

世界语言学与应用语言学研究丛书

Working Memory and Second Language Learning:
Towards an Integrated Approach

工作记忆与第二语言学习：
面向整合性方法

温植胜 著

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北京 BEIJING

京权图字：01-2018-1689

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This edition of 'Working Memory and Second Language Learning' is published by arrangement with Multilingual Matters and is for sale only in the following territories: Chinese mainland.

图书在版编目 (CIP) 数据

工作记忆与第二语言学习：面向整合性方法：英文 / 温植胜著. — 北京：外语教学与研究出版社，2018.8

(世界语言学与应用语言学研究丛书)

ISBN 978-7-5213-0382-7

I. ①工… II. ①温… III. ①第二语言-语言学习-研究-英文 IV. ①H003

中国版本图书馆 CIP 数据核字 (2018) 第 206614 号

出版人 徐建忠
项目负责 解碧琰
责任编辑 段长城
责任校对 解碧琰
封面设计 贾世旭
出版发行 外语教学与研究出版社
社 址 北京市西三环北路 19 号 (100089)
网 址 <http://www.fltrp.com>
印 刷 北京九州迅驰传媒文化有限公司
开 本 650×980 1/16
印 张 15.5
版 次 2018 年 9 月第 1 版 2018 年 9 月第 1 次印刷
书 号 ISBN 978-7-5213-0382-7
定 价 57.90 元

购书咨询：(010) 88819926 电子邮箱：club@fltrp.com
外研书店：<https://waiyants.tmall.com>
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联系电话：(010) 61207896 电子邮箱：zhijian@fltrp.com
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物料号：303820001

导读

本书是一本力作，值得推荐。希望这篇导读能将书中的核心思想、主要议题和基本研究结果用通俗易懂的语言呈现给读者。为了达到这个目的，我将导读分为三个部分：**第一部分**首先对工作记忆研究最基本的问题和脉络做出梳理，帮助不熟悉这一领域的读者在较短的时间内对它有一个相对全面的了解，同时也便于读者更好地理解本书所探讨的问题所处的历史位置和所具有的学科意义；**第二部分**介绍书中主要内容，旨在聚焦关键问题，凝练核心思想，突出重要贡献，同时针对一般读者在阅读中可能存在的疑惑或可能提出的问题做出一定的回应；**第三部分**将着力探讨在本书所述内容的基础上，工作记忆研究（尤其是工作记忆与二语习得的接口问题）如何进一步向前推进，以及目前还有哪些问题亟待回答。



工作记忆 (working memory) 是认知科学群 (包括心理学、神经科学、脑科学等) 中的重要概念和研究对象。工作记忆的相关研究在语言习得 (包括二语习得)、语言教学 (包括外语教学) 等领域占据着重要位置，凸显综合性与前沿性。但是，很多人或许对工作记忆概念本身的认识还存在一定的误区，其中最常见的一种不尽准确的理解就是“工作记忆是记忆的一种，即短时的记忆”。

对人类记忆分类的方法有多种，其中一种就是基于人脑对外界信息的加工过程，将记忆切分为感官记忆 (sensory memory)、短时记忆 (short-term memory) 和长时记忆 (long-term memory)。人的感官系统 (听

觉、视觉、触觉、嗅觉等)接收到外界刺激后,会把刺激(stimulus)转化为信息(information)。例如,我们听到旁边有人说“这本书很有意义”时,耳膜受到振动,接收到外界的声响刺激;这时,感官记忆将这样的刺激转化为信息,如“这是人发出的声音”。这就是感官记忆的作用。外界刺激被感官记忆转化为信息后,就进入了短时记忆进行暂时存储和在线加工。存储和加工往往是同步的——信息需要暂时保存在大脑中,才能被加工。如果是语言信息,那么短时记忆里的在线加工大多做的是语义、句法、语用等方面的处理。有些信息经过加工后,建构了重要意义,就会被人脑有意识或无意识地转送、存储在长时记忆里,以便日后提取、再现或进行二次加工、利用。

