The Psycholinguistics of Bilingualism

François Grosjean and Ping Li
The Psycholinguistics of Bilingualism
The Psycholinguistics of Bilingualism

François Grosjean and Ping Li
Primary Authors

With contributions from

Ellen Bialystok and Raluca Barac
Annette M.B. de Groot
Rosa M. Manchón
Virginia Yip
Contents

Author Biographies vii

Introduction 1

1 Bilingualism: A Short Introduction 5
François Grosjean
1.1 The Extent of Bilingualism 6
1.2 Describing Bilinguals 7
1.3 The Functions of Languages 11
1.4 Language Mode 14
1.5 Interacting with Bilinguals and Monolinguals 17
1.6 Biculturalism 21

I SPoken LANGUAGE PROCESSING 27

2 Speech Perception and Comprehension 29
François Grosjean
2.1 From the Speech Wave to the Mental Representation 30
2.2 Processing Monolingual Speech 33
2.3 Processing Bilingual Speech 39

3 Speech Production 50
François Grosjean
3.1 From Thought to Articulation 51
3.2 Producing Monolingual Speech 52
3.3 Language Production in Bilinguals Is a Dynamic Process 54
3.4 Producing Bilingual Speech 59

II WRitten LANGUAGE PROCESSING 71

4 Reading 73
Annette M.B. de Groot
4.1 An Outline of the Reading Process 74
4.2 Word Recognition in Bilinguals 76
4.3 Models of Bilingual Visual Word Recognition 87
4.4 Sentence Processing in Bilinguals 91
## 5 Writing
*Rosa M. Manchón*

5.1 The Psycholinguistics of Bilingual Writing: Mapping the Terrain 102
5.2 Bilingual Text Production Activity: Processes and Strategies 105
5.3 The Transfer of Knowledge and Skills in Bilingual Writing 111

## III LANGUAGE ACQUISITION

### 6 Simultaneous Language Acquisition
*Virginia Yip*

6.1 Theoretical Issues 121
6.2 Methodological Issues 124
6.3 Early Developmental Stages and Language Differentiation 129
6.4 Cross-linguistic Influence 130
6.5 Code-mixing 133
6.6 Extensions and Applications 137

### 7 Successive Language Acquisition
*Ping Li*

7.1 Age Effects in Second Language Acquisition 146
7.2 Speech Learning in Successive Language Acquisition 151
7.3 Dynamic Interaction between First Language and Second Language 155

## IV COGNITION AND THE BILINGUAL BRAIN

### 8 Bilingual Memory
*Annette M.B. de Groot*

8.1 The Organization of the Bilingual Mental Lexicon 172
8.2 Bilingual Concepts 181
8.3 Bilingual Autobiographical Memory 186

### 9 Cognitive Effects
*Ellen Bialystok and Raluca Barac*

9.1 Language and Metalinguistic Abilities 193
9.2 Acquisition of Literacy 198
9.3 Developing Executive Control 202
9.4 Advantages of Bilingualism across the Lifespan 206

### 10 Neurolinguistic and Neurocomputational Models
*Ping Li*

10.1 Neurolinguistic Traditions and Debates 215
10.2 The Cognitive Neuroscience of Bilingualism 220
10.3 Neurolinguistic Computational Modeling 228

Index 239
Author Biographies

Primary authors

François Grosjean is Professor Emeritus of Psycholinguistics at Neuchâtel University, Switzerland. His many publications on bilingualism include three books: Life with Two Languages: An Introduction to Bilingualism (1982), Studying Bilinguals (2008), and Bilingual: Life and Reality (2010). The latter was selected as a Choice Outstanding Academic Title. He is a Founding Editor of the journal Bilingualism: Language and Cognition and was its first Coordinating Editor.

Ping Li is Professor of Psychology, Linguistics, and Information Sciences and Technology at Pennsylvania State University. His books include The Handbook of East Asian Psycholinguistics (Volumes 1–3; General Editor; 2006), and The Acquisition of Lexical and Grammatical Aspect (co-authored with Y. Shirai, 2000). He is Editor of the journal Bilingualism: Language and Cognition, and Associate Editor of Frontiers in Language Sciences.

Guest authors

Ellen Bialystok is Distinguished Research Professor at York University in Canada. She has published extensively on bilingualism and its cognitive effects across the lifespan. Her books include Bilingualism in Development (2001) and Lifespan Cognition: Mechanisms of Change (2006) (co-edited with Fergus I.M. Craik). She is a fellow of the Royal Society of Canada and her research has been recognized with numerous awards, including the 2010 Killam Prize in the Social Sciences. Raluca Barac, PhD, is a research manager at the Hospital for Sick Children in Toronto, Canada.

