

Language processing in bilingual children

Edited by

ELLEN BIALYSTOK

Professor, Department of Psychology
York University, Ontario



CAMBRIDGE
UNIVERSITY PRESS

PUBLISHED BY THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE
The Pitt Building, Trumpington Street, Cambridge, United Kingdom

CAMBRIDGE UNIVERSITY PRESS

The Edinburgh Building, Cambridge CB2 2RU, UK <http://www.cup.cam.ac.uk>
40 West 20th Street, New York, NY 10011-4211, USA <http://www.cup.org>
10 Stamford Road, Oakleigh, Melbourne 3166, Australia
Ruiz de Alarcón 13, 28014 Madrid, Spain

© Cambridge University Press 1991

This book is in copyright. Subject to statutory exception
and to the provisions of relevant collective licensing agreements,
no reproduction of any part may take place without
the written permission of Cambridge University Press.

First published 1991

Reprinted 1992, 1994, 1996, 1998, 2000

British Library Cataloguing in Publication data

Language processing in bilingual children.

1. Bilingual children. Language skills. Acquisition

I. Bialystok, Ellen

404.2019

Library of Congress Cataloguing in Publication data

Language processing in bilingual children / edited by Ellen Bialystok.

p. cm.

Includes index.

ISBN 0 521 37021 3 (hardback) – ISBN 0 521 37918 0 (paperback)

1. Bilingualism in children. 2. Psycholinguistics. 3. Education.

Bilingual. I. Bialystock, Ellen.

P115.2.L36 1991

404'.2–dc20 90-37707 CIP

ISBN 0 521 37918 0 paperback

Transferred to digital printing 2003

Contents

<i>List of figures</i>	<i>page</i> ix
<i>List of tables</i>	x
<i>List of contributors</i>	xi
<i>Preface</i>	xiii
Introduction ELLEN BIALYSTOK	1
1 Language modules and bilingual processing MICHAEL SHARWOOD SMITH	10
2 Phonological processing in two languages IAN WATSON	25
3 Second-language learning in children: a model of language learning in social context LILY WONG FILLMORE	49
4 Interdependence of first- and second-language proficiency in bilingual children JIM CUMMINS	70
5 Giving formal definitions: a linguistic or metalinguistic skill? CATHERINE E. SNOW, HERLINDA CANCINO, JEANNE DE TEMPLE, and SARA SCHLEY	90
6 Metalinguistic dimensions of bilingual language proficiency ELLEN BIALYSTOK	113
7 Translation skill and metalinguistic awareness in bilinguals MARGUERITE MALAKOFF and KENJI HAKUTA	141

Contents

8	Towards an explanatory model of the interaction between bilingualism and cognitive development RAFAEL M. DIAZ and CYNTHIA KLINGLER	167
9	Constructive processes in bilingualism and their cognitive growth effects JANICE JOHNSON	193
10	Language, cognition, and education of bilingual children ELLEN BIALYSTOK and JIM CUMMINS	222
	<i>Index</i>	233

Figures

1.1	Forster's models	<i>page</i> 15
2.1	English six-year-old percentage /g/ responses	42
2.2	Classic discrimination/identification function	43
6.1	Domains of language use	122
6.2	Oral uses of language	125
6.3	Literate uses of language	128
6.4	Metalinguistic uses of language	131

Tables

2.1	Averaged V.O.T. production values	<i>page</i> 40
5.1	Means on English and French communicative adequacy (C.A.) and conversational features (C.F.) scores	97
5.2	Scores in English and French for children with home vs. school exposure to French	99
5.3	Effects of status as a bilingual on scores in English and French	100
5.4	Within-language correlations for English and French definitions scores	101
5.5	Between-language correlations for English and French definitions scores	102
7.1	Percentage of responses that were non-literal or literal translations in different translation directions and conditions	156
7.2	R ² values obtained through regression predicting translation times for words and sentences on English and Spanish proficiency, and the word-identification (W.I.) task	157
7.3	Examples of errors coded in translation tasks	158
7.4	Comparison of frequencies of error types in the story-translation task across subjects from study 1 and study 2	162

Introduction

ELLEN BIALYSTOK

The study of the cognitive and linguistic achievements of bilingual children has recently become a respectable, even popular, area of inquiry in psychology and education. The issue is not new, but its history as a serious topic of research is somewhat speckled. Researchers have indulged in speculation for some time about the consequences of bilingualism for children's cognitive development, school achievement, linguistic processing, and metalinguistic abilities, but clear theoretical connections based on sound empirical data have been rare.

