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Mental subtraction in high- and lower skilled arithmetic problem solvers: Verbal report versus operand-recognition paradigms.

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Summary: The authors used the operand-recognition paradigm (Thevenot, Fanget, Fayol) in order to study the strategies used by adults to solve subtraction problems. This paradigm capitalizes on the fact that algorithmic procedures degrade the memory traces of the operands. Therefore, greater difficulty in recognizing them is expected when calculations have been solved by reconstructive strategies rather than by retrieval of number facts from long-term memory. The present results suggest that low- and high-skilled individuals differ in their strategy when they solve problems involving minuends from 11 to 18. Whereas high-skilled individuals retrieve the results of such subtractions from long-term memory, lower skilled individuals have to resort to reconstructive strategies. Moreover, the authors directly confront the results obtained with the operand-recognition paradigm and those obtained with the more classical method of verbal report collection and show clearly that this second method of investigation fails to reveal this differential pattern. The rationale behind the operand-recognition paradigm is then discussed.

Classification: C30 C80 F30

Keywords: cognitive science; cognitive psychology; research; numerical cognition; individual differences; reconstructive strategies; algorithmic procedures; subtraction; cognitive arithmetic; arithmetic strategies; subtraction strategies; mental arithmetic

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