

Serial order and item memory in mono- and bilinguals

Kathrin Klingebiel¹, Brendan Weekes¹, and Steve Majerus²

1. Department of Psychology, University of Sussex

2. Département de Science Cognitives, Université de Liège

Recent studies have suggested that phonological short-term memory (STM) capacity is important for language acquisition. In both, children and grownups, reliable correlations have been obtained between digit span, nonword repetition ability, and vocabulary achievement while factoring out other possible factors like age and nonverbal intelligence (Gathercole, Service, Hitch, Adams, & Martin, 1999; Gathercole, Willis, Emslie, & Baddeley, 1992; Gupta, 2003). Majerus et al. (Majerus, Poncelet, Van der Linden, & Weekes, 2008) found that serial order memory was the most important predictor for new word learning. No evidence was found for item short-term memory as a predictor. Majerus et al. therefore suggested that order short-term memory and phonological awareness are independent predictors of new word learning. Our aim was to investigate the memory for serial order in mono- and bilingual language processing to elicit ERP correlates of item and order STM, during encoding, maintenance and retrieval stages. 25 monolingual native English speakers (6 male) and 25 bilingual German-English speakers (8 male), with no psychological or neurological disorders, were recruited from the university community. The hypothesis was that memory for serial order would activate specific brain regions, mainly in the right parietal cortex. We used an EGI (128 channel) net and recorded activity on trials involving memory for word sequences and memory for the items themselves. Bilingual language proficiency was assessed using a battery of tests to assess active and passive vocabulary knowledge. Participants listened to words via headphones. Behavioral results showed no differences between the monolingual and bilingual group, which made them comparable using ERP. We identified independent ERP components associated with verbal serial order and item memory as well as significant differences between monolingual and bilingual speakers. Our data support previous findings that memory of serial order is an important predictor of language processing!

Gathercole, S. E., Service, E., Hitch, G. J., Adams, A.-M., & Martin, A. J. (1999). Phonological Short-term Memory and Vocabulary Development: Further Evidence on the Nature of the Relationship. *Applied cognitive psychology*, 13, 65-77.

Gathercole, S. E., Willis, C. S., Emslie, H., & Baddeley, A. D. (1992). Phonological Memory and Vocabulary Development During the Early School Years: A Longitudinal Study. *Developmental Psychology*, 28(5), 887-898.

Gupta, P. (2003). Examining the relationship between word learning, nonword repetition, and immediate serial recall in adults. *The quarterly journal of experimental psychology*, 56A(7), 1213-1236.

Majerus, S., Poncelet, M., Van der Linden, M., & Weekes, B. (2008). Lexical learning in bilingual adults: The relative importance of short-term memory for serial order and phonological knowledge. *Cognition*, 107, 395-419.