How count-list knowledge relates to 3-year-olds' exact non-symbolic addition abilities

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Abstract

Previous work has shown that even young infants can "add" or "subtract" quantities of objects using the non-symbolic object tracking system. We asked how these non-symbolic addition skills may change as children learn to count. Thirty 3-year-old children completed a non-symbolic exact addition task, in which children saw an animal collect two sets of objects inside a container, and children were asked to choose the summed total from two alternatives. We also measured children's knowledge of the count list and their working memory capacity. We found that children with higher count knowledge performed better in solving non-symbolic addition problems with small sets of objects (<3). However, even strong counters struggled when one of the operands exceeded working memory capacity (>=3). Our results suggested that non-symbolic addition skills in 3-year-old's may be influenced by both their emerging number knowledge and the object tracking system.

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