如果我们把工作记忆等同于短时记忆,那么就窄化了工作记忆的概念,同时也窄化了工作记忆研究的视域。工作记忆的概念和感官记忆、长时记忆并不同处于一个可比较的层面。工作记忆在外延上包括了人脑意识中的所有内容和所有过程,也就是说,所有我们能意识到的事物都处在我们的工作记忆中,所有发生在我们意识范围内的认知过程也都属于工作记忆研究的范畴。因此,工作记忆实际上约等于人的意识(consciousness)。人的意识里会有哪些内容?主要就是正在短时记忆中暂时存储的信息。那么人的意识里又会发生哪些过程?除了短时记忆中对信息的暂时存储外,还有对这些信息的加工,以及对长时记忆中的内容的检索、提取、增加、修改、重组等,同时也包括在感官记忆中的信息转运。从内容的角度看,工作记忆的确和短时记忆很接近;但从加工的角度看,工作记忆的内涵比短时记忆丰富很多,工作记忆中的加工过程牵涉到感官记忆、短时记忆、长时记忆等所有记忆阶段。这也正是工作记忆研究非常复杂但又非常有价值的原因。总之,工作记忆是人的意识中暂时存储的信息和所有在线加工过程的总和——因此,工作记忆的研究既包括存储(storage)问题,也包括加工(processing)问题。

那么工作记忆对二语习得具有什么意义呢？首先，二语习得的认知本质就是人脑对信息进行**存储和加工**的心理过程。二语习得的所有方面都需要这样的心理过程。存储问题很好理解。单看加工问题，也是不言自明——语言知识（语音、词汇、语法、语用等）的学习涉及理解、归纳、概括、类比等心理过程；语言技能（听、说、读、写、译等）的运用涉及计划、监控、调节等心理过程；语言综合实践活动更是包括了异常复杂的心理过程和各个过程之间的协同与互动。当然，这一切的心理过程都需要以相应的存储能力作为保障，即存储是加工的基础。如果学习者学不好一门外语，从认知的角度来看，问题要么出在存储能力上，要么出在加工能力上，要么二者都存在问题。因此，工作记忆对二语习得具有认知上的基础性意义，是二语习得过程最根本的认知依据之一（另一个依据恐怕就要算是基因与遗传了）。

在目前已有的文献中，聚焦工作记忆对二语习得影响的研究已经涵盖了语言知识和语言技能这两个领域的绝大多数范畴、环节和要素，且获得了几乎一致的研究结论——工作记忆对语言知识、语言技能的学习和使用具有重要作用，即工作记忆的存储能力越强，加工效率越高，二语习得的成效就越好。换句话说，现在要想在语言知识和语言技能的领域内找到一个完全没有被研究过的“点”（比如工作记忆对动名词搭配习得的影响，或是工作记忆对科技文中寻读的影响），都是非常困难的。但是，尽管工作记忆对二语习得影响研究的辐射面很大，聚焦点很全，却体现出研究对象被过度切分导致过于零碎的特点——研究语法的人们只关注某个语法点，研究听力的人们只关注某些听的过程，诸如此类。还很少有人明确提出一个融合视角，将所有这些“点”综合在一起加以探讨和研究，以揭示工作记忆对二语习得的整合性影响。融合视角下的实证研究也自然成了一项突出的研究空白，展现出很宽广的探索空间。本书正是在这样一个研究背景和现状下，创造性地提出了一个整合方案，

