A meta-analysis of measures observed for interventions in reading comprehension for middles school students with learning disabilities

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**Abstract**

A meta-analysis was conducted to research the measures routinely used to conduct interventions for improving reading comprehension for middle school students with learning disabilities. Ten studies, published between 1995-2011, were identified and coded. The meta- analysis explored the question to what extent are reading comprehension measures being evaluated and implemented for students with learning disabilities in a middle school setting? The findings revealed that within the measure there are three main themes of identifying the main idea, questioning, and summarization of the passage read used to assess the effectiveness of interventions for reading compression. These three themes need to be incorporated in measures to ensure the effectiveness of reading interventions in middle school for students with learning disabilities.

Keywords: *reading comprehension, measures, students with learning disabilities, reading achievement, middle school, junior high school*

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In the United States and most other second and first world countries, the ability to read is considered a life skill. Human beings are not born knowing how to read, but rather develop the ability over time through formal education or other alternative methods. What happens when an individual does not develop this skill? How does an individual function in our society? It often depends on where that individual resides, but for the purposes of this paper let’s say the United States. One could surmise daily activities, often taken for granted by the mainstream become roadblocks for the illiterate portions of our populations. For example, a teenager who cannot read, also cannot write, which affects their productivity in school, completing job applications, reading instructions, directions, taking notes, reading signs, passing drivers tests, so on and so forth. After a while, strategies to cope will be used, such as technology to navigate directions or a map, technology to takes notes, memorizing some words and their corresponding symbols, but they will be hiding a secret they are ashamed of, which could lead to internal struggle, and the feelings of resentment, depression and solitude (Calhoon, 2005).

According to the National Institute of Literacy (2003), in United States alone 32 million adults cannot read. That's equal out to 14% of the population. To break it down even further 21% of adults in the US read below a fifth grade level and 90% of high school graduates read on a basic comprehension level (Solis, Miciak, Vaughn, & Fletcher, 2012). This affects individual’s job occupation, job stability, self-esteem, and their ability to become productive citizens.

With policies and resources being allocated into public education, students should have access to support needed to excel in reading. The same policies and resources given to schools to help students achieve reading in public education have also created a gap between different groups of students in school. One group in particular is students with learning disabilities. According to data in 2013, 69% of fourth graders and 60% of eighth graders with disabilities score beneath the basic level on the national assessment of educational progress reading test, signifying performance well beneath grade level expectations. However, nondisabled peers have 27% of fourth graders and 18% of eighth-graders score beneath basic on the reading tests (Solis, Miciak, Vaughn, & Fletcher, 2014). Students with learning disabilities continue to struggle in reading particularly from the transition from elementary school to middle school. One explanation for the increased gap can be attributed to the fact that students are required to comprehend their text at a greater level. When students transition from elementary to middle school, they encounter a shift from old routines to new experiences. In middle school, the students’ are now expected to independently manage their assignments, workload, and effectively organize and plan (Cleary, 2009). As a result, students with learning disabilities in middle school experience significant difficulty reading and interpreting text books because reading comprehension is a vital role in classroom instruction. (DiCecco & Gleason, 2002).

With comprehension being a crucial concepts presented in textbooks, it has a direct impact on students with learning disabilities being able to have access to the curriculum and achieving academic success. (Swanson, Hairrel, Kent, Callo, Wanzek, & Vaughn, 2014). It is important that a middle school have effective interventions to support students with learning disabilities and reading. According to Cleary and Callan (2014) an intervention is a specific program or set of steps to help a child improve in an area of need. Fundamental components of effective comprehension interventions contain recognizing main topic, be able to paraphrase the story read, self- questioning, activating students’ prior knowledge, and summarizing the read material (Cleary & Chen, 2009).

With reading being such a vital life skill for an individual to function in our society, it is important that we ensure that we have valid measures when we are implementing interventions for reading comprehension to support our middle school students with learning disabilities. Continued research in reading is important to helping students with learning disabilities become successful readers by using the best measures and interventions that are available. Analyzing the specific measures and how they are being incorporated into the intervention is essential to discover if the measures for the intervention has a direct impact on a students with a learning disability (Gajria, Jitendra, Sood, & Socks, 2007). It is important to conclude that students with learning disabilities are not affected by the measures that are being implemented in an intervention. For example, if an experimental group of students with learning disabilities were receiving a reading intervention, they should receive a similar amount of growth regardless of the measures being used. The intervention should be the overall effect, not the measure used in the intervention.

