

A Math Fact Fluency Intervention
With Scaffolding

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Abstract

The purpose of the study was to assess the effectiveness of a flash card intervention for fluency in basic math facts. The rate of recall of addition facts was assessed for an 8-year-old third grader who had ADHD. The tutoring program involved a structured flashcard drill with systematic reinforcement. A scaffold was built in to the intervention to aid him in generalizing from oral responding to written responding; he was taught to whisper the facts to himself as he wrote them down. Fluency of recall was assessed weekly, and data were analyzed across all phases of the study. The student showed definite gains in recall during the intervention phase.

A Math Fact Fluency Intervention With Scaffolding for Generalization

This student was an 8-year old student in third grade who had been receiving services in the category of Learning Disabled in Reading. He also had problems maintaining attention. His teacher had expressed concerns that he did not know any of his basic math facts, which was corroborated by a math curriculum-based assessment. It was determined to start with addition facts only through twice-weekly tutoring. Baseline was established through a timed written worksheet completed by the student that contained 100 single-digit addition facts using digits 1 – 9. This baseline data was used to identify which facts were already learned and which were not yet learned. A set of flashcards were prepared for tutoring, identifying which were “known” (by marking a green dot on the back) & which were “unknown” (by marking a red dot on the back)

A structured flashcard drill was employed based on a combination of folding-in (Shapiro, 2004) and the Fact Flash drill developed by Fasko (1994). Although several studies have examined the use of different ratios of learned to unlearned facts (i.e., (Dickinson & Butt, 1989; Gickling & Rosenfield, 1995; Cooke & Reichard, 1996), there has been no consensus as to which system is best for quickly attaining fluency. It was decided to use a proportion of 5 learned to 5 unlearned for the cards currently under review, called the *drill deck*.

. The student was presented with one card at a time and asked to state the fact and its product within 5 seconds. If the student responded correctly, and the tutor answered, “Good,” or “That’s right.” A “+” was marked on the back of the card, and the next card was presented. If the response was incorrect or timed out, a “-” was marked

on the back of the card, the correct fact and product were given orally, and the student was again required to state the correct fact and product.

The card was then placed behind the next card in the sequence so that it would be represented fairly quickly, thus reinforcing the learning. When a fact was correctly identified 5 times in a row (5 "+" marks), the card was considered mastered, and it was retired. If the card was one that had been identified as previously learned (as evidenced by the green dot on the back), it was replaced with another previously learned card; if it was a fact that had not been previously learned, it was replaced by another unlearned fact card. Thus the 50/50 proportion was always maintained.

A "scaffold" was introduced --- an intermediary step in which he whispered the facts aloud while writing them down. The "scaffold" step had been used successfully with a previous student who had difficulty when required to transfer oral skills to written; i.e., after building fluency when orally stating the math fact, he maintained the same baseline rate when required to write his responses (Fasko, Leach, & Bogard, 2005).

It was hypothesized that the scaffold would be of similar support to the current student because of his attention problems. Thus, the student was taught to state the facts and their sums to himself while writing the answers down. This concept was introduced at the beginning of the intervention and helped the student stay focused on that problem.

The results indicated a significant improvement in addition fluency.

References

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Authors' Notes

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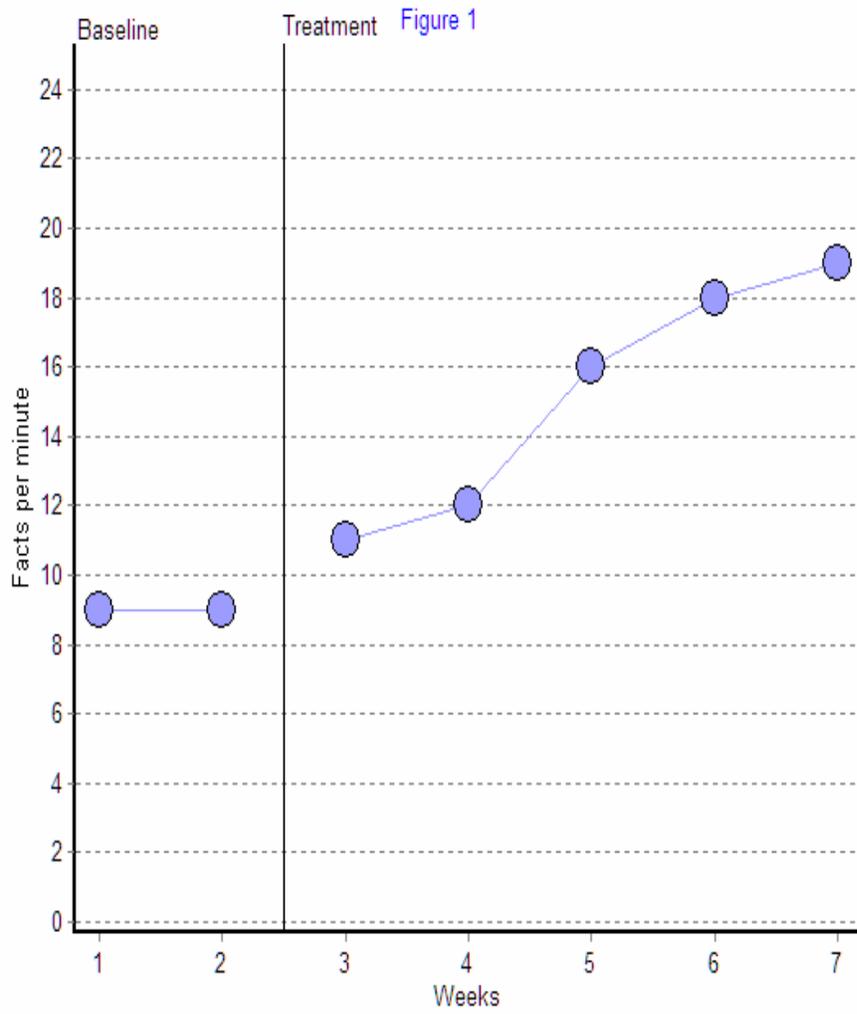


Figure 1. Math facts acquired.