic competences of teachers, one's achievement and interest, social interaction at school	Significant influence on feelings of one's well-being

> present throughout the learning process, because they are triggered by situational characteristics as well as by the person's appraisals. (Efklides & Volet, 2005: 378)

The focus of this article is on the systems of appraisal as seen from a psychological perspective and demonstrated in different studies. This argument is also supported by neurobiological evidence, for their role is determined by neural mechanisms operating in the human brain, and illustrated briefly by examples of different theories of emotion and empirical studies which bear them out.

Appraisal Systems: A Psychological Perspective

Schumann (1997) in describing the biological basis of motivation in human activity, including language learning, reminds us once again about the two innate systems operating in the human, that of homeostatic (bodily/survival) and sociostactic (interacting with others) regulation that motivate all our actions. Despite the innate regulation systems, everyone develops an individual system of somatic values:

> Through experience in the world, individuals accrue idiosyncratic preferences and aversions, which lead them to like certain things and dislike others … Organisms seem to determine value on the basis of certain criteria.… These appraisal systems assign value to current stimuli based on past experience … The value mechanisms influence the cognition (perception, attention, memory, and action) that is devoted to learning. (Schumann, 1997: 2)

The three values (homeostatic, sociostatic and somatic) constitute the so-called emotional memory (Schumann, 1997: 36), which gives rise to individual (idiosyncratic) appraisal systems. Since what constitutes the somatic value system is gathered throughout an individual's experience (e.g. in a learning context), appraisal systems are unique to a given individual and even the same stimulus may activate different appraisals. In the context of language learning, as Schumann rightly emphasizes, they will determine the approach a learner takes towards the teacher, peers, methods, materials, etc. – all the observable variables of a learning process. They also

> … guide our learning and foster the long-term cognitive effort (action tendencies) necessary to achieve high levels of mastery and expertise. The appraisals also curtail learning, producing variable success. This stimulus appraisal system, then, is a major factor in the wide range of proficiencies in SLA, and SLA, in this formulation, serves as a model for all SDL (sustained deep learning). (Schumann, 1997: 36)

Smith and Lazarus (1993: 234) define/characterize appraisals as

> . . . an evaluation of what one's relationship to the environment implies for personal well-being. Each positive emotion is said to be produced by a particular kind of appraised benefit, and each negative emotion by a particular kind of appraised harm. The emotional response is hypothesized to prepare and mobilize the person to cope with the particular appraised harm or benefit in an adaptive manner, that is, to avoid, minimize, or alleviate an appraised harm, or to seek, maximize, or maintain an appraised benefit. Whether a particular set of circumstances is appraised as harmful or beneficial depends, in part, on the person's specific configuration of goals, and beliefs. Appraisal thus serves the important mediational role of linking emotional responses to environmental circumstances on the one hand, and personal goals and beliefs on the other.

Lazarus and Smith (1988) see appraisal systems as operating on two levels:

(1) a primary appraisal (individual relevance of a stimulus to a person, and promotion or hindrance of a personal goal);
(2) a secondary appraisal (coping ability of an individual).

Psychologists have not agreed explicitly on how emotions and affectivity work in a human and what their relation to cognition is (e.g. Le Deux, 1996). However, in psychological models of emotion (e.g. Clore, 1994; Frijda, 1994; Lazarus, 1991), there is an agreement about the role of appraisal in cognition in creating responses to a stimulus and consequently activating the thinking part of the brain which 'allocates attention and memory resources to various problems, and the variability in such allocations affects learning' (Schumann, 1997: xix). In other words, as mentioned earlier, the appraisals are seen as activating some kind of response (either positive or negative) depending on the characteristics of appraisals made. Various theories categorize criteria of appraisals differently (Table 4.2).

One of the first models of stimulus appraisal related directly with the motivational dimension of undertaking an action (e.g. to perform a language task) is that of Scherer (1984, Table 4.2), who sees appraisal of a stimulus as assessed at the level of

- novelty: the degree of familiarity of the stimulus (task/data/action to be undertaken);
- intrinsic pleasantness: how pleasant the stimulus is which will determine the approach to it (indulgence versus avoidance);

Table 4.2 Selected approaches to appraisal criteria

Scherer	*Frijda*	*Ortony/Clore*	*Roseman*	*Smith/ Ellsworth*
Novelty	Change			Attention
Suddenness	Familiarity			
Familiarity				
Predictability		Unexpectedness		
Intrinsic pleasantness	Valence	Appealingness		Pleasantness
Goal significance				
Concern relevance				
Outcome probability	Focality		App/Ave motives	
Expectation	Certainty	Likelihood	Probability	Certainty
	Presence	Prospect realization		
Conduciveness	Open/closed	Desirability	Motive consistency	Goal/Path obstacle
	Urgency	Proximity		Anticipated effort
Urgency				
Coping potential				
Cause: Agent				
Cause: Motive				Agency
Control	Intent/ self-other	Agency	Agency	Agency
Power				
Adjustment	Modifiability			
Compatibility standards	Controllability			
External				
Internal		Blameworthiness		
	Value relevance			Legitimacy

Source: Adapted from Schumann (1997: 22).

- goal/need significance: evaluation of how relevant, significant and immediate the stimulus (task/action) is for an individual;
- coping potential: checking one's ability to cope or change the stimulus to adjust to one's potential;
- norm/self-compatibility: evaluation of the social/cultural appropriacy of the stimulus.

Various studies used Scherer's appraisal checks to measure different emotions (e.g. fear or anger) by means of closed-type questionnaires or computer simulations (Scherer, 1993).

One of the more influential in the context of learning models of appraisal is that of Frijda (1989, Table 4.2), who by means of bipolar scales evaluates learner's appraisal systems according to a detailed set of variables, and correlates them with action readiness variables (Table 4.3) to predict those which might enhance (*Moving toward*) or hinder language learning (*Moving away*) (Table 4.4).

Table 4.3 Appraisal and readiness variables

Appraisal variables	***Action readiness variables***
Pleasantness (valence)	Approach (moving toward)
Bearable (valence)	Be with (moving toward)
Goal-conducive (valence)	Protection (moving away)
Self-esteem	Avoidance (moving away)
Fairness	Attending
Interestingness	Distance (rejection)
Clearness (vertainty)	Rejection (rejection)
Outcome (certainty)	Disinterest
Stand (certainty)	Don't want
Suddenness (expectedness)	Boiling inwardly (moving against)
True (expectedness)	Antagonistic (moving against)
Anticipated effort	Reactant (moving against)
	Interrupted (interruption)
	Preoccupied (interruption)
	In command
	Helping

Source: Adapted from Frijda *et al.* (1989).

Table 4.4 Readiness to act

+ Language learning	*– Language learning*
Approach (moving toward)	Protection (moving away)
Be with (moving toward)	Avoidance (moving away)
Attending	Distance (rejection)
In command	Rejection (rejection)
	Disinterest
	Don't want
	Preoccupied
	Disappear from
	Inhibition (inhibition)
	Apathy (hypoactive)
	Giving up (hypoactive)
	Shutting off (hypoactive)
	Helplessness (hypoactive)

Source: After Frijda *et al.* in Schumann (1997: 29).

The categories in Table 4.4 clearly delineate the significance of positive emotions and their role in one's approach to language learning.

In psychological studies of appraisal systems the research tools employed embrace learner appraisal questionnaires, introspective diary studies and learner biographies (e.g. see Schumann, 1997). They give verbal evidence of the appraisal variables and their evaluation in creating motivations and approaches to learning, idiosyncratically grounded in one's own person and past and present observable context determined by an individual system of values. Thus they contribute to our understanding of which feelings and emotions contribute positively or negatively to a learning task (or any other behavior).

It is clear from the above presentation of the appraisal systems that although emotionally driven, they have a cognitive dimension as well, in that they consider

- goal relevance for an individual;
- compatibility with one's goals;
- preference to take certain actions in a specific context (involvement versus avoidance).

So emotion is not devoid of cognition. By studying the localization and type of brain activation in the process of appraisal, this relation may

be uncovered, as the appraisal systems (as any other activity) are stored and recalled by certain neural mechanisms of brain operations in processing the stimulus/data. It is neurolinguistic studies that can offer an explanation of appraisal systems, the relation between affective and cognitive functioning and so its relevance for educational context should not be neglected.

Appraisal Systems: A Neurobiological Perspective

It has been known for quite some time now which parts of the brain are responsible for the processing of emotions. It was already in the 40s of the past century that neurologists observed that the removal or disconnection of the part of the lower brain, that is the prefrontal cortex, results in lack of emotional processing in a patient. It is known that

> The prefrontal cortex, which is the part of the neocortex, what Goleman calls the 'thinking brain', interacts with an evolutionary older part of the brain called the limbic system – what Goleman calls the 'emotional brain'. A part of limbic system called amygdala is, in Goleman's words, 'the seat of all passions', and it has been in the identification of the function of this region that scientists have begun to understand the paths that emotions take in forming. (Gabriel, 2000: 2)

The stimulus one is exposed to enters the brain first through the areas responsible for emotions and thus it is the affective filter that responds to stimuli which are cognitive in nature (to describe a complex process in a greatly simplified way). In more detail Paradis (2004: 24) recapitulates:

> A neural mechanism consisting of the amygdala, the ventromedial prefrontal cortex the nucleus accumbens, the dopamime system and the peripheral nervous system assesses the motivational relevance and emotional significance of stimuli such as desirability of L2 (Schumann, 1990, 1998). Inputs to the orbital cortex and the amygdala allow these brain structures to evaluate reward value for incoming stimuli;
>
> Outputs of the evaluative cerebral structures project directly to the basal ganglia to allow implicit responses to be made on the basis of the hedonic evaluation of the stimuli. (Rolls, 1999)

Schumann (1997) sees the brain as operating through integration of three systems: a posterior sensory system, an anterior motor system and a ventral appraisal system.

Thanks to the integration of the three systems, Schumann (1997) clearly sees the relation between motivation and appraisal systems constituting a generative mechanism for motivation. He says:

> The appraisal system is necessary in order that the emotional relevance of sensory information (touch, sight, sound, etc.) can be assessed and appropriate behavioral activity can be taken in relation to that sensory information (e.g. fight, flight, approach, attend, think, learn).

He emphasizes the role of one's contextual adaptation, (partly) irrespective of past experience and degree of open-mindedness as significant variables in one's goal achievement.

Also the relative plasticity of the prefrontal areas of the brain contributes to possible adjustments of the appraisals systems.

The evaluations and adjustments are based on the appraisal systems (described earlier, Table 4.1) and relate to various features such has pleasantness, individual needs and coping potential, among many others. The neural mechanism explains then why it is so that in the context of L2 acquisition/learning, variability in L2 achievement is commonly observed as it relates directly to this emotional appraisal of the stimulus in a given learning context. This is the most evident proof for what was more or less intuitively proposed by psychology and consequently by language instruction theories, namely the role of the affective domain and more precisely, motivation in a language learning environment. So we are bound to accept the view that all human actions are directed by appraisal systems and values either accepted and in consequence direct one's actions, or rejected and in consequence lead to avoidance of certain actions by an individual.

In relation to knowledge learning as contrasted with learning to perform daily actions (as is the case with a baby), the term sustained deep learning (SDL) is used. SDL is seen as the process occurring over some period of time at deep level of processing to reach the final stage of an expertise in relation to knowledge and skills (Schumann, 1997: 32). However it is not everyone that reaches this state or they reach it in different ways and at different paces, and additionally to different degrees in different areas of knowledge. This variability can be accounted for by different appraisal systems.

Neurological Models of Emotion and Selected Empirical Studies

Measuring neural activity

As mentioned in the case of psychological studies of appraisal systems, the most commonly used data collection tools are questionnaires/surveys,

diaries and bibliographies or retrospective verbal data collected from individuals. In the case of neurolinguistic data, brain activation is measured by a whole variety of methods (neuroimaging techniques) used in the clinical treatment of patients such as the well-known

- PET (positron emission tomography) – it allows us, through the injection of radioactive tracers (which become greater in the area of high levels of blood flow), to localize different neural functions;
- fMRI (functional magnetic resonance imaging) – as in the case of PET, it also allows us to localize which areas of the brain are activated at a certain moment; it is done by means of measuring changes in the oxygenation of the brain generated by a magnetic resonance signal;
- ERP (event related potential) – this focuses on the timing aspect of brain activation, not the areas activated, electrodes attached to the scalp record brain activity and electroencephalogram (EEG) recordings of the natural rhythms of the brain are measured, thus giving evidence that the time of neural processing can be a response to a certain external stimulus (e.g. a visual one).

A lot of researchers working within a psychological or acquisition studies framework and methodology present a rather skeptical view of the validity of such techniques for the purposes of language processing/learning studies. In his comment on the validity of neuroimaging techniques in language acquisition research or more precisely in application to the bilingual brain, Paradis (2004) takes a critical look at the results obtained, pointing to the fact that they are often incongruent or even in conflict with other more traditional studies in language research, and even contradict each other. Paradis attributes this to 'a lack of linguistic sophistication' (Paradis, 2004: 183), which is determined by the fact that:

(1) The tasks are often nonlinguistic tasks (i.e. not part of the natural use of language) and hence do not involve the implicit procedural computations that underlie the processing of a verbal message either in comprehension or production.
(2) The selected stimuli often do not target components of language function and hence are not language relevant.
(3) Sometimes linguistic material is used, but in a nonlinguistic context, and thus it does not reveal any kind of language processing.
(4) Researchers do not differentiate between implicit and explicit components of language and often generalize from words (whose form and meaning are supported by declarative memory) to language (whose

implicit system – phonology, morphology and syntax – is supported by procedural memory).

Replication of the studies using the same stimulus, the same techniques and generally the same methodological design might eliminate the contradictions and inconsistencies in this type of research. So all in all Paradis's critique does not aim at rejecting but rather at verifying and refining the methodological and linguistic paradigm of this type of research.

Neuroscientific models of emotion and their overlap with psychological variables

To study appraisal systems from a neurobiological perspective, it is necessary to look at the available and most commonly followed models of emotion (Byrnes, 2001):

(1) A Network Model of Human Emotions (Halgren & Marinkovic, 1995).
(2) Polyvagel Theory (Porges, 1995).
(3) Hemispheric Asymmetry Models (Davidson, 1992; Fox, 1991; Schmidt, 1992).

It can be observed in these three models that there is an overlap of the psychological dimension (variables singled out) and neurological perspective (Table 4.5).

Some examples of studies that take up psychologically studied variables can be enumerated at this point:

- Porges (1995) – memory processes versus emotional engagement.
- Wigfield and Eccles (1992) – the neural basis for interest (in motivation).
- McEwen (1995) – reactions to stress.
- Fisher, Wik and Frederikson (1996) – the effects of stress on memory.

In what way do these models and the studies which empirically illustrate them relate to psychological research data? We might seek the answer firstly in:

(1) supporting evidence for psychological findings on learning, cognition and motivation in terms of variables assumed by both perspectives to be valid in the research area of affectivity (here, appraisal systems);
(2) a neural explanation of psychological processes with educational/medical treatment implications so found both in daily didactic practice and in dealing with deficit/impaired learners.

Table 4.5 An outline of the selected theories/models of emotion

A Network Model of Human Emotions (Halgren & Marinkovic, 1995)	*Polyvagal Theory (Porges, 1995)*	*Hemispheric Asymmetry (Davidson, 1992; Fox, 1991; Schmidt, 1992)*
The orienting complex, emotional event integration, response selection, sustained emotional context	Two neural subsystems of the vague nerve involved: primary emotions (innate neural base, the right hemisphere, homeostatic processes) versus culturally induced emotions (left-hemisphere – motor and language skills)	An approach-withdrawal system (the left frontal region versus the right frontal region, positive emotions of approach versus negative emotions of withdrawal-EEG data)
Four different neural substrates involved in processing (ERP data)	Simultaneous activation of both hemispheres	Variables: individual affective styles (stable emotional reactivity – innate?)
Variables: orienting attention/appraisal, e.g. coping potential neurally encoded stimulus/association with knowledge	Variables: attention, facial expression, vocalization, response, role of mood shifts	

Appraisal in Language Processsing – A Study Proposal

Emotion versus cognition: Are appraisals cognitive or affective?

Schumann (1997: 184–1985), following other researchers in the field of neurobiology, believes that

> 1. (…) cognition is done in the emotion areas of the brain. In appraisal, stimulus information is matched with stored information about emotional relevance and motivational significance of the same stimuli or similar stimuli encountered in the past (Frijda, 1993b). In other words, new stimuli are appraised in the light of previous information stored via the amygdala and orbitofrontal cortex. The matching provides emotional coloring to the new stimuli. The matching is a computation done by the brain's emotional systems.

> 2. (…) The issue is not whether the process involves computation but where the computation takes place or where it took place when the information was originally encoded. Synaptic alterations influenced by the amygdala, the orbitofrontal cortex, and related areas that appraise the emotional relevance of the stimuli might then be more properly considered affective processes, or affective computations.

The relation between emotional and cognitive processing as expressed by Schumann (1997: 184–1985) and other studies can be described as a two-level process following the sequence:

(1) THE APPRAISAL SYSTEM → AFFECTIVE/EMOTIONAL (personal relevance of the stimuli)
(2) THE SENSORY SYSTEM → COGNITVE PROCESSSING (cognitive computation of perceptual representations – e.g. visual or auditory)

Stimulus appraisal in multilingual language processing (a study proposal)

The search focus

The major concern of the project will be the description of the input stage of language processing by a multilingual language user and its influence on the consecutive stages of processing. More precisely, following the assumption expressing the significance of stimulus appraisal in language learning tasks, the research will aim to diagnose:

- Appraisal variables at the stage of input and their influence on the formulation of goals: learning goals (task-involvement) *versus* performance goals (ego-involvement) in terms of choice (strategies), persistence and effort (switch on or switch off).
- The way the appraisal system is verbalized in think aloud data (TAPs): cognitive versus affective comments (in other words, either its cognitive and/or its affective dimension). Also, language choice for different appraisals (preferences for either L1 or L2 – or possibly, L3) will be commented on.

Framework of the study

I would like to adopt a simplified version of language processing viewed as Information Processing Model (after Manolopoulou-Sergi, 2004), consisting of three processing stages:

INPUT – CENTRAL PROCESSING – OUTPUT

The focus of the study as mentioned earlier will be mainly on the input stage since it is this stage of processing where the appraisal system most visibly influences the whole process of task performance.

The input stage is understood here as the first exposure to the task itself and instruction given to a learner and language content. It can be described as a three-stage process:

(1) the pre-perception stage;
(2) the perception stage;
(3) the attention/noticing stage.

The pre-perception stage, in other words 'the alertness stage' (the term used by Tomlin & Villa, 1994), demonstrates a general predisposition to be involved in the learning task, the so-called pre-actional stage (the term used by Dorney, 2002). What is observable is

> ... motivational influences which might inhibit learners from being involved in the task at this pre-actional stage ... such as various goal properties, values associated with the learning process, attitudes, expectancy of success or failure, learner beliefs and strategies, environmental support or hindrance (Manolopoulou-Sergi, 2004: 432).

Thus, the pre-perception stage best exemplifies the influence of the appraisal systems a particular learner exhibits.

Manolopoulou-Sergi (2004: 432) sees as the most significant the variable of attitude:

> ... attitudes prepare individuals to evaluate the experience or the language situation/outcome before they actually get involved with the learning experience and therefore, react to it in a fairly stereotyped way. (Manolopoulou-Sergi, 2004: 432)

At the pre-perception stage, the goals are being formulated. The appraisal systems which relate to the formulation of learning goals that are shown in various studies (e.g. Dweck, 1986 or Graham & Golan, 1991) to be more success conducive as they directly relate to achievement rather than performance goals which focus on the personal dimension (ego-involvement). The focus on either of the two goals will determine the learners' approach to the task to be performed:

- Learning goals are seen as challenging the ability (even if it is perceived as low) one has and promote risk-taking as the tasks/skills to be developed by it are interesting/novel/important (etc.) enough.

- Performance goals promote defensive/withdrawal strategies if one's ability is seen as low and the ultimate goal of the task (as seen/appraised by an individual) is evaluation of his/her ability/result of the performance.

The remaining two stages of the processing continuum, the perception stage and the allocation of time stage, will be discussed in the study in so far as they are needed to show the influence of the initial application of the appraisal system at the pre-perception stage. *The perception stage* – this stage of processing will clearly be determined by the above two approaches (focus on the learning goals *versus* the performance goals): they will be either openness to input or activation of switch-off mechanisms or limited perception both in bottom-up and top-down processing (Eysenck, 2001). *The allocation of attention* – here, only selected elements of the input will be attended to and consequently noticed and potentially stored in long term memory (LTM) and hence open to further processing, as stated by the noticing hypothesis. Attention is limited in its capacity so the selection will be dictated by the appraisals made by the learner and the goals selected as mentioned earlier.

It can then be safely assumed that the input stage will have a direct impact on the later stages, those of central processing and the output stage, as it will 'enhance or block the learner's intention to be involved in the task or their strategic approach to the task' (Manolopoulou-Sergi, 2004: 436). Persistence and amount and type of effort (strategies) put into the task performance will result from the appraisal system responsible for the task approach and evident at the input stage. If we accept this view, we may anticipate that in our daily didactic practices, task-based teaching will be highly influenced by the type of instruction we provide in terms of the methods and materials used, and it will contribute significantly to learners' appraisal systems resulting from their learning experiences (among other variables).

Subjects, research method and language task

A group of 40 multilingual language users will participate in the study. The language profile of the informants will follow the pattern: L1 – Portuguese, L2 – English at the advanced level, L3 – German at the intermediate level. All of them are experienced language learners and users, well motivated as foreign languages (English and German) constitute the main focus of their university studies, which will give them qualifications to become either teachers of English or translators.

The task to be performed will consist of translating a short article on a theme well known to the participants, that is, the wine industry in Portugal.

The input will be first given in the L1 of the subjects, and at the second stage in their L2, to demonstrate the influence of the type of input on language processing. Each time the text will be translated into L3 (German). The focus of analysis of the performance will be on the appraisal of the situation of multilinguality and language constellations in the task and other variables as described by Scherer (1984) and Frijda *et al.* (1989), for example self-esteem, goal-conduciveness, ability, etc.

The method used will be a simultaneous introspection, that is on-line processing (think aloud data), recorded and later, transcribed as TAPs (thinking aloud protocols) of the text to be translated. The on-line data will give evidence of the appraisal of the type of task in terms of its challenge, novelty, interestingness, suddenness, coping ability outcome, etc.

The focus of observation is certainly not novel in any way; however, the methodology employed is. Simultaneous introspection will make it possible to observe to what extent what happens at the pre-perception stage and what the subjects are capable of verbalizing (i.e. what they are aware of) contributes to their successful (or unsuccessful) language processing at the later stages. Also, it will be possible to establish a certain hierarchy of appraisal variables with the view to defining their 'move toward' versus 'move away' (Frijda *et al.*, 1989) influence on the performance of the task at the later stages of language processing when translating.

Some comments on the study

Psychological studies of appraisals make use of learner data and show their awareness and perceptions of what constitutes their value systems on the basis of retrospection: using questionnaires, interviews and diary studies. My study will hopefully add to this by showing how these value systems (appraisals) are verbalized at the moment of being applied as triggers or blockers in language performance on-line. It would be interesting if the simultaneous introspective verbal data could be supplemented with brain activation recording by means of imaging techniques. This unfortunately is not available and so for the moment the study will provide only corroborative data. Schumann *et al.* (2004) have argued very convincingly that

> If our thinking about second language learning is not constrained by the biology of learning, and if it is only constrained by the analysis of the product of that learning, then we can say almost anything about underlying mechanisms … we can invoke, as though they were real, mechanisms such as affective filter, cognitive operating principles, noticing, monitoring … learning strategies. But … should we limit ourselves to metaphors? We can constrain our metaphors with

biological knowledge. Second language acquisition is a sub-field of applied linguistics and is as much psychological as it is linguistic. But just as we are making our link with psychology, psychology is becoming radically biologized.

Final Remarks

It seems that the application of neurolinguistic research combined with psychological studies can make a contribution on three levels to language acquisition research and consequently to instructional practices and educational policies:

- the explanatory level: the development of explicit theories of language and language acquisition in support of existing hypotheses and assumptions;
- the diagnostic level: in the case of special educational needs learners (e.g. blind or dyslexic learners) and normal learners in determining their aptitudes and learning profiles;
- the practical level: in the application of language teaching methods, techniques and materials specific to a context or an individual learner (Gabryś-Barker, 2006: 84).

To conclude, therefore, there is a need to take a multidisciplinary approach to researching the phenomena connected with human affectivity in order to validate and enrich the descriptive evidence of psycholinguistic studies. We also need urgently to replicate the studies done so far in neurolinguistics by means of different types of imaging techniques and complement them with psycholinguistic data, and in so doing to reach some degree of consensus on the results obtained.

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Chapter 5

Observable Strategizing: On Limbic Communication in Advanced Users of Language

AGNIESZKA ŚLĘZAK-ŚWIAT

Introduction

Limbic communication, which is most often associated with the interaction of an infant and a caregiver, is indeed the first type of communication a human being is exposed to. In the first year of the postnatal life, an infant develops several types of limbically based patterns (involving automatic assessment) which are realized by its motor responses to a given situation (Lamendella, 1977). These behaviors realized by motor responses (facial muscles activity and gestures) are the first achievement or avoidance and constitute an indispensable part of communication. Careful observation of the caregiver teaches a child to decode speakers' message, which involves attention to facial expressions and gestures. As a matter of fact, there are different ratios presented by different researchers as far as the percent of nonverbal communication constituting communication in general is concerned: Philpot (1983) claims it is 65%, McNeill (1992) 90% and Gabryś-Barker (2004) 70%. The percentage reaching almost one-thirds is undoubtedly worth investigating especially as regards advanced users of language and it is particularly interesting how their avoidance and achievement communication strategies are accompanied by motor responses (face muscle activation and gestures) which illustrate the activation of the limbic system. This chapter presents the results of the research investigating the number of paralinguistic strategies applied by advanced users of English who either successfully or unsuccessfully determined their goals of communication.

The Concept of Strategic Competence

Initially, the relationship between limbic communication and the concept of strategic competence seemed to be very far-fetched. The former is associated with involuntary reactions and the latter most often with voluntary ones. Thanks to Hymes (1972), it can be claimed that they are not mutually exclusive as he (1972: 277) indicated to the need of accounting for the fact that a normal child acquires knowledge of sentences, not only as grammatical but also as appropriate. The child acquires competence as to when to speak, when not and as to what to talk to about with whom, when, where and in what manner. The competence is developed based on the child's careful observation of how adults communicate. As regards *knowledge of sentences*, it takes explicit forms of training and as regards *competence as to when to speak, when not and as to what to talk to about with whom, when, where, in what manner*, the training is of implicit nature but the acquired competence allows for strategizing, be it voluntary or involuntary (realized by motor responses).

Despite the fact that it is Tarone (1977) who as the first researcher introduced nonverbal strategies to the taxonomy of communication strategies in L2, it is Canale (1983) who recognizes the importance of nonverbal communication (1983: 33) in his theoretical concept of strategic competence, which he (1983) defines as mastery of verbal and nonverbal strategies both:

(1) to compensate for breakdowns in communication due to insufficient competence or to performance limitation; and
(2) to enhance the rhetorical effect of utterances.

