Research in Progress

Lang. Teach. (2014), **47.2**, 262–265 © Cambridge University Press 2014
doi:10.1017/S0261444813000530

Language Learning Roundtable: Memory and Second Language Acquisition 2012, Hong Kong

Organized under the auspices of the *Language Learning* Roundtable Conference Grant (2012), this seminar aimed to provide an interactive forum for a group of second language acquisition (SLA) researchers with particular interests in cognitive linguistics and psycholinguistics to discuss key theoretical and methodological issues in the roles of key human memory systems (in particular, working memory) in various aspects of SLA. The seminar consisted of a tutorial workshop (Michael Ullman), three keynotes (Michael Ullman, Peter Skehan, and Cem Alptekin), and other invited speeches addressing the more specific relationships between working memory (WM) and various aspects of SLA (e.g. vocabulary, grammar, reading, speaking, writing, and interpreting).

Michael Ullman (Georgetown University) began the seminar with a tutorial workshop that provided an overview of all major memory systems in the human brain related to learning, including very short-term memory (iconic and echoic memory), WM, and the various longer-term memory systems (declarative memory, procedural memory, associative learning, priming, etc.). The functional characteristics, neuroanatomical substrates, biological (genetic) underpinnings, and clinical correlates of these memory systems were also presented. In the first keynote, also by Ullman, he also argued for a multidisciplinary investigation of the biological and computational bases of 'second language' (L2), integrating perspectives from a wide range of disciplines, including neuroscience, psychology, SLA, linguistics, endocrinology, and genetics. Through various experiments, he demonstrated how this wide-ranging approach could be used to examine the dependence of L1 and L2 on two long-term memory brain systems: declarative memory and procedural memory (the D/P model; Ullman 2012).

Michael Harrington (Queensland University) examined the implications of the newly proposed (and much under-researched) component of WM, the EPISODIC BUFFER, for our understanding of the memory processes that serve L2 discourse processing (in particular, the processing of pragmatic and causal inferences). He postulated that the episodic buffer interacts with the central executive and long-term memory in the retrieval of the linguistic (e.g. language structure, lexis) and specific-domain knowledge needed to make appropriate inferences, as well as the factors affecting the binding of this knowledge in the buffer. He further argued that among these factors, the role of automatic retrieval processes is of particular importance, given the variable nature of L2 knowledge.

Peter Skehan (University of Auckland) gave the second keynote and explored how attentional functioning depends upon the structure of WM and the implications of its

https://doi.org/10.1017/S0261444813000530 Published online by Cambridge University Press

limitation in span size for real-time L2 speech processing. He speculated that WM limitations play a key role in the interplay between the CONCEPTUALIZER and FORMULATOR stages in speech production; and that L2 mental lexicon limitations spill over, in their consequences, to all aspects of speech performance. In particular, such limitations make L2 speech production a serial rather than a parallel process. As a result, it is task characteristics and task conditions which impact upon attentional functioning and upon how the tendency towards serial processes is overcome. Such an analysis sheds light on theories of L2 performance, such as the TRADEOFF and COGNITION HYPOTHESES in L2 task-based planning research (Robinson 2011).

Mailce Borges Mota (Universidade Federal de Santa Catarina) also explored the relationship between WM and L2 pre-task planning and performance. Results from an empirical study (involving 50 Brazilian ESL learners) showed that under a no-planning condition, WM capacity significantly correlated with L2 speech accuracy (for the control group) and L2 speech fluency (for the experimental group). Under a planning condition, WM capacity significantly correlated with L2 speech fluency and complexity. In addition, higher WM span learners employed significantly more metacognitive strategies during planning than lower span counterparts. Within the same paradigm of WM and L2 task planning research, Mohammad Javad Ahmadian (University of Isfahan) reported on an empirical study that looked into L2 learners' WM capacity and their self-repair behavior under pressured online planning vs. careful online planning. The results seemed to suggest that self-monitoring of L2 speech led to L2 development by making learners notice the 'gaps' in their interlanguage systems.

