

ZMATH 2016a.00483

van der Ven, Sanne H. G.; Straatemeier, Marthe; Jansen, Brenda R. J.; Klinkenberg, Sharon; van der Maas, Han L. J.

Learning multiplication: an integrated analysis of the multiplication ability of primary school children and the difficulty of single digit and multidigit multiplication problems.

Learn. Individ. Differ. 43, 48-62 (2015).

Summary: In this study the mental multiplication ability of primary school children and the difficulty structure of all single digit and 469 multidigit multiplication problems, each solved tens of thousands of times in a web-based practice program, were investigated. Child analyses indicated three groups: single digit problem solvers, multidigit problem solvers, and high performers. Within-grade ability differences were very large. In the item analyses, previously identified effects in single digit multiplication, such as the *problem size effect* and the *tie effect*, were replicated in one integrated analysis. Data from two tasks were contrasted: one in which children used predominantly computational strategies, and one in which they are expected to rely mostly on retrieval. In both tasks we found most support for the computational efficiency model. Finally, exploratory analyses on the difficulty of multidigit problems suggest that children rely on the base 10 structure of our number system.

Classification: F32 D72

Keywords: multiplication; difficulty of multiplication problems; computer adaptive testing; item response theory

doi:10.1016/j.lindif.2015.08.013