且建构了扎实、具体、可视化的概念框架（而不只是理论和理念层面上的论述）。

二

如前所述，本书致力于建构一个创新框架，将工作记忆的不同组成部分和不同功能整合在一起，以揭示工作记忆对二语习得的整体性影响。为了达成这样的目的，作者在书中的三个主体部分从三个不同维度展开论述——描述了理据、综述了文献、详述了框架。三个维度之间具有逻辑上的顺序性和连贯性，即通过描述明确核心理据→通过综述吸纳最新成果→通过详述展示独特创造。第1章是引言，首先向读者介绍了工作记忆相关的研究概貌、基本概念、理论视域、研究主题和中心议题，并呈现了全书的结构。之后便是三个主体部分，分别聚焦上述**理据**（理论和方法的基础）、**文献**（工作记忆和语言习得研究的接口）和**框架**（融合视角下的工作记忆与二语习得）。

作为“理据”的第一部分：理论和方法的基础 (Theoretical and Methodological Foundations)

任何创新理论框架或概念框架的建构都需要找到基本的支撑点。对于本书所建构的工作记忆与二语习得整合性框架来说，最重要的两个支点就是工作记忆理论与工作记忆测量——前者紧扣工作记忆本质的内在界定，后者关注工作记忆表现的外在反映。基于一“内”一“外”的思路，“理据”部分的两章（第2章和第3章）分别描述与本书提出的整合性框架相关的工作记忆理论模型和工作记忆测量方法。

第2章“工作记忆的理论 and 模型” (Working Memory Theories and Models) 从历史发展的角度，描述工作记忆理论模型的演变，分别探讨了工作记忆概念的演变和最初的标准模型 (Evolution of WM and the Standard Model, 详见第2章第1节)、目前主流的工作记忆模型和存在

的争议 (Current WM Models and Controversies, 详见第 2 章第 2 节) 以及倡导整合性工作记忆理论的一些努力 (Toward Unified Theories of WM, 详见第 2 章第 3 节), 最后提出整合性模型的重要性、必要性和可行性 (An Integrated Model of WM, 详见第 2 章第 4 节)。这样的描写结构对于不太熟悉工作记忆研究的读者具有相当高的可读性, 可以帮助大家在脑中形成一条清晰的线索, 既涵盖了最经典、最具代表性的观点和理论, 又突出了核心议题和争议问题, 最终得以更加充分地认同本书后续所提出的整合性框架。

第 3 章“工作记忆的测量和问题”(Working Memory Measures and Issues) 从一开始就非常直接地指向工作记忆外在表现的重要指标“记忆广度”(memory span), 并从测量任务的角度展开描述, 帮助读者获得具化的理解。虽然记忆广度的测量分为简单任务和复杂任务(详见第 3 章第 1、2 节), 但背后的理论问题和方法论问题具有共性(详见第 3 章第 3、4 节)。对工作记忆测量感兴趣的读者一定能从本章的阅读中获得理论、方法论和实际操作三个层面的资讯。

作为“文献”的第二部分: 工作记忆和语言习得研究的接口 (Research Syntheses of Working Memory in L1 and L2 Learning)

“文献”部分综述工作记忆和语言习得研究的接口, 即聚焦工作记忆对语言习得的影响研究。本部分的两章(第 4、5 章)分别综述母语习得和二语习得两个领域的相关研究。做出母语/二语的划分, 至少具备两个方面的合理性。第一, 对于大多数语言学习者来说, 母语习得的起点和关键时期远早于二语习得。也就是说, 母语习得对工作记忆的利用在时间上早于二语习得。因此, 通过研究工作记忆对母语习得的影响往往能更好地考察学习者工作记忆发展的初阶特征, 而研究工作记忆对二语习得的影响则能帮助我们更多地获得工作记忆发展的后续特征。工作记忆对母语习得和二语习得的不同作用和影响, 或许也同时反映了工作记

忆自身的发展性特点。第二，一般来说，二语习得会受到来自母语的很多影响（促进作用和干扰作用并存），因此研究工作记忆对二语习得的影响，就不可能不将母语作为重要变量加以考虑。换言之，在工作记忆对二语习得发生影响的过程中，情况更加复杂，特征更加多元。