The extension of the first theoretical model of strategic competence with its enhancing rhetorical effect characteristic of communication strategies marks a significant change in the perception of the concept. However, Canale (1983) does not explain, for example, the relationship between mastery of nonverbal strategies and proficiency in SLA.

Duquette *et al.* (1988: 90) define strategic competence as the ability to apply communication strategies to keep the communication channel open and to maintain the interaction between the interlocutors and to run the conversation in accordance with the intentions of the speaker.

The interesting phenomenon observed by Dushay (1991) in his doctoral dissertation shows that L2 language learners/users use less gesticulation in expressing their message in L2 than in L1, which may account for the fact that it is difficult for a language learner to run a conversation according with their intentions. Learning a foreign language involves being

exposed to the facial and gestural patterns of the teacher only, as listening comprehension is devoid of the visual clues.

Paralinguistic Strategies

We decided to employ Corder's (1983) terminology and refer to nonverbal strategies as paralinguistic ones because in most of the cases they accompany the linguistic message.

Faerch and Kasper (1983) claim that to achieve the desired communicative goal a range of devices may be drawn to convey the intended meaning or even to abandon the original meaning and resort to a simpler and more easily achieved goal, one of them being paralinguistic strategies.

Communication strategies (Council for Cultural Co-operation, 2001: 57) are a means the language user exploits to mobilize and balance their resources, to activate skills and procedures, in order to fulfill the demands of communication in context and successfully complete the task in question in the most comprehensive or economical way feasible depending on their precise purpose.

However, in taxonomies of communication strategies, paralinguistic strategies are presented in very general terms:

- Tarone (1977) defines them as mime, includes all nonverbal accompaniments to communication, particularly those that serve in the place of the missing target language words;
- Corder (1983) is the first one who referred to them as paralinguistic ones;
- Faerch and Kasper (1983: 54) subclassified them as nonlinguistic strategies; in their (1983) view in face-to-face communication, learners frequently resort to nonlinguistic strategies such as mime, gesture and sound imitation, and an important function of nonlinguistic strategies is to signal an appeal to the interlocutor;
- Littlewood (1984) as nonlinguistic resources;
- Paribakht (1985) as mime understood as replacing and accompanying verbal input;
- Ellis (1994) as nonlinguistic strategies;
- Dörnyei (1995) as nonlinguistic signals: mime, gesture, facial expression or sound imitation.

Although some of them provide examples as far as compensations for breakdowns in communication are concerned, none of them refer to paralinguistic strategies as the ones that enhance rhetorical effect.

Bachman and Palmer's Concept of Strategic Competence

Bachman (1990) is the first to recognize the importance of the affective factor which is inseparably connected with the stimulus appraisal (limbic communication).

On defining strategic competence, Bachman (1990: 55) embarks with redefining the relationship between competence and performance, claiming that it has dynamic qualities. In his (1990: 85) view, strategic competence plays the central mediating role between knowledge structures, language competence and context of situation. Bachman (1990: 100) distinguishes the following components of strategic competence:

- assessing communicative resources;
- planning communication;
- executing this communication.

Initially, Bachman (1990: 100–101) describes the assessment component as the one which is concerned with the information relevant to achieving a communicative goal in a given context, determining what language competencies are available for use in achieving this goal, and further evaluating whether it has been achieved.

Later, the assessment component of strategic competence is referred to by Bachman and Cohen (1998: 5) as taking stock of what is needed, what one has to work with and how well one has done. It provides a means by which individuals relate their topical knowledge and language knowledge to the language use setting and tasks or to the testing situation and tasks. Assessment also takes into consideration the individual's affective responses in the application of assessment. The assessment component enables language users to:

- identify the information – including the language variety or dialect – that is needed for realizing a particular communicative goal in a given context;
- determine what language competences (native language, second or foreign language) are at our disposal for most effectively bringing that information to bear in achieving the communicative goal;
- ascertain the abilities and knowledge that are shared by our interlocutor;
- follow the communication attempt, evaluate the extent to which the communicative goal has been achieved.

Bachman and Cohen (1998: 6) claim that the assessment component operates in three ways. The first of them is referred to as an assessment of the

characteristics of the language use or test task, which identifies the characteristics of the language use task or test task, in order to determine:

- the desirability and feasibility of successfully completing the task and
- what elements of topical knowledge and language knowledge this is likely to require.

The next one is an assessment of the individual's own topical and language knowledge, which involves determining the extent to which relevant topical knowledge and areas of language knowledge are available and, if available, which of them might be utilized for successfully completing the task. This aspect of assessment also considers the individual's available affective schemata for coping with the demands of the task.

The final one is referred to as an *assessment of the correctness or appropriateness of the response to the test task* and involves evaluating the individual's response to the task with respect to the perceived criteria for correctness or appropriateness. The relevant criteria pertain to the grammatical, textual, functional and sociolinguistic characteristics of the response, as well as its topical content. In the event, the response appears to be incorrect or inappropriate. This aspect of assessment enables the individual to diagnose the possible causes of the problem, which might lead to a change in the communicative goal, the plan for implementing that goal or both, depending on the situation. Affective schemata are involved in determining the extent to which failure was due to inadequate effort, to the difficulty of the task or to random sources of interference.

Bachman and Palmer (1996: 70) define strategic competence as a set of metacognitive components, or strategies, that can be thought of as higher-order executive processes that provide a cognitive management function in language use, as well as in other cognitive activities. For them, using language involves the language user's topical knowledge and affective schemata, as well as all the areas of language knowledge. What makes language use possible is the integration of all of these components as language users create and interpret discourse in situationally appropriate ways. The integration of the components also proves how performance can be facilitated or inhibited by positive or negative affective responses, both to the topical content of test tasks and to a particular type of test task.

The affective factor presented by Bachman and Palmer (1996) plays a crucial role in the functioning of strategic competence as it filters all the strategic responses of the speaker. The assessment of the communicative situation the speaker is in is realized by facial expressions and gestures.

Limbic System and Assessing Communicative Resources

Limbic system is involved in the process of assessment of the communicative situation. Schumann (1997: 42) explains the functioning of the assessment in the limbic system from the thalamus, which is a relay station for all sensory information reaching the brain except olfaction (i.e. for sound, sight, taste and touch). From here the circuit projects to the lateral nucleus of the amygdala (the thalamo-amygdala pathway) and then to the central nucleus via the basolateral nucleus and the accessory basal nucleus. In the amygdala, the circuit projects to the brainstem, which leads to the autonomic responses and to the hypothalamus, where endocrine responses are stimulated.

At the same time, the stimulus moves from the thalamus to the amygdala and goes to the auditory cortex (the thalamo-cortical pathway), where it is analysed in more detail and then projects back to the lateral nucleus of the amygdala (the cortocofugal pathway). From the auditory cortex, the stimulus is transferred to the hippocampus, where the context in which it was heard is recorded and a declarative memory of the event is formed.

After having received the stimulus from the thalamus, the amygdala sends fibers to several subcortical sites: the basal forebrain, the hypothalamus, the thalamus, the midbrain, pons and medulla. Amaral *et al.* (1992) report that, in addition to these subcortical projections, the amygdala has extensive projections that goes back to the neocortex itself. For example, it projects to all the temporal and occipital areas involved in vision. Amaral *et al.* (1992: 41) note that on the basis of this connectivity, it is reasonable to predict that the amygdaloid complex might influence both early stages of sensory processing and higher-level cognitive processing.

Processing of the stimulus in the hippocampus allows the cortex to form a record of the event (certain context of communication) which may be available to consciousness at a later time (Schuman, 1997). Once again, from the hippocampus the circuit projects to the amygdala, where the stimulus can be further processed for its motivational relevance and emotional significance.

The importance of the hippocampus in the circuit is that it records the context in which the stimulus is perceived.

In that view, strategic competence can be perceived as the way language users access their emotions or as a feeling that helps reject some alternatives and preserve others.

According to Smith and Lazarus (1993: 234), the emotional response is hypothesized to prepare and mobilize the person to cope with the particular appraised harm or benefit in an adaptive manner, that is to avoid,

minimize or alleviate an appraised harm, or to seek, maximize or maintain an appraised benefit.

Appraisal Theories

Appraisal theorists (e.g. Scherer, 1984a; Smith, 1989) claim that facial expressions are a direct reflection of a person's appraisals of the situation. Smith (1989) and Pope and Smith (1994) claim that the forehead region – including the inner and outer frontalis muscle group – relates to perceived obstacle when there are little or no resources available to cope with it.

Scherer (1984b) claims that if a situation is controllable and when there are available resources to cope with it, the face would express elements indicating anger (Ekman, 1972), such as:

- frowning of the eyebrows (involving mainly the corrugator muscle group);
- tightening of the lips' orbicularis oris;
- inner and outer frontalis muscle group activity – relates to perceived obstacle when there are little or no resources available to cope with it – horizontal frown;
- corrugator muscle group, a situation is controllable and there are available resources to cope with it – vertical frown;
- orbicularis oris, a situation is controllable and there are available resources to cope with it
- the contraction of the inner part of orbicularis oculi muscle – squinting.

We have decided to observe how the above-listed facial expressions function as communication strategies and how they accompany communication strategies in general.

Gestures and Strategic Competence

McNeill (1992) believes that gestures contribute to a thinking process and reflect mental representation in the mental lexicon, and the study by McCafferty (1998) shows that there is a strong connection between cognition and affective/volitional concerns and that learners' strategic efforts are demonstrated to be of embodied nature. There are various assumptions about how gestures function in speech production, but there are two major theories that emerge from them: *The Lexical Retrieval Hypothesis* and *The Information Packaging Hypothesis* (Alibali *et al.*, 2000: 594). The former assumes that gestures 'serve to boost activation levels for the

to-be-retrieved-items' and the latter, researched by Alibali and Di Russo (1999), assumes that gestures may participate in other cognitive processes, such as reasoning or problem solving.

Gabryś-Barker (2004) presents the following functions of gestures. They function as:

(1) communicators of the semantic content, adding to information, especially in the L2 context as a context of a communication strategy of the L2 user (Ellis, 1994) in a situation of communicative failure;
(2) anxiety or tension-reduction devices in the context of communication problem, for example as observed by Butterworth and Hadar (1989) during the process of lexical retrieval;
(3) lexical access to be one of the representational modes in memory, which when activated 'tends to activate related concepts in other formats' (Krauss *et al.*, 2000: 266).

To the above-presented tension-reducing devices in point (2), we will refer in our research as to *tension reduction*.

Rusinek and Załazińska (2005: 51) also describe gestures that are referred to as assessing ones which are realized by placing one's fingers on the cheeks or the chin when talking to somebody.

For us, an interesting issue is how retrieval, accompanying, assessment and tension-reduction gestures function in L2 utterances of advanced users of English.

Research Design

The research was conducted in six sessions from January to June 2006 with the help of the following equipments: Toshiba Satelite personal computer with Harman/Kardon sound system, Nicon coolpics 3700 camera and a microphone. The length of each of the utterance was fixed to three-min windows.

The preparation of the recording room before the recording involved preparing the equipment, checking the compatibility of the personal computers and microphones.

Each session began with five-min introduction, during which students could ask questions concerning the recording.

Utterances of 60 subjects (fifth-year students) were videoed in three-min windows. They were to tell us their associations with a randomly picked Oscar Wilde's quotation. Twenty fourth-year students were asked only to listen to the recording of the utterances and decide whether the subjects' responses complied with the instruction and the quotations

given. The utterances of 22 of the subjects were assessed as complying with the instruction and quotation. The application of paralinguistic strategies and how they accompanied linguistic ones were analysed.

Results

Subjects' paralinguistic strategies were observed and registered. As the results show, successful subjects use more paralinguistic strategies (Table 5.1). There are different types of gestures accompanying gestures of the successful subjects and the unsuccessful ones. In the case of facial expression, the types are the same in both groups. In the successful group, gestures enhance the rhetorical effect of the utterance and help retrieve the desired vocabulary items and in the unsuccessful group, gestures help relieve the stress connected with language production.

There is also a different distribution of accompaniment of linguistic strategies by paralinguistic strategies. The analysis of the paralinguistic strategies applied by an advanced user of English shows that the linguistic strategies occurring to bridge the gap of deficiency in students' knowledge appear to be applied for rhetorical effect. In both groups of subjects, looking for feedback when applying linguistic communication strategies was very important. However, again in the successful group, the subjects sought for eye contact more often than the unsuccessful ones.

We were interested to know to what extent the paralinguistic strategies accompany the linguistic ones, and as the results show (Table 5.2) the most frequently accompanied one was the strategy of language switch and the least the application of hesitation sound.

The above-presented data indicate the fact that there should be greater awareness of body language. The percent being so high, it should be incorporated into foreign language teacher training because teachers' communication is supposed to be the most effective.

Table 5.1 General distribution of paralinguistic strategies

	Successful subjects	***Unsuccessful subjects***
Gestures	Accompanying, retrieval (20% more)	Assessment, autoadaptors
Facial expressions	Horizontal frowns, squinting and smiles with a look respectively (10% more)	Horizontal frowns, squinting and smiles with a look respectively

Table 5.2 Linguistic communication strategies and their accompaniment by paralinguistic strategies

	Successful subjects	***Unsuccessful subjects***
Repetition	Indirect eye gaze, horizontal frown, gesture of retrieval and vertical frown	Indirect eye gazes, horizontal frown, tension reduction gestures and accompanying gestures
All-purpose words	Gestures of retrieval	Indirect eye gazes
Restructuring	In/direct eye gazes and retrieval	In/direct eye gazes and horizontal frowns
Literal translation	Tightening of the lips, vertical frown and a laughter	In/direct gazes and horizontal frowns
Language switch	In/direct eye gazes	Horizontal frown and a smile
Prefabricated patterns	Horizontal frowns and in/direct gazes	Horizontal frowns and in/direct gazes;
Fillers	In/direct gazes and tension reduction gestures	Tightening of the lips and horizontal frown
Hesitation sounds	In/direct eye gaze, gestures of assessment and vertical frowns	Tightening of the lips, horizontal frowns and tension reduction gestures

The obtained data show that successful subjects were seeking eye contact more than the unsuccessful ones and they were attempting to consciously enhance their utterance by means of paralinguistic messages.

The majority of waiting for feedback strategies was applied by unsuccessful subjects. As the unsuccessful group applied more waiting for feedback strategies, these were automatically more often accompanied by paralinguistic strategies.

Concluding Remarks

Although strategizing becomes automatized in advanced users of English, it is not devoid of the explicit element of assessment. Successful

subjects apply 30% more of paralinguistic strategies and seek eye contact more frequently than the unsuccessful ones. On the whole, the linguistic strategies most often accompanied by paralinguistic strategies for the unsuccessful are language switch, fillers and repetition and for the successful group: language switch, literal translation and all-purpose words.

The data we obtained confirm McCafferty's (1998) claim that there is a strong connection between cognition and affective/volitional concerns (…) and that learners' strategic efforts are demonstrated to be of embodied nature, which is illustrated by subjects' application of paralinguistic strategies. It also confirms Smith and Lazarus's (1993: 234) claim that the emotional response prepares and mobilizes the person to cope with the particular appraised harm or benefit in an adaptive manner, that is, to avoid, minimize or alleviate an appraised harm, or to seek, maximize or maintain an appraised benefit as well as Scherer (1984a, 1984b) and Smith's (1989) claims that facial expressions are a direct reflection of a person's appraisals of the situation. The successful subjects displayed a greater number of facial expressions by 10%, which proves that there was an affective action of assessment behind it.

The data obtained from the observation of paralinguistic strategies allow us to claim that the assessment component of strategic competence, which is referred to by Bachman and Cohen (1998: 5) as taking stock of what is needed, what one has to work with and how well one has done, is present conceptually in the utterances of the advanced users of language. It also provides a means by which the individual relates their topical knowledge and language knowledge to the language use setting and tasks or to the testing situation and tasks as well as taking into consideration the individual's affective responses.

With the growing development in technology, a task we applied in our research does not seem to constitute a lot of technical problems and it can function as an awareness-raising exercise as students' retrospective comments on their performance do not necessarily comply with reality or their conceptions and expectations.

The advanced users of language seem to be strategically helpless as they are not aware of the possibilities that strategizing offer in effective communication. Unfortunately, we did not investigate subjects' in/competence in reference to the profile of their studies and it would be interesting to know whether the subjects who successfully determined their goal of communication were of teaching profile as it is they who need to be very skilled strategists and who need to be the most effective as regards communication.

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Part 2

Psycholinguistic Perspective

Chapter 6

Bilingual Language Control in Translation Tasks: A TAP Study into Mental Effort Management by Inexperienced Translators

BOGUSŁAWA WHYATT

Introduction

In the times when being bilingual is a desired rule and being monolingual becomes more of an exception, it is a shame to admit that we still do not know how the human mind copes with two language systems. The study of bilingualism has been a favorite subject of psycholinguistics in recent years, making effort to gain insight into the organization of mental lexicon in bilingual speakers. The study of bilingual lexicon has mainly focused on two layers, the lexical one and the layer of mental representations or concepts underlying the semantic level of language. One might say that it was focused on the 'hardware' that is the mental infrastructure the bilingual speakers have, whereas the question of 'software', that is the operating system has not been given much attention. Recently, with some advances in neurolinguistic fMRI studies, the issue of language control started to be researched and the results are matched against psycholinguistic models.

However, it turns out that the interest in bilingual language control has been very much focused on monolingual tasks, that is tasks where a bilingual person is utilizing only one of the language systems he/she has in their mental repertoire (see De Groot & Christoffels, 2006). This situation referred to by Grosjean (1997, 2001) as being positioned in a monolingual language mode is not able to fully account for the nature of bilingual language control. Therefore, it has to be complemented by research into language control

when a bilingual person is placed in a bilingual language mode with both language systems being simultaneously activated. This is precisely the case in interpreting and translation tasks. As admitted by De Groot and Christoffels in their recent publication (2006), research on translation and simultaneous interpreting has not been a part of 'the mainstream psycholinguistic work on bilingual language control' (De Groot & Christoffels, 2006: 189).

In this chapter I would like to attempt to shed some light on bilingual language control observed through Think Aloud Protocols (TAPs) (see Börsch, 1986 for details about the method) recorded while inexperienced translators performed a translation task. First, I would like to devote some attention to the notion of language control in bilinguals, then I want to present reasons why translation is a special case bilingual activity, next I shall introduce Gile's (1995) model of translation as a set of efforts/components, following that I would like to present my study, discuss the results and draw some conclusions pointing toward further research and some possible implications for the use of translation tasks in the SL classroom.

Language Control in Bilinguals

Probably the best source of information on the study of language control in bilingual speakers is a recent article by De Groot and Christoffels (2006). The working definition of language control which can be assumed from the article is that it is a control mechanism that is required for a bilingual to use one and not the other language. Language control can operate either globally in which case complete language systems are inhibited or activated, or locally where 'control impacts on a restricted set of memory representations' (De Groot & Christoffels, 2006: 189). As supported by neurolinguistic insights derived from research into bilingual aphasia (e.g. Fabbro, 1999; Green, 1986; Paradis *et al.*, 1982; Paradis, 2004), a control process constitutes an essential part of language processing (Rodriguez-Fornells *et al.*, 2006, also Bialystok *et al.*, 2005). To quote De Groot,

> non-pathological language use not only requires intact language (sub) systems and intact connections between them but also the means to activate and inhibit these systems and to inhibit inappropriate outputs of the systems. (De Groot & Christoffels, 2006: 190)

The fluent operation of the control mechanism will require resources in the form of energy which, as stressed by Green (1986: 211), is in a limited supply and therefore needs to be constantly replenished. Lack of necessary

resources to activate or inhibit the (sub)systems may lead to performance failure and errors. This may also happen if the essential energy has to compete with some 'external circumstances' such as stress, anxiety, noise or fatigue and tiredness.

Models of Language Control in Bilinguals

Most proposed models of language control in bilinguals are based on the same principle of suppression (inhibitory control) and/or activation of the whole language system (global control) or (sub)systems (local control). They also explicitly or implicitly assume that the bilingual's two languages are stored as two separate linguistic systems although the degree of separation and the nature of direct/indirect links between the lexical and conceptual levels of the two languages is open to debate (see Cieślicka, 2004: 165; De Groot, 2002; Kroll & Sholl, 1992; Kroll, 1993). For example, Green (1998) in his Inhibitory Control Model (ICM) [which itself is based on the Supervisory Attentional System (SAS) model of Norman and Shallice (1986)] assumed that a bilingual language system consists of two word input systems (for L1 and L2) and two word output systems (for L1 and L2), one shared conceptual system, one system for phonological assembly, one specifier to control the system and select the language for a particular task and a resource generator which is assumed to supply the required energy to operate the whole system (cf. De Groot & Christoffels, 2006: 190). In psycholinguistic terms, Green's ICM favors language selective lexical access. A different view comes from La Heij (2005) who explained the problem of language control in terms of local control. He assumed the so-called 'complex access, simple selection process' claiming that in the 'preverbal message' of a bilingual speaker there is detailed information on the speaker's intention in the form of a 'language cue' which determines which language, whether 'slang, formal language, irony or euphemism should be used' (De Groot & Christoffels, 2006: 195). This explains that although the human mind tends to overprepare itself by making more options available (Aitchison, 1996), only very few items (lemmas) will be selected as matching the specifications in the language cue. The difference between the two models reflects the global or local approach to language control. La Heij's explanation, however, does not involve the energy cost of the language control mechanism in operation.

The essential question to ask in this chapter is what kind of validity these results have for the study of control mechanisms in the actual process of translation.

Bilingual Language Control and Translation

It is no coincidence that an important contribution into the study of language control also reported on the bilingual's ability to translate. Insights from Green (1986), Price *et al.* (1999), Paradis (1982) and Fabbro (1999) suggest that translation should be viewed as a cognitive task totally disassociate from understanding and speaking a bilingual's two languages. In a similar vein, Beatens Beardsmore (1982) reports on the case of a writer, Julien Green 'who can be considered ambilingual as he can read, write, understand and speak equally well in French and in English, yet, his attempt to translate one of his own books led to a failure' (Beatens Beardsmore, 1982: 8). This points to the fact that translation is a special kind of bilingual activity or rather an interlingual activity (see Toury, 1995).

Translation as a Special Case Bilingual Activity

It goes without saying that the majority of people who learn a foreign language do not intend to use it for the purpose of translating texts from one language into the other. Their educational aims are rather monolingual in nature, that is they want to be able to speak and communicate in their second language with ease. Yet, it is a common misconception that anybody who has a bilingual knowledge is able to translate a text (see Harris & Sherwood, 1978; Hejwowski, 2004). As put by Holmes (1988: 103), 'the translator is in this simplistic common-sense view, a kind of cross-linguistic transcriber or copyist, a slightly glorified typist'. This kind of commonly shared expectation comes from monolingual clients seeking translation services and from bilinguals themselves until they sit down with a text and try to perform the activity. The first translational experience in students of, for example, English as a foreign language at university level has often a painfully disappointing effect usually accompanied by the feeling of their own inadequacy which combined with failure of finding help in bilingual dictionaries performs an eye-opening function to what really is involved in translation (Whyatt, 2003, 2006). So, is it possible to say what it takes to translate a text? At present there are many valuable contributions in the quest to gain insight into the process of translation. The results so far show that the mental reality of translation is counterintuitive to common expectations about its ease and required bilingual knowledge. Translation as put by Wilss (1996) is a knowledge-based activity where the linguistic knowledge of two language systems is a necessary but not sufficient prerequisite. To use a stronger claim voiced by Newmark (1969: 85) and quoted by Bell (1991: 34), 'any old fool can learn a language (…) but it takes an intelligent person to become a translator'.

What then are the essential components of the translator's intelligence? Bell (1991) devoted his whole book entitled 'Translation and translating. Theory and practice' to investigate what this 'intelligence' might consist of but even he himself did not escape the traditional attitude of tentatively equating translator's intelligence with his/her competence. Perhaps then it might be more plausible to view the translator's intelligence in terms of control over his/her knowledge structures. This perception is intrinsically based on the competence–performance dichotomy. Intelligence then would be the ability to use one's knowledge base to act and in the translator's case to perform a task of translating. However, to keep using the word intelligence in times when this quality is ascribed even to washing powder in advertising jargon seems academically inappropriate and the term cognitive control is more appealing. It is also usefully similar to a kin term of language control.

Although the concept of control mechanism in the process of translation/interpreting has not been researched, its presence has been voiced by some translation scholars. For example, Toury (1995) talking about his concept of 'a native translator' says that through normative environmental feedback as a response to the translator's final product, 'the translator starts to consider the "potential responses"' and eventually 'an internal control mechanism develops inside the translator' (Toury, 1995: 248).

Thus, it can be assumed that translation requires intense control with constant global/or local suppression/activation of the two (sub)systems required in the task of translating. This in turn will result in a high energy cost. Relying on this assumption, Daniel Gile (1995) put forward an interesting model of the translation process, which I'm going to discuss next as I believe that it well reflects the mental reality of translation.

Gile's Effort Model of the Translation Process

The model is an expression of Gile's experience as a translator involved in translator training and its original ideas go back to the 1970s. It was originally suggested for interpreter training but it can be also used to analyze translation in general. The model as a whole is constructed around the notion of processing capacity, requirements and limitations. Translating is perceived as 'an intellectual information-processing exercise' (Gile, 1995: 152) in which the application of knowledge both linguistic and extralinguistic becomes essential. The model divides the process of translation into four components or efforts:

(1) Comprehension;
(2) Production;

(3) Memory effort;
(4) Coordination effort.

It is a useful simplification of the translation process which as agreed by Translation Studies (TS) scholars is not linear with clear consecutive stages but more of a cascaded interactive process (see Bell, 1991: 60). According to Gile the translator in the process of translating will have to distribute his/her mental resources between the four components in order to achieve the intended purpose in the form of the Target Language (TL) text. Since, however, our mental resources such as our ability to concentrate, divide attention, spot and solve problems, make decisions as well as monitor our decisions are in limited supply, Gile suggests that if, for example, interpretation/comprehension takes up a lot or 'almost all' mental energy, the performance will deteriorate.

What I like about Gile's model is its simplicity, what I do not like about it is the lack of in-depth explanation of the four components and especially the last two components. Gile seems to devote the most attention to the comprehension component which he calls 'an exercise in inferencing' (Gile, 1995: 152), production is left as self-evident, memory effort is limited to short-term memory and coordination effort is described as the effort needed to coordinate the three other components. This lack of precise descriptions of the four components leaves it open to interpretation and is then more of a virtue than a vice. As pointed out by De Groot and Christoffels (2006: 198), it acknowledges that control processes constitute an essential part of language processing and Gile's coordination component can be taken as functionally similar to the language control mechanism. Translation then is viewed as a divided attention task with control needed to supervise the division of attention and to ensure progression toward completion of the task.

In my study I decided to use Gile's model to observe the distribution of mental resources between the four components with special attention paid to the coordination/control effort.