One factor that has made the problem so difficult to study is the enormous diversity that accompanies children's bilingualism. Consider, for example, some of the conditions under which children can become bilingual. Children can learn both languages simultaneously in the home; the second language can be learned through submersion in a foreign culture (and here the relative status of the first and second language becomes critical in determining outcomes); or the second language can be learned through immersion or foreign-language classrooms with the majority-language environment. These differences undermine most attempts to identify precise conditions for second-language acquisition, the psychological factors that accompany bilingualism, and the implication of bilingualism for academic and other achievements. Where research has been attempted, the enterprise has often been rendered uninterpretable by the failure to account for, and sometimes even to acknowledge, the critical differences among these situations.

Much of the early research in bilingualism was motivated by educational needs and policy but biased by particular prejudices against bilingualism (and possibly against immigrants in general). About thirty years ago, for example, the general wisdom held that bilingualism was a disorder that could be corrected through ruthless instruction in a standard majority language, pushing out of the inflicted child all traces of the invading language. This remedy was imposed despite the fact that the unwanted language was often the language of the child's home, heritage, and tradition. But the evidence was clear: immigrant children in North American schools were less successful academically than were their monolingual peers, and

the only explanation that entered the imaginations of those researchers was that bilingualism was to blame. It came as a surprise, therefore, when anglophone Canadian children in the early 1970s who had been sentenced to French immersion programs and educated entirely or partially through the medium of French did not display this bilingual pathology. Clearly, bilingualism, *per se*, was not the culprit.

There were, of course, some notable exceptions to this early style, such as Leopold's (1939–1949) seminal study of his daughter learning two languages, but these were rare. Most of the details we have about second-language acquisition and the use of two languages in specific contexts, especially educational contexts, come from research paradigms developed in the 1970s. This research marked a departure from the earlier psychometric studies in that it took bilingualism as a phenomenon worthy of scientific interest in its own right and not simply as an educational complication. But like the attitudes that shaped educational policy towards bilingualism in the earlier studies, the research has been characterized by great and sometimes sudden shifts of attention between models that are in some cases antithetical to each other.

Three main research approaches were initiated during the 1970s that were responsible for a proliferation of studies that had consequences for understanding language processing by bilingual children. These correspond roughly to linguistic, sociolinguistic, and psycholinguistic perspectives on language. Educational concerns remained relevant, but educational implications were more likely inferred from research undertaken in these other traditions. Although there was considerable work in evaluation studies, such as Canadian French Immersion and American Bilingual Education of various types, for example, these studies were in some ways parasitic on the more basic research that was setting norms of achievement for children learning a second language against which the results of those programs could be compared. Another important research orientation undertaken during that time was the neurolinguistic perspective, but that approach will not be dealt with in the present volume. It is interesting to note, nonetheless, that it was on the basis of a (possibly false) neurolinguistic argument concerning a "critical period" for second-language acquisition that the Canadian French Immersion programs found their strongest validation and subsequently rallied their greatest support (but see Johnson & Newport, 1989, for a revitalization of the critical-period view).

The majority of the research relevant to investigations of bilingualism is that focused on the linguistic, or more precisely, applied linguistic perspective. The principal issue is the linguistic documentation of the course of second-language acquisition. Each linguistic description, however, entails different psycholinguistic processes to support that model. The past two decades have witnessed striking changes in the linguistic interpretation

Introduction

of second-language acquisition, and correspondingly, in the psychological and educational implications that accompany each interpretation.

The prevailing view at the beginning of the 1970s was based on the linguistic approach of “contrastive analysis,” developed from Lado’s (1957) early work and reported in *Linguistics across cultures*. On that view, a linguistic comparison of two languages reveals the sources of potential difficulty for the learner by identifying the aspects of the two languages that differ from each other. The psycholinguistic basis of this interpretation was the claim that language learners learned a second language by substituting target-language forms and structures into what they already knew about their first language. Hence, transfer was a complete explanation for second-language learning. This view was abruptly replaced in the 1970s by a claim called “creative construction,” a term coined by Dulay and Burt (1975). On their view, there was no place for transfer. One learned a second language by starting all over again using the same processes that had guided first-language acquisition. It is only recently that a more balanced view has emerged, in which the obvious role of transfer is acknowledged but not offered as a complete explanation of second-language learning. A linguistic explanation of second-language learning which has achieved currency recently is based on the Chomskian view of government and binding (Chomsky, 1982). On this view, languages are learned by setting parameters in the “Language Acquisition Device,” and second-language learning involves the resetting of some parameters. Transfer is explained as the influence of the parameter settings established for the first language on the values necessary for the second.