第4章“母语研究中的工作记忆”（Working Memory in First Language Research）基本上从婴幼儿/儿童母语习得的阶段顺序展开研究综述，即本章的前三节分别探讨工作记忆对母语的词汇发展、听读能力和说写能力的影响。继而在第4节从语言学、语言加工的理论视角对这些母语研究展开评析，并在第5节总结了工作记忆和母语习得的内在联结。

第5章“二语研究中的工作记忆”（Working Memory in Second Language Research）首先采用了“从理论到实证”的思路综述工作记忆对二语习得影响的相关研究——即先梳理理论视角（第5章第1节），再综述实证研究（第5章第2节）。本章第3节进而整合理论和实证两方面的综述，对现有研究成果做了归纳、概括，并在第4节做出了精要的评述。与第4章第5节（工作记忆和母语习得的内在联结）呼应，本章第5节总结了工作记忆和二语习得的内在联结。

作为“框架”的第三部分：融合视角下的工作记忆与二语习得 (Toward an Integrated Perspective on Working Memory and SLA)

“框架”部分是本书最核心的内容，详述了工作记忆与二语习得整合性框架的建构和结构，并结合任务（task）和学能（aptitude）两个二语习得研究中的重要议题，展示了整合性框架的可接受性（理论角度）和可操作性（实践角度）。

第6章“工作记忆与二语习得研究的整合性框架”（An Integrated Framework for Working Memory and SLA Research）详述了创新整合性框架的建构思路与过程。首先是对工作记忆和二语习得研究中相关概念和

定义的重构 (Reconceptualizing and Redefining WM in SLA Research, 详见本章第 1 节), 并基于此反思、重建了二语习得在各个子域 (domains) 里、各个技能 (skills) 上和各个过程 (processes) 中的更优顺序 (详见本章第 2 节), 最后导向对整合性框架的倡导, 并探讨了该框架对本领域相关研究的预期促进 (详见本章第 3、4 节)。

第 7 章“二语习得和加工中的工作记忆: 听觉 / 执行模型” (Working Memory in L2 Acquisition and Processing: The P/E Model) 详述整合性框架的架构、层次和具体内容。整合性框架的外在结构具有二维特征, 即涉及二语习得和发展的子域 (详见本章第 1 节) 和二语子技能 (sub-skills, 详见本章第 2 节) 两个向量。本章第 3 节聚焦探讨整合性框架中的核心内容, 即基于听觉 / 执行假设 (The P/E Hypothesis) 的习得和加工模型。第 4 节对应用这一模型的基本原则作了说明。

第 8、9 章运用本书提出的创新整合性框架分别对二语习得中的任务议题和学能议题展开检视, 分析目前研究存在的问题和不足, 并通过展示听觉 / 执行模型如何能够解决这些问题来论述整合性框架的优势。第 10 章总结了全书内容并提出针对后续研究的建议。

三

本书探讨的核心问题是工作记忆与二语习得研究的创新性整合。更具体讲, 本书基于我们对工作记忆的研究和理解, 重构考察、探索二语习得问题的创新概念体系和路径框架。作者在描述工作记忆研究的理论、测量问题的基础上, 综述了工作记忆与语言习得关系的重要文献, 详述了基于听觉 / 执行模型的整合性框架。本书结构清晰, 论述要点突出, 逻辑自然流畅, 例证充分得当, 是二语习得领域的一本佳作。更重要的是, 其中所聚焦的问题很可能预示着未来若干年内在二语习得领域开展工作记忆研究的转向和新起点——更加面向工作记忆与二语习得的互动,

更多从认知的本质特征出发描述、解释、预测二语习得现象、特征和发展规律。

沿着这样的思路，借助本书的框架，我们或许有如下议题可展开进一步研究：第一，工作记忆对二语习得有显著的作用和意义，那么二语习得中的各项活动（认知的和行为的）是否也存在促进工作记忆发展的作用和意义？二语习得和工作记忆之间是否可以相互促进和协同发展？第二，工作记忆的发展对母语习得和二语习得均有重要意义，但现有研究表明，学习者在二语习得中对工作记忆的利用似乎没有在母语习得中那样充分，原因为何？在二语习得子域和子技能两个向量外，是否还存在第三向量？第三，既然工作记忆和二语习得存在理论和概念上的整合基础，那么在工作记忆的测量上是否也可有新的推进和发展？这些问题都非常值得探讨和研究。这也正是本书给我们提供可用、好用的新模型和新框架之外，给我们带来的重要启示。

