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# Connection between Tutoring Format and Reading Scores of Elementary Aged Children

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**Abstract:** Extant research shows that response to intervention (RTI) in individual and small group intervention settings increase children's reading skills; however, little information is available that investigates whether the type of intervention format makes a difference in learning to read. The Early Childhood Longitudinal Study, Kindergarten class (ECLS-K) database was used to identify third-grade children who received individual, small group, or combined individual and small group tutoring to increase their reading skills. The current study compared reading scores associated with each intervention type to determine which reading intervention format was most beneficial. The results indicated that children receiving small group intervention had higher reading scores than those receiving individual or combined interventions. Additionally, a significant difference was found between the small group and combined formats. These results demonstrate the advantages of small group tutoring for elementary-aged children, which could be beneficial regarding early prevention and identification of children who are struggling in reading.

*Keywords:* Intervention format; Reading skills; ECLS-K

Education is essential for children to be successful. It is also highly important for those involved in the education system to provide children with the most beneficial training with consideration of the child's individual needs. Indeed, children are unique and possess a particular set of skills, particularly children who may have disabilities that affect the type of education they will receive in school. For example, there are many children who need special education services due to their struggles with the general education curriculum. According to the United States Department of Education's Institute of Education Sciences, National Center for Education Statistics (NCES), the number of children during the 2015-2016 school year who were identified as receiving an intervention or service under the Individuals with Disabilities Act of 2004 (IDEA) is about 13% of all children in schools. Just as children under IDEA need to receive appropriate training in order to enhance their skills when they are having difficulties in school, so do children who come under the *Every Student Succeeds Act (ESSA)*. ESSA, similar to its predecessor *No Child Left Behind (NCLB)*; U.S. Department of Education, 2002), recognizes that all children with reading difficulties need to be identified early and provided with the most scientifically supported, research-based instruction (U.S. Department of Education, 2015). Neither document, however, specifies the format in which these children should receive their interventions, such as children under IDEA 2004 may receive either individual or small-group intervention, depending on their needs.

During the same time as NCLB, the Response to Intervention (RTI) model became the process used to implement intervention for those who do not succeed in the

general classroom. The RTI model includes three tiers: the first tier involves implementing interventions in the general education classroom, the second tier involves intensive small-group instruction in the general education classroom or outside the classroom, and the third tier includes intensive, direct instruction placement outside of the general education classroom where individual instruction occurs (Hollenback, 2007; Lewis, Mitchell, Bruntmeyer, & Sugai, 2016; McMaster, Fuchs, Fuchs, & Compton, 2005). Research is needed to determine if there is an intervention format in the RTI model that works best for children, in order to learn the skills they need to be successful in school. Although Bourland, Jablonski, and Lockhard (1988) found that individual and small group instruction did not differ systematically for children with disabilities, small group interventions tend to be the first format of choice when behavioral and/or academic concerns arise. This is supported by popular programs such as Positive Behavioral Interventions and Supports (PBIS; Crone, Hawken, & Honer, 2015), Social Emotional Learning (SEL; Newman & Dusenbury, 2015), and the Response to Intervention System (Lewis et al., 2016). The present study focused on the academic arena and investigated whether there were outcome differences among reading intervention formats with elementary-aged children.

Despite the number of programs that support small group intervention, a widely used intervention implemented in schools is individual instruction. Also known as one-on-one instruction, this type of tutoring is used as a supplement to general education classroom teaching and is considered to be the most effective (Elbaum, Vaughn, Hughes, Moody, 2000).

This type of tutoring can be very effective for young children in the early elementary years. Indeed, Felton and Pepper (1995) found that children with poor recognition skills in third grade were unable to make gains in basic reading by 8th grade without intensive individual intervention. Furthermore, according to Leal, Johanson, Toth, and Huang (2004), individual tutoring is most beneficial when it is intensive, assessment-based, supervised by reading specialists, and involves regular and effective evaluation by the instructor. Along with exploring the best format of intervention among children, several research studies have also examined the success of individual tutoring among diverse groups of children. Prior research indicates that children with attention problems who entered first grade with less developed reading skills received greater benefits from individual tutoring, even when their attention problems were negatively associated with first grade reading achievement (Rabiner, Malone, & the Conduct Problems Prevention Group, 2004). Children with other disorders have also benefited from the implementation of individual tutoring. Osburn and colleagues (2007) found that children with learning disabilities, cognitive disabilities, and those eligible for Title 1 reading services made significant achievement gains in reading with Project More, an intensive, individual tutoring program. Reputably, several studies have shown that individual tutoring is effective for young children; however, small group tutoring also has been found to benefit children with reading concerns.

