

ZMATH 2016a.00544

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Processing of space, time, and number contributes to mathematical abilities above and beyond domain-general cognitive abilities.

J. Exp. Child Psychol. 143, 85-101 (2016).

Summary: The current study investigated whether processing of number, space, and time contributes to mathematical abilities beyond previously known domain-general cognitive abilities in a sample of 8- to 10-year-old children ($N = 133$). Multiple regression analyses revealed that executive functions and general intelligence predicted all aspects of mathematics and overall mathematical ability. Working memory capacity did not contribute significantly to our models, whereas spatial ability was a strong predictor of achievement. The study replicates earlier research showing that non-symbolic number processing seems to lose predictive power of mathematical abilities once the symbolic system is acquired. Novel findings include the fact that time discrimination ability was tied to calculation ability. Therefore, a conclusion is that magnitude processing in general contributes to mathematical achievement.

Classification: F72 C32 C42

Keywords: mathematics development; numerical cognition; spatial processing; temporal processing; domain-general abilities; magnitude processing

doi:10.1016/j.jecp.2015.10.016