徐浩

2018年6月3日

Foreword

Peter Skehan

It is a great pleasure to me to write this Foreword to the book by Zhisheng (Edward) Wen. Edward completed his doctoral studies some years ago under my supervision at the Chinese University of Hong Kong (CUHK). I was blessed with a wonderful cohort of research students at CUHK before my retirement, and now I have the ultimate reward of one of them publishing a major monograph in the field of applied linguistics.

The book has brought together a number of literatures, and thus can make important contributions to applied linguistics. Most obviously, the book fills an important niche in applied linguistics by providing a thorough analysis of the construct and the measurement of working memory. There have been many journal articles in this area in recent years, and much progress has been made in the neighbouring field of cognitive psychology. But we still need a clear, up-to-date and comprehensive account of the area, as it applies to second language acquisition. This book fulfils that need. It reviews the general evidence and the underpinning theory. This represents a real service for our field, where we tend to be more focused on applications than on basic issues. The updating here is timely, indeed.

The book also examines the considerable literature that has been written specifically from the perspective of second language acquisition. In doing this, it uses wide reviews, for example of working memory theories and measures, to demonstrate some of the shortcomings of existing research. But then the book provides an extensive and extremely useful review of measurement and related issues. Edward argues that second language research using working memory measures has to become much more sophisticated than it has been in the past. Indeed, one of the problems with some current second language research is its dependence on partial measures of working memory. In the book, the argument is strongly made that from now on the different components of working memory, in particular its phonological component (PWM) and its executive aspects (EWM), have to be conceptualized and

assessed separately, due to their distinctive implications for specific SLA domains and processes.

The book, however, is not simply a review. It also provides innovative theoretical insights and practical guidelines for conducting empirical studies in this increasingly important line of inquiry. In the book, working memory theories are integrated effectively with current research in second language acquisition, such as the role of task planning and the study of second language task-based performance. In doing this, Edward is rather neatly linking two of my own areas of interest, which I (on reflection, oddly) have kept separate—those of individual differences, in this case, working memory and task-based speech performance. I am extremely grateful to Edward for making such a link where I have not! So the focus is not simply on exploring working memory for its own sake. The overarching objective is to explore whether and how working memory interacts with task features/conditions in the way they impact on second language performance. This Edward is able to argue, but he postulates that the effects can be subtle and therefore they should be approached with more carefully designed research. In so doing, he is bound to push the task performance research field into new and entirely desirable directions, which will have important consequences.

One particularly distinctive and innovative aspect of this book is what Edward terms as the ‘integrated perspective’ on research into working memory and second language acquisition. This conceptual framework portrays working memory as containing multiple components with embedded functions, and he uses this to demonstrate the importance of fractionated measurement if the construct of working memory is to be applied effectively in second language research. Previous research has been bedevilled by invalid composite measurements or partial measurement. The integrated perspective brings out the inadequacies of these approaches. But Edward also argues strongly for taking account of domain generality versus domain specificity in constructing working memory span tasks for second language studies, and this has important implications for future research. We have to concern ourselves with verbal material in second language acquisition, and verbal material which is closely linked to the dynamic L1–L2 scenarios as participants’ L2 proficiency grows. This too will have a strong impact on how working memory is to be conceptualized and effectively measured in second language research in the future.