Although identified as an evidence-based intervention, a variable within the individual tutoring format may be the overemphasized direct or drill practice activities. For example, on the Intervention Central website (Wright, 2013) the first four methods listed for increasing sight word vocabulary are direct practice or deliberate practice in memory-type interventions using flashcards or lists (Campitelli & Gobet, 2011). The Intervention Central website is very popular and considered a respected source for research-based interventions, however, although the four methods listed are all evidence-based interventions, the direct practice/drill is the method suggested (Baranek, Fienup, & Pace, 2011; Ferkis, Belfiore, & Skinner, 1997; Ruwe, McLaughlin, Derby, & Johnson, 2011). This method differs from the suggested interventions for small groups, such as Intervention Central's phonics intervention. Small group formats can more easily embed the cooperative learning approach (Slavin, 2012), which facilitates the positive social environment that influences learning (Irvin et. al., 2014).

Small group instruction does not involve singling out one child, whether within the general education curriculum or receiving specially designed instruction. Working with a child individually may have negative consequences, such as perceived isolation, particularly among those with autism spectrum disorder or other disorders (Ledford & Wehby, 2014). In addition, under guidelines implemented by IDEA 2004, schools must serve children with disabilities in the least restrictive environment (Council for Exceptional Children, 2010), which for most students would not be on an individual basis. Most notably, general education students in either the Multi-Tiered System of Supports (MTSS; Harlacher, Sakelaris,

& Kattelman, 2014) or Response to Intervention (RTI; Lewis et al., 2016) system receive small group intervention in an inclusive environment prior to an individually-based intervention format. Putting children into small groups in the general education classroom supports an inclusive environment and meets the tier 2 level intervention format. An additional benefit of the small group tutoring format is the pro-social interactions that can occur, which may not be able to be explicitly taught by teachers (Irvin, Boyd, Odom, 2014). In addition to the prosocial benefits, small group instruction has also shown to enhance reading skills in school-aged children. Indeed, Lennon and Sleinski (1999) found that when two students were working with one teacher in a small group, both students improved in their reading performance after the instruction. Notably, Lennon and Sleinski's results also indicate that students who were identified as being in "the middle," or average, in reading scores tended to be the highest scoring students in reading in the school district at the end of the year. Overall, the small group tutoring format creates an environment that allows children to feel included, expand social skills, and increase reading skills.

Small group tutoring has also been implicated to have a greater impact than individual tutoring for at-risk children's reading skills. Cavannaugh, Kim, Wanzek, and Vaughn (2004) conducted a meta-analysis which investigated the results of interventions that targeted kindergarten students who were at-risk for reading difficulties by looking at level of reading skill and whether they were involved in any type of intervention. The operational definition used for at-risk for reading difficulties was low phonemic awareness, low letter identification ability, few preschool or home literacy experiences, low socioeconomic status (SES), or attending a school with a historically low reading achievement. Children who had a language delay, mild intellectual disability, developmental delays, emotional and behavior disorders, and attention deficit/hyperactivity disorders were also included. The participants were measured at the reading skills level that children are expected to operate at, including measures of letter name, sounds, repetition, sight words, real and non-real words, phoneme segmentation and deletion, dictation, rhyming, blending, knowledge of vocabulary, word writing, spelling, and phonological processing, which are all basic reading skills that are learned in kindergarten. The researchers found a small to moderate effect for individual intervention regarding children with attention and reading difficulties. Interestingly, a moderate to high effect was found for children in small group instruction, with gains in reading outcomes for students in this treatment group. Both individual intervention and small group instruction seemed to benefit children, with the small group intervention formats being the most beneficial. Specifically, the most effective intervention was phonological awareness instruction with or without print, in a small group format, meeting two to three times a week over 8-10 weeks for approximately 15-30 minutes, and implemented by a researcher or researcher-trained instructor. Children investigated were those who met the study's criteria for at-risk for reading difficulties, as well as

children identified with a disorder or disability (Cavanaugh, et al., 2004). The researchers also examined students who were at-risk for reading based on low SES, low phonological awareness, disabilities, low phonological awareness, and low letter naming ability. The researchers, however, included a larger sample of students with disabilities (6 out of 27 studies) in which participants were more than students who are at-risk for reading.

