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Adding by counting, (clever) calculation, or "retrieval"? A study of young children's strategies for simple additions, using Siegler's "choice/no-choice" method

This study investigated young children's strategy use, in relation to task performance, using the "choice/no-choice" method (Siegler & Lemaire, 1997). Beginning second-graders, divided in three groups according to mathematical ability, solved a series of simple addition problems up to 20 in three different conditions. Problems belonged to four distinct types: problems with a large first and a small second addend (e.g., 9 + 3 =.), problems with a small first and a large second addend (e.g., 3 + 9 =.), "tie sums" (e.g., 6 + 6 =.), and "almost tie sums" (e.g., 6 + 7 =.). In the first condition, children could solve each problem by means of their preferential strategy. In the second and third condition, children were experimentally forced to solve all problems with one particular strategy, respectively "adding up to 10" (e.g., 9 + 3 = 9 + (1 + 2) = 10 + 2 = 12) and "retrieval". Fine-grained comparative analyses, using Siegler's model of "strategic change" (Lemaire & Siegler, 1995) as the theoretical framework, revealed that the mathematically more able children did not differ from their less able peers in terms of the kind of strategies they applied, but rather in terms of the frequency, efficiency, and adaptivity with which they applied particular strategies, resulting in clear group differences in task performances on the different problem types and in all three conditions. From a methodological perspective, the study documented the value of the "choice/no-choice" method to estimate the adaptive nature of children's strategy use.

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