The integrated framework, however, is only the starting point for some

major and original claims which are made in the book, and which go to the very heart of the linkage between working memory and second language learning and processing. Edward argues that the two key components, phonological working memory and executive working memory, relate to different aspects of L2 sub-domain acquisition and L2 sub-skills processing. To that effect, he posits a link between phonological working memory and the acquisitional and developmental aspects of SLA (such as L2 lexis, formulaic sequences and morphosyntax), with these being based on a capacity to access chunk-based (or exemplar-based) language. This suggests that their complexity is underpinned by a sound-processing capacity. In contrast, he suggests that executive working memory is more likely to be associated with attention regulation and monitoring mechanisms that likely affect offline processing activities and real-time performance aspects in L2 interaction and production. With Edward's so-called phonological/executive (P/E) model in place, we now have a much finer-grained account of how L2 learners' individual differences in working memory are related to different facets of second language acquisition, processing, performance and development, a claim which is uniquely Edward's!

Edward ends the book with the major claim that working memory occupies a central place in most contemporary language aptitude models, and therefore it should be included as a key aptitude component in explaining the different developmental stages of SLA. Most of the hypotheses as laid out in the P/E model have been about L2 acquisition and processing, but here he returns to the area of L2 development, and proposes that there is considerable evidence that working memory differences are dynamically implicated in longer-term development and change. His claim is that working memory is foreign language aptitude! This is the most effectively argued version of this claim that I have come across and this is a suitably strong way to end an excellent contribution to the interdisciplinary inquiry of second language acquisition.

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Twickenham, London, 2015

Preface and Acknowledgements

This book represents a personal survey and interpretation of the role of working memory (WM) in first and second language acquisition (SLA). Through this book, I hope to bring together and *integrate* major areas of my current research interests, namely WM research in cognitive science and SLA research in applied linguistics.

Before I embarked on this project 10 years ago, I intended to write an updated and extended version of Susan Gathercole and Alan Baddeley's seminal book *Working Memory and Language* (1993). Greatly motivated by their pioneering work, I have always held the view that WM should play a greater role in second language learning than in first language acquisition, and that the very topic of working memory and second language learning should deserve an independent book-length volume in its own right. My long-held conviction on this WM–SLA enterprise was greatly reinforced by Professor Alan Baddeley's opening speech (titled 'Working Memory at 40') delivered at the 2014 International Conference of Working Memory held at Cambridge University, which marked the 40th anniversary of the seminal multi-component model of WM (i.e. Baddeley & Hitch, 1974). Most encouraging and relevant of all, Baddeley concluded his speech by predicting that 'WM and second language learning' would be one of the more promising areas of WM research in the next decade. I am very pleased and grateful indeed to Professor Baddeley for sharing his insights and vision for the WM–SLA enterprise with me during my short stint at Cambridge. Of course, I am even more grateful to Alan for contributing the introductory chapter to my recent co-edited volume (Wen *et al.*, 2015) on this same topic (Baddeley, 2015), and for his endorsement written for this current volume as well. Above all, I wish to thank Professor Baddeley for introducing the classical WM model, which has inspired most of the WM–SLA explorations in applied linguistics and also laid the theoretical foundation for the integrated perspective on WM and SLA that I propose in this book.

On the other side of the WM–SLA enterprise, many of the ideas developed in this book have been greatly influenced by the pioneering work on SLA of my advisor and mentor, Professor Peter Skehan. To begin with, Professor Skehan underscored the central role that WM plays in the major developmental stages of SLA in his ground-breaking monograph *A Cognitive Approach to Language Learning* (1998). Building on this assumption, in this book I aim to specify and delineate how WM can be conceptualized and operationalized in line with recent research insights from the cognitive sciences to make it more applicable to practical SLA research. In this sense, this book can be regarded as a supplement and expansion to Skehan’s major volume.