The bulk of the empirical work undertaken in this linguistic tradition documented the acquisition of specific linguistic features. The fourteen English morphemes made famous by Roger Brown (1973) in his seminal longitudinal study of three children in the early stages of learning English (as a first language) achieved celebrated status. In addition, the journals were full of detailed descriptions of how learners of a particular language X mastered the Y (negation, question formation, pronominalization, past tense, etc.) of language Z. Although some of this work continues to the present, the legacy of the research of the 1970s is a meticulous body of data documenting the course of second-language learning.

A second perspective for research in the 1970s was based on sociolinguistic analyses of language learning and use. An important contribution of this approach is that it documented and analyzed the critical contextual facts that distinguish one bilingual situation from another. Studies examining the social context of bilingualism led to such crucial distinctions as high- versus low-status languages, additive versus subtractive bilingualism, full versus partial control of language, and frequent versus infrequent use of the language. All of these factors were shown to be instrumental in

the second-language acquisition process. A strong version of the sociolinguistic perspective led some to attribute the bulk of the explanation of second-language learning to social factors. John Schumann (1978) adopted this view and developed the *acculturation model* for second-language acquisition in which he argued that social factors such as integration into the community and personal feelings of assimilation provide an explanation of second-language learning.

A third type of research on bilingualism established in the 1970s was addressed to the perennial problem of why some people learned a second language more easily and more thoroughly than others. To this end, many studies of the characteristics of good and poor language learners were undertaken, assessing the role of such variables as aptitude, motivation, personality style, form of instruction, and the like on the ultimate level of proficiency achieved by the language learner. One particularly thorough example of a study of this type was conducted by Naiman *et al.* (1978). While no single profile of the "good language learner" ever emerged, one could no longer ignore such individual differences in making general statements about second-language learning. If nothing else, second-language learning was complex in ways that seemed irrelevant to first-language acquisition, and the contribution of the research on that problem was at least to identify some of the individual difference factors that conspired to produce that complexity.

These three perspectives constitute the research heritage for the study of bilingual children. There are, however, two obvious incongruities between the problems to which this research was addressed and the problems presented by the study of bilingual children. First is the problem of age. Although some of the studies carried out since the 1970s which contributed to the existing data base examined the second-language acquisition of children, the vast majority were studies of adult second-language learners. It is still an unsolved empirical question whether or not the course of language acquisition is the same for conceptually immature children as it is for adults. The most widespread commonsense belief about second-language learning, namely that children are more successful than adults, has been severely challenged with both theoretical and empirical arguments (e.g. Snow & Hoefnagel-Hohle, 1978) although new evidence has begun to emerge again in support of the critical-period view (Johnson & Newport, 1989). A correct description of the similarities and differences between child and adult second-language acquisition is still pending.

Second is the problem of effect. What is the consequence of having learned another language? What are the implications for the child's cognitive, linguistic, social, and educational experiences? It is primarily to this second issue that the present volume is addressed.

Two recent changes in the field of language research have made the direct and explicit study of the linguistic and cognitive development of

Introduction

bilingual children a timely issue. First is the “legitimization” of second-language studies into mainstream linguistic and psycholinguistic theorizing. Second is the shift in emphasis in psycholinguistic research from product descriptions to process models.

For a long time, there was a pervasive attitude among researchers studying language acquisition that the main problem to be solved, the dominant issue, was first-language acquisition. Second-language acquisition was perhaps a variation on a theme, but of far less interest and relevance than the child’s acquisition of a first language. That view, in the context of the times, may have been correct. It may be that no serious attention could be paid to something that was considered as a twist on a theme when the theme itself remained such a mystery. But we now know a great deal about first-language acquisition, and the insight that is occurring to some researchers is that we could know a great deal more if we included information about second-language learning into our theorizing. An interesting development in this regard is the completion model of language processing developed by Elizabeth Bates and Brian MacWhinney (e.g. MacWhinney, 1987). By taking seriously data about the way in which adults process a second language, they have developed a model which they offer as a valid description of language processing in general. In this way, research with second-language learners has contributed to an advance in mainstream psycholinguistic theorizing. Such developments enhance the status of studies of bilingual speakers.

The second change is that research in children’s cognitive and linguistic development has shifted from product descriptions of their accomplishments to process analyses of the causes of development. It is only about twenty-five years since psychology shed the shackles of behaviorism and allowed researchers to indulge in speculations and theories that included constructs such as “mind.” In some current models, for example those of Robbie Case (1985), Robert Sternberg (1984), and Robert Siegler (1984), processing is attributed to hierarchically related “schemes” that the child develops as a function of specific experiences. Throughout development, the schemes continually become elaborated and restructured. These schemes, then, have the responsibility for guiding and determining the child’s performance on specific tasks. Some of these models attribute excessive autonomy to such schemes (Sternberg may be a case in point) and leaves much of the important work in the hands (or mind) of some hypothetical homunculus. The important point, however, is that children’s experiences determine critical aspects of their cognitive organization, and that organization is instrumental in influencing the kinds of intellectual achievements that children can attain. In these terms, it is not implausible that bilingualism is an experience that has major consequences for children’s intellectual development.

