

ZMATH 2016f.00816

Thompson, Clarissa A.; Ratcliff, Roger; McKoon, Gail

Individual differences in the components of children's and adults' information processing for simple symbolic and non-symbolic numeric decisions.

J. Exp. Child Psychol. 150, 48-71 (2016).

Summary: How do speed and accuracy trade off, and what components of information processing develop as children and adults make simple numeric comparisons? Data from symbolic and non-symbolic number tasks were collected from 19 first graders ($M_{\text{age}} = 7.12$ years), 26 second/third graders ($M_{\text{age}} = 8.20$ years), 27 fourth/fifth graders ($M_{\text{age}} = 10.46$ years), and 19 seventh/eighth graders ($M_{\text{age}} = 13.22$ years). The non-symbolic task asked children to decide whether an array of asterisks had a larger or smaller number than 50, and the symbolic task asked whether a two-digit number was greater than or less than 50. We used a diffusion model analysis to estimate components of processing in tasks from accuracy, correct and error response times, and response time (RT) distributions. Participants who were accurate on one task were accurate on the other task, and participants who made fast decisions on one task made fast decisions on the other task. Older participants extracted a higher quality of information from the stimulus arrays, were more willing to make a decision, and were faster at encoding, transforming the stimulus representation, and executing their responses. Individual participants' accuracy and RTs were uncorrelated. Drift rate and boundary settings were significantly related across tasks, but they were unrelated to each other. Accuracy was mainly determined by drift rate, and RT was mainly determined by boundary separation. We concluded that RT and accuracy operate largely independently.

Classification: F20 F30 C30 C40

Keywords: diffusion model; response time; accuracy; cognitive development; numerical ability; individual differences

doi:10.1016/j.jecp.2016.04.005