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Cultural differences in complex addition: Efficient Chinese versus adaptive Belgians and Canadians.

J. Exp. Psychol.: Learn. Mem. Cogn. 35, No. 6, 1465-1476 (2009).

Summary: In the present study, the authors tested the effects of working-memory load on math problem solving in three different cultures: Flemish-speaking Belgians, English-speaking Canadians, and Chinese-speaking Chinese currently living in Canada. Participants solved complex addition problems (e.g., $58 + 76$) in no-load and working-memory load conditions, in which either the central executive or the phonological loop was loaded. The authors used the choice/no-choice method to obtain unbiased measures of strategy selection and strategy efficiency. The Chinese participants were faster than the Belgians, who were faster and more accurate than the Canadians. The Chinese also required fewer working-memory resources than did the Belgians and Canadians. However, the Chinese chose less adaptively from the available strategies than did the Belgians and Canadians. These cultural differences in math problem solving are likely the result of different instructional approaches during elementary school (practice and training in Asian countries vs. exploration and flexibility in non-Asian countries), differences in the number language, and informal cultural norms and standards. The relevance of being adaptive is discussed as well as the implications of the results in regards to the strategy choice and discovery simulation model of strategy selection.

Classification: C30 C80 F30 D50

Keywords: cognitive science; cognitive psychology; mental arithmetic; problem solving strategies; working memory; intercultural differences; research; comparative studies; short term memory; adjustment; mathematics education; teaching methods

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