In recent years, a growing body of literature has emerged in which process-oriented analyses of these types are applied to specific problems in children's linguistic development. An important part of this interest are the studies of children as they develop the ability to deal with complex uses of language, in particular the literacy skills of reading and writing. These skills have been shown to depend on specific types of language processing and the availability of a set of metalinguistic insights. Skilled readers, for example, are different from less skilled readers because they have more efficient executive schemes for processing language and they have a more elaborated understanding of language structure. The origins of early reading have been traced to types of language processing in which children can pay attention to such features of language as rhyme, alliteration, and paraphrase. Writing, too, is a complex process involving attention to specific linguistic features and integration of those features into a higher-order plan or scheme. More recently, considerable attention has been devoted to uncovering the metalinguistic skills developed by children in the early years, and the ways in which those skills interact with the child's progress in learning to read and write. In all these models, the accomplishments of reading and writing that had formerly been investigated as product descriptions (e.g. what the stages are in learning to read, what features of text make learning to read easier, what errors children make in early reading and writing) are recast as issues requiring explanation. These process models are invariably integrative, incorporating many aspects of children's competence. The contribution that the child's bilingualism might make to such linguistic processes has barely been investigated.

Some research explicitly addressed to the influence that bilingualism might have on cognitive and linguistic development has in fact been undertaken throughout the decades. The early studies in the 1950s and 1960s which argued for cognitive deficit to be the consequence of bilingualism can be largely dismissed on methodological grounds. (An excellent review of these studies is presented by Kenji Hakuta (1986) in *Mirror of language*.) In contrast, a number of studies in the 1970s linked certain cognitive and linguistic advantages to bilingualism. Many of these studies, however, seemed to be overenthusiastic in their effort to identify positive effects for bilingualism, in spite of the fact that results were sometimes equivocal and sometimes even negative. But the optimism was a necessary political tool: only forceful argument and convincing data could dethrone the predominant view of bilingualism as a liability.

The current theoretical and political ethos permits a sober and balanced examination of the influence of bilingualism on children's development. Theoretically, the models and research paradigms from which we study children's development are now sufficiently sophisticated that the complex and elusive issues involved in children's bilingualism may be addressed.

Introduction

Politically, it seems less necessary to “prove” the acceptability of bilingualism for children. We are free, that is, to discover that being bilingual may in fact bring no special cognitive or linguistic benefit to children, and that finding will not threaten the existence of children in our educational system who happen to be bilingual.

The chapters in this volume report research in this new tradition which examines basic processes in language acquisition and use for children who are bilingual. The ultimate aim is to develop a cognitive description for the acquisition and mastery of a second language, and to determine implications of becoming bilingual on children’s language processing and language awareness. The relevant questions are whether or not bilingualism affects the way in which children process language and the insights which they subsequently derive about the structure of language. Basic questions such as the relation between first- and second-language acquisition have long been entertained, but only within these recent process models can they be properly addressed. How is the second language acquired? What role is given to the child’s first language during that process? And how are the child’s cognitive and linguistic resources modified (or not) as a result of having mastered two linguistic systems?

The focus throughout is on the child’s cognitive resources and their role in the child’s development of specific types of intentional language-processing. In all cases, too, the contextual factors that define the bilingual situation are addressed. It is our belief that intensive study of the cognitive and linguistic development of bilingual children is essential, not only because of our obligation to understand the language development of those children who are bilingual, but also because of the incredibly rich source of knowledge gained from this understanding that we can apply to our study of first-language acquisition and cognitive development.