**Research Question**

As a researcher, it is important to recognize that all interventions targeted toward middle school students with learning disability in reading are not equal and as such the effectiveness of individual measures vary (Kim, Vaughn, Klingner, Woodruff, Reutebuch, & Kouzekanani, 2006). Consequently, there is a need for reading intervention programs in middle schools whose elements can be measured for individual effectiveness. In this paper, the purpose of my meta-analysis is to examine to what extent the effectiveness of reading comprehension measures being evaluated and implemented for students with a learning disabilities in a middle school setting. The research questions that will guide this mea-analysis are:

What individual measures have any bearing on the effectiveness of a reading comprehension intervention for students with learning disabilities?

What are the common strategies used in implementing measures for reading comprehension intervention for students with learning disabilities?

**Method**

**Search Procedures**

A comprehensive literature search was conducted looking at all peer-reviewed articles in all major database ( PsycINFO, Social Science Citation Index, Education Research Complete, and APA Education Psychology Handbook) to identify studies using the key words *reading comprehension, measures, students with learning disabilities, reading achievement, middle school, junior high school.* All dissertations and books were excluded. All articles must be written in English and pertain to research done on school systems in the United States. (Public, private, and alternative schools were included). All searches had to have an experimental or quasi- experimental design. All single- subject studies were omitted. A hand search was included in Exceptional Children and Journal of Learning Disabilities. All studies were included that ranged from 1995 through 2015.Initially, the search yielded 1,273 articles. I narrowed it down to nineteen articles pertaining to my study dates ranging from 1995 to 2015. Ten articles made my inclusion criteria. Ancestry searches were completed on all obtained articles and relevant review articles.

**Inclusion/Exclusion**

Studies were included in the meta-analysis if (a) students had to have a specific learning disability (LD), who currently were struggling with reading comprehension ranging from upper elementary school through middle school (4-8); 9grade studies could be included as long as the participants were less than thirty percent of the study, (b) the intervention had to have a primary focus on reading comprehension with measureable tools. Other variables could be incorporated but reading comprehension has to be the primary focus (e.g. self-regulation) (c) the articles had to have an effective size, (e) to meet the identification as a student with a learning disability, the students had to meet the requirements of IDEA. The student with a disability had to be classified as a struggling reader. A struggling reader was identified as an individual who was reading below their current grade level (2-4 levels below), (f) articles that include other disabilities or students with disabilities were include as long as thirty percent of the study had students with learning disabilities and they could be clearly distinguished in the study, and (g) all articles had to have a least one measure.

 Studies were excluded, (a) if the study was published prior to 2000, (b) any students that was considered as a struggling reading but not LD was excluded(c) if the article addressed conducted research in another county(d) studies that had the primary focus of characteristics of students with reading were excluded, (e) if the study was not peer reviewed (dissertation, book chapter and master thesis), (f) if the study employed a single-case or single-group design, (g) if the study specifically excluded students with LD from participation, and (h) all other disabilities were omitted unless they meet the inclusion criteria (e.g. ADHD and Dyslexia).

**Coding**

A coding instrument and coding manual with coding conventions were developed for systematic review. The coding conventions included, (a) study identification and information (e.g. author(s), year, publication), (b) characteristics of the sample (e.g., total number of participants, total number of special education students (with LD), data being disaggregated for students with LD, (c) description of intervention (e.g., description of intervention, learning component of intervention, duration of intervention,), (d) design features (e.g., design type, description of design, type of group assignment), (e) measures (e.g., total measures, intervention measures, measure description and scope of measures), (f) Procedures (e.g., teacher fidelity, student fidelity) and (e) results (e.g., significance). Coding conditions were established for each variable.

The journals were coded using quality indicators to ensure that the journals were creditable and aligned to the research topic. The journals focused on reading comprehension and interventions with middle school students with learning disabilities. All the journals incorporated interventions that had to clearly define the measures used in the intervention. It was important to have measures that were clearly described. A clearly described measure in a journal allows the researcher to categorize the measures. The coder was a doctoral student who received training in coding procedures.

**Results**

All studies involved students with learning disabilities who were struggling readers in elementary school through the completion of middle school (4th through 9th). The interventions related to reading comprehension for students with learning disabilities. There were ten studies that met the inclusion criteria between 1995 through 2015. All studies were from experimental groups of students with learning disabilities that ranged from four to fifty-nine participants. The journal of the studies consisted of *Learning Disability Quarterly, Journal of Learning Disabilities, The Journal of Special Education, Remedial and Special Education, and Reading and Writing Quarterly.* In the meta-analysis, the studies were coded for students with learning disabilities, reading comprehension interventions, and particularly what were the measures being used to assess the effectiveness of the intervention? See Table1 for the ten studies that met the inclusion criteria. In Table 2, the calculated effect size was displayed. Overall, when looking at the studies in Table 1, there were several embedded themes discovered within the measures for the interventions for students with learning disabilities. In addition, the embedded themes that were revealed within the measures were identifying the main idea, questioning, and summarization of the passage read. **Main Idea Identification**