The Study: Description, Method, Participants, the Text, Procedure

In order to gain access to the translator's on-line processing, I decided to use the method of thinking aloud which originated in introspective psychology (see Börsch, 1986) and has been used to study the process of translation by scholars with their background in psycholinguistics such as Lörscher (1986, 1991), Kiraly, (1991), Krings (1986), Kussmaul (1995). Ten third-year students of English as a foreign language whose competence

is at CAE level or higher were asked to translate a text and at the same time verbalize all the problems, doubts, comments that came to their attention while performing the task. The recordings of these verbalizations formed the so-called TAPs which constituted the raw data on information processing. The students were also asked to write down the translation after they first translated it orally so that further process/product analysis could be possible. The text used in the study was a brief section from a book by Lipniacka (1994) 'The Xenophobe's guide to the Poles' chosen on purpose so that all the background knowledge needed to comprehend it is available to the participants by the virtue of being native speakers of Polish and an informed beneficiaries of the Polish cultural heritage.

The text:

> *Wealth and success*
> *Few Poles have that hunger for power which drives those who become millionaires. The ambitious become chairmen of social committees rather than chairmen of their own companies.*
>
> *Not much value is put on money or possessions, the transience of worldly goods being too well known from past history. Moreover, in recent years no fortune could be legally or even morally acquired. Making a profit was 'profiteering' and for 50 years was considered a crime. It is still considered a suspect activity.*
>
> *Thus Poles do not strive to acquire money, and if some chances their way, it stays but briefly. One of the reasons for this is the stylish Polish gesture: from the shopkeeper who grandly waves aside small change, to the hotel owner who gave all his guests three meals a day, because he felt it too petty to sort out the half from the full boards.* (150 words)

All the participants translated and recorded their TAPs in the privacy of their own homes; totally undisturbed by the presence of the experimenter, they all could use any dictionaries that they normally use, they were not set any time limitations and they could have breaks if they wanted.

Data analysis

All the TAPs provide a wealth of information about processing which is usually a silent phenomenon performed in the translator's mind. My interest in their analysis is to focus on two aspects:

(1) The distribution of mental effort between the four components:
- Comprehension;
- Production;

- Memory;
- Coordination.

(2) The manifestation of coordination effort in the protocols.

The results

As the purpose of the study is not to provide any statistical validity and is aimed at generating hypotheses rather than testing them, the results are to be taken as an average approximation rather than as precise values.

Effort components

In terms of the distribution of effort into the four components, it is fairly straightforward that the majority of time and energy is spent in the memory and coordination component. For example in TAP1, the subject reported on four comprehension problems and six production problems, whereas the number of problems in the memory component and coordination component oscillates around 20. The number of processing within the coordination component can be much higher if the recorded changes to the first oral draft translation are also included.

This disproportion between the mental effort reported in the four components is probably due to the fact that both comprehension and production are in a way relying on the memory component, whereas the coordination effort in a way supervises the problem-solving process once the problem is brought to the conscious attention of the translator. If there are problems with lexical access and retrieval is inhibited, production cannot proceed and coordination effort has to be made to tackle the problem in order to complete the task. For example, let us look at processing while translating the title, 'wealth and success'.

TAP1:

> Wealth and success, mhm …, bogactwo i sukces, nie nie bogactwo, mhm …. coś innego, na przykład jakiś bliskoznaczny … do bogactwa, mhm … zamożność, zamożność i sukces???

Effort components:
Comprehension: 0
Production: 1
Memory: 1
Coordination: 1

There are no problems with understanding the phrase, production proceeds but its results are questioned by the coordination effort, memory

search begins for a more desirable solution, coordination effort feeds information on where to look and memory search follows the advice. Still due to lack of acceptance from the coordination component, the final solution is postponed and a decision is made when writing the translation. Accepted title 'Bogactwo i sukces'.

TAP2:

> Not much value is put on money or other possessions, ...
>
> Nie przykłada się dużej wagi do pieniędzy, ... yyy, do pieniędzy lub innych, yyy, Nie wiem jak to 'possessions', ... sprawdzę w słowniku, ... pos, possessions, majątek osobisty, dobytek, posiadłości, nie, nie, yy ojej, niewielką wagę przywiązuje się, yy do pieniędzy lub ..yy.. majątku

Effort components:
Comprehension: 0
Production: 1
Memory: 1
Coordination: 1

Comprehension seems problem free, smooth transfer proceeds until a production problem pops up, obviously the translator understands the lexical item in question but feels that there is a memory problem in finding the right equivalent, internal memory search is abandoned and the coordination effort decides to go for an external memory source, a dictionary, a list of possible equivalents is quoted, but the coordination effort is not satisfied with the options, pressing for a decision, the translated part of the SL sentence is refreshed in the working memory and a solution is decided upon. Later changed to 'i innych dóbr materialnych'.

One more example:

The last but one sentence of the text caused serious comprehension problems for all the participants: 'Thus Poles do not strive to acquire money, and if some chances their way, it stays but briefly'.

Effort components:
Comprehension: 1
Production: 1
Memory: 1
Coordination: 1

Processing the sentence took a lot of time (on average 4–6 min) and effort including intensive dictionary searching, numerous re-readings of

the problem phrase, questions about syntactic relations and the meaning of the phrase 'chances their way' as well as time spent on voicing sighs of helplessness and despair, including holly names and swearwords. Both the time spent on the sentence and effort to coordinate memory search in most cases used up a lot of the participants' mental energy and fatigue or exhaustion started to compete for the remaining resources. In most cases the performance deteriorated in processing the last sentence, dictionaries were used instead of internal memory; partial solutions were quickly accepted although their lack of perfection was signaled by the coordination effort. Focus of the coordination component was on task completion rather than on quality.

To sum up, the process of translation divided into four components follows a general pattern of action, similar to other actions that we perform, which as suggested by Donald (2006) consists of three stages: plan – execute – rehearse. In this respect, the memory and coordination effort is present at all the stages. Yet, as pointed out by Wilss (1996), memory research 'has not, surprisingly, been registered at all in translation studies' (with the exception of Wilss, 1992). As for the coordination effort it is the focus of the following section.

The coordination effort

Bell (1991: 57) described a psycholinguistic model of the translation process, where he used then available insights from cognitive studies on the bilingual memory architecture. In his model he used the term 'idea organizer' or 'Central Executive', which in Gile's approach accepted here functions as the 'coordination component'. When listing its functions in the translation process, Bell (1991: 57) says that they include:

(1) integrating the process;
(2) monitoring the accumulating information;
(3) revising.

Looking at the TAP data, it is possible to find verbalizations fitting into the three functions.

For example, when translating the sentence, 'Not many Poles have that hunger for power which drives those who become millionaires'.

TAP3:

> Niewielu Polaków, ma, nie … posiada, … też nie może być, nie 'kieruje' się będzie w dalszej części zdania, … niewielu Polaków, jakoś tak, mhm …, niewielu Polaków cechuje … głód władzy, który kieruje tymi, … którzy yy … stają się milionerami … trochę za dużo tych no 'which', dobra na razie może być.

> - no dobra, 'zysk' co się robi z zyskiem? 'przynosić zysk', nie 'przynosić zysk, nie 'robić zysk, tylko co? Nie wiem 'osiągać zysk'? (…) jak to było z tym zyskiem? … Już nie pamiętam, co to było, co powiedziałam, przynoszenie dochodów, nie pamiętam, musiałabym się cofnąć

Having analyzed the data from TAPs, it is possible to extend this list offered by Bell (1991: 57) by adding the function of:

(1) quality control, as in comments like:

- nie, nie podoba mi się
- dobytek to mi trochę brzmi 'obsolete' w tym kontekście
- niełądnie to stylistycznie brzmi, fatalnie

(2) mental effort management, as in comments like:

- nie wiem, co z tym zrobić
- no dobra, 'zysku', zostawię, bo nie wiem, co z tym zrobić
- 'profiteering', co ty było? Muszę sprawdzić w słowniku, bo nie wiem
- nie wiem, muszę sobie zrobić przerwę

or in stress relieving verbalizations:

- kurde
- trudny ten tekst
- cholera
- ojej

To sum up, the coordination component is focused on ensuring progression toward the intended goal, which is translating the text. It supervises the process, integrates all the consecutive decisions, monitors processed information, revises options, controls the quality of the output and decides on where to direct the remaining available mental resources, and makes the ultimate decision whether the energy suffices to continue the process or whether its resources have to be replenished. In other words, it controls more than what is assumed for the language control mechanism and therefore the term cognitive control seems more appropriate. The concept of a control mechanism in the process of translation is also signaled in other notions that were put forward by translation studies scholars. Concepts such as Holmes's map-theory (see Hönig, 1991), Lörscher's (1986) expectation structure or Hönig's (1991) macrostructure point to a governing internal mechanism that is somehow present in the translator's mind.

Conclusion

There is no doubt among practicing translators that translating as a special kind bilingual activity is a high energy consumer. Thus talking about mental effort management in the process of translation makes sense although it has not received much, if any, attention from TS scholars. Recent functional magnetic resonance imaging (fMRI) findings about language control in bilinguals have also stimulated interest in language control during translation. These efforts in finding the locus of language control in the brain point to the fact that the control center is not exclusive to language but underlines other cognitive skills (Gopher, 1992). The modest study reported in this chapter confirms these assumptions pointing to the fact that translation as a complex skill requires more than bilingual language control. Undoubtedly, in translation as an interactive process, we deal with coordination requirements that apart from languages include other knowledge domains. The results of the present study also point to the essential role played by memory in the operating capacity of the human translator. Problems with lexical retrieval, memory blocks and time-consuming dictionary searches put high mental demands on the operating system and use a lot of the available resources. The control mechanism will allocate all the time and attention needed to find a desired solution and when the system runs down on energy it will temporarily shut it down. Looking at the TAPs recorded for this study, the question arises, 'Is all the energy wisely used?' No, it is not. Translation as an interactive cognitive process requires what Newmark (quoted earlier in this chapter) called intelligence which as put by Wilss (1996) is the ability to use all the available knowledge in order to adapt to the requirements of the task and fulfill the task. The subjects in this study over rely on their linguistic knowledge; there are few references made to their metalinguistic knowledge and practically no connections are made to other knowledge domains which they undoubtedly have in their memory accumulated either through learning or experience. As put by Wilss (1996: 102), 'as experience with translation increases, the demand of cognitive expenditure decreases'. The question arises, 'Is it possible to teach better mental effort management and how it can be achieved?' More research is needed to offer some practical implications, beyond doubt it is worth the effort.

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Chapter 7

A Connectionist–Enactivist Perspective on Learning to Write

JAN ZALEWSKI

Introduction

This chapter presents what connectionist and enactivist theories of cognition can contribute to our understanding of learning writing as composing. In contrast to traditional cognitivism, these two approaches to human cognition exhibit greater neural plausibility, both being motivated by the fundamental recognition that the brain is a neural network. Traditionally perceived as theoretically dry and uninteresting (cf. Fitzgerald, 1987), the process of writing has attracted enormous research interest since the 1980s. Focal attention has been on writing as *composing*, that is, on writing as a meaning-making act. I attempt to explicate this epistemic process of writing as construction of conceptual content, by adopting the connectionist and enactivist view of cognition as flow of energy through neural networks, with specific patterns of neural activity resulting in specific cognitive-affective states. I conclude with what the proposed view of the writing process entails for classroom writing instruction.

Historical Background

The notion of *mental representation* constituted a core assumption underlying the revolution in cognitive sciences, and the metaphor of *network construction* has ever since provided a tool for dealing with mental representations. Network models have been used to account for the mind's *architecture*, helping to make predictions about acts of meaning making. Sach's (1967) experimental evidence that we remember meanings without remembering linguistic forms was taken to support the theory of underlying *propositional representations*, setting the mainstream

approach to cognition since the late 1960s. Propositional networks are called *localist* (Bechtel & Abrahamsen, 1991), meaning that each item of interest is encoded by assigning it to one node in the network. Nodes and the links between them are labeled by symbols, allowing for an explication of cognition as rule-based symbol manipulation. Such localist networks represent the *symbolic approach* to cognition.

In the mid-1980s, connectionism posed a challenge to the symbolic approach, offering an account for cognitive performance without invoking knowledge formats in the form of propositional representations. In the 1970s, cognitive scientists came to realize that some higher-level structures were needed to organize propositions in networks – initial proposals included Rumelhart's (1975) *schemata*, Minsky's (1977) *frames*, Schank and Abelson's (1977) *scripts*. Many cognitivists became gradually convinced of the need for some sort of *associative activation* of propositions organized in a network. This conviction arose among others from the observation that one piece of knowledge can elicit others in a manner facilitating further information processing. Collins and Loftus (1975) described how the process of *spreading activation* could account for *typicality effects* of prototype categories. They assigned a *weight* (strength) to each connection in the network to distinguish among features on the basis of their typicality for the category. With the addition of spreading activation and weights, propositional network models turned into hybrid systems placing symbols in networks that used associative activation (e.g. Anderson's, 1983, ACT* model). Such hybrid systems became forerunners to connectionist models of cognition and thus narrowed the gap between the rule-based symbolic models of the 1970s and the neural network models of the early cognitive era, the 1940s and 1950s (Cowan & Sharp, 1988). Those early neural network models were the initial approach to developing network models of cognitive performance, motivated by the recognition that the brain is a neural network. The re-emergence in the mid-1980s of neural networks in the form of *parallel distributed processing* (PDP) networks (Rumelhart & McClelland, 1986), usually referred to as the connectionist theory of mind, was building on the early tradition and re-established the ties between cognitive science and neuroscience severed in the 1970s during the dominance of the symbolic paradigm.

The connectionist architecture is thus claimed to have neural plausibility, that is, it is said to be more likely to replicate the way our brain works. Connectionism originates both in the early neural network tradition and in the symbolic tradition of the 1970s. All the crucial developments within the symbolic tradition, like Rumelhart's (1975) schema theory or Rosch's

(1978) prototype theory, belong in the connectionist tradition as well, where they can be given arguably better implementations (Bechtel & Abrahamsen, 1991). For example, the flexibility and adaptability of schemata is easier to achieve in the connectionist architecture, given connection strengths and associative activation. This flexibility gives connectionist networks the ability to account for typicality effects and to satisfy what are called *soft constraints*. Traditional symbolic models (taking the classical approach to categorization) work on the all-or-none basis and can satisfy *hard constraints* only. That is, even if one condition is not met, a rule does not apply. A connectionist system can satisfy soft constraints, meaning that it finds the best solution to a situation where multiple constraints compete by meeting as many of them as possible, even if none of the conditions are met completely (a point I take up in the section 'Contexts of knowing' as relevant to my discussion of writing performance).

There is one more general point to be made. Being motivated by the recognition that the brain is a neural network, connectionism equates mental representations with patterns of neural activity, which is what connectionism shares with enactivism, both presenting a clear contrast to traditional cognitivism in this respect. However, breaking further away from cognitivist tradition, enactivism faces up to the fundamental epistemological issue inherent in the notion of *mental representation*. Namely, it rejects the strong epistemological sense of *mental representation* as implying the existence of an objective knower-independent reality, but allows for a weak pragmatic sense of *mental representation* as being about something (Varela *et al.*, 1991). This last point is of paramount importance to my discussion of writing performance. Taking this enactivist epistemological stance, I will argue that writing must not be understood in terms of an appropriate response to an *objectively* (i.e. deterministically) perceived situation.

Purpose

The debates in cognitive sciences concerning the mind's architecture are directly relevant to composition studies' concern with writing performance as an epistemic act of constructing meaning. In this chapter, I use the cognitive theories of connectionism and enactivism as a source of metaphors for how the cognitive processes of the mind may operate. As Flower (1994: 96) observes, connectionism is not a theory of 'how knowledge is *remembered* but of how it is *constructed* out of memory'. Importantly to us, interested in writing performance, connectionism can show how conceptual knowledge is constructed out of and in terms of

mostly unconceptualized/implicit sociocultural experience. Traditional cognitive models of writing, like Bereiter and Scardamalia's (1987) *knowledge-telling* and *knowledge-transforming*, viewed writing as generating conceptual content, a process that could be subjected to metacognitive constraints in the case of mature writers, but they did not account for the role of implicit, unconceptualized knowledge in the writing process. My aim in this chapter is to show how connectionism allows us to view both the more implicit and the more explicit processes and to see how they interact in the construction of meaning in writing. Allowing us to view writing as a process of deploying or configuring conceptual knowledge in terms of a concurrently activated *context of knowing*, connectionism offers a new perspective on what constitutes a major challenge in learning to write.

Contexts of Knowing

In contrast to the traditional symbolic approach (see the section Historical Background), the connectionist approach to modeling cognition is called *subsymbolic* because it deconstructs symbols into smaller units called *microfeatures* (Rumelhart & McClelland, 1986), which are not meaningful by themselves and whose cumulative meaning depends on the larger pattern of connectivity within which they are being activated. Thus, knowledge is not stored as prefabricated conceptual units. The subconceptual level of analysis accounts for the greater flexibility of the connectionist network in modeling cognitive performance. In fact, traditionally regarded as conceptual, cognitive competencies (including writing) require a subconceptual level of analysis (Smolensky, 1987). In a subsymbolic network, any bit of knowledge is distributed across a large number of processing units. In such a *distributed network*, cognitive processes operate in parallel by means of associative spreading activation. Thus, the distributed network is opposed to the localist network, which imposes hard constraints on cognitive operations. For example, if a writer is thinking an idea which is a single concept, the localist paradigm assumes the entire concept to be activated as an intact symbolic unit. By contrast, in a subsymbolic distributed network, when the same concept is being processed, a large and varying number of microfeatures are being activated in various degrees, with the result that some features (even those possibly relevant) may not be sufficiently activated to rise to the level of consciousness. Which features do rise to the level of consciousness on a given occasion depends on the larger pattern of neural activity, that is, the context within which the concept is being activated. In other words, the meaning of a concept will vary with context. This is

the characteristic of PDP networks that is referred to as their ability to work within soft constraints.

This feature of PDP networks is of fundamental value in my discussion of writing in that it accounts for the context-sensitive nature of meaning making as a *constructive* act. What connectionist theory tells us is that even the most conventionalized units of meaning like lexicalized concepts do not exist as prefabricated symbolic units of knowledge stored away in memory but rather are constructed anew every time we process them, in different contexts sprouting different meaning connections. The connectivity patterns are shaped by previous processing experience which is responsible for modifying the weights (strength) of connections between processing units. The weights affect (i.e. either excite or inhibit) the parallel processes of spreading activation in the network. In the connectionist paradigm then knowledge is claimed to be stored in the strengths of those connections and learning is said to be the side effect of information processing. Enactivism adds that such knowledge is tantamount to capacity for specific *context*-sensitive behavior and in this sense it is *situated knowledge*.

I have already referred to the larger pattern of neural activity as the *context* in which a concept is activated. Context is accordingly defined as a set of cognitive constraints. In order to better understand the process of writing, I employ the basic connectionist idea that meaning making comes about through an interplay of multiple sources of knowing acting as simultaneous constraints on one another. I classify such constraints in writing into two categories. Namely, writing can be seen as a process of constructing conceptual content out of subconceptual microfeatures by configuring them into a conceptual knowledge network, which I refer to as the writer's *internal context of knowing*. Such a conceptual knowledge network can be seen as configured in terms of a simultaneously lower-activated *external context of knowing*, that is, the larger connectivity pattern within which the conceptual network is constructed. In this way, I group mental representations into two kinds of mutual simultaneous constraints operating in the process of writing and refer to them as the *internal* and *external* contexts.[1] The difference between the internal and external contexts is drawn here following (a) Chafe's (1980, 1994) discussion of consciousness in terms of activation levels and the resulting degrees of our awareness ranging from *peripheral* to *focal*; (b) Roediger and McDermott's (1993) distinction between two types of processing, namely, *stimulus-driven* or implicit versus *concept-driven* or explicit; and (c) Alexander *et al.*'s (1991) distinction between four major types of knowledge: *affective*, *sociocultural*, *conceptual* and *metacognitive*.

A Disambiguation Task from The Connectionist Viewpoint

To illustrate the distinction between the internal and external contexts of knowing, I will use an example from Anderson's (1995: 573) discussion of lexical disambiguation from the connectionist viewpoint, that is, based on multiple simultaneous constraints and the massively parallel way we process information. Representing an aspect of North American culture which will likely be less familiar to non-Americans, Anderson's example will help me make my point concerning sociocultural moorings of conceptual knowledge. Given the cue words *bat*, *ball* and *diamond*, one of several possible associations of each of these cues when they are taken individually is the baseball schema – each cue activating other schemata as well (e.g. *bat* activating *mammal*, *ball* activating *football*, *diamond* activating *jewelry*). However, for the three cues taken together, *baseball* is the only shared association (at least, for a resident of North America, as Anderson points out). Hence, the baseball schema can receive the most activation because of its links to all three cues. The three cues are accordingly said to constitute the internal context of knowing when the topical information is baseball. By *topical* I mean information receiving sustained activation. The basis for this cognitive-process definition of *topic* is the notion of consciousness with its uneven spread of activation, the maximally activated information being its focus and the lower-activated information being its periphery (see Chafe, 1980, 1994). Along the continuum from minimum to maximum activation, there will be a point beyond which the information activated is of current concern, the central portion of consciousness being occupied by matters of current concern. This central portion of consciousness constitutes the topic-focus continuum. The maximum activation of focal information quickly subsides, but when it is sustained for a time within the range of current concern, then the focal information becomes topical. Based on this process definition of topic, we can say that the notion of *internal* versus *external* context is dependent on the topic of thinking. Topical information will be synonymous with the internal context and so with higher activation, higher awareness and concept-driven processing, which means conceptualized (i.e. conceptual and possibly metacognitive) knowledge as opposed to unconceptualized knowledge called here *sociocultural* (which means lower activation, lower awareness and stimulus-driven processing). That part of our sociocultural experience which has not been sufficiently conceptualized cannot enter the internal context of knowing, nevertheless, as the lower-activated/less conscious external context of knowing, it has important influence on the internal context (affecting the spread of activation within it).

Based on Chafe's (1994) notion of the *dynamic flow* of consciousness, it can be stated that the centers of consciousness form a succession of focal points of maximum activation with each focus being quickly replaced by another. These successive centers constitute the internal context of knowing as a process of spreading activation within the range of the focus-to-topic continuum (i.e. within the range of matters of current concern), while the peripheral and progressively lower-activated portions of consciousness constitute the external context to the extent that these areas of lower activation contribute to the spread of activation within the range of matters of current concern.

When we are being presented with the three cues *bat*, *ball* and *diamond*, each of them one at a time becomes focal, that is, receives maximum activation for a short period of time. As the activation spreads in the network and subsides, the result will likely be maximum sustained activation being given to the concept *baseball* – because of it being the more complex schema inclusive of all the three cues – which in this way becomes topical. However, typically information becomes topical not only due to receiving sustained high levels of activation from successive focuses but also due to receiving activation from simultaneously lower-activated (peripheral) representations, that is, not only from the internal but also from the external context. The example under consideration represents a case when the three cues are used as internal constraints to induce a topic. Such an inductive association task is artificial because it is removed from a sociopragmatic context of situation, which means that it is limited to concept-driven/explicit processing when stimulus-driven/implicit processing could offer additional topic-external and yet relevant cues/constraints to help solve the problem. In such a case, problem solving can be aided by the metacognitive awareness of this being a disambiguation-by-association task, which calls for concept-driven/explicit rather than stimulus-driven/implicit processing.[2] However, as Anderson (1995) himself observes, this disambiguation-by-association task is more solvable for residents of North America than others. This is because, as Kellogg (1994) puts it, 'thinking proceeds through a filter of *sociocultural knowledge*' (1994: 49), or we might say that conceptual processing is biased toward dominant sociocultural experience. In other cultures there might very well be other solutions to the same association problem, as the three cues when interpreted in a different sociocultural/external context of knowing might yield a different topic (i.e. might be subsumed under a different schema). The general point here is that conceptual thinking is grounded in sociocultural experience.

A Writing Task from a Connectionist–Enactivist Viewpoint

What follows from my distinction between the internal versus external contexts of knowing in terms of maximum activation (focal information) and sustained high activation (topical information) versus low activation (peripheral information) is that writers may only be peripherally aware of what is called the external context when being engaged in the very process of generating conceptual content (i.e. while constructing the internal context of knowing). However, in the case of a more mature approach to writing (cf. Bereiter & Scardamalia's, 1987, *knowledge-transforming*), metacognitive concerns such as consideration of purpose, audience and appropriate strategies can be brought into the internal context of thinking to constrain subsequent construction of conceptual content. As the activation of these metacognitive concerns subsides, they retreat into the external context guiding later construction of relevant content. The crucial point is that like the internal context, the external context of knowing is also defined as mental representations; however, we are only peripherally aware of those representations, being engaged in constructing conceptual content (in accordance with the definition of the two types of contexts in terms of activation levels). It follows that, as mental representations, the external context is also subject to mental construction. This is a point that from the enactivist standpoint is of fundamental epistemological consequence – which is a point I turn to now.

The key difference between the two contexts of knowing is that while the internal context is explicitly constructed (i.e. in terms of conceptual knowledge), the construction of the external context can range from more implicit (carried out in terms of unconceptualized, affective and sociocultural, knowledge) to more explicit (i.e. carried out in terms of conceptualized knowledge). Within this framework, *a rhetorical situation* (in contrast to a *writing situation*) is defined as that part of the external context of knowing in writing that has been explicitly constructed in terms of metacognitive knowledge. Such metacognitive knowledge can ultimately produce conscious awareness of a context of situation/context of knowing as a complex of entities and relations constructed purposefully by the writer as opposed to constructed implicitly in terms of affective and sociocultural knowledge – the latter case producing no more than awareness of the immediate context of situation as a complex of objective (i.e. writer-independent) entities and relations.[3] The point that the external context of knowing is mentally constructed is indeed of paramount importance because, although cognitive linguists (e.g. Langacker, 1987) have demonstrated how conceptual meaning is context dependent, we still tend to understand that context

as a given, that is, as objective (knower-independent) and beyond our control. This is the understanding of *context* which underlies traditional discussion of *rhetorical situation*, as in Bitzer's (1968) seminal article introducing this concept into modern rhetorical theory.

By way of example, let us consider a traditional classroom writing situation where students are given a topic to write on, for example, *Baseball – America's favorite game*. In this situation, the topical information receiving sustained high levels of activation is American baseball and the students' task is to present it to an unspecified audience. What content cues the students will focus on (a process which constitutes the internal context of thinking directly responsible for the construction of conceptual content) depends on how they represent the task to themselves (i.e. how they construct their external context of knowing). Similar to the above disambiguation task, a traditional writing task like this one is not presented in a sociopragmatic context, as part of any meaningful social practice other than writing for a teacher and for a grade.[4] The students may start thinking about baseball in the context of, for example, explaining the rules of the game to a novice unfamiliar with the game or else in terms of presenting their point of view on the current situation in American Major League Baseball to other fans. Such task representation may be more implicit (stimulus-driven) or more explicit (concept-driven), which depends on whether or not they think in terms of their actual situation. Implicit representation, being socioculturally biased, means that in our Polish context, Polish students will typically start thinking about explaining the rules of the game to a Polish audience, while in the American context American students will likely start thinking about Major League Baseball with the American audience in mind. The students will be writing based *not* on an explicitly constructed *rhetorical situation* but responding to an implicitly constructed *writing situation*, perceived as objective/knower-independent, and so deterministic in the sense of requiring from them an appropriate response. This non-rhetorical approach to writing implies *situational determinism*, which means that when they are implicitly represented (i.e. based on stimulus-driven processing) and are accordingly perceived as objective, 'situations are seen as directly imposing certain types of behavior, the "appropriate" behavior' (Riley, 1996: p. 123).