Annette de Groot is Professor of Experimental Psycholinguistics at the University of Amsterdam. She is the author of Language and Cognition in Bilinguals and Multilinguals: An Introduction (2011), and with Judith Kroll she edited Tutorials in

Rosa Manchón is Professor of Applied Linguistics at the University of Murcia, Spain. Her books include Writing in Foreign Language Contexts: Learning, Teaching, and Research (2007), Learning-to-Write and Writing-to-Learn in an Additional Language (2011), and L2 Writing Development: Multiple Perspectives (2012). Together with Chris Tardy, she edits the Journal of Second Language Writing.

Virginia Yip is Professor and Chairperson of Linguistics and Modern Languages as well as Director of the Childhood Bilingualism Research Centre at The Chinese University of Hong Kong. Her books include Interlanguage and Learnability (1995) and The Bilingual Child: Early Development and Language Contact (co-authored with Stephen Matthews, 2007), which received the Linguistic Society of America’s Leonard Bloomfield Book Award. She has also co-authored a series of books on Cantonese grammar.
In the last 25 years, the field of bilingualism has grown tremendously, as can be seen by the presence of numerous introductory books on the topic, the publication of edited and more specialized monographs, the emergence of encyclopedias and new academic journals, not to mention numerous websites and blogs dedicated to the subject.

One of the most dynamic areas of bilingualism research involves the psycholinguistic study of both adults and children. Most books usually concentrate on particular domains such as language processing and representation in adult bilinguals, bilingual child language acquisition, the cognitive aspects of bilingualism, the bilingual brain, and so on. Few books cover all these domains at once. In addition, most are aimed at advanced students and specialists or at those who have a solid background in cognitive psychology, psycholinguistics or applied linguistics.

This book on the psycholinguistics of bilingualism is a general introduction to the field rather than a comprehensive survey. Among its different aims, the first is to present the most important aspects of the area in a clear, informative and pedagogical manner. To do so, the main authors have benefited from the collaboration of guest authors, who are experts in their own fields – Ellen Bialystok and Raluca Barac, Annette de Groot, Rosa Manchón and Virginia Yip. The second aim is to make the issues discussed accessible to non-specialists, most notably undergraduates and masters students with little previous exposure to the field of bilingualism and, sometimes, limited knowledge of psycholinguistics and cognitive psychology. The third aim is to give the various areas of the psycholinguistics of bilingualism equal weight, even though some are investigated more extensively by today’s researchers. For example, written language processing has received much more attention than spoken language processing in recent years even though bilingualism primarily involves spoken languages. The final aim is to introduce readers to the approaches and methodology used in the field, most
Introduction

notably observation, experimentation, verbal and computational modeling, as well as brain imaging.

The book begins with a short introductory chapter on bilingualism and bilinguals (Chapter 1). It presents a number of basic concepts and clarifies some misconceptions. Since bilingual participants in studies bring specific language knowledge and use to the research environment, it is important to understand these phenomena as reflected in the participants themselves so as to be able to make better sense of the data obtained.

The book is then organized into four parts. Part I concerns spoken language processing. Chapter 2 is dedicated to speech perception and comprehension and examines how bilinguals process just one language when no elements of the other language(s) are present. It then considers how bilinguals perceive and comprehend speech that contains code-switches and borrowings. Chapter 3 examines speech production and shows how it is a dynamic process, sometimes language selective and sometimes language independent. In addition it studies the time course of language switching, how it is constrained by syntactic considerations, and its impact on the phonetics of the utterance.

Part II is concerned with written language processing. It contains two chapters, one on reading and one on writing (this latter topic is relatively rare in the literature). Chapter 4, written by Annette de Groot, examines whether visual word recognition in bilinguals is restricted to the contextually appropriate language or whether the other language is also involved. Both experimental studies and models are called upon to provide an answer. It then discusses how bilingual readers resolve syntactic ambiguities and how they process semantic and syntactic anomalies. Chapter 5, authored by Rosa Manchón, considers the processing features of bilingual text production including the strategic role of the stronger language when the less dominant language is being written. It also investigates the interplay between writing expertise and linguistic ability, and discusses the transfer of writing knowledge and skills across languages.

Part III is dedicated to language acquisition in bilinguals. Chapter 6, written by Virginia Yip, deals with simultaneous language acquisition and discusses such issues as balanced vs. unbalanced development and whether the latter takes place separately for each language or not. It also examines language differentiation in the early stages of acquisition and looks into cross-linguistic influences, code-mixing, as well as trilingual acquisition and language development in children with language disorders. Chapter 7 is concerned with successive language acquisition. It provides a review of the contentious critical period hypothesis and the theoretical perspectives that accompany it. It then examines speech learning and the variables that may influence its success. It ends with an examination of how the two languages influence one another and suggests that even a native language is susceptible to change as proficiency and use increase in the other language.

