○ A. M. B. DE GROOT, *LANGUAGE AND COGNITION IN BILINGUALS AND MULTILINGUALS: AN INTRODUCTION*

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de Groot states that, while there might be many journals and books that investigate bilingualism and multilingualism, existing books and journals are either too specific in scope, deal with only one topic, or are too detailed to qualify as an introduction. The book under review attempts to fill this gap by providing comprehensive information about language acquisition, language processing, and language production as the three main areas of research on bilingualism. It also deals with different classifications of bilingualism and major theoretical and methodological issues pertaining to bilingual research at an introductory level so that it is accessible to less advanced readership. The book comprises a preface and eight chapters.

In the first chapter, de Groot provides an overview of the subsequent seven chapters and sheds some light on the terminology used in the book. She also objects to the monolingual bias that has been prevalent in research carried out in the field of psycholinguistics since its inception in 1950s. The author asserts that, in the current global context where bilingualism and multilingualism have become a norm, it is no longer possible to ignore related research and maintain a monolingual orientation. de Groot further elaborates on the methodological and substantive problems and observes that in most research on bilingualism, participants' knowledge of more than one language is completely ignored. The author also points out areas needing more research, including the writing skills of bilinguals, and their morphological and pragmatic abilities. Moreover, de Groot identifies issues pertaining to balanced bilingualism, sequential bilingualism, the impact of bilingualism on additional language acquisition, bilingual representation, and processing phenomena that have generated an increase in research on bilingualism and multilingualism.

Chapter 2 of the book focuses on early bilingualism and the impact of the age of acquisition on second language learning. It discusses different tasks and methods applied to explore the speech perception of infants. Since infants pay more attention to novel stimuli than familiar ones, the book discusses different methods used for exploiting this phenomenon to investigate infants' speech perception. Some of the methods discussed include high-amplitude sucking paradigm (HAS), heart-rate paradigm, preferential looking technique, head-turn procedures, and event-related potentials (ERPs). In second part of this chapter de Groot discusses the Critical Period Hypothesis (CPH) and its impact on feral children,

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language signers, and second language (L2) learners. This chapter discusses some more sophisticated techniques used in recent L2 research, including voice onset time (VOT), positron emission topography (PET), and functional magnetic resonance imaging (fMRI). In addition, this chapter also provides new explanations of language processing in the bilingual brain. For example, proficient L2 users activate the same regions of the brain as native speakers, whereas less proficient users of an L2 activate different regions. Similarly, working memory, and declarative memory decay with aging and older learners have more processing load compared to early learners because of their limited perception and memory skills (McDonald, 2006).

In Chapter 3, de Groot explores late foreign language (FL) vocabulary learning and compares it with first language vocabulary acquisition. Different methods for assessing vocabulary development are discussed, including the keyword method, paired associate learning and vocabulary learning in context. The author also reviews the weaknesses of these methods; for example, the keyword method is more effective if the keywords are provided by the researcher or learner's peers, and if they are unsuitable for abstract vocabulary. However, word-word paired associate learning is applicable to all types of learning. This chapter also addresses the role of background music, cognates, encoding strategies, and translation equivalents in FL vocabulary development. Towards the end of the chapter, de Groot provides a detailed account of the revised hierarchical model.

Chapters 4 and 5 discuss language recognition and production in spoken and written language, and simultaneous activation of memory in the two language systems of bilinguals' brains. The concepts of language-nonselective lexical access and language-selective lexical access are also discussed in light of research findings. The former postulates that input in any one of the two languages of bilinguals co-activates information in both languages of the learner, whereas the later assumes language-specific activation in bilinguals' brains. Some of the research methods described in these chapters include word recognition, sentence processing, interlexical homographs and homophones both in context and out of context. The bilingual interactive activation (BIA) model and the semantic, orthographic, and phonological interactive activation (SOPHIA) model are also compared to examine language-nonselective lexical access. Moreover, de Groot observes that like models of word recognition, a model of speech production is also borrowed from monolingual researchers (Levelt, Roelofs & Meyer, 1999) and applied to research on bilingual speech production, which posits co-activation of both languages in the bilingual brain. A concern discussed with reference to co-activation of two languages is that activation of the non-response language might impede production. However, de Groot considers this assumption to be wrong because research findings show that nonselective activation is followed by language-specific activation. Some of the common tasks applied to examine speech production in bilingual research include picture naming activities, picture translation and picture-word interference

tasks. Chapters 4 and 5 also negate the longstanding stereotype that bilingualism hinders language development; rather, it demonstrates that word production and recognition in a bilingual's two languages may exploit the same one underlying processing mechanism for words that are the same or strongly interconnected in the two languages. A bilingual advantage is also confirmed by Del Puerto (2007) who states that "bilingualism, at worst, does not hinder the learning of other languages and, at best, exerts a positive influence" (p.4).

Chapter 6 evaluates research on language control in bilingual language use. It focuses on the nature of context in context-specific language use. Four related theoretical dimensions of language control are discussed here. They include (a) scope of control: whether it is exerted globally or locally, (b) direction of control: whether control is proactive or reactive, (c) locus of control: whether it affects the entire langue system or output only, and (d) source of control: whether the control is internal or external. The chapter also discusses several models for bilingual language control. One such model is Language-mode theory. de Groot assumes that in any communicative context one language is chosen as the main language of communication and the degree of code switching between two languages depends on the degree of activeness of the guest language. The author also suggests that language control between two languages can also be attained through task specific training, which links professional interpreters' language control skills to their task specific training.

Chapter 7 discusses the impact of bilingualism on cognition in general and cognitive control and intelligence in particular. This chapter highlights the processes and contexts that lead to additive and subtractive bilingualism. The typological distance of already-acquired languages, the target language, and the strength and proportion of use of known languages are shown to affect the acquisition of additional language. The impact of typological distance on additional language acquisition is also explored in Carvalho and Da Silva (2006). These authors found that English and Spanish bilinguals depend more on Spanish for the acquisition of Portuguese, as Spanish is said to have less typological distance than Portuguese. Similar findings are confirmed in Cenoz (2001) and Del Puerto (2007). These studies confirm de Groot's findings that suggest that languages with less typological distances lead to additive bilingualism.

Chapter 8, the final chapter, attempts to summarize past research on the bilingual and monolingual brain. It aims to explore two questions in particular: (1) what parts of the brain are involved in language processing in bilinguals, and whether those are the same or different from the monolingual brain (2) "what brain regions are involved in bilingual language control" (p.406). To answer these questions, the book takes a historic route and shows how the Broca's and Wernicke's areas don't sufficiently explain language in the bilingual brain. Some later though modest research on the bilingual brain is highlighted, and the reader is left with many questions about the actual state of brain research and bilingualism.

To conclude, the book gives more weight to bilingualism rather than multilingualism. This emphasis reflects the small amount of existing research on multilingualism. Moreover, the length of the book (i.e., 528 pages), and complex details of some methods, for example HAS and ERPs, might be difficult for beginner-level readers. However, the introductory nature of the book and format of the chapters, including the introduction, methods and task, evidence and summary of the main findings provides a coherent structure making the book easy for anyone to read: bilinguals, bilingual program administrators, interpreters and bilingual teachers. The glossary, figures and references provided in the book should also encourage graduate students and researchers in the field of bilingualism and psycholinguistics to conduct future research on bilingualism.

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