Since research has supported increased reading scores outcome through both small group intervention and individual intervention formats, it would seem that the combined intervention group (i.e. small group and individual intervention) would result in the greatest increase in reading scores. However, that may not be the case when children are exposed to too many learning environments, resulting in many context effects. Being exposed to different materials, information, or professionals may conflict with children's learning and create feelings of overstimulation. This may result in an over arousal of the hypothalamic-pituitary-adrenal axis (HPA axis), which controls reactions to stressful events (Laurant et al., 2014). Ongoing stress, rather than acute stress, may occur in children who receive interventions through multiple formats at one time. With this particular type of stress, children with passive strategies may not react, and may appear to comprehend the material; however, due to the overwhelming amount of stimulation, they may, in fact, react later (e.g. outbursts, shutting down, complaining). If children do not comprehend the information presented in the interventions, testing will indicate a lack of learning (Thompson & Raisor, 2013). In any case, these overstimulated children would not be in their zone of proximal development (ZPD), according to Lev Vygotsky (1978). Tutors need to consider where children are emotionally, as well as academically, to ensure each child's optimal learning and their ZPD. For example, a third-grade student who is struggling in reading and is receiving one hour per week of individual tutoring and two sessions a week of small group tutoring may feel overwhelmed; thus, emotionally, they may not be gaining the most benefit from this level of intervention. Indeed, this needs to be considered when meeting student's individual academic needs.

When children are struggling with reading, it is important to find the proper intervention that will help them to succeed in school and life. Previous research has shown that reading interventions help children (Rabiner, et al., 2004) and that small group interventions are more effective than individualized ones (Cavanaugh et al., 2004). Unfortunately, these studies did not examine the most effective intervention format for kindergarten and first grade children in the general population who are not identified as having a disability. It is important to ascertain whether small group interventions are effective across the entire population of students in the school system. It is also important to control for covariates, as noted in previous literature (Rabiner et al., 2004), due to the likelihood that covariates could confound the effects of intervention format regarding reading scores. In the current study, children in the general population who received supplemental interventions, were used to

investigate which intervention format benefit children individually. In the current study, there were only 1.9% children diagnosed with a disorder, as compared to Cavanaugh et al. (2004) whose study included more children with disabilities. Also, the current study explored basic reading skills as well as more advanced reading skills, such as comprehension. Indeed, it is valuable to examine advanced reading skills in older children in order to identify which interventions are beneficial in relation to more advanced reading skills. Based on previous findings related to children with disabilities and at-risk for reading problems, it was hypothesized that a reading intervention in a small group format would benefit elementary aged children more than individual intervention, even when controlling for demographics related to reading level (i.e. age, gender, race, income).

## Method

### Participants

The participants were third-grade students from the Early Childhood Longitudinal Program Kindergarten Class 1998-99 (U.S. Department of Education, National Center for Education Statistics, 2009c). Third-grade data were used because most learning and behavior patterns are established by third grade (Pianta & Steinberg, 1992). This was substantiated by Naomi Karp, Director of the National Institute on Early Childhood Development and Education, at the Transition to Kindergarten synthesis conference in 1998, where she reported that states generally use low third grade reading scores to make predictions about future dropout rates in high school, as well as incarceration rates.

In this database, a total of 21,260 kindergarteners from the original ECLS-K cohort participated in the initial study. When these children were in first grade, additional participants were added to the study sample (i.e., Sample Freshening). Third grade children who did not participate in the kindergarten and first grade years (including those who were added in the first grade) were not included in the third grade sample; therefore, the sample is not representative of all third graders (USDoe, NCES, 2009c). Simplified, this means that when data were collected during the 2001-2002 school year (when participants were in third grade), approximately 21,357 children were eligible to participate and a total of 15,305 children responded. Because not all children received tutoring in reading, there were approximately 425 children with completed data (tutoring type, reading score, and demographic data) from the ECLS-K sample who were able to be analyzed for this study. Table 1 displays the demographic information for the 425 total participants and for each tutoring type. Consistent with the general population, there were some children identified with a disability. In the study sample, parents identified a small percentage of children (1.9%) as having ADHD, hyperactivity, or another diagnosis or diagnoses. About 1% of the children in the third-grade sample were either excluded from the study or required accommodations. Accommodations during the reading direct cognitive test included environmental and scheduling modifications, as well as health care aides per students'

Individualized Education Programs (IEPs). Other IEP modifications included assistive devices such as braces, hearing aids, canes, or voice synthesizers. Children were excluded based on a disability that prevented them from being able to take the assessment or required an accommodation that was not offered by ECLS-K.

