NICHCY The National Dissemination Center for Children with Disabilities

Research to Practice

Structured Abstract No. 82, March 2012

Reading Comprehension Instruction for Students with Learning Disabilities, 1995-2006: A Meta-Analysis

This is a structured abstract of a meta-analysis conducted by Berkeley, Scruggs, and Mastropieri in 2010. The full citation for this meta-analysis appears on page 4.

Abstract

This meta-analysis of research conducted between 1995 and 2006 synthesizes findings of 40 studies for improving the reading comprehension of students with learning disabilities. Nearly 2,000 students participated in the interventions, which were classified as fundamental reading instruction, text enhancements, and questioning/strategy instruction (including those that incorporated peer-mediated instruction and self-regulation).

Mean weighted effect sizes were calculated for criterion-referenced measures (0.69 for treatment effects, 0.69 for maintenance effects, and 0.75 for generalization effects) and for norm-referenced tests (0.52 for treatment effects).

These outcomes were somewhat lower than, but generally consistent with, the results of previous meta-analyses, which showed that reading comprehension interventions are generally very effective. Higher outcomes were noted for interventions that were implemented by researchers than those implemented by teachers. Implications for practice and further research are discussed.

Background

Reading requires both the ability to decode text and the ability to understand and extract meaning from text. Reading comprehension is the ability to obtain meaning from text. This meta-analysis examined the effectiveness of the reading comprehension strategies most commonly used to teach students with learning disabilities (LD). The researchers divided the reading comprehension interventions they examined into the following categories:

- **Questioning/Strategy Instruction** | Questioning/strategy instruction interventions focused on teaching students reading comprehension strategies, directly questioning students while reading, or teaching students to self-question while reading. Interventions in this category included *teacher-directed questioning* (which encompasses both directly questioning students and training students to ask themselves or their peers questions while they read), *reading comprehension strategy instruction* (e.g., activating prior knowledge, making predictions, summarizing, identifying main ideas, clarifying, questioning, and analyzing text structure), and *peer tutoring* (e.g., peer-assisted learning strategies, Collaborative Strategic Reading (CSR), the Text Content and Structure Program, reciprocal teaching, and class-wide peer tutoring).
- **Text Enhancements** | The primary purpose of text enhancement interventions is to increase reading comprehension by supplementing or enhancing the text. Text enhancement interventions included in-text question placement, graphic organizers, and technology (e.g., hypermedia

and video vocabulary instruction for text enhancement).

- **Fundamental Reading Skills Training** | Fundamental reading skills interventions provided training in basic skills (e.g., phonological awareness and/or phonics skills) to increase reading comprehension. This category contained packaged intervention programs designed to teach basic reading skills (e.g., the Behavioral Reading Therapy Program, the Failure Free Reading Program, the Auditory Discrimination in Depth Program, Embedded Phonics, and the Dyslexia Training Program). All the fundamental reading skills programs maintained very low student-to-teacher ratios during implementation.
- **Other** | The two interventions in this category were a school-wide cooperative learning program and an evaluation of a program with multiple components.

Research Questions

1. Does reading comprehension instructional research conducted since the earlier meta-analysis by Mastropieri, Scruggs, Bakken, and Whedon (1996) result in comparable effect sizes?
2. Will other differences be observed between recent research and previous research, for example, differences in types of treatments examined?

Research Design—Meta-analysis

Number of Studies—40

Number of Subjects—1,734

Years Spanned—1995-2006

Research Subjects—Students with learning disabilities in kindergarten through 12th grade. The mean age of participants was 12 years old (150.5 months).

Specified Disability
Learning disabilities

Interventions
Interventions designed to improve student reading comprehension, with specific reading comprehension outcomes.

Duration of Intervention
Intervention sessions ranged in number between 1 and 155 with a mean of 29.8 sessions. Their length ranged between 20 and 140 minutes, with a mean of 49.7 minutes.

Research Subjects

A total of 1,734 students with learning disabilities participated across the 40 studies. Their age and grade level varied as follows:

- 15 studies involved elementary school students;
- 18 involved middle school students;
- 6 included high school students; and
- 1 examined students in a residential facility for adjudicated youth.

The mean age of participants was 12 years old (150.5 months).

Specified Disability

All of the studies included in this meta-analysis focused on students classified as having a learning disability (LD). In addition, 8 studies included small groups of children with other classifications (e.g., ADHD, or remedial reading).

Intervention

Several interventions designed to improve student reading comprehension and containing specific reading comprehension outcomes were examined. In order of their prevalence in the 40 studies, the interventions were categorized as:

- questioning/strategy instruction (67.5%)
- text enhancements (15.0%)
- fundamental reading skills training (12.5%)
- “other” (5.0%).

Duration of Intervention

Intervention sessions ranged in number between 1 and 155 with a mean of 29.8 sessions. Their length ranged between 20 and 140 minutes, with a mean of 49.7 minutes.

About Effect Size

Effect size is a statistical calculation that is often represented as ES or d. In this study, effect size measured the impact of reading comprehension interventions. Three main types of effects were examined in this meta-analysis:

- **treatment** (how effective a particular reading strategy or intervention was in improving the immediate reading comprehension of students);
- **maintenance** (how well students were able to continue using the reading strategy or intervention after the study had ended); and
- **generalization** (how effectively students were able to apply the reading strategy or intervention in other subject areas or to other types of text).

