

Prather, Richard (2009). Acquisition of arithmetic principles through structured input.

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Abstract

A crucial aspect of arithmetic learning is the acquisition of the principles that govern arithmetic. Many studies have described children's knowledge of these principles at different ages. However relatively few studies have directly addressed the mechanisms of acquisition of this principle knowledge. Research from learning in other domains suggests that learners may acquire principle knowledge through experience with examples of arithmetic equations. This dissertation focuses on the role of experience with correct, incorrect and incorrect violation equations in principle acquisition. Also, I investigate the role of equation encoding in principle knowledge and acquisition. The first study addresses experience with violation equations as a catalyst for principle acquisition. The second and third studies further investigate experience with violations in addition to experience with correct equations. The fourth and fifth studies address how manipulations in equation encoding may lead to changes in arithmetic principle knowledge. Results suggest that experience with violations is beneficial to principle knowledge and that equation encoding is linked to principle knowledge. The results include a discussion of educational applications.