The final part, Part IV, covers cognition and the bilingual brain. Chapter 8, authored by Annette de Groot, examines bilingual memory and presents various
Introduction

models of the organization of lexical word forms and their conceptual representations in the bilingual mental lexicon. It then looks at whether, how, and why L1 and L2 concepts differ from one another and from those of monolinguals. It ends with a discussion of bilingual episodic/autobiographical memory and asks whether one’s memory encodes the language used in a past event, and what this implies for later retrieval. Chapter 9, written by Ellen Bialystok and Raluca Barac, is dedicated to the cognitive effects of bilingualism. It begins by describing the verbal abilities of bilingual children and adults in terms of vocabulary size, metalinguistic awareness and learning to read. It continues with an overview of the nonverbal consequences of being bilingual, primarily changes in executive function abilities during childhood and adulthood, and what this means for the aging brain. The last chapter of the book, Chapter 10, investigates neurolinguistic and neurocomputational models that pertain to bilingualism. It offers an overview of a number of neurolinguistic traditions and debates, and then examines the cognitive neuroscience of bilingualism. This is accompanied by a brief guide to relevant neuroimaging methodologies. The chapter ends by showing how neurolinguistic computational modeling complements behavioral and neuroimaging studies.

A few additional points need to be made. First, all authors in their respective chapters attempt to present the approaches and methodology used in their domains by taking illustrative studies or models and describing them in some detail. Thus readers will normally find an in-depth discussion of a few studies instead of a comprehensive review of numerous studies. Second, even though some references are made to monolinguals, in particular with regard to language processes and representation as well as cognitive effects, the aim is not to compare monolinguals and bilinguals. This is a delicate issue, especially for those who espouse a holistic view of bilingualism whereby the bilingual person is not considered as two separate monolinguals. For the time being, we have decided to leave this issue aside. Third, the book has been written with pedagogical considerations in mind. Thus, for instance, each chapter ends with research questions and further readings.

This book can be used for courses in psycholinguistics, linguistics, cognitive sciences, speech and language pathology, bilingualism, applied linguistics, and first and second language acquisition. It is ideal for upper level BA and BS courses, first- and second-year graduate studies, as well as for lay persons who wish to find out about the psycholinguistics of bilingualism.

We would like to end by thanking our guest authors who very kindly accepted to take part in this book project and write chapters for the level of reader at which the book is aimed. They have done a wonderful job in putting this into practice as well as integrating their chapters into the book as a whole, and for this we are grateful to them. Our thanks also go to Professor John Field, with whom this book was discussed at the very outset, to Danielle Descoteaux, Acquisitions Editor at Wiley-Blackwell, who made the project possible and who has accompanied us in such a supportive way from the very beginning, as well as to Julia Kirk, Project Editor,
Introduction

Fiona Screen, Copy Editor, and Allison Medoff, Editorial Assistant, for their kind help. Finally, we wish to thank our respective families for their unwavering and loving support. We dedicate this book to them.

François Grosjean and Ping Li
March 2012
Chapter 1

Bilingualism: A Short Introduction
François Grosjean

The words “bilingual” and “bilingualism” have many different meanings depending on the context they are used in. They can include the knowledge and use of two or more languages, the presentation of information in two languages, the need for two languages, the recognition of two or more languages, and so on. Since this book focuses on the psycholinguistics of bilingual adults and children, we will define bilingualism, and indeed multilingualism, as the use of two or more languages (or dialects) in everyday life.

This chapter has several aims. The first is to introduce readers to basic concepts concerning bilingualism and bilinguals so as to help them understand more specialized chapters later in the book. Readers bring with them knowledge of language and cognition but they may know less about bilingualism. Hopefully this chapter will help fill this gap. The second aim is to describe what it is that bilingual participants bring to the studies they take part in. In everyday life, they are “regular bilinguals” with specific language knowledge and language use which they bring to this research as participants. Some of the aspects that will be mentioned are studied specifically or manipulated directly by psycholinguists whilst others simply accompany bilingual participants into the research environment. We need to understand these phenomena so as to be able to make sense of the data that are obtained.

A third aim, which is not restricted to this chapter alone, will be to clarify some misconceptions that surround bilingualism and bilinguals, such as that bilinguals have equal and perfect knowledge of their two or more languages, that they have no accent in any of their languages, that they acquired their languages in childhood, that they are all competent translators, and so on. When it comes to children, we hear that bilingualism will delay their language acquisition, that children will invariably mix their languages, and that being bilingual will have negative effects on their development (see Grosjean, 2010, for a discussion of many of these misconceptions). Some of these will be dispelled in this chapter and others in later chapters.