Explicit task representation means that instead of thinking in terms of their actual situation (essentially, in dominant sociocultural terms, i.e. either that baseball is an unfamiliar game in Poland or a national pastime in the United States), students must start by considering the key elements of the rhetorical situation, namely, their choice of audience in relation to their purpose in writing. While actual situations support stimulus-driven

processing of the immediate physical–social context of situation and so provide for more implicit construction of an external context of knowing, they may indeed lead to successful content generation in writing but they in fact foster the less aware, non-rhetorical approach to writing – the writer perceives the situational context as a given which is beyond his/her control. To learn to write, students need to learn to control their situations to see options instead of one appropriate response. In fact, as Chafe (1994) observes, written language is preservable through time and space because it is not grounded in the immediate situation of the writer. Writing is thus *desituated* and as such cannot be adequately supported by stimulus-driven processing of the immediate situation of the writer. Consequently, writing tasks as desituated will call for concept-driven processing and an explicit representation. In contrast to speaking, writing situations call for the more aware, rhetorical approach in which the writer controls the situation rather than sees it as writer independent and requiring a specific response. Spoken language is produced under stringent time constraints and so certainly gives much less chance to shift attention away from matters of current concern (i.e. the internal context), in this way preventing more aware construction of an external context of knowing. By contrast, writing is not subject to such time constraints and the more desituated it is, the less it can depend on implicit/stimulus-driven processing. Instead, writers need to rely more on explicit/concept-driven processing in order to construct an external context of knowing.

Conclusion

From the connectionist–enactivist perspective presented here, what constitutes a fundamental challenge in learning to write is the need for explicit construction of an external context of knowing in writing (called *constructing the rhetorical situation*). The problem is that immature writers will fall back on largely implicit construal of their task in terms of their immediate situation, which is what they normally do as speakers. To help them develop as writers, we need to develop their ability to represent problem situations/external contexts of knowing to themselves in more explicit rather than implicit terms. From the connectionist viewpoint, such metacognitive control in the form of constructing a rhetorical situation means ability to take preemptive action against automatic *tunability* of mental representations to currently active contexts of knowing (Hinton *et al.*, 1986). Writing instruction cannot be limited to assigning topics and having students write. To help students develop as writers, we need to present them with more elaborate writing assignments, leading them to

construct a more explicit representation of the task. In the case of the above example of a writing task (see the section A Writing Task from a Connectionist–Enactivist Viewpoint), it means raising the students' awareness of what it means to present baseball to an audience which need not be part of the immediate physical or social situation of the writer. Such awareness constitutes an important part of the external context of knowing influencing generation of relevant conceptual content.

A clearly desituated writing task, for example, one involving a more hypothetical situation which cannot be supported by stimulus-driven processing of the immediate situation, can better lead to concept-driven processing and constructing an explicit representation of such a task. It will in effect support the more aware, rhetorical approach, where the student writers learn to control the context of situation by intentionally selecting its elements and defining their relations. The students' more explicit representation of the task to themselves, constituting the external context of knowing, gives them greater control over activation of relevant conceptual content. Their ability to represent to themselves the problem situation in more explicit terms means metacognitive control consisting in taking preemptive action against automatic tunability of mental representations to implicitly activated contexts of knowing.

Notes

1. For a discussion of this distinction, see Zalewski (2006).
2. See, for example, Davidson *et al.* (1994) on task/problem representation as one of the metacognitive processes contributing to problem-solving performance.
3. It will be noticed that as a writing process which does not involve metacognitive knowledge, *knowledge telling* is referred to as a *non-rhetorical* approach to writing (Bereiter & Scardamalia, 1987).
4. I do not argue that writing is still taught in Poland using the traditional product-oriented instruction. Actually, there is no research on which to base any such claims. Nevertheless, the fact that at our universities writing is taught only in foreign language departments points to the traditional view of writing as just a *linguistic* skill (providing forms for pre-existing content) rather than a *composing* skill (an epistemic act of meaning-making). Indeed, there is no tradition of *composition* instruction in our country (see Reichelt, 2005).

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Chapter 8

Cross-Linguistic Conceptual Influence from a Bilingual Perspective: In Search of Research Paradigm

JOLANTA LATKOWSKA

Introduction

This chapter concerns itself with the subject of conceptual transfer and its workings in the bilingual mental lexicon. As the discussion will be held within the theoretical framework of multi-competence, which assumes that the languages in the bilingual mind are in continuous communication (Cook, 2003), the focus will be both on second/foreign language acquisition and on bilingual designs that investigate L2-induced L1 restructuring. Considerable thought will also be given to the practicalities of research in this area as they might provide insightful guidelines for future studies to follow.

In general, the chapter discusses current views on conceptual representation within the bilingual lexicon. These are based on the assumption that linguistic resources and non-linguistic knowledge are stored together in a domain-general representational system, which makes it possible for language and cognition to interact on a number of levels (Bialystok, 2005: 419). This is why researchers take the trouble to distinguish between the cognitive and linguistic effects that expression through more than one code, that is language, has on the L1/L2 user.

In this vein, a substantial body of research into conceptual transfer is oriented towards cognitive processes, which involve transferring literacy skills and problem solutions between languages in the bilingual mind and which tend to go under the name of conceptual transfer or academic skills (Bialystok, 2001; Cummins, 1991, 2000; Francis, 1999; Francis, 2000;

Kecskes & Papp, 2000, 2003). To be more specific, despite the impression of being tightly linked to a specific language, literacy skills such as dealing with text difficulty, knowledge of cultural schemata and of discourse structure, overall linguistic knowledge, as well as familiarity with the subject matter (Durgunoglu, 1997) are code-neutral as they can be used to analyse texts in any language once an adequate level of proficiency in the language has been reached (Francis, 2000). The term conceptual transfer has also been used to refer to the transfer of non-linguistic information in problem-solving tasks, which according to Frances (1999) is independent of the language of encoding and decoding.

Another issue that has received considerable attention from researchers and has become a subject of a heated debate for the past decade or so is the relation of concepts and of conceptual transfer to language and language-mediated behaviour. For instance, Appel (2000) argues persuasively that, even though we do not understand what concepts are, they do not seem to be part of language as such, and that therefore there can be no conceptual transfer from one language to another. In the same breath, he questions the logic of analysing the conceptual structure of the lexicon, as this is a contradiction in terms (cf. Pavlenko, 1999).

A somewhat less extreme position has been taken by Jarvis (2000: 19), who describes conceptual transfer as *the effects of underlying non-linguistic (or extra-linguistic) conceptual representations on a learner's (bilingual's) use of both the first and second language.* He additionally points out that this definition squares with Jackendoff's (1990) idea of an I-language, which exists in the mind of particular individuals, and which is instantiated by their thoughts and mental representations. Odlin (2005), by contrast, emphasizes the opposite phenomenon, that is the influence of language on thought and defines conceptual transfer in terms of linguistic relativity, which, in his opinion, can be observed mainly in L2 production and comprehension.

In spite of these seemingly contradictory assumptions, the Jarvis and Odlin definitions are in fact complementary in that each describes conceptual transfer as a dynamic process operating on the verge of thought and language in a direction predicted by the theory of multi-competence. Accordingly, in this chapter the term *conceptual influence (transfer)* will be used to refer to the hypothesized bidirectional interaction at the level of conceptual representations underlying verbal and non-verbal behaviour in situations involving either the native language or another language that was acquired later in life, or indeed both languages.

As regards the relation of concepts to language, it is an issue linked to current thinking on the architecture of human mind and of bilingual

memory. The former is beyond the scope of this chapter. The latter, however, is by all means relevant as it tends to determine second language acquisition (SLA) and bilingual data interpretation and collection procedures. Presented below are two opposing positions on conceptual representation within the bilingual lexicon, as well as some arguments in their favour.

Unity of the Semantic and Conceptual Levels

The unitary view has been endorsed by a number of bilingual paradigms, the most pertinent of them being the Revised Hierarchical Model (Kroll & Stewart, 1994) and the Distributed Feature Model (de Groot & Kroll, 1997). The former sheds light on the relationship between words and meanings/concepts, while the latter elucidates the dynamics of the semantic/conceptual interdependence within bilingual memory. In addition, the Revised Hierarchical Model portrays the development of bilingual proficiency, as well as clarifying the nature of cognitive processes operating at different stages of bilingual growth, which makes it particularly relevant to L2 teaching practice.

Current discussions seem to support the notion that the bilingual lexicon has a two-layered (hierarchical) structure, which encompasses two independent lexicons, one for each language, and a semantic/conceptual store, which is shared by both languages. This indeed is the main tenet of the Hierarchical Model, to the effect that a translation pair like, for example *apple/jabłko* (Polish) is believed to have three components in bilingual memory: the L1 and L2 word forms and a shared meaning (Francis, 2005; Kroll & Tokowicz, 2005). The existence of a common semantic base is implied by reaction time research, which shows that semantic priming occurs between languages, and that semantically similar words from both the L1 and L2 interfere with picture naming in either language. Furthermore, L1 meanings are readily available in the L2 in SLA contexts, and forward and backward translation is relatively easy for most bilinguals. It must be borne in mind, however, that the research tends to use concrete words, which are presented out of context (Kroll & Sunderman, 2003).

In the Revised Hierarchical Model, there is also an asymmetry both in the size of the lexicons and in the strength of the connections between them (deGroot & Kroll, 1997; Kroll & Stewart, 1994; Kroll & Tokowicz, 2005). This is because the L1 is the dominant language, while the L2 is less well developed on account of being acquired later in life. Furthermore, the model postulates a developmental shift from lexical association for L2, which initially may only be accessed through the L1 lexicon, to direct concept mediation, which is a function of growing proficiency in the L2

(de Groot & Kroll, 1997; Kroll & Stewart, 1994; Kroll & Tokowicz, 2005). This, in turn, explains why the links connecting the lexicons to each other and to the semantic level are stronger for the L2 to L1 processing, and less efficient in the opposite direction, that is from L1 to L2.

Central to the unitary view is the assumption that the semantic and conceptual levels are merged, and, as such, contain information about word meanings and concepts, both linguistic and extra-linguistic (Francis, 2005). In an attempt to specify the contents of the semantic level and thus account for the concreteness and cognate effects observed in reaction time designs, de Groot (1992, cited in de Groot & Kroll, 1997) proposed the Distributed (Conceptual) Feature Model, which states that conceptual/semantic representations contain *sets of primitive meaning elements* (de Groot, 1992, cited in de Groot & Kroll, 1997: 48) or semantic features, which determine the meaning(s) of words in a particular language. The extent to which these features overlap in a specific pair of translation equivalents delimits the degree of semantic equivalence for these words.

Furthermore, the degree of interlingual semantic overlap is governed by the lexical category the words belong to. To be more specific, concrete nouns and cognates have similar referents with attributes that coincide across languages while abstract nouns and non-cognates are more varied in scope and thus share and/or activate fewer semantic primitives. This is why abstract words, in particular, seem to be more difficult to translate and are more context and culture-dependent in both comprehension and translation (Kroll & Tokowicz, 2005). The theory also acknowledges the existence of language-specific meanings, which are simply all those features that are not shared by the pair concerned. To its detriment, it makes no distinction between written and spoken language.

An objection that is often raised against the unitary position (see Pavlenko, 1999) is that it fails to differentiate between meanings, which are linguistic in nature, and concepts that may be unrelated to language. This lack of systemic differentiation may result from the use of reaction time designs, which in the opinion of Jarvis and Pavlenko (2007) are suitable for investigations into monolingualism, where one can find direct concept-meaning correspondences.

To counter such criticisms, de Groot (2000) argues that the task of separating conceptual and semantic representations, as well as defining the differences between them may be tedious and infeasible since both are derived from experience with words and the surrounding environment, and as such, reflect internal thought processes and interaction with the world at large (Lakoff, 1987). Moreover, attempts to define *word meanings* as sets of essential semantic features are, in her view, doomed to failure

since it is possible to provide convincing and all-inclusive definitions for very few words (de Groot, 2000). Recent evaluations of componential analysis also stress this point (Kövecses, 2006).

To resolve this dilemma, Francis (2000, 2005) proposes a compromise solution, which posits that semantic representations are a subset of all concepts, which form a system derived from experience. Despite the fact that there are more concepts than words, every concept can be expressed in human language either as words or as sentences (Francis, 2005: 252). Semantic representations are the representations of word or sentence meaning, which remain in a subset relation to the concept concerned. Incidentally, this explains why it is so difficult to distinguish between them. An alternative explanation is that word meanings are a particular type of concept or *fragments of conceptual structure* (Jackendoff, 1994: 131), or indeed *mappings of verbal labels to their concepts* (Francis, 2000: 14). Accordingly, word meanings that are linked to specific concepts are referred to as lexical or semantic concepts, while the remaining concepts are non-linguistic (Roelofs, 2000).

Overall, the view that there is a unity between semantic and conceptual representations has been voiced mainly by cognitive linguists and psychologists. Its leading proponents on the linguistics side include Langacker (1987: 5), Jackendoff (1983: 95), Fodor (1975: 530), Wierzbicka (1996), Lakoff (1987), Kövecses (2006) and Aitchison (1997). Strong unitary influences may also be observed in SLA research, where think aloud protocols have been used to investigate mental operations underlying language tasks.

It cannot escape notice, however, that the separatist position is gaining ground as evidence from a variety of research designs and branches of linguistics is beginning to accumulate. Some of their arguments are presented below.

Separation Between Semantic and Conceptual Representations

This position advances the view that concepts, as instantiated by thought, and language are separate (Pederson & Nuyts, 1997) and constitute systemically independent constructs. In this vein, thought is assumed to be non-linguistic and autonomous from language. The pivotal question is whether *the representations that underlie linguistic meaning, that is semantic representations* are the same as those that *underlie non-linguistic thinking, that is conceptual representations?* (Levinson, 1997: 15). In truth, the question has been answered in the negative by Levinson (1997), who adopted an

extremist stance and categorically ruled out the possibility that there might be some kind of conflation and/or unity between these two levels. He also rejected the subset relation (see Francis, 2000, 2005), which substantiated the existence of lexicalized concepts and bridged the gap between the unitary and separatist positions.

Given the growing awareness of pragmatics and popularity of ecological cross-cultural studies, it comes as no surprise that his views appeal to both psycholinguistic and SLA circles (cf. Paradis, 2004; Pavlenko, 1999; Odlin, 2005). What follows are some of the reasons why Levinson and like-minded researchers believe that the unitary camp *must simply be wrong* (Levinson, 1997: 16).

Ontologically, the conceptual system develops before language, and remains neurofunctionally independent of lexical semantics (Paradis, 2004: 198). Moreover, both Paradis (2004) and Levinson (1997) stress the multi-sensory nature of thought, alias concepts, which may be accessed through a number of channels other than language. A case in point is the fact that memories of smells, tactile experiences, music and imagery are often stored in a non-linguistic form, and are more often than not difficult to verbalize. The reverse may also be true, namely, semantically pertinent words alongside tactile, visual, auditory, etc. stimuli may activate the corresponding concepts. In the absence thereof, concepts may be self-activated simply by thinking about them.

On that note, Levinson (1997) argues that not every thought is, or indeed, can be verbalized, and that identical words may express different meanings. For instance, depending on the geographical situation of the speakers *I saw some animals in the park* may in fact refer to animals as different as squirrels and monkeys (Green, 2000). Thought is specific and precise, while language often resorts to crude generalizations, as evidenced by indexicals (does *Tomorrow I'll leave for Paris* mean the same the following day?; Levinson, 1997). Thought is often *gestalt*, while language, due to production constraints, remains linear.

Levinson's arguments are strengthened by the existence of pragmatics which, thanks to contextual clues, makes communication economical. To put it another way, it is pragmatics that makes it possible for people to say less than they actually think and imply more than they actually say, which inevitably highlights the disparity between thought, as instantiated by communicative intention (illocutionary force), and language as manifested by the semantic rendition of that intention. On the other hand, it is vital to remember that situational language use is subject to processes such as meaning negotiation, speech redundancy, expectation-driven understanding, experience-derived and assumed knowledge, as well as a

plethora of other factors that may potentially impact on the effectiveness of verbal communication, not to mention non-verbal signals, which according to Morain (1978) convey 65% of meaning in communication. By virtue of supplementing the linguistic message, they, too, are indicative of the underlying thought. All things considered, the inescapable conclusion is that it may be premature and/or insufficient to make generalizations regarding the form of human thought on the basis of an analysis of linguistic items outside the framework of face-to-face communication and models of meaning negotiation (cf. Kramsch, 2005). This remark assumes even more significance in the light of the fact that language has a social nature and, as such, is bound to be conventional. This, in practical terms, means that its size and expressiveness, grammar and vocabulary-wise, need to be limited to ensure both learnability and wide-spread use. In Levinson's (1997) view, human thought is not subject to such constraints.

What is a concept, then? Surprisingly enough, the answer to this question appears to be a highly divisive issue, which instigated a number of quite diverse theories from propositional systems (Jackendoff, 1992) to image-based models (Paivio, 1991) to symbolic systems of the signifier/signified type (Pederson & Nuyts, 1997). For the purposes of this work, I will quote a few definitions put forward by researchers with an interest in bilingualism in the hope that they will shed light on the dependencies between language-motivated conceptualizations within the bilingual lexicon, and on the overall relationship between concepts and language.

Thus, from a neurolinguistic perspective, a concept is a pattern of neural activation referring to events, properties, objects and the like. Concepts are never activated as wholes. What is activated, that is brought to consciousness, are those features that are relevant to the situation at hand (Paradis, 2000). Pavlenko (1999, 2005: 435) sees concepts as *mental representations that affect individuals' immediate perception, attention and recall and allow members of specific culture groups to conduct identification, comprehension, inferencing and categorization along the same lines.* She is also of the opinion that concepts contain *imagery, schemata, motor programmes* and all multisensory information obtained through interaction with the environment (Pavlenko, 1999: 212). To the cognitive scientist, a concept is an abstraction, which contains everything an individual knows about a particular event or experience.

In line with his beliefs about systemic separation of concepts and meanings, Paradis (2004) explains that, despite its non-linguistic nature, the conceptual store may contain culture-bound concepts, which are organized around semantic boundaries of lexical items, that is language-based concepts, and which are derived from experience. This often leads to one-to-one correspondences between meanings, which in Paradis' opinion are

part of lexical representation along with phonological and written forms and concepts. He adds, however, that this should not be construed as being indicative of the existence of a joint semantic-conceptual store because there are also concepts that are completely independent of language.

In the bilingual mental lexicon, L1 and L2 translation equivalents may activate the same or different concepts. There are concepts that can only be verbalized adequately in one language, to the effect that bilinguals are often forced to resort to borrowing to patch up lexical gaps, that is name a concept that has not been lexicalized in the language being spoken. It follows that lack of a lexical label is not synonymous with an absence of an equivalent concept in the bilingual's mind, as the concept may be easily expressed in the other language.

Differences in conceptual representations are reinforced by cultural and typological contrasts. Following Lucy (1996), Pavlenko (1999) contends that, in addition to lexicalized and grammaticized concepts, that is concepts denoted by grammatical categories such as aspect, the conceptual system contains narrative structures and discourse patterns, which reflect conventional communication routines. These are typically acquired through interaction with members of a particular community and/or culture, and may instigate change and modifications in the bilingual's conceptual store, depending on the intensity and nature of contact with either language. This is because concepts are not static and are themselves subject to change (Paradis, 2000).

All things considered, apart from its unquestionable heuristic merits, the separatist position has opened up new avenues for research into bilingual memory. I strongly agree with Levinson (1997) that it is necessary for most branches of linguistics to join forces and devise methodology that would enable us to capture the multi-dimensional nature of conceptual representation and its relation to language(s) in the mental lexicon. In this connection, what needs to be stressed is that, to date, both the separatist and unitary positions have contributed significantly to our understanding of language per se and language use in monolingual and bilingual contexts by using study techniques that conformed to the rigour of empirical science. This is why, despite their contradictory viewpoints, they should not be dismissed lightly but rather treated as complementary, as each offers insights into specific language processing mechanisms under specific conditions.

Research into Conceptual Influence

To date, research into conceptual influence has covered a significant portion of the bilingual spectrum. In what follows I discuss selected strands

of research in the domain of SLA, bilingualism and multi-competence with emphasis on data collection procedures and overall research designs.

Research into the transfer of language skills within the framework of multi-competence

In referring to the nature of bilingual competence, Grosjean (1982, 1998a) remarked that bilinguals are not 'two monolinguals in one' but competent speakers–hearers, whose level of competence in each language is determined by the need for particular language skills in their environment. In addition, numerous studies (Pavlenko, 2003; Cook, 2003) suggest that knowledge and use of more than one language have bearing on the underlying L1/L2 competences. To capture the holistic character of this dynamic construct, Cook coined the term multi-competence, which he defined as *knowledge of two languages [stored] in the same mind* (Cook, 1996: 65). In keeping with the definition, the term covers all cases of bilingualism and multilingualism. Cook (1996: 65) also believes that, within the bilingual mind, languages are subject to constant restructuring, change and adaptation processes, which, according to Kellerman (1995: 142), are bidirectional and may take the form of structural and cognitive transfer. The former constitutes a linguistic phenomenon involving morpho-syntactic and lexical elements of language, while the latter requires conceptual interaction, which makes skills and knowledge obtained in one language available in the other (cf. Kecskes & Papp, 2000).

The development of multi-competence tends to be studied in natural SLA contexts, which entail authentic communication with L2 users, as well as exposure to the target language in a variety of contexts and forms. The focus, however, is on aspects of L2 → L1 interaction and/or bidirectional transfer at the individual level (Pavlenko & Jarvis, 2002). Kecskes and Papp (2000; cf. Cummins, 1979) observe that for multi-competence to develop, the L2 user/learner needs to reach a certain level of proficiency in both languages. Despite defying attempts at definition, the level remains quite high.

Once developed, multi-competence becomes a platform for any *kind of movement or influence of concepts, knowledge, skills or linguistic elements* (Kecskes & Papp, 2000: XVI), which occurs bidirectionally, that is from one language to another. This, in practical terms, means that the contents of the conceptual store (see de Groot & Kroll, 1997) become available through both language channels.[1] A similar stance is adopted by Herdina and Jessner (2002), whose Dynamic Model of Multilingualism posits that knowledge of two or more languages has an impact not only on the

languages as such but also on the linguistic system as a whole. When conflated, the constituent languages acquire properties that none of them has on its own, in the same way that nitroglycerine acquires its explosiveness (Herdina & Jessner, 2002: 27). In this sense, holistic multi-competence brings about a complete transformation of its component languages.

It is a popular belief that in the majority of FL classes language learning is often limited to conscious study of a new code (Pavlenko, 1999). Still, there is evidence to suggest that limited contact with a foreign language has an impact on the acquisition of L1 reading skills (Yelland *et al.*, 1993), and that intensive FL training and immersion programmes provide enough contextual backup and processing intensity to make acquisition possible, thus creating grounds for the development of multi-competence.

Since in the formal FL context one can hardly expect the FL to directly influence the L1 as transfer, borrowing and the like, its presence will be felt in a much subtler way via what Kecskes and Papp (2000) see as language-neutral conceptual transfer, but what from a practical standpoint could be termed greater intellectual efficiency or indeed cognitive transfer (cf. Kellerman, 1995). It is essential to realize that such phenomena are regarded as cross-linguistic transfer (Herdina & Jessner, 2002), even though they do not always manifest themselves in a purely linguistic form. A case in point is Singleton's (1999) list of cognitive benefits that bilingualism bestows on individuals with all ranges of ability (Baker, 2001). It runs as follows:

- bilingualism facilitates the development of verbal intelligence and social skills, including interpersonal communication, in a way that goes beyond language (Herdina & Jessner, 2002);
- bilinguals have better metalinguistic skills than unilinguals;
- bilinguals display greater creativity and divergent thinking than unilinguals.

Apparently, cognitive advantages can also be observed in the native language of L2 learners, as attested to by Kecskes and Papp's (2000) study, which was conducted in a FL setting. Drawing on their results, Kecskes and Papp add the following to the list: a more sophisticated use of L1, better narrative skills, greater syntactic complexity and well-formedness of sentences, as well as a more selective use of vocabulary (Kecskes & Papp, 2000: 19). These were ascertained on the basis of the data obtained by means of quantitative measures developed for the analysis of essays or narratives by advanced FL learners on intensive and immersion programmes. Kecskes and Papp (2003) also suggest that summary writing is a useful way of finding out whether or not the learner is capable of

producing conceptual renditions of texts, rather than simply rewriting them using the vocabulary of the original.

In the multi-competence framework, typical research designs involve two groups of speakers of the same language, with one group composed of L1 monolinguals and the other of L1/L2 bilinguals. An attempt is also made to control for language mode (Grosjean, 2001) to prevent transfer errors caused by on-line processing. The practicalities of research in this area are discussed at length in Kecskes and Papp (2003).

Research into linguistic relativity

Linguistic relativity is a close ally of the separatist camp. Accordingly, what is stressed is the need to study different types of behaviour, both verbal and non-verbal, and to single out language – conditioned and independent reactions, as well as their underlying conceptual basis (Nuyts & Pederson, 1997; Pavlenko, 1999, 2005). This, in turn, calls for an interdisciplinary approach to data collection and analysis because, as Pederson and Nuyts (1997) observe, *characterizing conceptual structure will never be possible on the basis of an investigation of any single type of behaviour in isolation* (Pederson & Nuyts, 1997: 6). Moreover, progress on this front can only be made *by combining as many different types of language data and by taking into account as many different perspectives on language use as possible* (Pederson & Nuyts, 1997: 7). More recent designs, however, subscribe to a more analytical approach, which specifically defines linguistic relativity as the influence of language on non-linguistic thought. Consequently, they aim to isolate language from thought by excluding verbalization even at the level of inner speech (Green, 2000). It was this rationale that was implemented in studies investigating the conceptualization of space (Levinson, 1997) and individuation (Lucy, 1992b). As Lucy (1992b) explains, the prime objective of such research is to investigate non-linguistic concepts, which could be tapped through a number of 'conceptual' tasks that require no verbal input or response. An example is a sorting task, which makes use of shapes cut out of different substances, for example metal, leather or paper. The subjects are expected to sort them out according to their inherent conceptual categories such as shape, material or others. In a different study designed along similar lines, Lucy (1992b) used sticks and marbles to research numeration in Yucatec (a Mayan language). Likewise, Levinson (1997) performed a rotation task to find out how speakers of Tzeltal (a Mayan language) conceptualized space and spatial arrangements. To this end, he placed an arrow on a table in front of a Tzeltal speaker. The arrow was pointing to the right or left. The individual was then asked to turn round and face another table with yet another arrow on it. His/her

tasks were to reproduce the arrangement from the first table. The project also used Dutch controls, which gave it a comparative character.

