John W. Schwieter and Zhisheng (Edward) Wen: The Cambridge Handbook of Working Memory and Language

This handbook provides a comprehensive overview of the most recent research on working memory (WM) and language presented by leading researchers around the globe. It is the first book of its kind to explore the fundamental role of working memory in the acquisition, processing, impairment, and training of both first and second languages. This book was edited by John W. Schwieter and Zhisheng (Edward) Wen. John Schwieter is a Professor of Spanish and Linguistics, Cross-Appointed in Psychology, and the Director of Bilingualism Matters @ Laurier and the Language Acquisition, Multilingualism, and Cognition Laboratory at Wilfrid Laurier University in Canada. His research focuses on psycholinguistic and neurolinguistic approaches to multilingualism and language acquisition. Zhisheng Wen is an Associate Professor in the School of Languages and Translation at Macao Polytechnic University. He researches second language acquisition, task-based language teaching and learning, psycholinguistics, and cognitive science, especially the roles of working memory and language aptitude in language sciences and bilingualism. The book begins with an overview of the handbook (Chapter 1) and continues with the introductory chapter (Chapter 2) on the working memory model by Alan Baddeley. Following Part I, the book continues with five thematic sections (Part II- VI) that deal with working memory in relation to: Theoretical models and measures; Linguistic theories and frameworks; First language processing; Bilingual acquisition and processing; and Language disorders, interventions, and instruction. Finally, the volume's last chapter (Chapter 40) summarises this work and points the way to a unified theory of working memory and language.

Following the introduction, Part II outlines ten chapters (Chapters 3-12) describing theoretical models and working memory measurements. Chapter 3 by Coolidge and Wynn provides a comprehensive overview of the evolution of working memory and language. In Chapter 4, Papagno presents an updated perspective on utilizing the phonological loop as a learning tool for language. The author offers an overview of the role of the phonological loop. The next chapter by Adams, Forsberg, and Cowan provides a comprehensive analysis of the Embedded-Process Model of Working Memory, which posits that WM is a set of mechanisms that facilitate the maintenance of information in an activated state. This chapter aims to elucidate the fundamental concepts required for comprehending the role of attention and long-term memory in supporting the effective use of language at various levels. The sixth chapter is devoted to the concept of long-term working memory and its relationship to language comprehension. Adams and Delaney thoroughly review the history of long-term WM theory. The chapter concludes with a discussion of the most recent studies

that have examined the link between neural activity and long-term working memory in reasoning skills and language comprehension. In Chapter 7, the authors offer an in-depth analysis of the cognitive neuroscience of working memory and language. The chapter focuses on the brain substrate linked to working memory and language processing from the point of view of their interconnectedness, synergy, and integration.

Chapter 8 examines computational models for working memory in language processing, explaining the phonological loop and language processing. The following chapter, titled – The Time-Based Resource Sharing Model of Working Memory for Language – examines the function and development of working memory across the integration of executive attention and the timed components of cognitive processes. The authors delineate the boundary between the domain-specific maintenance systems that monitor verbal information and the domain-general system that depends on attention. Moreover, the chapter provides insight into how verbal information is sustained in WM from childhood to adulthood and how linguistic characteristics influence the short-term memory capacity of verbal information. In Chapter 10, Rönnberg and colleagues introduce the Ease of Language Understanding model, which explains the use of various memory systems to support language perception and comprehension. The model suggests that working memory plays a role in predicting and retrospectively analysing the phonological, semantic, and syntactic aspects of communication. Chapter 11, titled – Assessing Children's Working Memory – outlines various assessment methods for evaluating a child's working memory capacity (WMC), which tends to correlate with academic learning difficulties and specific learning disabilities in those with low WMC. Additionally, this chapter explores measures for examining storage and processing through backward and digit span tests. The final chapter of Part II focuses on the significance of WMC and attention and aims to assist researchers. It discusses the value of executive functions in exploring WM and the interplay between WMC, attention control, and language comprehension.