Indeed, I owe a great personal debt to Peter with respect to my academic endeavours and career development. First, I wish to thank him for sharing his pioneering research on language aptitude and L2 task performance in his impeccable courses during his tenure at CUHK, which immediately lured me into this rather challenging yet extremely rewarding line of research. I am also grateful to Peter for his meticulous supervision and constant guidance during my academic pursuits from the early years until the current day. His never-failing endorsements of my WM–SLA ambition have meant so much to me. Above all, his insights and scholarship on memory and aptitude have been instrumental and fundamental in shaping my broad perspective on viewing ‘WM as language aptitude’ in SLA. I hereby extend my utmost gratitude to Peter for his never-failing mentorship over the years and a special ‘thank you’ for the Foreword he has written for this book.

In addition to my great thanks to Alan Baddeley and Peter Skehan, I wish to place on record my sincere gratitude to two other long-term research collaborators, Professor Mailce Borges Mota (at the Universidade Federal de Santa Catarina in Brazil) and Dr Arthur McNeill (at the Hong Kong University of Science and Technology), for their enduring collegial encouragement and support. It has been my great pleasure and fortune to have known and collaborated with Mailce and Arthur on a number of rewarding projects on WM and SLA (e.g. Wen *et al.*, 2013, 2014, 2015). To a great extent, Mailce and Arthur have reassured me that I never need to feel (too) lonely in pursuing this relatively unpopular research topic in Hong Kong (although I recently left and moved to Macao). Therefore, I also extend a heartfelt ‘thank you’ to Mailce and Arthur for accompanying me on this otherwise lonely journey.

I also wish to extend my gratitude to many other admirable cognitive

psychologists cum SLA researchers who have helped me to reshape, revise and refine my integrated perspective on WM and SLA over the years. First, I would like to thank Professor Nick Ellis at the University of Michigan for the Morley Scholar Fellowship that he so generously offered me in 2011. Indeed, the summer I spent at the English Language Institute (ELI) in Ann Arbor was a most memorable and rewarding overseas experience for me. Most importantly, it allowed me to benefit substantially from Nick's penetrating insights on the relationship between WM and the acquisition of linguistic sequences in first and second language acquisition, which have subsequently transformed me into an ardent follower of connectionism, construction grammar, and usage-based SLA approaches. As such, I attribute a great proportion (50%) of my P/E model (the 'P' part) to Nick! Of course, my sincere thanks also go to other faculty and staff members at the ELI (*inter alia*, Ute Römer, Diane Larsen-Freeman, John Swales and Veronica Moore) for making my stay there such an enjoyable and unforgettable experience (let's go blue!).

I also wish to acknowledge my gratitude to Professor Michael Ullman from Georgetown University for his sparkling insights into the neurocognitive basis of memory systems and SLA. I want to thank Michael in particular for agreeing to present his keynote and a workshop at the Language Learning roundtable on 'Memory and Second Language Acquisition' that I convened and organized with Mailce and Arthur in 2012 in Hong Kong—see Wen *et al.* (2014) for more details. I have to admit that Michael's multidisciplinary perspective on long-term memory and SLA (as encapsulated in his indomitable D/P model) is so ingenious it provided the inspiration for the name for my own WM–SLA model (i.e. the P/E model). Therefore, I am sincerely thankful to Michael for having greatly broadened my vision and research scope in pursuing the WM–SLA enterprise.

I also wish to thank many other respectable and knowledgeable scholars and colleagues (in both the cognitive sciences and applied linguistics) for sharing their insights on relevant issues in WM, language aptitude and SLA over the years. These include, among many others, Brian MacWhinney, Nelson Cowan, Randall Engle, John Williams, Peter Robinson, Alison Mackey, Alan Juffs, Michael Harrington, Pauline Foster, Emma Marsden, Lourdes Ortega, Rod Ellis, Cem Aptekin, Mohammad Ahmadian, Clare Wright, Adriana Biedron, Melissa Baralt, Tan Lihai, Dong Yanping, Shen Jiaxuan, Zhao Lun, Wang Chuming, Lu Zhi, Li Shaofeng, Yang Jing and Yi Baoshu. Many thanks to you all for your insights, support and encouragement!