Indeed, the study of individuation and space clarifies to a degree the nature of the relationship between meaning, as expressed by words, and concepts, as represented by thought. One of its major finding has been that conceptual coding for non-linguistic tasks mirrors the structure of linguistic or semantic coding (Levinson, 1997: 38). Simply put, it provides enough evidence to confirm the Whorfian contention that language has an impact on how people think. The research does not, however, allow researchers to ascertain whether and/or to what extent those representations are independent of language (Green, 2000). In this connection, Green (2000) contends that reliable insights may only be obtained by entirely blocking the use of language, which in non-verbal tasks may take the form of silent verbalization.

The use of bilingual subjects in studies of conceptualization also points in the direction of Whorfian effects. The emerging picture is that of conceptual dynamism, change and adjustment, whose forms range from concept coexistence, transfer, convergence and shift through to restructuring and attrition (Pavlenko, 1999, 2005). However scarce and questionable, the research findings imply that bilinguals do have a larger and more varied conceptual base than monolinguals, and that their language and thinking patterns may differ from those exhibited by monolinguals. In Pavlenko's view (2005), this is determined by the intensity of language contact, age, domains of language use, personal language history, level of proficiency and the stage of acculturation, as well as the nature of the language itself. To substantiate these claims, one could turn to the results of the Nivea experiment (Cook *et al.*, 2006), which revealed that extended contact with English in its natural environment has changed the mode of shape/substance categorization in Japanese learners of L2 English. To be more specific, learners with more than three years of residence in the target country showed considerably more preferences for shape-based categorizations than learners with a stay of less than three years. Moreover, there was convergence towards monolingual norms as L2 learners with longer residence did not differ significantly from L2 native speakers while those with a shorter stay did. These results have been replicated by Athanasopoulos (2006, 2008).

Research into how language-mediated concepts acquired through experience with L1 affect the use of another language

Like linguistic relativity, this line of research investigates the interface between language and cognition. In this case, however, the focus is not so much on non-linguistic cognition as on the language of users of two

or more languages, in line with the view that language-mediated lexicalized and grammaticalized concepts, which have been acquired through interaction in one language exert an influence on the use of another. Consequently, conceptual transfer is defined as the effects of language-mediated conceptual representations and of the resultant patterns of thought on a learner's (bilingual's) use of both the first and second language. The domains in which such effects have been detected include, among others, motion (Jarvis, 1998), emotion (Pavlenko, 2006) and time (Jarvis & Pavlenko, 2007). Under this view, conceptual transfer is deemed to occur when speakers of different L1s name and/or verbally categorize the same referents differently when using the same L2 (Jarvis & Pavlenko, 2007). On an individual level, there should be consistency in the way a particular bilingual refers to objects and events in both L1 and L2, despite conceptual contrasts between the corresponding domains in both languages (Jarvis, 2007).

A case in point is a study by Malt and Sloman (2003), who asked Spanish-speaking learners of L2 English to name containers, for example bottles, jars, dishes and bowls in English. They found that even learners with an extended stay in the USA preferred L1-based conceptualizations and differed from L2 native speakers. Likewise, research into colour categorization revealed a variety of behaviours from the use of radically different colour terms in each of the bilinguals' languages to a shift in colour boundaries, through to an identification of colours non-existent in one of the languages and overlooked by its monolingual native speakers (Pavlenko, 2005).

Although Jarvis and Pavlenko (2007; Jarvis, 2007) emphasize strongly the differences between linguistic relativity and the conceptual transfer hypothesis, they recommend (Jarvis & Pavlenko, 2007) that research into the latter employs both verbal and non-verbal techniques, such as naming tasks, picture and film description, sorting and categorization, to identify cross-linguistic conceptual contrasts and elicit verbal responses from bilinguals (cf. Ameel *et al.*, 2005). Exclusive use of non-verbal tasks would only obscure the issue by highlighting its relativistic dimension. While the rationale for the application of relativistic methodology is definitely sound, its routine usage along with careless analysis of findings may obscure cause and effect, and result in the conflation of both theories. A point to the credit of such conflation would be the admission that language and cognition are integrated to a large extent and that even though it is possible to disentangle one from the other and study each separately, the whole is much more than the sum of its components. On the other hand, however, a more analytic approach may help specify the

conditions of occurrence of particular effects. For instance, of some significance to the field is the fact that not all conceptual differences arise from structural contrasts, as evidenced by Pavlenko's (2003) study of the word *privacy*, which being non-existent in Russian made its way into the lexicon of those Russian immigrants to the USA who had spent at least three years in an English environment. By the same token, it is also likely that not all grammatical structures have a relativistic impact on cognition (Odlin, 2005).

Another potential hurdle to clear is the assumed dissociation between conceptual and semantic transfer. In a broader sense, it reflects the debate over the unity and/or disparity of the semantic and conceptual levels of representation. Cross-linguistic semantic transfer occurs at points where word meanings are mapped onto concepts. This is most evident in cases of polysemy and homonymy. In this connection, utterances like *He bit himself in the* ***language*** (Jarvis & Pavlenko, 2007: 120) produced by Finnish and Polish speakers exemplify semantic transfer as what has been borrowed is the word, including its meaning, which happens to be linked to two different concepts, that is that of a language and tongue (Polish *język*, Finnish *kieli*). By contrast, as Jarvis and Pavlenko (2007: 120–121) explain, *when an English learner of Russian asks for a 'chashka' (=cup) in reference to a paper cup, the transfer is both semantic (inappropriate link) and conceptual (inadequate knowledge of the contents of the conceptual category).* In Russian plastic cups are members of the category 'stakany' (tumblers).

A note of caution is in place, however, since research into object categorization in a culturally homogenous context (Ameel *et al.*, 2005; Malt & Sloman, 2003) shows a dissociation between linguistic naming, which varies considerably across languages, and non-linguistic categorization, which remains relatively uniform despite lexical differences. In Ameel's opinion, this dissociation is congruent with Levelt's (Levelt *et al.*, 1999) distinction between non-linguistic concepts, and language-specific lexical concepts. She also stresses the need to distinguish between *language-specific semantic knowledge and shared non-linguistic concepts* (Levelt *et al.*, 1999: 77). The implication of this statement is that, as attested by her research, lexicalized concepts and non-linguistic ones may constitute different levels of representation and that semantic and conceptual contrasts could best be explained in terms of the verbal/non-verbal, linguistic/non-linguistic oppositions. On a practical level, an L2 user who calls a plastic cup a mug by analogy to his L1 (Polish: 'kubek'-mug) is probably implementing semantic transfer. To ascertain whether conceptual transfer has taken place, it would be necessary to show that non-verbal categorization of 'kubek' and 'cup' performed by (native) speakers of both languages

mirrors their linguistic labelling. In this vein, concepts linked to abstract words could be investigated through the use of role play and film retells (see Pavlenko, 2003).

All in all, the existent evidence suggests that bilinguals are sensitive to conceptual constrains imposed by their respective languages and manifest differences in both verbal and non-verbal tests. Considering the variety of theoretical frameworks and the resultant methodological diversity, it seems necessary for future research to find ways of integrating data from both verbal and non-verbal paradigms. Some of the practical concerns relating to this issue are discussed in the next section.

Research Design: Practical Implications

The present discussion highlights the fact that in order to fully understand the conceptual domain and its relationship to language and cognition, it is necessary to pool resources from a variety of disciplines with an interest in psycholinguistics. These will probably include both analytical and holistic designs since, as pointed out by Green (2000: 16), only *careful experimental and modelling efforts* will allow us to grasp the complexity of the issue. On the other hand, Ervin-Tripp (2000) stresses the need to study concepts as they manifest themselves in natural discourse. In this vein, one way to achieve this is to identify a concept category, describe its defining features and see how it functions in a number of settings and in combination with factors that form the situational backdrop. Inspired by Lucy (1992a), Levinson (2003: 19) develops this procedure by recommending the following steps:

- pick a domain, that is, a concept;
- look into the linguistic coding of the domain in languages, and sort them out according to the types distinguished. This step may require the use of communication tasks with native speakers that would reveal the available linguistic resources;
- look at the non-linguistic coding of the domain in non-linguistic cognition of speakers of the languages under investigation. Levinson (2003: 19) warns that the last stage may create insurmountable problems as research will often have to be conducted in different cultures, which may give rise to problems of comparability. There may be cultural, political and ethical difficulties, too. Besides, it is not easy to create designs revealing the underlying cognitive 'modus operandi' without uttering a single word. In Levinson's research, this effect was achieved through the rotation paradigm. Without a shadow of a doubt, a similar paradigm could be devised for bilingual subjects.

Even though it may be possible to separate concepts from their semantic carriers through the use of 'clever' methodology, it is necessary to remember that, in the light of the available evidence, they remain in a close relationship and are to a certain extent mutually dependent; at least, this is how they reveal themselves in acts of interpersonal communication, verbal and non-verbal; bilingual and monolingual. This is why research into bilingualism, SLA and foreign language teaching in particular should seek an understanding of the interplay of factors and conditions, which determine the character of (lexicalized) concepts, their acquisition, development and influence on both linguistic and cognitive functioning of individuals. With regard to the latter, it would be particularly useful to explore how knowledge of another language, together with the manner of its acquisition and use, influence specific language domains, for example literacy skills or metaphorical density (Kecskes & Papp, 2003) in both languages, and to what degree language-specific concepts transcend linguistic coding and affect expression and comprehension in the other language. Additionally, Jarvis (2000) suggests researching aspects of concept mutability and L2-induced reconceptualization, while Pavlenko (1999, 2005) points at the relationship between concepts and words used in different language modes and contexts, as well as in their peripheral and metaphorical meanings. This, in practical terms, spells an end to the study of words in isolation. The framework she recommends includes naming, categorization, matching, inferencing, memory tasks, role play, elicited story telling and the study of habitual thought (Pavlenko, 2005), that is routine ways of attending to objects and events, classifying and remembering them (Lucy, 1992a).

To conclude, there can be no doubt that when confronted with an issue of such enormous complexity as conceptual representation, researchers have no choice but to resort to a variety of data sources and research methodologies. Only in this way will it be possible to capture some of the intricacy and uniqueness of the multi-faceted constructs of human thought and of its relation to language.

Note

1. The idea of a shared conceptual store which functions as a platform for skills transfer has also been promoted by Cummins (1991), who speaks of a common underlying proficiency (CUP). Through it, it is possible for the L2 to affect the L1 positively, even though the influence can be observed mainly in the domain of pragmatics, literary skills and phonology (Herdina & Jessner, 2002).

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Chapter 9

On the Asymmetry of Verb–Noun Collocations

WOJCIECH MALEC

Introduction

This chapter is primarily concerned with the relative prominence of one of the elements of an asymmetric verb–noun collocation. It also investigates the impact of this asymmetry on the cognitive demand of a test item measuring second-language learners' knowledge of such a combination. In simple terms, what is at issue is the familiar dilemma of deciding which constituent of a collocation should be chosen as the target word. For instance, in order to test knowledge of an expression such as *pay attention*, the test writer can construct an item in which it is either the verb or the noun that is replaced with a gap in a context sentence, as in the example below:

(1) You will need to _____ attention to the first impression you make.
You will need to pay _____ to the first impression you make.

The key question is whether the difficulty of both test items is the same.

The discussion begins with an operational definition of collocation. Then, the problem of collocational headedness is considered and a method of determining the directionality of collocations is presented. This is followed by the results of an empirical study whose aim was to ascertain whether the choice of the target word makes a difference to test performance.

The Nature of Collocation

The vocabulary of a language is organized according to two main structuring tendencies: paradigmatic relations and syntagmatic relations

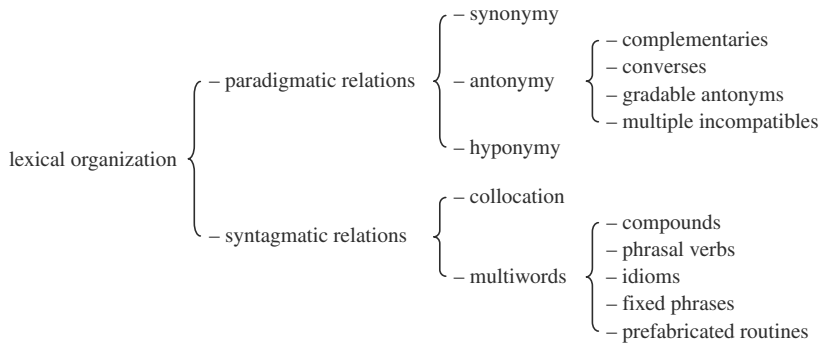

Figure 9.1 Types of lexical organization (from Chodkiewicz, 2000: 26)

(Figure 9.1). The former 'reflect the semantic choices available at a particular structure point in a sentence' (Cruse, 2000: 148), and the latter 'hold between items which occur in the same sentence, particularly those which stand in an intimate syntactic relationship' (Cruse, 2000: 148). According to the classification given in Figure 9.1, collocations constitute one type of syntagmatic relations, distinct from multi-word items, although Chodkiewicz (2000) points out that this is just one of several different approaches to categorizing units larger than isolated words (Chodkiewicz, 2000: 29, footnote 5).

According to Hoey (1991), collocation 'is the statistically identifiable property of lexis whereby a lexical item may be shown to be more likely to occur with certain items than with others' (1991: 154). He adds that besides being a statistical fact, collocation is also a psycholinguistic reality: language users can easily restore words that have been replaced with blanks in a text 'using only the evidence of the contexts left behind' (Hoey, 1991: 154).[1] In this broad approach, collocation can be seen as a general term covering all syntagmatic lexical relations.

Such a broad interpretation of the concept of collocation is common to all corpus linguists. Most notably, Sinclair (1991) views collocation as 'the occurrence of two or more words within a short space of each other in a text' (1991: 170). Even though he recognizes the distinctness of idioms (defined as co-occurrences which produce single units of meaning), he admits that they overlap with collocations, and that 'the line between them is not clear' (Sinclair, 1991: 170). Collocations and idioms alike are instantiations of the lexical regularities found in language as governed by the *idiom principle*. This principle explains why two or more lexical items are frequently found together in speech and writing. It complements the

open-choice principle, according to which every 'slot' in a phrase or clause can be filled by a wide range of possible words as long as they are grammatically correct.

No clear distinction between collocations and other multi-word units is made by Ellis (1996, 1997). From the point of view of language learning, collocations constitute 'big words' and represent one of several levels of 'chunking'. For Nattinger and DeCarrico (1992), meaningful and recurrent chunks of language other than frozen forms such as idioms or clichés are either (pure) *collocations* (having no pragmatic functions) or *lexical phrases* (collocations which have pragmatic functions).

As regards idioms and collocations, these lexical types have traditionally been differentiated from each other on the basis of the compositionality of their semantics. An idiom, as opposed to a collocation, is viewed as being semantically opaque in the sense that its meaning is 'figurative and not predictable from the literal meanings of its constituents' (Allan, 2001: 126). The distinction is far from clear-cut, though. As noted by Singleton (2000), many common collocations are characterized by 'peculiar semantics'. For example, *heavy smoker* does not denote 'overweight nicotine-user', nor does *criminal lawyer* mean 'law-breaking attorney' (Singleton, 2000: 51).

Fernando (1996) categorizes multiword expressions into idioms and habitual collocations. For her, however, the semantics of idioms and collocations is not a decisive factor in distinguishing one type from the other: both literal and non-literal expressions can be found in either category. Rather, what makes the two types different is the degree of variability: 'only those expressions which become conventionally fixed in a specific order and lexical form, or have only a restricted set of variants, acquire the status of idioms' (Fernando, 1996: 31).

Depending on the 'degree of exclusivity' (Schmitt, 2000: 77), collocations can be divided into *restricted/fixed/strong collocations* on the one hand and *open/flexible/weak collocations* on the other. Hill (2000) distinguishes four categories, defined in terms of collocational strength:

- unique collocations, for example *foot the bill, shrug one's shoulders*;
- strong collocations, for example *rancid butter, trenchant criticism*;
- medium-strength collocations, for example *hold a conversation, make a mistake*;
- weak collocations, for example *red car, big house*.

From the perspective of language learning and teaching, although it is possible to make a distinction between collocations and other multi-word

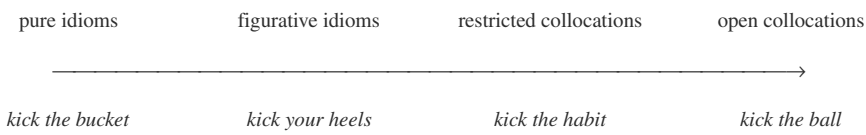

Figure 9.2 Continuum of collocability (Cowie *et al.*, 1993; Howarth, 1998)

combinations (as in, e.g. Thornbury, 2002), it is also useful to keep them together. For example, Nation (2001) uses the term collocation

> to loosely describe any generally accepted grouping of words into phrases or clauses. From a learning point of view, it makes sense to regard collocations as items which frequently occur together and have some degree of semantic unpredictability. These two criteria justify spending time on collocations because of the return in fluency and nativelike selection. (Nation, 2001: 317)

Such a view of collocation will be adopted here: any sequence of words that is frequently found in the language in a relatively fixed form and merits the learners' attention because of its semantic unpredictability will be referred to as collocation. This unpredictability and fixedness is not an either-or issue – it should rather be seen as a continuum ranging from pure idioms to open collocations, as illustrated in Figure 9.2.

In what follows, I will primarily concentrate on restricted lexical collocations of the verb + direct object type.

Collocational Headedness

Syntactically speaking, a verb–noun collocation is a verb phrase. In *X*-bar syntax, the head of a phrase X^n is the lexical category *X* that is at the base of the entire configuration (e.g. Jackendoff, 1977). Thus, in this approach, the head of any verb–noun collocation is the verb, that is the element whose grammatical features are inherited by the phrase as a whole. In terms of selection restrictions, the verb is said to subcategorize for the nouns that it can occur with.

From a psycholinguistic point of view, however, the direction of headedness might be different. In this approach, it is usually the noun that selects the verb and is thus the head of the phrase simply because it is more predictive of the verb than vice versa. This makes sense because, as pointed out by Howarth (1996), many of the verbs which form verb–object collocations are in fact delexicalized by virtue of being among the most frequently occurring words in the language. For example, it might be rather counter-intuitive to regard the verb as head in phrases such as those

in example (2) because in none of these collocations is the prototypical sense of the verb active. Instead, the verb might be said to acquire its sense 'through association with the object' (Howarth, 1996: 14). *Pay attention* has nothing to do with the literal sense of *pay*, etc:

(2) pay attention, bear a resemblance, meet demands

However, not all verb–noun combinations are like the three expressions above. For example, in each of the collocations in example (3), the noun is definitely of greater frequency in the language than the verb; we are much more likely to expect the noun *fear* after hearing the verb *allay* than the other way around.

(3) allay fears, bow one's head, wield power

As a consequence, in the psycholinguistic approach, the direction of headedness should be expected to vary from one collocation to another.

The obvious problem here is that it may sometimes be virtually impossible to decide which component of a given verb phrase is more prominent. In the collocations in example (4), to mention but a few, neither the verb nor the noun stands out as being more common.

(4) derive pleasure, seek advice, level an accusation

Furthermore, in each of these collocations, the number of verbs that co-occur with the noun is more or less the same as the number of nouns that co-occur with the verb. In all likelihood, then, the verbs would be just as predictive of the nouns as the nouns would be of the verbs. These collocations are symmetric, or 'right-and-left predictive' in Kjellmer's (1991) terms.

The Study

The purpose of this empirical study was to find out whether the choice of the target word has an impact on the difficulty of a test item measuring second-language learners' knowledge of a unidirectional, or asymmetric, collocation. The results were also expected to give insight into the strength of collocational links in the L2 mental lexicon.

For the experiment, 40 collocations were selected (20 of them were taken from the lexical syllabus being studied by the test takers and another 20 were 'general English'). With the help of the British National Corpus (BNC, 1997; SARA, 1997), the direction of collocability, based on frequency of occurrence, was determined for each collocation. This analysis was performed using the 'Word Query' and 'Collocations' options in SARA.

Table 9.1 Frequency analysis (an example)

	Verb frequency	***Noun frequency***	***Collocation frequency***	***V%***	***N%***
Hit the jackpot	10,387	125	36	0.35	28.80
V% = 36/10387 × 100 = 0.0035 × 100 = 0.35% N% = 36/125 × 100 = 0.288 × 100 = 28.80%					

To illustrate, Table 9.1 shows how the procedure can be applied to the collocation *hit the jackpot*. First, the number of all occurrences of the verb and of the noun in the corpus is found with the help of the Lancaster lemmatization scheme (because it groups all forms of a given part of speech under one headword). Next, five words to the left and five words to the right of either the verb or the noun are searched for the other element of the collocation (also using the Lancaster scheme); in this way, the number of all occurrences of the collocation is determined. In Table 9.1, the results of this part of the analysis are given under 'Verb Frequency', 'Noun Frequency' and 'Collocation Frequency'.

Next, the probability that the verb will co-occur with the noun whenever it (the verb) is encountered in the corpus and the probability that the noun will co-occur with the verb whenever it (the noun) is encountered are calculated by dividing 'Collocation Frequency' by 'Verb Frequency' (for the verb) and by dividing 'Collocation Frequency' by 'Noun Frequency' (for the noun) and multiplying the result by 100.

Thus, the number of times that this collocation occurs in the BNC constitutes 28.80% of all occurrences of the noun *jackpot* and only 0.35% of all occurrences of the verb *to hit*. This means that we can be almost 30% certain that when we come across the noun *jackpot*, it will actually occur in collocation with the verb *to hit*. But we can be only less than half a per cent certain that when we see or hear the verb *to hit*, it will co-occur with the noun *jackpot*. On this basis, we can conclude that the noun is the psycholinguistic head of the collocation because we are more likely to expect the verb after hearing the noun than the other way round.

This argument can be supported by considering the difference between the number of nouns that frequently co-occur with the verb and the number of verbs that frequently co-occur with the noun. With the help of Longman Dictionary of Contemporary English (LDOCE, 2003) and Longman Phrases Database (LPD, 2002), 25 nouns were found to frequently co-occur with the verb *to hit*, whereas no other verb besides *to hit* was found to collocate with the noun *jackpot*, although two more were found in

the BNC (*to win* – 7 hits and *to scoop* – 6 hits). By this criterion, too, it is the noun that is the head of the collocation because it is arguably easier to predict one of only three words (verbs) when the noun is given than it is to predict one of 25 words (nouns) when the verb is given. Therefore, we can conclude that it is the noun that selects the verb to form the collocation *hit the jackpot*.

The collocations selected for this experiment with the results of the frequency analysis are given in Table 9.2. The collocations in SUBSET I (*a* and *b*) are left-headed, whereas those in SUBSET II (*a* and *b*) are right-headed. The difference between verb prominence (V%) and noun prominence (N%) is given in the last column and can be regarded as a measure of the strength of the unidirectionality of the respective collocation. Thus, *clench one's fist* is by this criterion more unidirectional than *cross one's mind*.

It might be argued that instead of the *difference*, the *ratio* would be more appropriate. Thus, for the first collocation in Table 9.2, we would get 35.35/12.28 = 2.88. This would mean that the verb is almost three *times* more predictive of the noun than the other way around. However, while in the case of the *difference*, all values range from 0 to 100, in the case of the *ratio* the scale becomes virtually unbounded. For example, for *gatecrash the party* the value of the ratio would be 1686.

For each of the 40 collocations, two test items were constructed such that one of them elicited the head of the collocation and the other one elicited the non-head; in either case the other constituent was given in the prompt. These items made up two parallel test forms and were administered according to the experimental design given in Table 9.3. Form A of the test was administered to one group of students, and Form B to another group. For each test item, the test takers were asked to complete the second sentence so that it had the same meaning as the first sentence using the word given. More precisely, they were to produce the whole collocation when one of its elements was given (verb or noun, underlined in Table 9.3).[2]

However, when the two test forms were administered to a group of 28 students of English Philology, this test format appeared not to be perfectly adequate for the purposes of this study, owing to the fact that it was not always successful in eliciting the expected responses. The test takers produced collocations that were not as common as the ones in the key, but possible, which was confirmed by a native speaker of English.[3] Therefore, the decision was taken to add the first letter of each missing constituent to the prompt. This second version of the test was administered to a different group of 52 subjects (also students of English Philology).

