Introduction

The aim of this book is to provide a comprehensive review of the dynamic interactions between language and cognition in children, by stressing the role of cognitive control. Cognitive control is a critical contributor to language development and to children's academic performance. Significant progress has been made in the past decades in both the cognitive and neuroscience literature in describing and interpreting the control mechanisms that are needed for language learning and everyday functioning. As a result, scholars in both bilingualism and language impairment disciplines have shown a growing interest in the development of the cognitive control processes. Despite the relatively large number of studies on cognitive control in populations with different language skills, no previous work has provided an exhaustive overview of the associations and dissociations between the control processes and variations in language ability and proficiency. The goal of this book is to integrate information across disciplines and provide a synthesized review of theory and practice in an accessible format for professionals with assorted disciplinary backgrounds.

By describing the behavioral and physiological associations between language and cognitive control and the modulating factors that contribute to their variations in individuals with different language competencies, a trajectory is presented that reflects converging and diverging paths of cognitive and language skills. The emerging picture demonstrates that certain cognitive control functions may be more advanced in individuals with superior language skills, while those very same functions are impaired in people with language disorders. Through the integration of findings from different disciplinary literatures, a pattern appears to reveal that particular cognitive control functions are more closely linked to specific language skills, whereas others show less interaction with language variations. The outcomes provide evidence suggesting that the interaction between cognitive control and language is part of a dynamic system that is highly influenced by variations in culture, social context, and previous experiences.

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The findings strongly support the argument that we need to extend our studies to more linguistically and culturally diverse populations, including minority language speakers and emerging bilingual individuals, as well as to people who exhibit language disorders, in hopes of gaining more in-depth knowledge about interactions between human cognition and language. By improving our understanding of the relationship between cognitive control and language across speakers with various competencies, we will be able to develop more sensitive and efficient experimental paradigms as well as assessment and intervention methods that will help us to solve some of the current theoretical debates and certain ongoing clinical problems, such as the misclassification of children. With more efficient clinical tools, we will also be able to raise our awareness of children with developmental language disorder (DLD) and children with low language proficiency, because these populations are still underserved, particularly in minority groups and non-English-speaking families. Although the main focus across chapters is on studies including children and adolescents, there are some references to findings in young adults when relevant questions have not been explored in children.

Chapter 1 defines the basic terms and language-related concepts and clarifies the distinction between the two main language dimensions (i.e., language ability and proficiency). A clear conceptual differentiation between language ability and proficiency is important and has both theoretical and clinical/educational implications, particularly for children who speak minority languages, are emerging bilingual speakers, and/or exhibit DLD. Nevertheless, we also need to examine the interactions between these dimensions and the resulting complex language patterns in children (e.g., multilingual children with a language talent or children with bilingual DLD). Chapter 2 provides a theoretical foundation for discussion of the cognitive control processes. It presents the main concepts and major theoretical accounts, in order to better understand the control mechanisms, the recruitment of control resources, and the selection of task-relevant processes. Chapter 3 imparts the current methodological issues related to participant selection; task sensitivity and impurity; and the identification of target control functions. Additional points to this discussion include the need for a solid conceptual framework and the selection of appropriate analyses.

Following these introductory chapters on the theoretical, conceptual, and methodological foundations of language and cognitive control, the remaining seven chapters focus on particular interactions between specific language and cognitive control components. Chapter 4

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reviews the effects of age on language development and cognitive control. Particularly for the early years, the review describes developmental trends and identifies associations and dissociations by examining the interactions among these processes. During a more detailed inspection of these interactions, it further reveals how individual differences in language acquisition are linked to the development of nonlinguistic cognitive skills, neural maturation, and variations in environmental influences.

The complex interactions between cognitive control and language are discussed in more depth along the two main language dimensions in Chapter 5. The links between cognitive control and language ability and the associations between cognitive control and language proficiency are reviewed, first separately, and then in relationship to each other and to the development of academic skills and social interactions. Subsequently, Chapter 6 shows how the quality and quantity of language input affects both children's language ability and their cognitive control development. A nuanced exploration of the distinctions between input and intake as well as between input and exposure points to a complex pattern of interactions between these components and children's communicative skills. The effect of the social context is further analyzed in Chapter 7, by revealing how local (e.g., language register use) and global (e.g., culture, socioeconomic status) changes affect children's cognitive control and language performance, as indicated by neural and behavioral findings. This chapter provides a unique overview of the interactions among language, cognition, and social context by examining how individuals with different language abilities and varying language proficiencies respond to assorted social-communicative demands.

Chapter 8 highlights the close links between cognitive control and processing speed and uncovers how this interaction is influenced by age; task type and complexity; targeted cognitive functions; and children's language skills. The focus in this chapter is on the complex interactions among these variables and on their modulating effects on processing speed. Chapter 9 provides a review of recent cognitive training studies, with a concentration on those training methods that have most widely been associated with language development. The discussion of fundamental training-related questions, such as neuroplasticity, transfer, and individual differences, is proceeded by a more detailed examination of one domain-specific method (i.e., working memory training) and a multi-domain approach (i.e., music training). The final Chapter 10 offers a synthesis of the previously discussed

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findings. It provides a more holistic picture about the relationship between cognitive control and language by presenting the most critical issues and offering solutions for future research, including a discussion about the way an individual-differences approach may be combined with experimental designs to provide a method within which variability in performance is viewed as key information. Additional focus is placed on the need for interprofessional collaborations among researchers across disciplines, as well as between researchers and practitioners and educators, in order to better serve children with various language skills.

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