 There were several studies that had students identify the main idea as their measure for reading comprehension in an intervention. It must be noted that identification of the main idea was not the only component in the measures. Many articles had several measures within them. In identifying the main idea, the students with learning disabilities were often asked to read a passage and verbally or in writing identify the main idea. Jitendra, Cole, and Wilson (1998) used a main idea direct instructional program and self-monitoring program to support reading comprehension. The interventions consisted of students with learning disabilities working with two doctoral students reading a passage and identifying the central action of a person, naming groups, identifying alternative options in the passage, and identifying the main idea. The intervention was administered for three months. The performance on narrative passages had a large effective size of 1.89, improved for all students with learning disabilities receiving the intervention. In contrast, the performance of the control group remained the same. Kim et al., (2006) used a computer-based program to increase reading comprehension of students with learning disabilities identifying the main idea independently and with a partner. A researcher and teacher gave the intervention for ten to twelve weeks. The intervention with the measure produced a small effect size of 0.42. Bakken, Mastropieri, and Scruggs (1997) focused on reading comprehension within science by identifying the first sentence of the passage and list and organize the main topics in the passage. The intervention was given by the researcher. The intervention was ninety-four minutes for three sessions. The intervention produced a moderate low effect size of .59. Johnson, Graham, and Harris (1997) employed a retelling format to examine the “conditions of four instructional conditions on each of the retell measures (main idea, details, and total part rating)” (p.87). The intervention was given by graduate student’s that lasted four to six weeks. The intervention had a large effect size of 1.27. Identifying the main idea was a procedure that was used in many articles; however, there were other measures used.

**Questioning**

 Within the studies, there were different interventions and measures. Every article had certain measures it used to test the effectiveness of the reading comprehension intervention. Several articles used questioning as the main measure to address reading comprehension. The concept of questioning usually involved students with disabilities reading a passage and responding to questions orally or written. Berkeley & Riccomini (2002) implemented a comprehension monitoring strategy steps that were provided for students. The steps that was used was a mnemonic phrase called QRAC- the-Code. QRAC-the-Code taught the students to “(a) question (turn headings into questions), (b) read (read the section and stop), (c) answer (can I remember my questions?), and (d) check (see if your answer was correct)” (p. 5). Students with learning disabilities received the intervention for three days. There was an improvement of comprehension of text with questioning for students with learning disabilities. There was an upper moderate effect size of 0.73. Berkeley, Mastropieri, and Scruggs (2011) conducted a reading comprehension strategy (RCS) with which they taught six reading comprehension strategies and attribution retraining (AR). Focusing on RCS, the students with learning disabilities were taught “(a) setting a purpose, (b) previewing, (c) activating background knowledge, (d) self-questioning, and (e) strategy monitoring” (p. 20). The intervention was given over a four-week period. Finding for the RCS group, using questioning as their measures, suggested benefits in learning content with reading with a large effect size of 0.94.

In Boyle (1996), students with learning disabilities worked with a researcher who administered eleven, fifty minute sessions of reading a passage and having the students with learning disabilities responded to 15 comprehension questions pertaining to the passage. The questions were literal (repeat or recognize information) and inferential (mentally manipulate information). Students with learning disabilities had a small effect size of .17 with the intervention. Nonetheless, questioning was a measure that was used to aid in the structure of the intervention. Lastly, there was a final theme that was revealed within the measures for the interventions.

**Summarization**

This measure required that the students have the ability to express in writing the specific details and sequence a passage read. Previously noted, the measure of summarization was often implemented with other variables to assess reading comprehension. For example, DiCecco and Gleason (2002) with teacher support had students with learning disabilities use a graphic organizer for a four week period to summarize in sequence what they read from social studies textbook. They produced a large effect size of 1.66 from this intervention. In Calhoon (2005), the author used linguistic skills training (LST) and peer assisted learning strategies (PALS). In PALS, the author had the intervention taught by the teacher to the students with learning disabilities for thirty-one weeks. The students with learning disabilities implemented paragraph shrinking to assess comprehension (this is a similar concept of summarization with reading passages). The intervention yielded a moderate effect size of 0.70. Bryant, Vaughn, Linan- Thompson, Ugel, Hamff, and Haugen (2000) used word identification, partner reading, and collaborative strategic reading (CSR) to aid in reading comprehension. CSR had the students with learning disabilities identifying prior knowledge about the passage, self-questioning, identify main idea, paraphrase, and summarize. The intervention was given to students with learning disabilities for sixteen weeks by their teacher. There was a small overall effect size of 0.27.