Table 9.2 Frequency analysis of the collocations selected for the test

	Syllabus	*Verb frequency*	*Noun frequency*	*Collocation frequency*	*V%*	*N%*	*Difference*
SUBSET Ia (VERB noun)							
CLENCH fist		512	1474	181	*35.35*	12.28	23.07
CROSS mind	✓	6731	23,103	193	*2.87*	0.84	2.03
WHET appetite		105	1030	91	*86.67*	8.83	77.83
MOW lawn		169	1359	42	*24.85*	3.09	21.76
AROUSE suspicion	✓	1346	2161	104	*7.73*	4.81	2.91
DECLARE war	✓	6117	29,107	249	*4.07*	0.86	3.22
JOG memory	✓	467	9934	56	*11.99*	0.56	11.43
UNDERMINE confidence	✓	2034	6962	88	*4.33*	1.26	3.06
SHED tears		1364	4486	117	*8.58*	2.61	5.97
RISK lives	✓	2018	62,653	165	*8.18*	0.26	7.91
							Mean: 15.92 Median: 6.94
SUBSET Ib (VERB noun)							
REVERSE charges		2246	16,391	6	*0.27*	0.04	0.23
PURSE lips	✓	207	6097	181	*87.44*	2.97	84.47

(*Continued*)

Table 9.2 *Continued*

	Syllabus	*Verb frequency*	*Noun frequency*	*Collocation frequency*	*V%*	*N%*	*Difference*
POSE question	✓	2869	38,185	493	*17.18*	1.29	15.89
THUMB lift		117	2690	15	*12.82*	0.56	12.26
STRETCH legs		4508	11,176	234	*5.19*	2.09	3.10
POKE fun		685	3345	56	*8.18*	1.67	6.50
SWAP places		880	52,583	19	*2.16*	0.04	2.12
ALLAY fears	✓	219	9382	89	*40.64*	0.95	39.69
AMASS fortune		248	3009	36	*14.52*	1.20	13.32
GATECRASH party		31	52,281	11	*35.48*	0.02	35.46
							Mean: 21.31 Median: 12.79
SUBSET IIa (verb NOUN)							
set TRAP		39,150	1674	87	0.22	*5.20*	4.97
take PRIORITY		173,956	5352	142	0.08	*2.65*	2.57
bear RESEMBLANCE	✓	16,967	747	253	1.49	*33.87*	32.38
catch GLIMPSE	✓	13,976	1060	296	2.12	*27.92*	25.81
jump QUEUE	✓	4995	1176	27	0.54	*2.30*	1.76
lose TOUCH	✓	26,897	5735	196	0.73	*3.42*	2.69

meet DEMANDS	✓	32,929	13,760	674	2.05	*4.90*	2.85
watch CLOCK		18,934	3182	27	0.14	*0.85*	0.71
work WONDERS		63,083	2258	89	0.14	*3.94*	3.80
raise ALARM	✓	19,118	2353	156	0.82	*6.63*	5.81
							Mean: 8.33 Median: 3.33
SUBSET IIb (verb NOUN)							
find FAULT	✓	95,790	4121	130	0.14	*3.15*	3.02
leave DEPOSIT	✓	61,859	3604	30	0.05	*0.83*	0.78
pay VISIT	✓	37,462	10,126	492	1.31	*4.86*	3.55
play FOOL	✓	37,632	1792	24	0.06	*1.34*	1.28
take PRIDE		173,956	2722	285	0.16	*10.47*	10.31
keep SECRET		49,134	3413	320	0.65	*9.38*	8.72
pay HEED		37,462	149	78	0.21	*52.35*	52.14
lose TEMPER		26,897	1267	255	0.95	*20.13*	19.18
learn LESSON		18,878	4510	642	3.40	*14.24*	10.83
take OFFENCE	✓	173,956	5995	175	0.10	*2.92*	2.82
							Mean: 11.26 Median: 6.14

Table 9.3 Experimental design (counterbalanced) with illustrative test items

	Form A (Group I)	*Form B (Group II)*
SUBSET Ia CLENCH fist	VERB noun She curled her fingers up very tightly and went to punch him. FIST *She _____ and went to punch him.*	VERB noun She curled her fingers up very tightly and went to punch him. CLENCHED *She _____ and went to punch him.*
SUBSET Ib POSE question	VERB noun We want to begin by asking: what is the point of research? POSING *We want to begin by _____: what is the point of research?*	VERB noun We want to begin by asking: what is the point of research? QUESTION *We want to begin by _____: what is the point of research?*
SUBSET IIa set TRAP	verb NOUN In this scene Beatrix invents a plan to catch Maurice doing something wrong. TRAP *In this scene Beatrix _____ for Maurice.*	verb NOUN In this scene Beatrix invents a plan to catch Maurice doing something wrong. SETS *In this scene Beatrix _____ for Maurice.*
SUBSET IIb find FAULT	verb NOUN It is not easy to criticize Jimmy Connors' version of the backhand, is it? FIND *It is not easy to _____ with Jimmy Connors' version of the backhand, is it?*	verb NOUN It is not easy to criticize Jimmy Connors' version of the backhand, is it? FAULT *It is not easy to _____ with Jimmy Connors' version of the backhand, is it?*

Analysis

In the statistical analysis of the results, the scores obtained by each collocation in the two experimental conditions were compared. For reasons suggested above, the conditions were called *easy* (the one in which the head was given) and *difficult* (the one in which the non-head was given). This also means that the experimental hypotheses were directional, and because of that one-tailed statistical tests were used.

The raw scores are given in Table 9.4. The figures under 'Diff.' (=*Difference*) were calculated by subtracting each collocation's score obtained in the 'difficult' condition from the corresponding score obtained in the 'easy' condition. Values below zero indicate that in certain cases recalling the non-head turned out to be actually more difficult than recalling the head.

Table 9.4 Test results (raw scores)

	Version 1 (only head/non-head given)				*Version 2 (head/non-head given + first letter of the missing element)*			
	(N = 28)				*(N = 52)*			
	Easy	***Difficult***	***Difference***	***Sum***	***Easy***	***Difficult***	***Difference***	***Sum***
SUBSET Ia (VERB noun)								
CLENCH fist	13	12	1	25	25	17	8	42
CROSS mind	14	12	2	26	24	6	18	30
WHET appetite	5	7	–2	12	4	0	4	4
MOW lawn	9	11	–2	20	24	20	4	44
AROUSE suspicion	13	9	4	22	23	24	–1	47
DECLARE war	13	13	0	26	25	24	1	49
JOG memory	11	4	7	15	25	8	17	33
UNDERMINE confidence	14	12	2	26	19	9	10	28
SHED tears	13	10	3	23	23	5	18	28
RISK lives	14	14	0	28	23	25	–2	48
SUBSET Ib (VERB noun)								
REVERSE charges	0	0	0	0	1	0	1	1
PURSE lips	12	13	–1	25	21	13	8	34

(*Continued*)

Table 9.4 *Continued*

	Version 1 (only head/non-head given)				*Version 2 (head/non-head given + first letter of the missing element)*			
	(N = 28)				*(N = 52)*			
	Easy	*Difficult*	*Difference*	*Sum*	*Easy*	*Difficult*	*Difference*	*Sum*
POSE question	14	13	1	27	25	19	6	44
THUMB lift	4	9	–5	13	5	1	4	6
STRETCH legs	11	11	0	22	21	15	6	36
POKE fun	2	1	1	3	5	3	2	8
SWAP places	9	9	0	18	21	17	4	38
ALLAY fears	8	6	2	14	20	7	13	27
AMASS fortune	12	12	0	24	26	5	21	31
GATECRASH party	8	8	0	16	21	2	19	23
SUBSET IIa (verb NOUN)								
set TRAP	11	10	1	21	16	20	–4	36
take PRIORITY	9	5	4	14	21	6	15	27
bear RESEMBLANCE	12	14	–2	26	25	24	1	49
catch GLIMPSE	11	12	–1	23	25	16	9	41
jump QUEUE	7	9	–2	16	24	21	3	45

lose TOUCH	13	14	–1	27	26	21	5	47
meet DEMANDS	6	13	–7	19	10	17	–7	27
watch CLOCK	6	11	–5	17	20	23	–3	43
work WONDERS	14	10	4	24	12	12	0	24
raise ALARM	13	13	0	26	26	23	3	49
SUBSET IIb (verb NOUN)								
find FAULT	11	13	–2	24	17	17	0	34
leave DEPOSIT	7	5	2	12	21	13	8	34
pay VISIT	12	14	–2	26	22	26	–4	48
play FOOL	8	11	–3	19	24	22	2	46
take PRIDE	12	9	3	21	24	25	–1	49
keep SECRET	13	12	1	25	25	24	1	49
pay HEED	5	1	4	6	11	0	11	11
lose TEMPER	14	12	2	26	24	20	4	44
learn LESSON	9	10	–1	19	25	18	7	43
take OFFENCE	13	12	1	25	22	16	6	38

The data were not normally distributed (according to the results of both Kolmogorov–Smirnov and Shapiro–Wilk tests), so only non-parametric tests were used. A summary of the statistical analysis of Version 1 is given in Table 9.5, and a summary of the statistical analysis of Version 2 can be found in Table 9.6.

There was no statistical difference between the two experimental conditions in the case of Version 1, whereas in the case of Version 2 the conditions differed significantly, except for SUBSET IIa. The reason for this might be the fact that the collocations in this subset were not as unidirectional as those in the other subsets. Table 9.7 shows clearly that the greater the strength of collocational unidirectionality (indicated by the Mean and Median[4] of the difference between verb prominence and noun prominence), the more significant is the difference between the two experimental conditions (cf. Table 9.2 and Table 9.6).

This correspondence is confirmed by the correlation (calculated for the entire set of data, i.e. not divided into the four subsets) between (a)

Table 9.5 Results of the analysis (test version 1)

Descriptive statistics					
Subset		***N***	***Median***	***Minimum***	***Maximum***
Ia	easy_1	10	13.00	5.00	14.00
	difficult_1	10	11.50	4.00	14.00
Ib	easy_1	10	8.50	0.00	14.00
	difficult_1	10	9.00	0.00	13.00
IIa	easy_1	10	11.00	6.00	14.00
	difficult_1	10	11.50	5.00	14.00
IIb	easy_1	10	11.50	5.00	14.00
	difficult_1	10	11.50	1.00	14.00
Wilcoxon signed ranks test					
Subset	***Z***			***Exact Sig. (one-tailed)***	
Ia	–1.560			.074	
Ib	–0.137			.500	
IIa	–0.893			.211	
IIb	–0.618			.298	

Table 9.6 Results of the analysis (test version 2)

Descriptive statistics					
Subset		***N***	***Median***	***Minimum***	***Maximum***
Ia	easy_2	10	23.50	4.00	25.00
	difficult_2	10	13.00	0.00	25.00
Ib	easy_2	10	21.00	1.00	26.00
	difficult_2	10	6.00	0.00	19.00
IIa	easy_2	10	22.50	10.00	26.00
	difficult_2	10	20.50	6.00	24.00
IIb	easy_2	10	23.00	11.00	25.00
	difficult_2	10	19.00	0.00	26.00
Wilcoxon signed ranks test					
Subset	***Z***			***Exact Sig. (one-tailed)***	
Ia	–2.349			.009	
Ib	–2.807			.001	
IIa	–0.892			.213	
IIb	–1.958			.029	

Table 9.7 Strength of collocational unidirectionality (expected versus measured)

	Difference between V% and N%		***Z***	***Exact Sig (one-tailed)***
	Mean	***Median***		
SUBSET Ia (VERB noun)	15.92	6.94	–2.349	.009
SUBSET Ib (VERB noun)	21.31	12.79	–2.807	.001
SUBSET IIa (verb NOUN)	8.33	3.33	–0.892	.213
SUBSET IIb (verb NOUN)	11.26	6.14	–1.958	.029

the strength of collocational unidirectionality as estimated on the basis of corpus evidence (frequency analysis), that is *the expected strength of unidirectionality* ('Difference' in Table 9.2) and (b) its strength as indicated by the results of the test, that is *the measured strength of unidirectionality* ('Difference' in Table 9.4, Version 2) [Spearman's rho: $\rho_s = .31$, $p < .05$ (one-tailed)].

Finally, the (measured) strength of unidirectionality of the collocations drawn from the syllabus (*Mdn* = 4.00) did not differ from that of the 'general English' collocations (*Mdn* = 4.00), as indicated by the Mann–Whitney test (*U* = 185.50, *ns*) (Version 2).

Conclusions

The results of the study indicate that recalling the non-head is easier than recalling the head. A collocation test item is easier when the head is given because it is more predictive of the non-head than the non-head is of the head (Test Version 2). However, without the 'first-letter constraint', the difficulty of the test item does not seem to depend on the position of the target word with respect to the head of the collocation (Test Version 1).

These results may be interpreted to mean that collocational links in the L2 mental lexicon are not equally strong in both directions. Even though some of the collocations had been learned by the participants prior to the test, they still had problems recalling the missing constituents, or opted for alternative responses.

In this respect, the L2 lexicon seems to be different from the L1 lexicon. A study by Bonk (2003) suggests that collocational links in the L1 lexicon might be equally strong in both directions. He studied priming effects for verb–object collocations using naming and lexical decision tasks. Because of the fact that the collocations that he had selected for the experiment were predominantly left-predictive (the nouns were the psycholinguistic heads), he hypothesized that the priming effect would be 'even stronger if cued from the objects of the verbs' (Bonk, 2003: 16), that is that it would be stronger 'in the direction that is consistent with the head of the verb phrase' (Bonk, 2003: 16). However, this prediction was not supported by the results of his experiments. Priming appeared to be of similar magnitude for collocations presented in either direction.

In other words, there is reason to believe that for a first-language speaker it makes no difference which constituent of a collocation is given as a prompt to recall the whole construction. For a second-language speaker, however, the difference is significant.

Notes

1. There is psycholinguistic evidence that word meaning is acquired 'by noting the words which come alongside' (Aitchison, 1994: 89), and that collocation constitutes one of the four most important connections in the mental lexicon (cf. Aitchison, 1994: 84).
2. Although collocations can be tested in many different ways (a review of the relevant techniques can be found in Malec, 2006), the item format used in this study is ideal for assessing recall (as opposed to recognition) (see also Read, 2000).
3. I would like to thank Dr Robert Looby for his assistance in this matter.
4. It might be argued that the mean is not the best estimate of central tendency for the data in question (see Table 9.2) because it can be 'grossly affected by atypical values' (Ferguson, 1971: 53). Most of the values in the V% and N% columns are relatively low, so the 'outliers' with very high values have a great impact on the means. Because of that, the median is probably a better estimate of central tendency for this particular set of data.

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Chapter 10

Gender Differences in L1 and L2 Reading

LILIANA PIASECKA

Introduction

Research on sex or gender differences has been controversial for a number of reasons. Some researchers (e.g. Baumeister, 1988) warn against dangers that may result from such studies. One such danger concerns favouring one sex over the other in educational contexts. Other researchers (e.g. Hare-Mustin & Maracek, 1994; Hollway, 1994) observe that overemphasising gender differences obscures differences within sexes. This does not mean, however, that this kind of research should be abandoned because, as Halpern and LaMay (2000) say

> … despite the dangers inherent in answering questions about group differences, censorship, even self-censorship, does not promote equality and can be far more dangerous and counterproductive than directly addressing the question. Stereotypes and prejudice are not caused by an open process of scientific inquiry; in fact, they seem to flourish in the absence of data. (Halpern & LaMay, 2000: 233)

This chapter focuses on gender differences in cognitive abilities, with a special emphasis on language ability as manifested by reading achievement both in the native (Polish) and foreign (English) language.

Fundamental terminological difficulties emerge when differences between males and females are discussed and referred to either as 'sex' or 'gender' differences. Therefore, there is research on sex differences (e.g. Halpern's *Sex Differences in Cognitive Abilities*, 2000; Kimura's *Sex and Cognition*, 1999; Moir & Jessel's *Brain Sex*, 1991; Moir & Jessel, 1993) along

with the research on gender differences (e.g. Cameron, 2005; Feingold, 1996; Taylor & Nikolova, 2004). The term 'sex' is preferred when biologically based differences are studied. 'Gender' is used when socially based differences are the focus of inquiry. In this chapter the term 'gender' has been used to account for differences in reading between males and females.

Research evidence shows that there are consistent patterns of gender differences in cognitive abilities. Kimura (2006) thoroughly discusses these differences in terms of various abilities. Her framework will be followed here, with a special emphasis on language abilities, as they are the focus of this chapter.

With respect to motor abilities, men do better at such tasks as throwing things at a target (e.g. a game of darts) or catching objects (e.g. ball games), whereas women have an advantage at the so-called subtle motor activities (e.g. performing movement sequences using fingers, like in weaving, knitting or sewing). Spatial abilities tests show men's advantage at mental rotation and throwing objects at a target. Moreover, they score higher on visuospatial tests involving judgements of velocity and navigation through three-dimensional space (Halpern, 2004). Women are better at recalling the location and sequence of objects along a certain route. These differences may imply that in the case of spatial orientation men rely more on geometric properties of space, while women use characteristic elements of the environment.

Mathematical abilities present an interesting case. While females are better at calculations and tests which refer to the material that was learned at school, males outperform them on standardised tests of mathematics and science that do not directly correspond to the material from the school curriculum. In general, women obtain higher grades in school (Halpern, 2004). Ackerman (2006) observes that there are 'stark and compelling' gender differences that refer to the performance of students taking advanced placement tests in maths and sciences. It appears that although females completed more such tests across all content areas than males, males took more maths and science (chemistry and physics) tests than females. Males also scored higher on these tests than females. Ackerman argues that the differences may be interpreted in terms of Cattell's concept of fluid and crystallised intelligence. Fluid intelligence (i.e. independent of individual experience, understood as an ability to solve new problems, draw inferences and find connections between various ideas) is involved in math tests, for example SAT-Math, whereas verbal tests, for example SAT-Verbal, rely on crystallised intelligence (i.e. using skills, knowledge and experience residing in long-term memory) (Cavanaugh & Blanchard-Fields, 2006). In addition, math and science tests involve crystallised intelligence not

in its historical form (knowledge acquired through education and experience) but in its current form. This current type of knowledge along with domain knowledge are important predictors of school and beyond-school success.

As far as language abilities are concerned, females show an advantage since early years of life. Girls usually start speaking earlier than boys, they use longer sentences, their articulation and grammar are more correct. Consequently, they have a richer vocabulary. Moreover, they are better at spelling, reading and tests in which they have to generate words according to a certain rule (e.g. words that start with a certain letter). The question arises, then, whether these differences persist and can be observed in adolescents and adults. Current research suggests that adult women do not have a richer vocabulary nor higher verbal intelligence though they are better at spelling, have a higher verbal fluency understood as generating words beginning or ending with a specific letter. Most important for the purpose of the present discussion, they consistently do better than men on tests of verbal memory (Kimura, 2006).

Gender differences have also been identified in attitudes to reading. Diamond and Onwuegbuzie (2001) as well as Cloer and Dalton (2001) reported that girls have more positive attitudes to reading and higher reading achievement than boys. Gender differences with respect to attitudes to reading in grades 1 to 5 (except grade 2) were also found by Kush *et al.* (1995). Worrell *et al.* (2007) provide additional evidence in support of gender differences and suggest that these differences are present regardless of the students' achievement levels.

Similar findings have been reported in a comparative study on Hong Kong, Singaporean and English students' reading (Tse *et al.*, 2006). It appeared that students who had more positive reading attitudes and whose self-concepts were higher were more successful on reading tasks. Moreover, the researchers found that the females in all three national groups showed significantly more positive attitudes to reading and their reading achievement was higher than the males. Therefore, the researchers argue 'that the gender differences may be universal across cultures' (Tse *et al.*, 2006: 84). Research on reading attitudes implies that this is a factor that should not be ignored in studies on reading across languages.

Investigating reading development of Polish children at the initial stages of formal education, Sochacka (2004) found statistically significant differences between the performance of girls and boys. The results of her longitudinal study show that girls read faster and more correctly than boys. The girls had an advantage in reading pseudo-words but their initial advantage in reading the natural text was disappearing at the later stages

of the study. Sochacka explains that this might have been due to the fact that the reading task was too easy.

An interesting piece of research is reported by Bügel and Buunk (1996) who found that in the Netherlands females taking national foreign language examinations obtained lower scores than males. The difference was slight but consistent and the situation itself unexpected as in earlier years of education females performed equally well or better than males, especially on foreign language tests. The researchers hypothesised that sex differences in prior knowledge and interests had an effect on the reading performance in the foreign language in such a way that the topic of a text became an important element accounting for sex differences. Females and males have different interests and, consequently, different background, or prior, knowledge. According to Bügel and Buunk, Dutch males watch more television, show more interest in computers, technical topics and sports. They like reading about cars, technology, economics, politics and sports. Dutch females like social, home and artistic activities. They also read more than males and their readings are different as they prefer texts on fashion, pop starts, human relations, romance and art. In addition, they read more fiction and literature than males. The researchers found out that, indeed, the topic of the text was an important factor in the reading performance. Female students did better on female topics, while male students did better on male topics but they showed a higher level of text comprehension than females. The researchers explain that this may be due to the fact that males read informative texts that are more demanding in terms of structure and vocabulary than the texts read by females. This research is particularly relevant to the purpose of this chapter because the participants of the study were adolescents, around 16 years of age. The participants of the study reported below were around 15 years of age at the time of data collection. The findings of this study also undermine the commonly held opinion about the female advantage on reading comprehension. Thus it is even more justified to find the direction of gender differences in the Polish educational context beyond the initial stages of learning to read.

It also has to be borne in mind that reading ability is shaped by a number of linguistic, individual (reader-related) and environmental factors pertaining to the ability to read in the native (Polish) and the foreign (English) language. Linguistic factors refer to the learners' proficiency in L1 and L2. Individual or reader-related factors are specified as the learner's language aptitude, attitude to the practice of reading, attitude to learning, reading preferences and specific learning difficulties (dyslexia). Environmental factors, among other things, cover the learners' preferred

leisure activities. The access to and the use of the Internet along with the use of various dictionaries also belong to this group. Therefore, they also have been analysed from the point of view of gender differences.

The Study

On the basis of the available research on gender differences, the following hypotheses were formulated:

(1) Females obtain higher scores on reading comprehension tests in L1 and in L2 than males.
(2) Females show a higher level of language aptitude than males.
(3) Females are more successful school learners and language learners than males.
(4) Gender differences are observed with respect to leisure activities, reading preferences, attitudes to reading, use of computers and specific learning difficulties (dyslexia).

The data which were analysed in terms of gender differences were collected in a study on reading in two languages.

Participants

Three hundred and fifteen Lower Secondary School learners from grade 3, 15 years old, learning in eight State Lower Secondary Schools in Opole participated in the study that took place in 2004 and 2005. There were 152 girls (48.2%) and 163 boys (51.8%). They were not randomly selected for the study but were members of already existing groups.

Materials

The participants filled in the questionnaire on leisure activities (a checklist with yes/no options), reading preferences (a checklist of text types on the 0–4 Likert scale showing how much the participants like reading specified text types), attitudes to reading (3–0 Likert scale showing how much they like reading), use of computers (yes/no questions), specific learning difficulties (dyslexia) (yes/no question) and the use of dictionaries (a checklist of dictionary types on a Likert scale showing how often they are used). They also did two reading comprehension tests and a language aptitude test.

The test of reading comprehension in Polish (L1RT) is a 15-item multiple choice test and was partly based on the practice texts and tests for

Lower Secondary School students (Barańska *et al.*, 2002). Aesop's fable (Revell & Norman, 1997), also with a 15-item multipe choice items, was designed for testing reading comprehension in English (L2RT). The aptitude test (henceforth LAT) was designed by Kuliniak (2002) and consists of 40 closed items divided into eight tasks testing stylistic sensitivity along with the ability to use appropriate grammatical structures, idiomatic sensitivity and richness of vocabulary, grammatical sensitivity (by identifying analogous forms in Polish and in Latin) and inductive learning ability (on the basis of an artificial language).

Analyses

STATISTICA software was applied in the data analysis. Descriptive statistics, frequencies, ANOVA and non-parametric statistics (chi-square) were calculated.

Results

To verify the first three hypotheses about the female advantage in reading, school success and foreign language learning success, the analysis of variance (ANOVA) was carried out. In the analysis, gender was the independent variable, while test scores and grades were dependent variables. The results of the analysis are shown in Table 10.1.

Table 10.1 Mean scores for reading tests, language aptitude and school achievement and the ANOVA ($p < 0.01$)

	Females Mean	***Males Mean***	***F***
L1 reading test	11.75	10.60	**12.28**
L2 reading test	10.38	9.22	**6.35**
Language aptitude test	30.01	26.26	**21.74**
L1 grade	4.19	3.71	**23.38**
L2 grade	4.46	3.99	**17.36**
General average grade	4.50	4.25	**12.37**

Note: The *F* value in bold means that the difference between means is statistically significant

The girls show a statistically significant advantage on all the measures related to school success. They read better in both languages, they show a higher level of language aptitude and they obtain higher grades for language subjects than boys. Academically they are more successful than boys, as rendered by the mean general average grade. This does not mean that the boys in the study are not successful. They are – a general average grade of 4.25 implies a more than good level of school achievement.

Other gender differences were found with respect to leisure activities, attitude to reading and reading preferences, the use of dictionaries, the use of computers and learning difficulties. These are factors that seem to contribute to reading fluency in any language.

Female and male learners prefer to spend their time differently. Their preferences are shown in Table 10.2 in which they are ranked from the most (No. 1) to the least preferred (No. 10). The chi-square values were calculated on the basis of frequencies and they show if the differences between the genders are statistically significant. In the table, the differences that are statistically significant at $p < 0.05$ are shown in boldface.

The girls prefer spending their free time meeting friends and family, reading, watching TV, using the internet, developing their own interests

Table 10.2 Gender preferences towards leisure activities and chi-square values (at $p < 0.05$)

	Females			***Males***			***chi-square***	***p***
Leisure activity	***0***	***1***	***Rank***	***0***	***1***	***Rank***		
Meeting people	25	126	1	50	113	3	**8.59**	**0.003**
Reading	33	118	2	59	104	4	**7.78**	**0.005**
Watching TV	42	109	3	29	134	1	**4.5**	**0.03**
Internet	60	91	4	44	119	2	**5.74**	**0.02**
Own interests and hobbies	63	88	5	68	95	6	0.001	0.99
Sports	74	77	6	62	101	5	2.26	0.13
Movies	79	72	7	99	64	7	**3.84**	**0.05**
Walks	87	64	8	132	61	8	**20.28**	**0.0001**
Disco	99	52	9	123	40	10	**3.70**	**0.05**
Other	124	27	10	120	43	9	3.27	0.07

Note: In the table, 0 stands for 'no' and 1 stands for 'Yes'

and hobbies, going to the movies, practising sports, walking and going to the disco. The boys watch television, use the internet, meet people, read and practise sports. They also go to the movies and the disco. The statistically significant gender differences refer to meeting people, reading, watching TV, using the internet, practising sports, going for walks and to the disco. The differences in the manner in which teenagers spend their free time show that girls care more about social relations, they read more than the boys, watch less television, go for walks and to discos more frequently. The boys, on the other hand, watch more television and are more interested in computers and computer technology. They also meet other people and read, but these activities are less preferred than TV and computers. They also practise more sports than the girls.

When attitudes to reading were analysed, it appeared that the female learners revealed a more positive attitude to reading ($M = 2.15$) than the males ($M = 1.53$). The difference is statistically significant ($F = 44.98$ at $p < .05$).

As far as reading preferences are concerned, the first observation is that adolescents do not read avidly. The original checklist contained 18 items on the 0–4 Likert scale. When the mean values for each text type were calculated for the whole sample, it became evident that some text types are not read. The types that are not read by either gender (mean < 1) were excluded from the analysis. When the mean values were calculated for each gender separately, remarkable differences were noticed with respect to reading preferences. The results are presented in Table 10.3. Statistically significant gender differences at $p < .01$ are shown in boldface.

Girls' reading preferences are completely different from that of boys'. Thus females like reading youth magazines, youth literature, adventure novels, memoirs, obligatory books from the reading list. They also read poetry, newspapers, mystery and fantasy novels, plays and documentaries. Boys also like reading youth magazines but the girls' preferences are stronger. Contrary to the females, the males prefer newspapers, comics, fantasy and adventure novels. A look at Table 10.3 warrants a conclusion that there are more differences than similarities between the reading preferences of both groups. They do not differ only with respect to newspapers, fantasy and historical novels.

The analysis of data revealed that 61 participants (19.6% of the sample) had been diagnosed dyslexic. In this group, 24 (39.3%) dyslexics were female, while 37 (60.7%) were male. The ANOVA showed that statistically significant differences in reading were found between females and males only with respect to reading in L1($F = 8.93$, $p < .01$). Dyslexic females read better than dyslexic males.

Table 10.3 Reading preferences by gender

Text type	*Mean*		*F*	*P*
	Females	*Males*		
Obligatory reading list books	2.18	1.81	**19.05**	**0.001**
Youth magazines	3.03	2.37	**14.06**	**0.001**
Newspapers	2.03	2.21	1.16	0.282
Youth literature	2.91	1.52	**80.13**	**0.001**
Documentaries	1.59	1.45	**8.60**	**0.004**
Mystery novels	2.01	1.28	**17.08**	**0.001**
Fantasy novels	1.79	1.92	0.45	0.50
Love stories	1.04	0.11	**57.15**	**0.001**
Historical novels	1.35	1.19	1.08	0.30
Adventure novels	2.75	1.67	**47.54**	**0.001**
Contemporary world prose	1.13	0.38	**35.14**	**0.001**
Memoirs	2.64	0.35	**271.63**	**0.001**
Poetry	2.06	0.54	**112.53**	**0.001**
Plays	1.78	0.48	**87.89**	**0.001**
Comics	1.39	2.06	**14.15**	**0.001**

The analysis of leisure activities shows that using computers is one of the males' favourites. It also appeared that both genders have access to the Internet at home and at school but more males than females use the Internet. Males use it to find information necessary to do homework and to pursue their own interests more frequently than females (Table 10.4). More interesting, although there are differences in frequencies, they are not statistically significant (as shown by the chi-square values).

