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Title
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Journal
Proceedings of the Annual Meeting of the Cognitive Science Society, 37(0)

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Publication Date
2015

Peer reviewed

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Cognitive Flexibility in Mathematics: Bilingual Children Show Cognitive Advantages

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Abstract: Mathematical problem solving requires cognitive flexibility. Bilingual children show advantages in cognitive flexibility as compared to monolingual children. Whether this bilingual cognitive advantage extends to mathematical skills is the focus of the present study. To measure children's use of cognitive flexibility, worksheets containing 60 arithmetic problems of different operations were administered to first- through fifth-grade monolingual and bilingual children; children were given 60 seconds to complete as many grade-appropriate problems as possible. Performance on the math worksheet was analyzed as the number of problems completed and solved correctly. Results indicate that bilingualism affects arithmetic problem solving in third- through fifth-graders (problems completed: $F(1,24)=9.20$, $p<.01$; accuracy: $F(1,24)=3.30$, $p=.08$) but not first- and second-graders (problems completed: $F(1,38)=0.38$, $p=.54$; accuracy: $F(1,38)=0.83$, $p=.37$). Findings from this study thus suggest that bilingual cognitive flexibility extends to mathematical problem solving, and that this cognitive flexibility develops over the elementary school years in bilingual children.