### Measures

The ECLS-K researchers obtained data over several years of children from kindergarten to 8<sup>th</sup> grade. Data included interviews with parents, teachers, principals, student records, and direct and indirect child assessments. The base-year data were collected during the fall and spring of the 1998-1999 school year with a sample of kindergarteners. Follow-up data were collected when most of the kindergarteners were in first grade during the fall and spring of the 1999-2000 school year. The next set of data collection occurred when most of the base year children were in third grade during the 2001-2002 year. The current study uses data from the third-grade year, specifically examining children's reading skills and the format for their reading tutoring. The assessment tools measured the children's skills and their growth over time (U.S. Department of Education, National Center for Education Statistics, 2009d). The assessment instruments used in this study included the reading direct cognitive test, the ECLS-K Parent Interview, and the Teacher Questionnaire Part C.

The reading direct cognitive test measured student phonemic awareness, single word decoding, reading vocabulary, and passage comprehension (U.S. Department of Education, National Center for Education Statistics, 2009d). The comprehension portion of the assessment specifically measured initial understanding, developing interpretation, personal reflection, and demonstrating a critical stance. A reading passage section measured sentence comprehension, paragraph comprehension, and story comprehension, and included a variety of genres of literature, such as poetry, letters, informational text, and narrative text. The reading assessment consisted of five proficiency levels including (1) recognizing common "sight" words, (2) reading words in context, (3) making inferences using cues that were directly stated with key words from the text (literal inference), (4) identifying clues used to make inferences (extrapolation) and using personal background knowledge combined with cues in a sentence to understand the use of homonyms, and (5) demonstrating the understanding of the author's craft and making connections between problems in the narrative and similar life problems (evaluation) (National Center for Education Statistics). The reading test involved a 15-17 question routing test that guided the selection of one of the three second-stage forms. The Item Response Theory (IRT; Embretson & Reise, 2013) reading scores for third grade children in the ECLS-K study were used and the range of scores were 0-154 (M=106.1, SD=20.7).

Parent interviews consisted of 500 questions regarding their child's school experiences, childcare, parent characteristics, and child health (U.S. Department of Education, National Center for Education Statistics, 2009d). Specifically,

the race of the children and the total household income of the parents were taken from the parent interview questionnaire.

Part C of the ECLS-K teacher questionnaire (third grade) was used, which asked about the type of intervention each child received. For intervention, the teachers were specifically asked if the child received either individual or small group tutoring for reading. There were 52 children in the individual only tutoring group, 235 children in the small group only tutoring group, and 138 children who were in both types of tutoring (individual and small group).

### Procedures

According to the User Manual for the ECLS-K Third Grade Public-Use Data File and Electronic Codebook, in September 2001, all participating ECLS-K schools were contacted via telephone to begin assessment in the spring. If a child transferred to a new school, those schools were contacted and recruited. A package sent to the participating schools asked them to prepare for the pre-assessment call and the assessment itself. The package included information on the third-grade data collection. The schools all identified a school staff coordinator, usually one who completed the ECLS study in the previous years, to be a liaison for the study and to complete an information form on the ECLS-K sampled children before the phone call to the school. Parental consent taken in the base year of the study was reviewed with the school coordinator to see if it could be used for the third-grade sample. Parent letters and consent forms were mailed and sent back to the school coordinator if consent needed to be re-obtained.

The child assessment was conducted March through June 2002. To conduct the direct child assessments, field supervisors and assessors obtained either a classroom or established space at the school library. Field supervisors and assessors were all trained in a standardized format. The children were signed out of their classrooms to participate in the assessment and signed back into the classroom once completed. The assessments took an average of 94 minutes. Children could receive accommodations for their assessments including alternative seating, scheduling or timing changes, the presence of a healthcare aid, or use of an assistive device.