The participants were also asked about their use of various dictionaries since this is assumed to contribute to the lexical development of the reader. It appeared that the girls declared to use various dictionaries (spelling dictionary, dictionary of the Polish language, dictionary of foreign words, Polish–English, English–Polish and English–English dictionaries) more frequently than the boys (Table 10.5). In this case, the statistically significant gender differences were found in relation to the use of the Polish language

Table 10.4 Use of the internet by males and females (frequencies)

	Females	*Males*
Access to the internet at home	99	120
Access to the internet at school	64	66
Using the internet	134	156
Finding information for schoolwork	118	122
Finding information related to personal interests	112	133

Table 10.5 The use of dictionaries

Type of dictionary	*Females*	*Males*	*F*	*p*
Spelling dictionary	2.27	2.10	1.49	0.22
Polish language dictionary	2.41	1.96	**8.93**	**0.003**
Dictionary of foreign words	3.07	2.44	**17.33**	**0.001**
Polish–English dictionary	4.15	3.57	**23.22**	**0.001**
English–Polish dictionary	4.10	3.51	**21.45**	**0.001**
English–English dictionary	1.50	1.32	0.92	0.34

dictionary, dictionary of foreign words (Pol. *Słownik wyrazów obcych)*, Polish–English and English–Polish dicitionaries, as illustrated by the boldfaced *F* values in Table 10.5. The significance level was set at $p < .01$.

No gender differences were identified when such variables such as the length of exposure to English, attending private language lessons or language courses were analysed.

Discussion

The results of the present study allow to confirm all the hypotheses formulated above. Polish female adolescents have an advantage on reading comprehension in L1 and L2. The advantage that girls have over boys at the early stages of learning to read (Sochacka, 2004) does not disappear with age but continues into adolescence. The females also show a higher level of language aptitude and are more successful school and language learners than males. Gender differences observed with respect to leisure activities

suggest that the girls are more socially oriented, and they like reading in their free time while the boys show more interest in watching TV and in modern communication technologies. The female learners also developed a more positive attitude to reading than males and there is a remarkable difference in their reading preferences. Both groups read youth magazines, but the males are more keen on reading newspapers than the females who like fiction and literature. This finding is partly consistent with the results reported by Bügel and Buunk (1996) and may explain the differences in background knowledge and interests. More males have specific difficulties with reading and writing, which has a negative effect on their reading performance in their L1. The females use various dictionaries more frequently than the males, which may suggest either that the girls are more inquisitive or that the boys are more eager to risk a guess when they are not certain about the form or meaning of specific linguistic items. Although the males are more enthusiastic internet users, the females also take advantage of this invaluable source of information and entertainment.

The findings of the current study are mostly consistent with the findings of other researchers concerned with gender differences, except the findings by Bügel and Buunk (1996), according to which Dutch male adolescents do better on reading comprehension than females. Other researchers agree that girls do better at school and obtain higher scores on literacy tests, which is also supported by the data from 15-year-old participants in the Programme for International Student Assessment (PISA) (The PISA Assessment Framework, 2003). Males achieve higher results on mathematics tests and significantly higher results on scientific literacy (Halpern, 2004).

Girls' high achievement on reading literacy may be better understood if cognitive models of the reading process are considered (e.g. Rayner & Pollatsek, 1989). Successful reading involves the interaction of lower- and higher-level processes. Lower-level or bottom-up processes are concerned with fast recognition of the visual stimuli and it has to be remembered that since early years of life girls have a larger vocabulary, subtle perceptual abilities and an advantage in spelling. Higher-level processes, on the other hand, refer to making sense of what has been recognised. The recognised form has to be moved to short-term memory where lexical access takes place and further processing, dependent on the components of long-term memory, occurs. The girls' advantage on verbal memory is an important asset in text comprehension. Moreover, fewer girls are dyslexic and even when they are, they seem to cope with the problem more effectively than the boys. The results also suggest that both genders have a comparable access to language education and to modern information technologies and they are free to decide whether to take advantage of them or not.

Are the observed gender differences, especially in relation to language abilities, inborn (due to nature)? Or do they result from culturally and socially determined ways of bringing up children (due to nurture)?

Actually, these questions have been bothering gender specialists for some time. Feingold (1996) claims that three competing models are used to explain these differences, that is biological, sociocultural and biosocial. He argues that if there are innate differences between the sexes, then the societies would provide gender roles that are based on specific abilities and make them a part of the social structure. The environment itself also contributes to these differences in such a way that the individuals who show a certain talent are encouraged to practise and develop it. Moreover, 'different models may be valid for different abilities' (Feingold, 1996: 28).

Halpern (2004) claims that nature and nurture cannot be separated when talking about gender differences because biological and psychosocial factors mutually influence each other. Therefore, she has proposed a psychobiosocial model that is a useful framework for understanding cognitive sex differences. She argues:

> What people learn influences the structure of their neurons (e.g. their branching and size); brain architectures, in turn, support certain skills and abilities, which may lead people to select additional experiences. Differences in the interests of females and males both derive from the differences in areas in which they have achieved success and lead to further differential success in these areas because of differential knowledge and experience. Learning is both a biological and environmental variable, and biology and environment are as inseparable as conjoined twins who share a common heart. (Halpern, 2004: 138)

Conclusions

The empirical findings reported in this chapter refer only to a fraction of human cognitive abilities, namely to reading literacy where the female advantage is well documented across all age groups. Genders display differential abilities and skills though recently cognitive gender differences have been reported to decrease (Feingold, 1996; Kimura, 2006).

Although genders differ as groups, an individual's activity, behaviour and performance in a range of sociocultural contexts results from a combination of neuronal, genetic, hormonal, environmental and motivational factors and therefore is unique. This actually is a warning against stereotyping in relation to gender roles.

Last but not least, instead of talking about generic men and women exemplifying gender differences, some researchers point to gender diversity (Cameron, 2005). There are many varieties of gender identities that are dynamic and influenced by factors such as age, ethnicity, class, occupation and many others. Cameron claims that 'Gender is [...] not something you acquire once and for all at an early stage of life, but an ongoing accomplishment produced by your repeated actions' (2005: 486).

Most important, despite gender differences, girls and boys, men and women should have equal chances and opportunities in the educational, social, economic and political contexts. Eventually, an individual makes a decision if and how to use these chances, considering their own skills and abilities.

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Chapter 11

An Educational Language Community: External and Internal Language Use by Multilingual Students

ANNA EWERT

L2 Users and Their Communities

This chapter aims to describe patterns of external and internal language use in a unique community of multilingual students. The theoretical model the present study adopts is the one of multicompetence. Multicompetence has been originally defined as '[t]he compound state of a mind with two grammars' (Cook, 1991: 112), and later redefined as 'the knowledge of more than one language in the same mind' (Cook, 2002: 10). The term was originally used as part of dispute with Chomsky's Universal Grammar theory, and is sometimes associated with the generative view of language. Several attempts to reconceptualize multicompetence as theory of language knowledge have appeared recently. The multicompetence view is consistent with dynamic systems views of multilingual development (De Bot *et al.*, 2005, 2007; Jessner, 2003; Herdina & Jessner, 2002), while Hall *et al.* (2006) propose a usage-based reconceptualization of multicompetence. Paraphrasing Jakobson (1953), it remains to be said that multicompetence is the fundamental problem of linguistics.

Cook (2002) defines an L2 user as someone who uses other language than their L1 for real-life purposes. Discussing the nature of the L2 user, Cook (2007: 5) points out that three questions must be answered:

- Who are the L2 users?
- What is the 'language' they know?
- What is the community they belong to?

Cook (2007) distinguishes several kinds of communities of L2 users:

- the community of minority language speakers communicating with the majority;
- the community of minority language speakers communicating with other minority language speakers;
- the community of minority speakers (re)-acquiring the minority language;
- the community of short-term visitors to a country;
- the international professional community of L2 users;
- the micro community;
- the community of L2 educated students;
- the community of students learning L2 in school.

If short-term visitors to a country, that is people who rarely communicate in L2 with others of the same kind, are classified as members of the same community, the need arises to disambiguate what is meant by a speech community. There is little agreement among sociolinguists as to what a speech community is and how it should be defined, and whether speech communities exist at all (see Patrick, 2002 for discussion). According to Labov

> The speech community is not defined by any marked agreement in the use of language elements, so much as by participation in a set of shared norms; these norms may be observed in overt types of evaluative behavior, and by the uniformity of abstract patterns of variation. (Labov, 1972: 120–121)

The situation is similar in bilingualism research. While Weinreich (1953) discusses bilingual speech communities, Mackey (1972) denounces their existence:

> If language is the property of the group, bilingualism is the property of the individual. An individual's use of two languages supposes the existence of two different language communities; it does not suppose the existence of a bilingual community. The bilingual community can only be regarded as a dependent collection of individuals who have reasons for being bilingual. (Mackey, 1972, [2000]: 26)

Mackey's view cannot be agreed with for the obvious reason that bilinguals do employ different speech styles while communicating with other bilinguals from those they use in communication with monolinguals (Grosjean, 1989). Deliberate code switching and mixing should be taken as argument for the existence of bilingual speech communities. In applied

linguistics, speech community has been defined by Corder (1973) in the following way:

> A speech community is made up of individuals who regard themselves as speaking the same language; it need have no other defining attributes. (Corder, 1973: 53)

Corder's definition will be adopted in this chapter with certain reservations. Most importantly, a speech community may consist entirely of individuals who speak a given combination of languages and share certain norms concerning communicative behaviour.

The present study deals with patterns of language use by Polish students in a combined degree Russian and English programme at Adam Mickiewicz University in Poznań. These students will be considered multilingual since they use languages other than the L1 for real-life purposes during their education at the university. The aims of the study are threefold:

- to show that the students in the combined degree Russian and English programme belong to a unique speech community;
- to describe this speech community from an emic perspective;
- to provide qualitative data concerning multilinguals' experience of crosslinguistic influences in their external and internal language use.

Mackey's (1972) descriptors of bilingualism, that is degree, external and internal function, code alternation and interference (crosslinguistic influence), will be adhered to in order to provide the characteristics of this multilingual community.

The study relies on self-report. While more objective methodologies exist to measure other aspects of multilingualism, self-report is the only possibility to tap internal language use. It is also believed that this technique will permit to shed some light on aspects of crosslinguistic influence that are not amenable to more objective investigation. External and internal language use in bilinguals has been so far studied by Cook (1998) by means of a paper and pencil questionnaire and by Pavlenko (2005) with the use of a web questionnaire. Sicola (2003) used ethnographic interviews to research crosslinguistic and crosscultural influence in American expatriates on their return to the United States.

The Study

Participants

A total of 17 students (1 male, 16 female) in their fourth and fifth year of the combined degree in Russian and English programme at Adam

Mickiewicz University in Poznań participated in the study. Apart from one or two who were absent on the day of collecting the data, these were all the students enrolled in the programme in both the years, as attempt has been made to cover in detail these two cohorts as a representative section of the whole community of multilingual students. All the participants, apart from intensive training in linguistics received in the course of their stay at the university, took a one-semester course in bilingualism, which allowed to assume familiarity with the basic terminology used in the self-report questionnaire. The students filled out the questionnaires in class for course credit.

Self-Report Questionnaire

The instrument used in this study was a self-report questionnaire containing 28 questions. Ample space was provided in the questionnaire for students' comments on their behaviours and such comments were explicitly invited wherever possible. The questionnaire was administered in English.

The content of the questions can be summarized as follows:

Questions 1–3: Background information.
Question 4: Self-rated proficiency.
Question 5: External language uses.
Questions 6–12: Internal language uses.
Questions 13–15: Emotional uses.
Questions 16–20: Code switching.
Questions 21–28: Interference.

Questions 1–4, 6, 9, 12–15 were based on Dewaele and Pavlenko (2001–2003). The actual questions will be provided in the following section, together with the results. Representative comments will be quoted where possible, space permitting. All the students' comments are provided below in italics. The comments will be provided in the language in which they were originally given, with as little editing as possible.

The questionnaire took about 50 min. The subjects were given as much time to complete it as they needed. Lack of space does not permit to include the whole questionnaire here. The background questions required providing the information explicitly asked for. Questions 12–15, 20, 28 were open-ended. Questions 6–11, 16–19, 21–27 concerned frequency of stated behaviours. Responding to these questions, the subjects were supposed to tick one of the options provided. In the analysis, numerical values have been assigned to the answers in the following way: never = 0, rarely = 1, sometimes = 2, frequently = 3, all the time = 4.

Results and Discussion

Question 1: Which languages do you know and what order did you learn them in? Was acquisition naturalistic (outside of school), instructed (at school, university, etc.) or both?

A table to fill out accompanied this question, which will not be provided here for lack of space. Additional information required was age at which acquisition of the respective language started.

Polish is the L1 for all the subjects. Eleven subjects listed English as the L2. Mean age at which they started learning English is 7.82 years. Five gave Russian as the L2, mean age of acquisition 12.2 years. One subject listed German as the L2. Eleven subjects listed Russian as the L3 with mean age of acquisition 14.09, 5 listed English with mean age of acquisition 15 years. All the L2s and L3s were learned in instructed contexts; only one subject stated that the acquisition of Russian was *a bit naturalistic*. The L4s listed were German (four respondents), Greek, Latin (three respondents), French, English (one respondent) and Norwegian. One subject listed Greek as an L5. Except two cases, all the L4s and the L5 were learned in instructed contexts. One L4 (Greek) was acquired in a naturalistic context, and in one case (Norwegian) acquisition was both naturalistic and instructed. Languages that are not shared by all the subjects will not be included in further analysis.

Question 2: Which do you consider to be your dominant language(s)?

Ten subjects stated that Polish is their dominant language, six subjects listed Polish and English, one subject listed Polish, English and Russian. This rare occurrence of Russian in the participants' responses to this question is partially accounted for by relatively shorter period of acquisition, since Russian was usually acquired at a later age than English. Additionally, one student provided the following comment:

(1) *Unfortunately, our Russian classes are not very communicative and, as a result, I lack contact with this language. On the other hand, I'm overwhelmed with English and it's my dominating language.*

Question 3: What language(s) do your parents speak?

All the parents speak Polish. Other languages listed were Russian (four times), English (twice), German and French. In 13 cases the parents speak Polish only. One student indicated that the parents' L2 knowledge is basic.

Question 4: On the scale from 1 (least proficient) to 5 (fully fluent) how do you rate yourself in speaking, understanding, reading, writing in all of the languages in question?

Mean self-rated proficiencies are given in Table 11.1. It is worth noting here that the students quite often do not rate themselves as fully fluent in their L1. The ratings for English and Russian are lower than those for Polish. The subjects see their level of proficiency in Russian as similar to their proficiency in English. If this result is compared to which they regard as their dominant languages, it becomes obvious that dominance does not really depend on perceived proficiency.

Question 5: How often do you use your languages in the following contexts or for the purposes stated?

(Never = 0, at least once a year = 1, at least once a month = 2, every week = 3, every day = 4, several hours a day = 5.)

Responding to this question, the subjects were asked to provide a numerical value in each box of the grid. Table 11.2 gives mean values of the provided responses. In the original formulation, three more domains were included: at home, in a language class and travelling abroad. These were deleted from further analysis, since it turned out that they had not been understood in the same way by all the participants. The students were not clear as to whether doing homework assignments and preparing for classes counted as use of a particular language at home. Similarly, they were not certain which of their classes counted as language classes, since some of the linguistics and literature courses they were taking were taught in English or in Russian. The responses given to the travelling abroad prompt suggested that the students travelled abroad at least several times a month, which was obviously not the case.

The responses reveal that the subjects use the three languages frequently and for a variety of purposes, both for study and for recreation. In the study context English is used more often than Polish. Russian is used less frequently than English in all the contexts. All the three languages are used regularly for communicating with friends.

Question 6: Which language(s) do you use for mental calculations/ arithmetic? Tick where appropriate.

Table 11.1 Mean self-rated proficiency in Polish, English and Russian

	Speaking	***Comprehension***	***Reading***	***Writing***
Polish	4.76	4.94	4.94	4.71
English	3.74	4.35	4.29	4.06
Russian	3.65	4.38	4.35	3.68

Table 11.2 Mean frequencies of language use for external functions

	L1	*English*	*Russian*
At the university	4.41	3.88	3.47
Communicating with friends	4.65	3.41	2.65
Watching TV, DVDs, listening to the radio	4.35	3.12	2.24
Reading for study purposes	3.71	4.00	3.29
Reading for pleasure (books, newspapers, magazines, internet pages, etc.)	3.82	3.18	2.47
Writing for study purposes (homework assignments)	2.24	3.18	2.65
Correspondence, including formal letters, applications, email and internet communicators	3.65	2.71	1.35

Questions 6–11, 16–19, 21–27 concerned frequency of stated behaviours. Numerical values assigned to students' responses are explained in the section 'Self-Report Questionnaire'. Below, mean reported frequencies are given.

Polish: 3.82
English: 1.65
Russian: 1.0
Other: 0.35.

Question 7: Which language(s) do you take private notes in (e.g. in a diary, making a shopping list)?

Polish: 3.59
English: 1.59
Russian: 0.65
Other: 0.18.

Question 8: Which language(s) do you use for prayer?

Polish: 3.59
English: 0.35

Russian: 0
Other: 0.

Question 9: If you form sentences silently (inner speech), what language do you use? Tick where appropriate.

Polish: 3.29
English: 2.47
Russian: 1.82
Other: 0.35.

Question 10: Which language(s) do you dream in?

Polish: 3.65
English: 1.65
Russian: 1.0
Other: 0.06.

Question 11: Which language(s) do you swear in?

Polish: 2.53
English: 2.0
Russian: 0.76
Other: 0.35.

Questions 6–11 concerned frequencies of internal uses of the respective languages. The results show that Polish is used most frequently for all the internal functions. English is used more frequently than Russian, which is consistent with what the subjects regard as their dominant languages (Question 2).

All the languages are used for internal functions except prayer, which is almost exclusively reserved for Polish. Swearing takes place in English not much less frequently than in Polish, but rarely or never in Russian. This may be related to differences between the languages. Pavlenko (2005) notices that swear words sound stronger and more abusive in Russian than in English.

Question 12: If you do write in a personal diary – or were to write in one – what language(s) do you or would you use and why?

Four subjects indicated that they would use Polish only, two subjects answered that they would use English, and all the others pointed out that they would probably use some combination of languages. Russian was mentioned less frequently than English. The reason for using Polish was ease and precision of expressing oneself. One reason for using English or Russian was need of secrecy, that is less likelihood that someone would understand those private notes. The other frequently given reason was

that writing in L2 would be a good method of practising the language. Students who opted for Polish often added comments of the kind:

(2) *I think I would use Polish as this is the language I feel comfortable with, and I don't usually lack vocabulary to express myself. However, I suppose some English phrases would appear there.*
(3) *Some thoughts appear in my mind already in English and they seem to be more accurate.*

Question 13: If you were to recall some bad or difficult memories, what language would you prefer to discuss them in and why?

Ten subjects said they would rather discuss bad memories in Polish. The most often provided reason was the fact that the people with whom they usually discuss such memories speak only Polish. Ease of expression was another frequently given reason. One subject would rather choose English. The remaining subjects either said that language did not matter or that the choice of preferred language would depend on the content of those memories. The reasons for choosing an L2 were the following:

(4) *While speaking English I tend to be more outgoing and open, so recalling bad memories would be easier in English.*
(5) *… recalling such memories in a foreign language I'm more detached.*
(6) *… topic I find intimidating I prefer to discuss in English.*
(7) *… English, Russian, if memories deal with contexts when these languages were used.*

Question 14: Is it easier or more difficult for you to talk about emotional topics in your second or third language? If there is a difference, could you describe it and perhaps provide some examples?

As with the previous question, opinions were mixed. Five subjects stated that it was easier for them to express emotions in Polish, one subject said that it was easier to express emotions in English. Representative opinions:

(8) *Emotions are best described in Polish. In other languages they seem artificial.*
(9) *It is more difficult because sometimes I simply do not know the appropriate word in a foreign language. However, sometimes words from the other language come to my mind if they are more suitable and have no appropriate counterpart in Polish.*
(10) *The question cuts both sides. It is easier to speak in Polish* [because of] *the ability to translate my feelings into words. It is easier to speak in English – the use of this language gives me the opportunity to look at an emotion/problem from a different angle.*

(11) *It makes no difference to me whether I speak English or Polish, but my proficiency in Russian wouldn't allow me to talk about emotions.*

Question 15: Do you feel like a different person sometimes when you use your different languages?

Ten subjects provided an affirmative answer, seven said that it never happens to them. Typical responses were as follows:

(12) *When I use English, I feel more confident, reserved and ironic.*
(13) *Yes, it makes me more versatile and less narrow-minded.*
(14) *Yes. I can speak with ease in L2, expressing my thoughts or describing personal topics that I would not talk about in my L1.*
(15) *No. The language I speak does not influence the way I feel. I do not identify myself with different cultures.*

Question 16: Do you switch between languages within a conversation with certain people?

Questions 16–19 refer to frequencies of reported behaviours. Numerical values have been assigned to the subjects' responses in the way described above, from 4 (highest) to 0 (lowest). The reported frequencies of code switching in the contexts provided are as follows:

In class: 2.65
When speaking with friends at the university: 2.88
In other situations: 2.29.

Question 17: Do you switch between languages when talking about certain matters? Tick where appropriate.

When talking about matters related to your study: 3.12
When talking about everyday life matters: 2.12
When talking about personal matters: 1.94
When talking about some other things: 2.06.

Responses to Questions 16 and 17 show that the subjects relatively frequently switch between the codes. It seems that the amount of code switching depends more on the topic of conversation than on the situational context.

Question 18: Do you switch between/mix your languages in the following situations:

When you count things or do mental arithmetic: 1.47
When you take private notes (e.g. in a diary, making a shopping list): 2.35

When you talk to yourself: 2.53
When you use an internet communicator or write an SMS message: 2.47.

Question 18 concerned the amount of code switching as an internal function. The results show that internal code switching is as frequent as code switching in public speech.

Question 19: If you do, why do you switch between languages?

You do not know the right word or expression in L1: 2.35
You do not know the right word or expression in L2 or L3: 2.41
You know the right L1 word or expression but cannot find it: 2.59
You know the right L2 or L3 word or expression but cannot find it: 2.53
You find it difficult control it: 1.59
It makes communication easier and faster: 2.65
The language you speak lacks certain meanings: 2.29
Everyone else does it: 1.00.

The responses show that the reasons behind code switching are complex and varied. Lack of knowledge of the required word or expression in any of the languages is a frequent reason for switching codes, as well as temporary problems with accessing the desired form. Relatively rarely do the subjects report problems with inhibiting the undesired form. Quite frequently code switching is deliberate and results from good comparative knowledge of the languages and striving for precision of expressing the desired meaning. It seems that following fashion of any kind and imitating the speech of other members of a community is the least important aspect of code switching. The subjects report that they alternate between codes because it makes communication easier and faster. It seems that their code switching originates in an internal need more than from a desire to accommodate the expectations of others.

Question 20: Can you provide some typical examples of your code switches?

The following are literal quotes from the questionnaire. In several cases citation marks have been added to differentiate the examples of code switches given by the participants, spellings have been left unchanged. Explanations in regular brackets are ones that have been given by the participants. Additional translations have been provided in square brackets where necessary. Parts of quoted text in Polish are given in regular font, Russian is marked by boldface. Morphological and orthographic integration in case of borrowings has been disregarded in marking the language if the words do not function as borrowings in general Polish.

(16) *I frequently use English words when talking to my friends in a group. Then, everybody knows the meaning of such words (e.g. handout, research). I also use English when talking to my boyfriend, but it is rather for fun.*
(17) *Ridingi (readings), spicze (speeches).*
(18) Końcowy egzamin na IFA nie spełnia *validity factor.*
[The final exam in the School of English does not meet the validity criterion.]
(19) *Instead of saying* akcesoria [accessories], *I sometimes use the Russian word* ***aksesuary*** *(with Polish pronunciation).*
(20) *I often use the word 'misleading' because I often forget the Polish equivalent.*
(21) ***'sobornost'*** *instead of* 'wspólnota' [community], *because it has an extra meaning.*
(22) *Everyday expressions, for example See you, bye-bye, really, question tags.*
(23) *I use phrases from films, songs – 'My precious', 'I'll be back, soon'.*
(24) *Ty* **miamlio** *(ros.* **m'aml'a** *o osobie strachliwej, nieśmiałej).*
[You ***miamlia*** (Russian ***m'aml'a*** about a timid, shy person).]
(25) Zrobisz mi ***kofie****?* (kawę)
[Will you make me some ***kofie***? (coffee)]
(26) Idź, ***sdziełaj kserokopii.***
[Go and make photocopies.]

The examples given range from nonce borrowings to borrowings that have been firmly established and are widely used by this population (e.g. *ridingi, spicze*), but are not in popular use among Poles who are not university students of English. The quoted utterances exemplify and add to the reasons for code switches mentioned in the previous question. As the subjects say, they sometimes use expressions from another language out of playfulness.

Question 21: Do you feel your L1 interferes with your other languages in ways you find difficult to control? Do you find yourself in situations when you simply cannot switch off the L1 while using the other languages?

In responses to questions 21–27 numerical values have also been assigned to the subjects' responses from 4 (highest reported frequency) to 0 (lowest frequency).

In speech: 2.41
In writing: 1.12.

Two subjects commented that they sometimes cannot control their language and resort to L1 while talking about very emotional topics or while angry.

Question 22: Do you feel your L2 or L3 interferes with your L1 in ways you find difficult to control?

In speech: 1.65
In writing: 1.12.

Although second and third languages rarely interfere with L1, most students report such experiences, as is shown by their comments:

(27) *I use words that don't exist in Polish.*
(28) *When I speak L1, sometimes instead of L1 L2 words come up and it is difficult for me to find equivalent.*
(29) *Often when I speak L1, words come to me from L2. I find it annoying, but it only happens when I am tired or haven't slept enough.*
(30) *I wrote:* … pokój, okna którego wychodzą na … [… room the windows of which overlook …] *instead of* … pokój, którego okna wychodzą na … [… room whose windows overlook …] *(influence of Russian syntax).*

The comment in brackets in the last utterance quoted comes from the subject. The example shows how subjective crosslinguistic influence can be. Both examples given by the student, differing only in word order, are acceptable in Polish.

Question 23: Do you feel your L2 interferes with your L3 in ways you find difficult to control?

In speech: 1.18
In writing: 1.0.