The volume begins with a linguistic description of language processing that can accommodate processing in two languages. This chapter, by Sharwood Smith, sets out a clear statement of the linguistic resources recruited in ordinary language use (such as conversation) and points out how those resources might be organized for bilingual speakers (since his focus is not exclusively on children). The second chapter by Watson examines one aspect of linguistic competence, phonological ability, and reports empirical evidence for the course of the phonological development of bilingual children. These data are used to evaluate alternative models of phonological processing. The third chapter addresses acquisition. Wong Fillmore bases her discussion of the acquisition of a second language by young children on the incredibly rich longitudinal data base she and her colleagues have collected studying the language acquisition of immigrant children. She presents a model for acquisition that has three components – social, linguistic, and cognitive – and demonstrates the essential role each plays

in a description of language acquisition. In the fourth chapter, Cummins applies one of the distinctions made by Wong Fillmore concerning the difference between individual and environmental sources of influence in acquiring language proficiency to the problem of how the first language influences the development of proficiency in the second language. He adds a further distinction between contextualized and decontextualized uses of language and demonstrates that the greatest influence is for decontextualized school-related uses of language. Snow, Cancino, De Temple, and Schley pursue this distinction in their investigation of the ability of bilingual and monolingual children to provide definitions, an important linguistic task that is quintessentially a "school problem." Substantiating Cummins' claims, children perform comparably on this task in both their first and second languages. Bilingualism seems not to influence performance. Other kinds of language tasks do, however, show variation in performance as a function of bilingualism. These are reviewed in the sixth chapter by Bialystok. Malakoff and Hakuta are interested in the problem of translation, clearly a linguistic task available only to children who are bilingual. They ask how children do translations and what that ability reveals about their linguistic organization and processing. Diaz and Klingler, in the eighth chapter, readdress the old problem of the effect of bilingualism on intelligence. They demonstrate that more precision in the description of the child's bilingualism is necessary to make much progress with this question. They also bring a new perspective to the issue by interpreting the question from a Vygotskian viewpoint. An attempt to provide some explanatory constructs for these effects of bilingualism on cognitive growth is proposed by Johnson in the ninth chapter. A final chapter by Bialystok and Cummins summarizes the main findings concerning the language processing and language awareness of bilingual children and assesses the contribution of the last decade of research.

Three themes run through these papers. First, most of the papers include reports of original research, but the emphasis in each case is on the larger issues of language processing that are relevant for bilingual children. Thus the data are used to support the more general enterprise of theory building. Second, the linguistic process or accomplishment examined in each case is in the domain of what one might call "intentional language use." These are the aspects of language that impact most directly on cognition – using language in the service of specific goals, as in reading or understanding metaphors, reflecting on language as a structured body of knowledge, as in developing linguistic awareness, and manipulating language to achieve specific ends, as in writing and translating. Third, the approach in all cases is on processing. The tacit assumption is that we are beyond the stage of inquiry in the field in which product descriptions will advance our knowledge. Further progress depends on understanding how the system works,

Introduction

how it changes, and how it adapts. These questions can only be answered by examining mental processes.

References

- Brown, R. 1973. *A first language: the early stages*. Cambridge, MA: Harvard University Press.
- Case, R. 1985. *Intellectual development: from birth to adulthood*. New York: Academic Press.
- Chomsky, N. 1982. *Some concepts and consequences of the theory of government and binding*. Cambridge, MA: M.I.T. Press.
- Dulay, H. & M. Burt 1975. Creative construction in second language learning. In M. Burt & H. Dulay (eds.), *New directions in second language learning, teaching and bilingual education*. Washington, DC: TESOL.
- Hakuta, K. 1986. *Mirror of language: the debate on bilingualism*. New York: Basic Books.
- Johnson J. S. & E. L. Newport 1989. Critical period effects in second language learning: the influence of maturational state on the acquisition of English as a second language. *Cognitive Psychology*, 21, 60–99.
- Lado, R. 1957. *Linguistics across cultures: applied linguistics for language teachers*. Ann Arbor, MI: University of Michigan Press.
- Leopold, W. F. 1939–1949. *Speech development of a bilingual child: a linguist's record*. Evanston, IL: Northwestern University Press.
- MacWhinney, B. 1987. Applying the competition model to bilingualism. *Applied Psycholinguistics*, 8, 315–327.
- Naiman, N., M. Frohlich, H. H. Stern & A. Todesco. 1978. *The good language learner*. Toronto: Ontario Institute for Studies in Education.
- Schumann, J. 1978. The acculturation model for second language acquisition. In R. Gingras (ed.), *Second language acquisition and foreign language teaching*. Arlington, VA: Center for Applied Linguistics.
- Siegler, R. S. 1984. Mechanisms of cognitive growth: variation and selection. In R. J. Sternberg (ed.), *Mechanisms of cognitive development*. New York: Freeman.
- Snow, C. E. & M. Hoefnagel-Hohle 1978. The critical period for language acquisition: evidence from second language learning. *Child Development*, 49, 1114–1128.
- Sternberg, R. J. 1984. Mechanisms of cognitive development. A componential approach. In R. J. Sternberg (ed.), *Mechanisms of cognitive development*. New York: Freeman.