

Learning it by ear: phonological loop and phonological sensitivity in aid of foreign vocabulary learning

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Phonological loop (Baddeley & Hitch, 1974) is a memory component used for storing verbal information over short periods of time. A series of studies led by Gathercole (Gathercole, 1995; Gathercole & Baddeley, 1990; Gathercole & Masoura, 2003) indicate that this component can aid vocabulary acquisition in small children and foreign language learners. However, several more recent studies question these findings (Bowey, 2001; Melby-Lervåg et al., 2012; Metsala, 1999). It is possible that the factor actually involved in word learning is phonological sensitivity (awareness): the ability to dissect words into smaller units and manipulate these units. This ability might have been accidentally tapped by the non-word repetition tasks used as phonological loop tests in most studies (Bowey, 2001). Several papers indicate a correlation between phonological sensitivity test scores and the size of native vocabulary in young children (Bowey, 1996; McBride-Chang et al., 2005; Metsala, 1999). In this study, we wanted to examine this relationship in foreign language learners. We hypothesised that phonological sensitivity (but not phonological loop) is of crucial importance for learning foreign words and that children with higher scores on sensitivity tests will learn such words faster.

We tested 30 Polish 9-year-olds on a) phonological sensitivity, b) phonological loop and c) speed of word learning. Phonological sensitivity tasks were taken from CTOPP 2 battery (Wagner, Torgesen, Rashotte, & Pearson, 2013). The phonological loop capacity was measured with ISR tasks, in which children were to recall lists of non-words, rather than single non-words as in Gathercole's paradigm. The word learning speed test included three computerised tasks. In task 1 (baseline condition) children were to learn three pairs of Polish words as quickly as possible. Task 2 was to emulate the process of learning new words of the native language. Children were taught three pairs, each consisting of a Polish word and a non-word created from the most common syllables in a Polish corpus. Task 3 was an emulation of a foreign word learning situation. Children were asked to learn 3 pairs consisting of a Polish word and a non-word constructed from rare syllables found in the Polish corpus. The non-words in task 3 were pronounced by native speakers of Russian, which made them sound like words of a foreign language. The non-words in all learning tasks were controlled for phonological structure, sonority and the number of phonemes. Upon collecting the data, we ran correlation and regression analyses to check for the relationship between the predictor variables – a) phonological sensitivity and b) phonological loop – and the outcome variable (word learning speed scores obtained in each of the three tasks).

The foreign word learning task was the only one in which any correlation with our predictor variables was detected. The foreign word learning task scores correlated significantly with the phonological sensitivity scores ($r = 0.39$, $p < .05$), but not with the phonological loop scores ($r = 0.15$, $p > .1$). This supports our hypothesis that it is phonological sensitivity, not phonological loop that is of crucial importance for learning words of a foreign language.

- Baddeley, A. D., & Hitch, G. J. (1974). Working memory. In G. H. Bower (Ed.), *The Psychology of Learning and Motivation: Advances in Research and Theory* (pp. 47–89). Academic Press.
- Bowey, J. A. (1996). On the association between phonological memory and receptive vocabulary in five-year-olds. *Journal of Experimental Child Psychology*, 63(1), 44–78. doi:10.1006/jecp.1996.0042
- Bowey, J. A. (2001). Nonword Repetition and Young Children's Receptive Vocabulary: A Longitudinal Study. *Applied Psycholinguistics*, 22(03), 441–469. doi:null
- Gathercole, S. E. (1995). Is nonword repetition a test of phonological memory or long-term knowledge? It all depends on the nonwords. *Memory & Cognition*, 23(1), 83–94. doi:10.3758/BF03210559
- Gathercole, S. E., & Baddeley, A. D. (1990). The role of phonological memory in vocabulary acquisition: A study of young children learning new names. *British Journal of Psychology*, 81(4), 439–454. doi:10.1111/j.2044-8295.1990.tb02371.x
- Gathercole, S. E., & Masoura, E. V. (2003). Contrasting contributions of phonological short-term memory and long-term knowledge to vocabulary learning in a foreign language. *Memory*, 13(3-4), 422–429. doi:10.1080/09658210344000323
- McBride-Chang, C., Cho, J.-R., Liu, H., Wagner, R. K., Shu, H., Zhou, A., ... Muse, A. (2005). Changing models across cultures: Associations of phonological awareness and morphological structure awareness with vocabulary and word recognition in second graders from Beijing, Hong Kong, Korea, and the

- United States. *Journal of Experimental Child Psychology*, 92(2), 140–160.
doi:10.1016/j.jecp.2005.03.009
- Melby-Lervåg, M., Lervåg, A., Lyster, S.-A. H., Klem, M., Hagtvet, B., & Hulme, C. (2012). Nonword-Repetition Ability Does Not Appear to Be a Causal Influence on Children's Vocabulary Development. *Psychological Science*, 23(10), 1092–1098. doi:10.1177/0956797612443833
- Metsala, J. L. (1999). Young children's phonological awareness and nonword repetition as a function of vocabulary development. *Journal of Educational Psychology*, 91(1), 3–19. doi:10.1037/0022-0663.91.1.3
- Wagner, R. K., Torgesen, J. K., Rashotte, C. A., & Pearson, N. A. (2013). *Comprehensive Test of Phonological Processing-Second Edition: CTOPP-2*. PRO-ED.