Part III consists of six chapters (Chapters 13-18), which present significant theoretical contributions from general linguistics. Chapter 13 examines whether WM shapes grammar. Chapter 14 investigates the link between branching and WM from a cross-linguistic perspective. The chapter reflects on prior research into the correlation between word order and attention allocation. In the next chapter, the authors provide an objective review of the history of cognitive science on human memory and examine several different approaches. Chapter 16 provides an overview of studies investigating how WM impacts the formation of syntactic dependency structures. In Chapter 17, Truscott and Sharwood Smith analyse the Modular Cognition Framework and WM, focusing on the framework's role in language development. The final chapter of Part II examines the relationship between WM and the language acquisition device proposed by Chomsky.

Part IV consists of five chapters (Chapters 19-23) that present research reviews on WM and the processing and use of L1. In Chapter 19, the author reviews research on WM in word reading and summarizes previous studies on the topic. The next chapter investigates the role of WM in language comprehension and production from a neuropsychological perspective. In Chapter 21, the authors examine the research into how WM supports cognitive processes during online comprehension of L1 and L2 texts. Chapter 22 transitions to exploring the relationship between working memory and speech planning. The final chapter of Part IV details how writing processes utilize both the executive and nonexecutive components of working memory.

Part V is comprised of nine chapters (Chapters 24-32) and concentrates on bilingual acquisition and processing, as well as WM. Chapter 24 explores the relationship between measures of WM and L2 vocabulary. The chapter concludes by suggesting new approaches to interpreting tasks typically used in WM and L2 vocabulary studies. In the following chapter, the authors examine the development of children's working memory and L2 grammar. They begin by evaluating past research on statistical learning in L1 acquisition and no cue competition in L2 learners. The study of working memory and L2 grammar development in adults is the focus of Chapter 26. In the next chapter, Cunnings presents and critically assesses various models of WM. Additionally, he investigates the impact of WM on L2 sentence processing by examining multiple studies. Methodological issues in the study of WM and L2 reading comprehension are discussed in Chapter 28. The chapter also elucidates the significance of understanding reading comprehension processes and outlines key issues that should be addressed for more fruitful research. Chapter 29 concentrates on WM and L2 speaking tasks, proposing that researchers should investigate the role of WM in the formulation of speech production. The forthcoming chapter alters its attention to L2 interaction and WM, starting with an outline, summarising methods and findings, and culminating with a conversation on restrictions, pedagogical implications, and future study directions. Chapter 31 examines the role of WM in interpreting studies and presents a comprehensive overview of research spanning from the 1970s to the 2010s. Emphasis is placed on both simultaneous interpreting and consecutive interpreting in this chapter. Finally, the fifth part's concluding chapter examines the synthesis of methodological approaches for WM tasks in L2 research, presenting two decades of research findings.

There are seven chapters (Chapters 33-39) in Part VI, titled – Language Disorders, Interventions, and Instruction. The initial chapter in Part VI offers a critical review of specific learning disorders resulting from WM deficits. Swanson is the author of this chapter, who emphasizes the association between executive components of WM and reading and mathematics skills in children struggling with specific learning disorders. Chapter 34 by Montgomery, Gillam, and Evans provides a novel perspective on the association between memory and sentence comprehension understanding in children with developmental language disorders.

Chapter 35, titled – Working Memory and Childhood Deafness – focuses on conducting studies of deaf individuals who use both spoken and signed languages from the medical and social models of deafness. Chapter 36 documents the progress of working memory training in the classroom. In the following chapter, the authors explore the constraints on classroom learning caused by limited WM resources. They specifically focus on the impact of poor WM on children's ability to follow instructions related to learning activities and classroom management tasks. Chapter 38 explores cognitive load theory and instructional design for language learning. The concluding chapter, titled – Working Memory Training Meta-Analyses and Clinical Implications – presents a meta-analysis of studies on WM training, which reveals the properties and effectiveness of such training.

The book ends with a comprehensive analysis written by Wen and Schwieter. They propose a unified theory of working memory and language. The initial portion of their work highlights and synthesizes multiple perspectives of working memory from cognitive science. Subsequently, they put forward an integrated account and taxonomy of WM, which can serve as a practical framework for researchers in language sciences and bilingualism studies.

The handbook is a valuable reference for higher-level undergraduates, postgraduates, and researchers looking into the function of working memory in the acquisition of first and second languages, multilingual usage, and language retention throughout one's life.

Reference

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