Interaction between L2 and L3 is also rare, but familiar to most participants:

(31) *Sometimes I have a tendency to* zruszczać [Russify] *English words.*
(32) *Sometimes when I speak L2 (Russian), certain word in L3 (English) comes to my mind first and I can't remember the word in L2.*
(33) *It sometimes happens but it is so rare I don't pay attention.*

Question 24: Have you ever been told you speak your L1 with a foreign accent? Only four subjects report such experiences, mean frequency: 0.41.

Question 25: Have you ever experienced a situation in which the influence of the L2 or L3 culture led to difficulties in communicating with other L1 users?

Nine subjects, that is about half of all, report difficulties in communicating with monolingual Poles due to foreign influences. One subject notes that this happens mostly in communication with her grandparents.

Another gives an example of Russian food as a topic that led to difficulties in communication because the interlocutors were not familiar with some of the terms she used.

Question 26: Have you ever felt that while writing in one language you actually formulate your thoughts in another language and then translate them

From L1 to L2 (L3): 1.65
From L2 (L3) to L1: 1.29
From L2 (L3) to L3 (L2): 1.12.

Question 27: Have you ever felt that while speaking one language you actually formulate your thoughts in another language and then translate them

From L1 to L2 (L3): 1.47
From L2 (L3) to L1: 1.76
From L2 (L3) to L3 (L2): 1.12.

The majority of participants report formulating their thoughts in a different language than the one being used, but this is not a frequent phenomenon.

Question 28: How important is it for you to keep your languages apart?

Only four participants stated that keeping their language apart was not important to them. The remaining participants acknowledged that keeping the languages apart is important, providing a number of reasons. The following quotes exemplify typical opinions on this point:

(34) *Well, when I'm among my friends, who know my L2 and L3, I don't care about keeping the languages apart. However, when I talk to my parents (family) or people who don't speak the foreign languages I know I'm very conscious about not using words from those languages. I know how irritating it is when people overuse borrowed phrases.*
(35) *I love the Polish language and admire its beauty. That is why I think the separation of L1 and Lx is very important. I do my best to separate it from Lx in formal context. I also take care of my L1, but sometimes I code-switch.*
(36) *I'd say rather important, because it is after all the aim of learning to be fluent and able to express oneself in a language without interruptions from the other languages.*
(37) *It's very important but sometimes difficult.*

Conclusion

The multilingual students in the combined degree Russian and English programme form a unique speech community both in Corder's (1973)

understanding, as well as in the Labovian's (1972) sense, discussed at the beginning. On the one hand, they are distinguished from other users of Polish by the fact of sharing the same languages. On the other, they develop unique multilingual ways of communicating, as exemplified by their responses to Question 20. Although they recognize the importance of keeping their languages apart, they switch codes consciously and deliberately, depending on contextual needs, of which they seem to have a good awareness. Thus, in discourse terms, they share the same evaluative norms. They are also aware that those norms cannot be adhered to outside of the educational language community they belong to.

With regard to external and internal language use, the study confirms earlier findings concerning language use in bilinguals (Cook, 1998; Pavlenko, 2005). L1 is the preferred language for expressing emotions, although individual preferences might vary. Emotions might sound artificial in another language, but expressing them in L2 or L3 might also allow the subjects to perceive their own emotional experiences differently.

Cook (1998) notes that there is 'a continuum between public and private use. The same person who is using the L2 in public is likely to be using the L2 in private in their heads'. The results of the present study lend full support to this claim. L2s and L3s that are frequently used for study purposes are present in inner speech, used for taking private notes and doing mental calculations. Prayer is primarily the domain of L1 and cursing in Russian seems less appropriate than in English (Pavlenko, 2005). The novelty of the present study was in examining internal patterns of code switching. In this respect, Cook's (1998) conclusion was also borne out – if code switching appears in public use, it is very likely to appear in private use as well.

Interference, or crosslinguistic influence, plays an important role in multilingual language use, although the participants do not perceive it as a problem. Their subjective experiences show that all the languages are activated in production, although they usually do not have a problem with suppressing the non-target forms. The data also suggest that crosslinguistic influence as subjectively experienced might differ from what a researcher would classify as instances of such in samples of language production (see the last comment in responses to Question 22).

All in all, the study shows that educational languages influence the students' behaviour outside of the classroom, the ways in which they interact with other members of the same educational community as well as the ways in which they construct themselves as language users. The subjective experience of multilingualism changes one's awareness of their own linguistic functioning.

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Chapter 12

Language Awareness in Using Cognate Vocabulary: The Case of Polish Advanced Students of English in the Light of the Theory of Affordances

AGNIESZKA OTWINOWSKA-KASZTELANIC

Introduction

The theory of affordances has recently gained more attention, not only from psychologists, but also from cognitive and applied linguists. It is widely discussed with reference to areas as diverse as environmental psychology, industrial design, human–computer interaction, artificial intelligence and language learning. As far as learning is concerned, the theory sheds new light on the meaning and importance of awareness phenomena in cognition.

This chapter will shortly discuss the connection between the affordances and language, second language acquisition (SLA) and awareness phenomena. It will show why the presence of cognate vocabulary constitutes a set of affordances, which are not easily available to all language learners. Next, it will focus on the results of an awareness-raising experiment that will be discussed in the light of the affordance theory.

Affordances in Language Learning

The theory of affordances and SLA

The theory of affordances was first proposed by the perceptual psychologist Gibson (1977, 1979). According to Gibson, an organism perceives a

set of possibilities the environment provides – or affords – for fulfilling its goals. An affordance is 'a specific combination of the properties of its substance and its surfaces taken with reference to the animal' (Gibson, 1977: 67). In other words, affordances are the perceived opportunities for action provided for the observer by an environment. That is, affordances can be understood as the possibilities that an object or environment offers (or appears to offer) for action or functioning.

Norman (1988), who used the term affordance in the context of Human–Machine Interaction, popularized it within the field of interaction design. In his further work (Norman, 1999) he developed the term, referring to 'perceived affordance'. This distinction makes the concept dependent not only on the physical capabilities of the actor, but their goals, plans, values, beliefs and past experience. As he puts it: '… the term affordance refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used' (1999: 9). Effectively, Norman's affordance 'suggests' how an object can be used and interacted with.

Norman's idea of perceived affordance has been taken over by cognitive psychologists and linguists. For the recent decade linguists have discussed the fact that language, like any other environment, offers certain affordances to its users. For instance, MacWhinney (1999) notes that language plays an important role in communicating information about situational affordances. Segalowitz (1997) suggests that taking advantage of affordances that language offers plays a role in individual differences in second-language attainment. According to him, learners may vary with regard to the flexibility and fluency required to deal with language; however, their L2 performance may also involve sensitivity to environmental affordances, that is the ability to adjust to the changing linguistic and non-linguistic context.

Segalowitz (2001) further points to the fact that affordances are important for learning, on one condition, however. Although a given language like any physical environment possesses affordances, and supports a particular set of constructions, the constructions are

> available for packaging a message if the speaker knows how to use them. These constructions afford the possibility of making certain messages but not others, and make some messages easier to communicate than others. (Segalowitz, 2001: 15)

In other words, language offers certain potential affordances and these are connected with language resources and language-learning environments of the learners. Thus, learning or acquiring a language involves

'attuning one's attention system to perceive the communicative affordances provided by the linguistic environment' (Segalowitz, 2001: 15–16).

Segalowitz's framework, where learning is seen as a complex interaction between individuals and the context in which they find themselves, ties up with Schmidt's Noticing Hypothesis (1998), which states that every aspect of SLA involves attention. As Snow puts it,

> A situation provides a suitable niche only for those persons who are prepared to meet and use its affordances effectively. Those not properly tuned or prepared will in some way fail to perform effectively in the situation as given. (Snow, 1998: 107)

Without noticing certain affordances available, the learner may not be able to use them. Thus, affordances are connected with the perception of certain opportunities, and what follows, for affordances to be perceived, observers must be sensitive to the relevant information and attend to that information. As for affordances associated with language learning and use, they will only be available to those learners who are aware of them. According to Singleton and Aronin (2007: 85), 'the higher the level of language awareness is, the more effectively language-related possibilities are likely to be perceived and capitalised upon'.

Affordances and cross-linguistic similarities

It is a well-known fact that all human beings and animals assess environmental stimuli to judge if they will enhance or hinder the fulfilling of needs and desires. Similarly, language users and learners will intuitively judge if phenomena within language and across languages may be utilized to enhance communication. As Odlin (2006: 30) puts it, '[w]ith specific reference to interlingual identifications, we can surmise that stimulus appraisal entails, *inter alia*, a judgement about communicative utility'.

Among the phenomena enhancing or hindering language learning, one can find cross-linguistic similarities and differences. Wode (1983, quoted after Odlin, 2006) suggested that learners need to notice (consciously or not) a crucial similarity between the native and the target language. Odlin (2006: 29) further adds that although such an idea seems promising and sound, 'researchers have not yet been able to provide a full answer to the question of just what can make a similarity crucial'. In his previous work, however, Odlin stated the following:

> . . . similarities and dissimilarities in word forms, along with similarities and dissimilarities in word meanings, play a major role in how

> quickly a particular foreign language may be learned by speakers of another language … (Odlin, 1989: 77)

This means that, if noticed and recognised by the learner, cognate word forms, even if they do not constitute 'crucial similarity' between the native and the target language, may be regarded as a set of affordances in learning a foreign language.

As far as Polish learners of English are concerned, they have at their disposal over 3000 items common to both languages as was presented by Otwinowska-Kasztelanic (2004, 2007b). Historically, these will be loanwords, that is words borrowed from English into Polish, for example *biznes*; *hamburger*; words borrowed independently by both languages, for example *sputnik; robot* or internationalisms, that is words shared by a number of languages, for example *aktor*, *optymizm.* Such a number of words and especially terms derived from Latin and Greek may definitely be utilized to enhance communication for a Polish learner of English.

Basing on those assumptions, a small-scale experiment was carried out to check if introducing English–Polish cognates to the classroom really enhances language learning (Otwinowska-Kasztelanic, 2001). The subjects of the small experiment were four Polish total beginners of English in the experimental group and four total beginners in the control group. The material of the English course for the experimental group was supplemented by exercises activating about 1000 English–Polish cognates which had been extracted from *Oxford Elementary Learner's Dictionary* (1995). During the 60-h course, the students from the experimental group worked on the exercises and were constantly sensitised to the existence of language cognates. Thanks to activating cognate vocabulary, the beginning learners of English from the experimental group proved more effective in communicating than those from the control group who were not aware of the existence of cognates. This was shown in both receptive and productive tasks (oral interview). Thanks to the sensitization, the experimental group's language awareness rose and so they learned how to rely on their intelligence and linguistic intuitions as far as similarities in the Polish–English lexis are concerned. In other words, they were able to use the potential of the affordances offered by cognate vocabulary.

As the above example suggests, formal similarities of cognate forms can easily trigger positive transfer, on a certain condition, however. As numerous authors suggest, the learner must first recognize opportunities for transfer and hence – be aware of the existence of cognate vocabulary (Odlin, 1989; Ringbom, 1986, 2007; Singleton, 2006). This was also clearly stated by Soufra (2001, after Singleton, 2006), who described the case of

English learners of Greek and their failure to make the connection between native words and their Greek equivalents even when formal and semantic relationships between the words were obvious. As Odlin suggested:

> … more and more research on contrastive lexical semantics shows that recognition of cognates is often a problem. Learners may not always note the formal similarities that mark a cognate relation, and they may not always believe that there is a real cognate relationship … (Odlin, 1989: 79)

A key notion in the understanding of why certain learners fail to notice the relationship is one of the psychotypological distances between L1 and L2. Cross-linguistic influence is stronger between languages which are typologically close, such as Polish and Slovak, for instance. However, it is only when languages are perceived as close by the learners, that cross-linguistic influence increases (Kellermann, 1983; Ringbom, 1986; Singleton, 2006). Ringbom (2006: 38) even talks about 'perceived and assumed similarity' as opposed to 'objective' similarity of language items and forms. If learners perceive an L2 to be significantly different or distant from their L1, they may not be aware, or may not even notice certain formal similarities between the two. Thus, awareness and readiness to use the affordances offered by the cognate vocabulary depends on the perceived psychotypological distance between L1 and L2.

Investigating and Raising Awareness of Cognate Vocabulary

Perceived psychotypological distance between English and Polish

Man´czak-Wohlfeld (2006) suggests that even Poles whose level of English is advanced cannot enumerate English borrowings into Polish. In a recent study, Otwinowska-Kasztelanic (2007a and 2009) points to the fact that even advanced Polish students of English are generally unaware of the existence of cognate vocabulary because they perceive Polish and English as typologically distant. A great majority of the 100 intermediate and the 200 advanced students who were examined did not believe in the existence of a large number of Polish–English cognates. Nor were they aware of the existence of cognates they obviously knew and used when speaking and writing English. There are two implications of this survey. Even those Poles whose level of English is advanced do not recognize opportunities for positive transfer from L1. Therefore,

they cannot notice and use the potential affordances which cognates offer to them.

The aim of the research

If students do not recognize opportunities for transfer, it is interesting to check if intensive language awareness training can change the situation. From the survey results it is clear that even Polish advanced learners of English should have a certain language awareness developed in them. This may enable them to recognize opportunities for transfer. This awareness could be defined as the learner's sensitivity to the similarities between the Polish and the English language. As Rubin points out

> Once the student's attention is drawn to the [cognate] relationship, the same student may learn several hundred words in a very short time. Hence, some kinds of conscious interventions are assumed to be helpful in the learning process. Rubin (1987: 16)

Thus an experiment was designed to find out whether sensitizing advanced learners to the existence of Polish–English cognates would help them recognize and use cognate vocabulary. The aim of the project was not only to raise the students' language awareness, but also to teach them to use various vocabulary learning strategies, including the conscious search for cognates. The students were to be provided with various opportunities for positive transfer from Polish and various tasks were designed to check if the transfer takes place.

Research design

The study took place between February and June 2006. The subjects were two groups of students from the Institute of English Studies, Warsaw University, from now on called the Experimental Group 1 and the Control Group 1. Initially, there were 18 students in each group, all at the advanced level of English (B2/C1). Unfortunately, both groups were of mixed ability, with some students whose command of English was much poorer than others, and one student who was clearly multilingual. Several students quit the course during the semester.

The course comprised integrated skills work with an additional intensive vocabulary study element and lasted for one semester (30 h of tuition). Both groups were presented with cognate vocabulary gathered into thematic groups and constantly informed about various vocabulary learning strategies. They were also encouraged to take part in tasks activating

the cognate vocabulary added to the course. It is only the Experimental Group 1, however, who were sensitised to the existence of Polish–English cognates and the possibilities of using them in speech and writing. In Control Group 1 the tasks for cognate activation were treated only as warm-ups and time fillers. The activities used to activate cognates involved listing, word mapping, grouping, matching, contextualization, recombination and communicative activities.

Means of assessing students' awareness

At the initial stage both groups responded to two questionnaires. The first one assessed the students' awareness of Polish–English cognates, the second once, adapted from Wenden and Rubin (1987) was meant to learn about students' background and their vocabulary learning strategies. At the end of the course, the students were asked to fill in another questionnaire concerning vocabulary learning strategies and to rate the usefulness of the strategies they had been presented with during the course (Otwinowska-Kasztelanic, 2007a). Initially, only one student (clearly multilingual) proved to be fully aware of the existence of language cognates. Other students proved unaware of the existence of Polish–English cognates.

The students' recognition and use of cognates was assessed on the basis of a reading task, a writing task and an oral interview. The reading task involved scanning an unfamiliar text to underline cognates within a time limit of 6 min. The writing task involved producing a short paragraph comparing two people. It was carried out after a series of vocabulary and communicative activities involving the use of cognate personality adjectives. The number of cognates used was counted and compared for both groups. The oral interviews took place at the end of the course. They were recorded, transcribed and the number of cognates used by the students was counted.

The results of the experiment

The students' recognition of cognates was assessed on the basis of a reading task, which took place approximately after one-third of the course. The students were given a text of 830 words (taken from the Skills section in www.onestopenglish.com), which included 70 cognates. Their task was to scan the text and underline the cognates within the time limit of six minutes.

Eleven students from Experimental Group 1 and 12 students from Control Group 1 took part in the test. On average, the students in

Table 12.1 Number of cognates (out of 70) found in the text of 830 words within a time limit of 6 min

Experimental Group 1		*Control Group 1*	
Student	*Number of cognates recognized*	*Student*	*Number of cognates recognised*
Student 1E1	67	Student 1C1	37
Student 2E1	56	Student 2C1	33
Student 3E1	51	Student 3C1	32
Student 4E1	51	Student 4C1	31
Student 5E1	50	Student 5C1	29
Student 6E1	50	Student 6C1	29
Student 7E1	46	Student 7C1	29
Student 8E1	45	Student 8C1	22
Student 9E1	38	Student 9C1	18
Student 10E1	23	Student 10C1	18
Student 11E1	15	Student 11C1	17
		Student 12C1	12

Experimental Group 1 underlined 45 out of 70 cognates (with only three students below average), whereas in Control Group 1 only 25 out of 70 cognates (with five students below average). The detailed results are presented above (Table 12.1).

Clearly, in the recognition task Experimental Group 1 proved much more effective than Control Group 1. The best student from the control group was only as good at recognising cognates as the ninth student in the experimental group.

The students' production of cognates was measured in a writing task and a speaking task. The writing task took place in the middle of the course during a class on describing personality. It involved producing a short paragraph comparing two people and it was the final step of a series of vocabulary study and communicative activities involving the use of personality adjectives (which included numerous cognate adjectives originating from Latin). The students from Experimental Group 1 had been sensitized to cognates during the communicative activities and vocabulary study, whereas Control Group 1 had been exposed to the same vocabulary,

but not sensitized to cognates. The number of cognate adjectives used in the paragraphs was counted and compared for both groups. The Experimental Group produced 12 paragraphs, which together constituted 997 running words of text. The Control Group produced 14 paragraphs, which together gave 915 running words of text.

The results for both groups were strikingly different. The students from Experimental Group 1, who had been sensitized to cognates during the communicative activity and vocabulary study, used cognate adjectives 40 times, which on average was 4% of the running words of the text. In total, cognate vocabulary constituted 6.6% of the running words of the texts written by Experimental Group 1. Control Group 1, who had only been exposed to the same vocabulary, and not sensitized to the possibility of using cognates when describing personality, used cognate adjectives only 24 times. On average it was 2.5% of the running words of the text. In their case, cognate vocabulary constituted 4.9% of the running words.

As for the speaking task, it was a formal oral test performed in pairs in front of the interviewer. The task was a role-play and the topics involved describing personality, clothes, interior design and travel and holidays. A non-surreptitious microphone was always used and the speakers were always informed that they are being recorded. This, obviously, put the students in a rather stressful position, but the stress factor was meant to make them rely on the affordances of cognate vocabulary as the 'easier' option. The recorded utterances were later transcribed and the number of running words, as well as the number of cognates was counted. Separately, the number of false friends and non-existent words was counted for each student, because of the common belief that teaching cognates may lead to overusing false friends by students of foreign languages.

The recordings took place at the very end of the course. In Experimental Group 1, 14 students were recorded, and they produced a total of 3506 running words, which on average gives 250 running words per student. The students in this group used cognates (tokens) 91 times, which on average gives 2.6% of the running words of the recorded text. In Control Group 1, there were 16 students who took part in the recordings. They produced a total of 4647 running words, which on average gives 290 running words per student. Control Group 1 used cognates (tokens) 97 times, which on average gives 2% of the running words of the recorded text.

The above results show that, on average, the Experimental Group used cognates in speaking more often than the control group. It is more interesting, however, to look at the individual variations. Tables 12.2 and 12.3 show the results for each student who took part in the recordings.

Table 12.2 Number of cognates produced during the oral task by the students from Experimental Group 1

Experimental Group 1	*Number of*			*Cognates as percentage of the running words*	*False friends and non-existent words*	*Number of cognates (types) used in the conversation*
	Running words	*Cognates used (tokens)*	*Cognates used (types)*			
Student 1E1	233	2	2	0.85	–	7
Student 2E1	209	8	7	3.82	–	
Student 3E1	365	9	9	2.46	–	11
Student 4E1	283	4	4	1.41	–	
Student 5E1	216	2	2	0.92	–	3
Student 6E1	176	1	1	0.57	–	
Student 7E1	308	6	4	1.95	–	7
Student 8E1	211	8	5	3.79	–	
Student 9E1	285	7	5	2.80	–	11
Student 10E1	225	9	7	4.0	–	
Student 11E1	293	10	7	3.41	–	7
Student 12E1	191	4	3	2.10	–	
Student 13E1	265	16	15	6.03	–	24
Student 14E1	246	13	12	5.28	1	

Table 12.3 Number of cognates produced during the oral task by the students from Control Group 1

Control Group 1	*Number of*			*Cognates as percentage of the running words*	*False friends and non-existent words*	*Number of cognates (types) used in the conversation*
	Running words	*Cognates used (tokens)*	*Cognates used (types)*			
Student 1C1	377	7	6	1.85	4	9
Student 2C1	224	4	3	1.78	–	
Student 3C1	309	9	5	2.91	–	11
Student 4C1	280	9	6	3.21	–	
Student 5C1	187	5	4	2.67	–	12
Student 6C1	188	10	8	5.31	–	
Student 7C1	459	10	4	2.18	–	9
Student 8C1	399	15	8	3.75	1	
Student 9C1	325	1	4	1.23	–	9
Student 10C1	288	8	7	2.78	–	
Student 11C1	339	7	6	2.06	–	6
Student 12C1	181	2	2	1.1	–	
Student 13C1	332	4	3	1.2	–	6
Student 14C1	184	3	3	1.63	–	
Student 15C1	208	1	1	0.48	–	3
Student 16C1	367	2	2	0.54	–	

In both groups there were students who used just one cognate word (Student 6E1 and Student 9C1). In both cases these were female students whose level of English was lower than average. These students nearly failed the oral task altogether, having found the oral test and the presence of the non-surreptitious microphone too stressful. In both groups there were also students who used cognates 10 times or more. Their results show that the use of cognates may be connected with the students' idiolect. Student 13E1 and Student 14E1 from the Experimental Group used a cognate word 16 and 13 times, respectively, where most cognates were of different types (15 and 12 types, respectively). On the other hand, Student 8C1 from the Control Group had a tendency to repeat the same cognate several times (15 tokens to 8 types of cognates used).

As for the percentage of cognates in the running words of the text they ranged from 0.57% to 6.03% for the Experimental Group 1 and 0.48% to 5.31% for the Control Group 1, so there were no huge differences between the groups. However, the Experimental Group used cognates more often in each conversation: the students used 3–24 cognate types, 10 types per conversation on average. The Control Group used 3–12 cognate types, roughly eight types per conversation. Contrary to the common belief that teaching cognates may lead learners to overusing false friends, the students from both groups did not overuse them when speaking, although they had been exposed to cognate vocabulary for the whole semester. From the above results it also seems that at the advanced level overusing false friends and non-existent words can be an idiolectal feature. It was clearly the case in the speech of Student 1C1 from the Control Group.

On the whole, the experiment shows that awareness raising and strategy training concerning cognate vocabulary may enhance positive transfer from L1 in the case of Poles sensitised to the existence of Polish–English cognates. It is also clear that the students from the Experimental Group 1 more often made use of the affordances offered by activating their cognate vocabulary, as compared to the Control Group 1.

Experiment: a case study

In Experimental Group 1 there was a student whose linguistic behaviour during the course was rather different than expected. This student is marked as Student 1E1.

First of all, it turned out that this female student had been fully aware of the existence of cognates and the possibility of using them, which was shown in the initial questionnaire. This was quite an exception, since no other student from among those who responded to the questionnaire

revealed such a level of language awareness. As for Questionnaire 2, whose task was to reveal the students' background, Student 1E1 considered herself a successful learner, and a risk-taking person. She also proved multilingual with her native Polish and advanced level of English, German and Italian (C1, C2 and B2 of the CEFR scale, respectively).

As far as Student 1E1's results are concerned, she was the most efficient of all the students tested in the recognition task (reading), since she recognized 67 out of 70 cognates (see Table 12.1). In the writing task she used six cognates in an 80 words paragraph. So in her writing cognates constituted 7.5% of the running words of the text, which was much above the average. What is interesting, she used the word 'appasionate' instead of 'passionate', which shows influences of her other languages. However, in the speaking task Student 1E1 used only two cognates (types and tokens) in the 233 running words she uttered, which gives 0.85% of the running words. This was one of the lowest scores in the whole group, comparable with those of the very weak students. Such a low score is seemingly strange, as this person should have been the first to use the affordances offered by the cognate vocabulary, especially in a stressful situation of a formal speaking test.

As a way of explaining this result it can be suggested that advanced multilingual learners do not necessarily have to rely on L1–L2 similarities when producing speech and writing, since they have other means of expressing their thoughts, such as wider vocabulary range, idiomatic expressions, etc. On the other hand, they are obviously aware of affordances offered by cross-linguistic similarities (Ringbom, 2006; Singleton, 2006; Singleton & Aronin, 2007). Hence the student's outstanding performance in recognition tasks. In this case, using cognate vocabulary in speaking may have depended on the student's level of English and her knowledge of other languages. These findings remain in accordance with those of Williams and Hammarberg (1998). On the basis of a case study they argued that multilinguals may avoid transfer from their L1 and may be more prone to be influenced by other languages they know. They called it 'foreign language effect'.

Conclusions and Implications

This chapter has briefly presented the theory of affordances and its importance for SLA. Speakers or learners of a language have certain potential affordances at their disposal. The affordances are connected with their language resources, as well as language-learning and language-using environments. Positive lexical transfer from the mother tongue may offer

a set of affordances if the learner is aware of their existence and if he/she perceives the L1 and the L2 as psychotypologically close.

In this chapter it has been argued that in the case of Polish learners of English even if the learners are initially unaware of the existence of cognates, training and activation clearly changes the situation. It has been shown that awareness raising and strategy training concerning cognate vocabulary may enhance positive transfer from L1 in the case of English and Polish. Exposure to and activation of English–Polish cognate vocabulary helped students from the Experimental Group recognize cognates more efficiently in receptive tasks and use cognates more often in productive tasks.

Students from the Experimental Group more often made use of the affordances offered by activating their cognate vocabulary, as compared to the Control Group. Even those students from the Experimental Group who failed the oral task proved more effective in the reading and writing tasks than the students from the Control Group. What is interesting, neither of the groups exposed to cognates showed the tendency to overuse false friends. Using false friends proved to be a rather idiolectal feature.

The experiment has also shown that the use of cognates may be a matter of the student's idiolect and may also depend on the knowledge of other languages. And so, multilingual students do not have to rely on their cognate vocabulary when speaking, as they posses other means of expressing their thoughts, such as wider vocabulary range, idiomatic expressions, etc. They may also consciously avoid relying on their L1 when speaking.

On the basis of the research one should say that raising learners' awareness of cognate vocabulary and training them to consciously use this strategy really enhances positive transfer from L1. So, it seems reasonable to postulate introducing awareness raising and strategy training to the teaching of foreign languages in those cases where formal similarities between languages occur. Learners have to be made aware of those similarities to notice and use the potential of the affordances offered by cognates.

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