An effect size of less than d=0.20 suggests that a treatment did not have a significant effect on the sample population. Larger effect sizes indicate that the treatment has had some impact; for example:

- d=0.20 indicates a small or low impact
- d=0.50 indicates a moderate impact
- d=0.80 or above indicates a large impact

Effect Size in This Meta-Analysis

In this meta-analysis, the overall weighted mean effect size across all types of effects (i.e., treatment, maintenance, and generalization effects) was **0.70** (indicating a significant impact) for reading comprehension studies that used criterion-referenced tests. When this overall effect size was subdivided, it showed weighted mean effect sizes of:

- 0.69 for treatment effects,
- 0.69 for maintenance effects,
- 0.75 for generalization effects.

The overall mean effect size, for both criterion-referenced and norm-referenced measures across treatment, maintenance, and generalization outcomes, was 0.65.

The mean weighted effect sizes for reading comprehension instruction research were found to be statistically significant; however, they were lower than the effect sizes found in the 1996 meta-analysis conducted by Mastropieri et al. The researchers suggest several reasons why the effect sizes of reading comprehension studies conducted since the mid-1990s were more moderate than the effect sizes of earlier studies. For example, the authors note that studies of interventions delivered by researchers tend to result in higher effect sizes than those delivered by teachers, possibly due to researchers' greater familiarity and comfort with the interventions they study than the teachers they train to implement those interventions. In the 1996 meta-analysis, a greater proportion of the studies examined were researcher-led interventions, which may have contributed to higher effect sizes.

Findings

Questioning/Strategy Instruction | The use of questioning or strategy instruction for teaching students with LD reading comprehension skills has been studied more extensively than any other reading comprehension strategy (n=27, or 67.5% of the studies), and has shown moderate to high effectiveness across studies. Five studies on questioning/strategy instruction reported very high effect sizes (ES > 2). All of the interventions shown to be highly effective involved teaching students to ask and answer questions about the text's main idea.

In addition, 4 out of the 5 highly effective interventions included a *self-monitoring* component, and 2 studies with very high effect sizes included a strategy called *attribution retraining,* where students learn to associate progress in their reading skills with their effort and strategy use.

Text Enhancements | In-text question placement, graphic organizers, and technology were used to teach students reading comprehension in eight of the studies reviewed. Text enhancements were found to be effective in helping students with LD learn reading comprehension strategies.

Fundamental Reading Skills Training | Overall, instructing students in basic reading skills using packaged interventions with low student-to-teacher ratios was an effective method of increasing reading comprehension.

Other Interventions | The two studies on programs that did not fit into the other categories of studies yielded small effect sizes.

Conclusion / Recommendations

This meta-analysis confirms previous findings that, overall, reading comprehension interventions for students with LD have a greater positive impact on student skill development than traditional instruction alone. Although the effect sizes were lower than those found in previous meta-analyses, reading comprehension interventions involving questioning/strategy instruction, training in fundamental reading skills, and text enhancements nonetheless ranged from moderate to high.

The authors note a common thread between the wide range of interventions included in this meta-analysis: a focus on teaching students to attend more carefully and think more systematically while they read. Since previous research has found that most students with LD fail to use these strategies on their own, the implication of this meta-analysis is that systematically teaching reading comprehension using any of these interventions is likely to significantly improve students' ability to derive meaning from text.

Abstracted from—

Berkeley, S., Scruggs, T.E., & Mastropieri, M.A. (2010). Reading comprehension instruction for students with learning disabilities, 1995–2006: A meta-analysis. *Remedial & Special Education, 31*(6), 423-436.

Research Connections

Looking for more information from the reading research? We're pleased to point you to these additional resources, all available in the research section of NICHCY's website.

The Power of Strategy Instruction
Strategy instruction is a powerful approach to teaching that is backed by years of quality research. Strategy instruction gives students the same tools and techniques that efficient learners use to understand and learn new material or skills.
http://nichcy.org/research/ee/learning-strategies

Experimental Intervention Research on Students with Learning Disabilities
This meta-analysis identifies effective interventions for students with LD, with emphasis on determining the effectiveness of strategy instruction and direct instruction.
http://nichcy.org/research/summaries/abstract36

Fluency and Comprehension Gains as a Result of Repeated Reading
Repeated reading is a strategic approach designed to increase reading fluency and comprehension. During repeated reading, students read and re-read a selected short passage until they reach a satisfactory level of fluency. This simple fluency exercise is one of the most studied.
http://nichcy.org/research/summaries/abstract55

Graphic Organizers and Their Effects on the Reading Comprehension of Students with LD
Graphic organizers provide a framework for students to connect new information to existing knowledge. Examples include semantic maps, cognitive maps, story maps, and Venn diagrams. Are they effective in improving the reading comprehension of students with LD?
http://nichcy.org/research/summaries/abstract21

How Effective Are One-to-One Tutoring Programs in Reading for Elementary Students at Risk for Reading Failure?
The title of this meta-analysis fully captures its focus.
http://nichcy.org/research/summaries/abstract3

Reading Research for Students with LD
This structured abstract summarizes the findings of a meta-analysis examining the effectiveness of different models of word recognition and reading comprehension instruction for students with LD.
http://nichcy.org/research/summaries/abstract32

Searching for the Best Model for Instructing Students with Learning Disabilities
This summarizes a meta-analysis of effective teaching models for students with LD, concluding that: (a) the most effective models combined components of direct and strategy instruction; (b) eight major instructional factors captured most intervention programs; and (c) the explicit strategy instruction factor best predicted magnitude of treatment outcomes.
http://nichcy.org/research/summaries/abstract35

Author of this structured abstract: Kyrie Dragoo, NICHCY

Publication of this document is made possible through Cooperative Agreement #H326N030008 between FHI 360 and the Office of Special Education Programs, U.S. Department of Education. The contents of this document do not necessarily reflect the views or policies of the Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.