

# Neurolinguistic and Psycholinguistic Perspectives on SLA

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# **Neurolinguistic and Psycholinguistic Perspectives on SLA**

Edited by

Janusz Arabski and Adam Wojtaszek

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**Bogusława Whyatt** is an Assistant Professor at the School of English, Adam Mickiewicz University in Poznań, Poland. With her background in psycholinguistics, she has been investigating the process of translation using such empirical methods as Think Aloud Protocols and, more recently, the Translog software. Drawing from her teaching experience, she has written about the benefits of translation tasks for the learners' developing bilingual knowledge. Currently, she is working on her post-doctoral project, which investigates the genesis and evolution of translation as a human skill. She is also a freelance translator.

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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 neuro-biological perspective.

The last contribution in this section investigates paralinguistic strategies applied by advanced learners of English. Ślęzak-Świat focuses on the sub-cortical 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.

## References

- Gibson, J.J. (1977) The theory of affordances. In R.E. Shaw and J. Bransford (eds) *Perceiving, Acting, and Knowing* (pp. 67–82). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Gile, D. (1995) *Basic Concepts and Models for Interpreter and Translator Training*. Amsterdam/Philadelphia: John Benjamins.
- Mackey, W.F. (1972) The description of bilingualism. *Canadian Journal of Linguistics* 7, 51–85. [Reprinted in Li Wei (ed.) (2000) *The Bilingualism Reader*. London: Routledge.]
- Schumann, J.H. (1997) *The Neurobiology of Affect in Language*. Oxford: Blackwell.

*Part 1*

## ***Neurolinguistic Perspective***