In essence, the articles that fit the criteria for this meta-analysis all had various components used as measures. Some studies were more explicit with their measures. However, it is recognized that a majority of the studies incorporated different aspects of measures to support the reading comprehension intervention. With all the measures, one could still decipher themes within the measures.

**Duration**

 With the aforementioned studies discussed, there was a wide range duration implementation for the interventions. The interventions ranged from three days to seven and half months (Berkeley & Riccomini, 2-11; Calhoon, 2005).

**Discussion**

In summary,based on the meta-analysis of the ten studies used in the paper, there is a multitude of interventions and measures being used to support middle school students with learning disabilities with reading comprehension. The studies covered students from fourth through ninth grade. All races, genders, and social economic class were part of the study. The meta-analysis was important to gain a deeper understanding of the measures being implemented in middle school with students with learning disabilities and their effectiveness in validating an intervention.

With all the interventions in middle schools being implemented, it is critical that researchers focus their attention on measures and how they are being used to assess the effectiveness of an intervention. Overall, there is no identified agreed upon measure (aka gold standard) that has been implemented for intervention research for reading comprehension of middle school students with learning disabilities. For example, a researcher might use a form of questioning techniques to assess the effectiveness of an intervention. In contrast, another researcher might use a form of identifying the main idea in a reading passage to assess a reading intervention. Consequently, how are we ensuring that students are receiving a true benefit from an intervention? How do we know if the intervention is effective or is it the measure that gives the invention its effectiveness? As researchers, how can we truly measure the effectiveness of an intervention if we cannot say in confidence that these are the best measures for the intervention? The field requires more research on focusing on the measures being used in an intervention. Researchers need to have a clear understanding about the measures and its effectiveness for students with learning disabilities. The more researchers strive to attain true measures, the closer they will be able to obtain absolute academic growth in reading with students with learning disabilities.

When addressing the research questions stated in the study, the question asked about the individual measures and it’s bearing on the effectiveness of a reading comprehension intervention for students with learning disabilities? It was discovered that when an intervention had embedded measures that involved questioning of students with disabilities the study had a higher effect size. One conclusion can be the strategies and concepts that were involved in the study. Questioning is a metacognition skill. In fact, much of learning is a conscious process that incorporates metacognitive knowledge and skills as key components (Zimmerman, 2014). These metacognitive skills and knowledge can be learned, and so, the students can "learn how to learn"(Cleary & Callan, 2014). For instance, In Berkeley and Riccomini (2011) the researchers used QRAC-the-code to teach students with disabilities how to ask the right questions to learn. One could surmise, that creating an intervention that help students become aware of their inquiry process and an ability to reflect on it could enable students to improve their learning expertise while also acquiring subject matter expertise (Swanson, 2014). With that being said, when implementing measures in an intervention it must have embedded metacognition skills to as fundamental components (Zimmerman, 2008).

When researching the question about common strategies used in implementing measures for reading comprehension intervention for students with learning disabilities, there were common variables revealed. The strategies in the studies incorporated working with the student’s one-on-one instruction and teaching the intervention, shared vocabulary knowledge, back ground knowledge, and active reading and task persistence. These are evidence-based strategies that are used to increase reading comprehension (Gersten, Fuchs, Williams, & Baker, 2001). It is still not clear if the measures effect the effectiveness of the intervention or if the strategies used to implement the invention have any bearing. There seems to be a combination of factors that can be incorporated to increase the effectiveness of a reading intervention for students with learning disabilities.

When considering reading comprehension intervention measures for students with learning disabilities in middle school, researchers should take in consideration measures that involve metacognition skills (Cleary, 2009). The measures should also focus on the components of embedding the main idea, questioning, and summarization. In the meta-analysis, it was discovered that these three measures, with a metacognitive element and specific strategies used for the intervention, are important components that must be integrated in measuring the effectiveness of reading comprehension interventions.

**Limitations**

There are several limitations to this meta-analysis. The most important is the inexperience of the researcher. As a developing researcher, it is difficult interpreting and analyzing the research presented in the study. It is also important to note the restraints of the timeline of a semester to conduct a thorough meta-analysis. The sample size consisted of ten studies that ranged from 1995 to 2015. Allowing for a wider span might present additional information to strengthen the meta-analysis. The next steps should include extending the parameters of the search to include K-12 students with learning disabilities. As a developing researcher, I would suggest continued research on this topic with further analysis of the measures being used in reading comprehension interventions.

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**Tables**