Packets with hard-copy teacher questionnaires were mailed to the schools February 2002 with a request to be returned at the time of the child assessment or mailed back to the researchers. The teachers were asked to complete individual ratings on the sampled children and were paid \$7 for each child rating.

Letters were mailed to parents to remind them about the assessment and parent interviews were conducted. The parent interviews were administered by telephone or using computer-assisted interviewing (CAI) March through July 2002. Interviews were conducted in person if the respondent could not complete them over the phone. The parent interview lasted an average of 62 minutes. Figure 1 illustrates the timelines of the data collection process.

For the current study, the ECLS-K 1999 public and private use databases were required, which included data on all of the necessary variables. A compact disc (CD) containing the private use database was used to obtain the parent's and

children’s demographic data (U.S. Department of Education, National Center for Education Statistics, 2009a). The third-grade manuals from the public data CD were used to obtain participant information, the direct reading cognitive test, the teacher questionnaire, and the parent questionnaires, as well as the procedures. The reading score was from the direct cognitive

assessment in which the Reading IRT score was used. The type of reading intervention the children participated in came from the Teacher Questionnaire Part C, asking whether the students were in individual or small group tutoring for reading (U.S. Department of Education, National Center for Education Statistics, 2009b).

Table 1  
Demographic Information of Participants

| Demographic                             | Category Total           | Individual Tutoring      | Small Group Tutoring     | Combination Format        |
|---|--------------------------|--------------------------|--------------------------|---------------------------|
| Gender                                  |                          |                          |                          |                           |
| Male                                    | 224 (52.7%)              | 29 (55.8%)               | 123 (52.3%)              | 72 (52.2%)                |
| Female                                  | 201 (47.3%)              | 23 (44.2%)               | 112 (47.7%)              | 66 (47.8%)                |
| Age                                     |                          |                          |                          |                           |
| Mean (in Years)                         | M=9.27                   | M=9.24 SD=5.29           | M=9.28 SD=4.59           | M=9.26 SD=4.96            |
| SD (in Months)                          | SD=4.79                  |                          |                          |                           |
| Race                                    |                          |                          |                          |                           |
| White, Non-Hispanic                     | 32%                      | 30.8%                    | 29.8%                    | 36.2%                     |
| Black or African American, Non-Hispanic | 27.1%                    | 23.1%                    | 26%                      | 30.4%                     |
| Hispanic, Race Not Specified            | 14.6%                    | 17.3%                    | 14%                      | 14.5%                     |
| Hispanic, Race Specified                | 12.5%                    | 13.5%                    | 13.2%                    | 10.9%                     |
| Asian                                   | 5.4%                     | 3.8%                     | 6.4%                     | 4.3%                      |
| American Indian or Alaska Native        | 4.5%                     | 5.8%                     | 6%                       | 1.4%                      |
| Multiracial and Unknown                 | 2.6%                     | 1.9%                     | 3.4%                     | 1.4%                      |
| Native Hawaiian, Other Pacific Islander | 1.4%                     | 3.8%                     | 1.3%                     | 0.7%                      |
| Household Income                        |                          |                          |                          |                           |
|   | M=\$14,841<br>SD=\$7,158 | M=\$15,577<br>SD=\$7,669 | M=\$14,554<br>SD=\$6,815 | M=\$15,051<br>SD=\$7,5468 |
| Public School                           | 411                      | 51                       | 226                      | 134                       |
| Private School                          | 14                       | 1                        | 9                        | 4                         |
| Reading Scores                          | M = 88.18<br>SD = 19.42  | M = 85.54<br>SD = 20.90  | M = 91.51<br>SD = 19.02  | M = 83.49<br>SD = 18.50   |
| Totals                                  | 425                      | 52                       | 235                      | 138                       |

