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**No evidence of learning in non-symbolic numerical tasks – a comment on Park and Brannon (2014).**

Cognition 150, 243-247 (2016).

Summary: Two recent studies – one of which was published in this journal – claimed to have found that learning on a non-symbolic arithmetic task improved performance on a symbolic arithmetic task [*J. Park* and *E. M. Brannon*, “Training the approximate number system improves math proficiency”, *Psychol. Sci.* 24, No. 10, 2013–2019 (2013; doi:10.1177/0956797613482944); *Cognition* 133, No. 1, 188–200 (2014; ME 2014f.00485)]. This finding has potentially far-reaching implications, because it would constitute evidence for a causal link between the Approximate Number System (ANS) and symbolic-math ability. Here, we argue that, due to the methodology used in both studies, the interpretation of data in terms of an improvement in ANS performance is problematic. We provide arguments and simulations showing that the trends in the data are similar to what one would expect for a non-learning observer. We discuss the implications for the original interpretation in terms of causality between non-symbolic and symbolic arithmetic performance.

*Classification:* F20 F30 C30

*Keywords:* numerical cognition; approximate number system; cognitive training

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