Li Shaofeng (University of Auckland) added an independent variable of language analytical ability (a subset of the Modern Language Aptitude Test; Carroll & Sapon 1959) and explored its relationship with WM with respect to receiving implicit and explicit corrective feedback. Statistical results from structural equation modeling analysis and multiple regression analyses suggested that both WM and language analytical ability were components of language aptitude, though they played differential roles in relation to feedback types. Lu Yanbin (Tsinghua University) reported on the results of a study which investigated the relationship between WM and L2 written performance. Correlation and multiple regression analyses showed only a slight contribution of WM capacity to timed writing performance in L2 argumentative essays. The results were discussed in terms of the measurement instruments used for WM capacity and the concept of WM as a domain-specific or domain-general construct.

Cem Alptekin (Boğaziçi University) gave the third keynote, which focused on the relationship between WM (as measured by the reading span task) and L2 reading by probing the effects of differences in secondary task design (semantic vs. syntactic) and the language of the task (first vs. second), with adult learners of English at a relatively advanced proficiency level. Exploratory factor analysis results suggested that storage is task- and language-independent. However, processing is affected by the linguistic nature of the secondary task and the language in which the task is presented. The findings were discussed in relation to Ullman's D/P model of SLA (2012). In a follow-up study presented by his colleague Gülcan Erçetin (Boğaziçi University), it was found that L2 working memory is able to manipulate and store both explicit and implicit L2 input through controlled and

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automatic processes. However, whereas L2 reading is associated with explicit L2 knowledge and L2 working memory, it does not relate to implicit knowledge.

Sun-A Kim (Hong Kong Polytechnic University) examined the influence of WM on learning to read L2 Chinese characters under two conditions. Condition one was designed to lead participants to make more use of visual WM, while the second condition was intended to involve more phonological WM. The results showed that participants who had higher visuospatial WM spans were better able to learn the visually enhanced characters, while those with higher verbal WM capacities performed better at learning the regular Chinese characters belonging to the normal and the similar sets. On the other hand, WM effects seemed to disappear when participants learned to read the six groups of phonetic families whose consistency levels varied.

Alan Juffs (University of Pittsburgh) began by reviewing the results of major SLA studies that had explored the role of WM (e.g. as measured by the reading span task) in L2 grammatical processing (within the generative approach) and took issue with their claimed failure to find WM effects in sentence processing in adult L2 learners in self-paced reading studies. He went on to report a study that explored a specific case of full relative clause processing where WM effects were not found in self-paced reading but were found in the reading of longer passages. The results suggested that, while somewhat different, these learners might not be fundamentally different when processing relative clauses in their L2. Moreover, the reading span WM results suggested that WM in L2 processing predicts global comprehension and efficiency in processing rather than micro-level syntactic processing routines.

Dong Yanping (Guangdong University of Foreign Studies) explored the relationship between WM, language processing, and interpreting. Empirical results from 19 tests were presented (including English–Chinese and Chinese–English consecutive interpreting, tests of language skills, and seven different measures of WM spans), administered to a group of third-year English majors who had just completed two semesters of interpreting training. The results indicated that, for student interpreters, although language skills were important to English–Chinese interpreting performance, these skills mostly functioned through the mediation of psychological competence, which included interpreting anxiety, English listening span, and Chinese speaking span. However, no measurement of these WM span tasks was related to interpreting performance in the pretest which was taken when the participants had just started their interpreting training. This led the author to conclude that interpreting training was perhaps a process of learning to assemble and coordinate one's relevant capabilities when carrying out the demanding task of interpreting.

Wen Zhisheng (Hong Kong Shue Yan University), as discussant, began by teasing out major theoretical and methodological issues (as well as their consequences) in current WM/SLA studies. These include a lack of consensus about the concept of the WM construct; a lack of standardized procedures for measuring and scoring WM span tasks; and a lack of meaningful and constructive theoretical/hypothetical links between WM and specific SLA cognitive processes. To mitigate this situation, he advocated an integrated framework for theorizing and measuring the WM construct in SLA research (Wen 2012). The central tenet of the integrated framework is that the phonological component of WM and its executive component are two key language-relevant WM components that should be treated (i.e. conceptualized and measured) separately in specific L2 domains and activities, because of

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the distinctive mechanisms associated with each. Included within this framework are also general principles and practical guidelines for future SLA research with a WM focus.

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