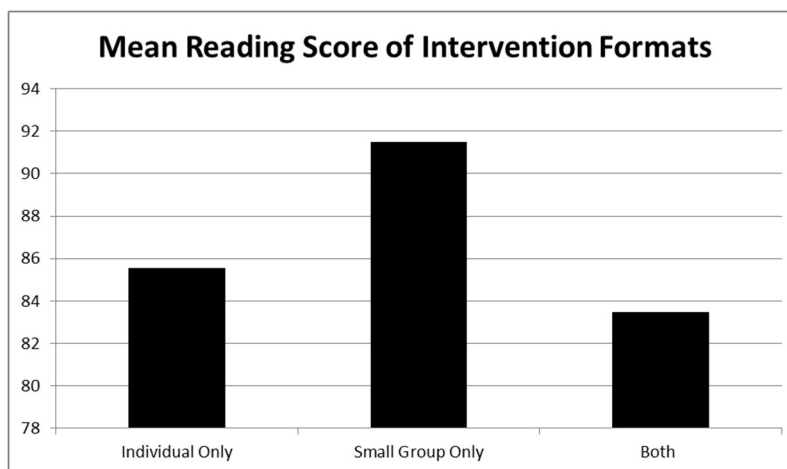


Figure 1: Mean Reading Score of Intervention Formats

### Results

To test the hypothesized intervention format effect on reading scores, a one way analysis of variance (ANOVA) was conducted with the intervention format (individual tutoring, small group tutoring, and combined interventions) as the independent variable and the reading IRT score as the dependent variable. The outcome expected was that small group tutoring would benefit elementary-aged children more than individual tutoring. Indeed, results yielded a significant main effect of intervention format,  $F(2, 422) = 8.25, p < 0.01$ , see Figure 2. Post hoc analyses revealed that the reading scores for the small-group intervention ( $M = 91.51, SD = 19.02$ ) were significantly higher than the combined group ( $M = 83.49, SD = 18.50$ ),  $t(371) = 3.97, p < .01, 95\% CI [3.21, 12.84]$ . There were no other significant differences among the groups. It should be noted that the mean IRT score was higher ( $M = 106.1$ ) for third graders in the Early Childhood Longitudinal Study in comparison to the participants in the present study, even those with the most successful intervention format outcomes ( $M = 88.18$ ). This is logical, as these students were receiving interventions as a result of their struggles in reading.

A follow-up analysis of covariance (ANCOVA) was conducted on the above test, controlling for participant's age, gender, race, and income. The results confirmed that the intervention effect remained the same, even when controlling for age, gender, race, and income,  $F(2, 418) = 8.69, p < .01$ . Thus, the hypothesized intervention effect difference among the intervention types was still significant.

### Discussion

The results of this research study support the hypothesis that the small group reading intervention format will benefit elementary aged children more than individual intervention, even when demographics (age, gender, race, and income) are controlled. The children in the small group reading intervention type had higher reading scores than children in the individual reading intervention, as well as the combined intervention group. The small group reading intervention was significantly

greater than the combined group of individual and small group reading interventions. These results extend current knowledge and introduce several implications for those in the education system.

Although the results from the ECLS-K databases support the hypothesis, there are some limitations to this research. Firstly, due to the small sample size of children with disabilities in this database, the authors were unable to test the differences in the intervention formats between children with disabilities and the general population. Indeed, investigating the difference between individuals with disabilities and the general population of elementary-aged children would add significantly to literature. A second limitation to this study is that, as this study was reading-specific, the success of a specific format of intervention may differ depending upon the intervention itself. In other words, these results may not generalize to other interventions, such as mathematics. There are several evidence-based interventions in the literature, as well as different types used in the school system, that may have a different impact on elementary-aged children than the tutoring used in this research. It would be valuable to investigate how effective these other interventions are and if they produce the same results as the current study. Thus, the implications from this research can fuel future investigations in this field.

From this current research, ideas for future investigations could arise that may enhance the understanding of interventions for elementary-aged children. Future research into the specific aspects of small group tutoring may identify how influential the social aspect, activities, or inclusiveness of the small group format is on success. Indeed, this may help school systems to effectively and efficiently embed the most successful components into interventions. Additionally, this increased understanding could trigger an additional line of research related to identifying the most beneficial intervention format(s) or components for a broad range of specific disabilities.

In conclusion, this study gives those working in the school system, including teachers, school psychologists, tutors, principals, and special education teachers, information

regarding the benefits of small group tutoring for elementary aged children. This research study can further assist those working with children the information needed in order to provide children the best educational opportunities. Overall, utilizing small group tutoring in the school system may be more effective than other types of interventions and, by using small group tutoring, extra help will be provided to students with or without identified learning disabilities, which result in higher reading achievement.

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