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The Effects of Multiple Exemplar Instruction on Reading Comprehension for a Secondary Student with a Reading Delay

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Abstract

This study tested the effects of multiple exemplar instruction on reading comprehension for a middle school student with a reading delay. A multiple probe design was used to evaluate and observe the changes in the number of questions the student answered correctly. Probes consisted of: (1) pre-experimental, (2) single exemplar instruction (SEI), (3) post-SEI, (4) MEI, and (5) post-MEI. The independent variable was a multiple exemplar intervention that required the student to read a passage across three topographies (silently, listening, and aloud).

Multiple exemplar instruction was shown to be effective in increasing the number of questions answered correctly during single exemplar instruction probes. The effects of MEI on reading comprehension for this student as well as limitations and future research of the study are discussed.

Keywords: multiple exemplar instruction, reading comprehension, multiple probe design
The Effects of Multiple Exemplar Instruction on Reading Comprehension for a Secondary Student with a Reading Delay

Reading comprehension plays a significant role in how a student will perform in an academic setting and on routine academic standardized tests. Catherine Snow (2002) defines reading comprehension as "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (p. xiii). For a reader to comprehend they must have a range of abilities such as, but not limited to attention and memory skills, motivation, and knowledge of different topics (Catherine Snow, 2002). Those with reading delays may have difficulty with this particular ability. According to the National Assessment of Educational Progress (2013), only thirty-four percent of fourth grade students read at their grade level. Students who are in fourth grade and do not read at their grade level are four times as likely to drop out of high school (National Assessment of Educational Progress, 2013). It is important to find interventions to decrease the likelihood of students dropping out of high school.

Justine Fancher (2007) evaluated the effects of reading comprehension after a student was instructed to read a passage silently or aloud. Results indicated that reading aloud produced higher comprehension scores on the Qualitative Reading Inventory-4 assessment for sixteen students (Francher, 2007). Mustafa Turkyilmaz (2014) examined the relation among oral fluency; silently reading fluency, retell fluency, and reading comprehension for 399 fifth-grade students. Reading comprehension tests was used to assess reading silently and their comprehension abilities. Results showed that reading aloud produced higher comprehension scores than silent reading (Turkyilmaz et al., 2014). Reading aloud has been extremely effective in increasing students comprehension levels, however the goal of this project is to teach the
student how to comprehend information when asked to read silently. The goal of this project is to evaluate whether MEI can increase reading comprehension when instructed to read silently.

Multiple exemplar instruction can be defined as directly teaching behavior with a variety of stimulus variations or response topographies that ultimately helps to ensure a learner acquires a desired response in the form of multiple untrained topographies (Rosales, Rehfeldt, Lovett, 2011). R. Douglas Greer (2007) evaluated the effects of MEI on the ability to name objects compared to singular exemplar instruction (SEI). Using a multiple probe design, including SEI and MEI probes, the conclusion was that MEI resulted in the naming ability based on correct responses in the experiment (Greer et al., 2007). Silber and Martens (2010) evaluated MEI effects on reading fluency and compared it to repeated reading. Participants were first and second-grade students. Using passages in both repeated reading instruction and MEI, it was determined that student who received MEI had higher fluency and comprehension gains than the control and repeated reading group (Silber & Martens, 2010). Although there is significant research using MEI, there is currently no research on how to implement MEI across three reading topographies to evaluate or improve reading comprehension for students.

There is a need for reading interventions that focus on increasing students’ comprehension levels. The purpose of this study is to provide an efficient reading intervention to increase the student’s reading comprehension scores and extend current research on multiple exemplar instruction (MEI). Multiple exemplar instruction across three different topographies: reading silently, aloud, and listening was used to help increase comprehension scores when required to read silently.
Method

Participant

This study involved one student from a local middle school in Kalamazoo, Michigan. The participant was a 13 year old male currently in the 8th grade. The student was recommended for this study because his reading comprehension test scores indicated that he had a reading delay of two or more years. Additional requirements for this student included: (a) referral by a teacher or counselor because of a history of reading challenges, specifically to reading comprehension (b) data from educational record indicating that the student read between the 10th and 40th percentiles on a standardized test administered less than 1 year and 2 months earlier, (c) a delay of two or more years in reading based on normative age or grade equivalent data on a standardized test, and (d) availability for weekly 35 -minute test sessions. The student would have been excluded if he did not meet this criterion. This student was also selected because he was within close distance to Western Michigan University.

Setting and Materials

Sessions took place in a quiet library study room located at the middle school. Only the primary observer and student were present during the session. There were limited distractions so that the student could focus on the given task, and requirements. Before starting this research, the primary observer collected standardized test scores from the previous 14 months. Students who were selected based on their standardized test scores were given the San Diego Quick Reading Assessment and the Test of Reading Comprehension (TORC) 4 Assessment to ensure the reliability and validity of the student's reading comprehension scores. After the tests, the pre-experimental probe was implemented. The student was given a passage and comprehension
questions from either the Comprehensive Assessment of Reading Strategies (CARS) book or from the ReadWorks website. All reading passages given to the student were appropriate for the student's grade level. Passages contained reading comprehension questions that focused on: finding main idea and the author's purpose, recalling facts and details, comparing and contrasting, understanding sequences, making predictions, etc. Comprehension questions were answered using a number 2 pencil. An additional researcher present completed fidelity checks at each session. Data collection occurred with a pencil and data sheet after the student answered all comprehension questions.

**Procedure**

*Design.* To evaluate the effects of MEI a multiple probe design was used. The dependent variable was defined as the number of correct responses to comprehension questions. The independent variable was a multiple exemplar intervention across three topographies: silent reading, reading aloud and listening to the instructor read the passage. Probes consisted of (1) a pre-experimental probe which determined the comprehension baseline for the student, (2) a single exemplar instruction, (3) a post-single exemplar instruction, (4) a multiple exemplar instruction, and (5) a post-multiple exemplar instruction probe.

*Procedure.* The instructor and student were seated at the table in the quiet library study room. Sessions began with the instructor explaining to the student the procedure instructions, requirements, and expectations. Depending on the condition, instructions and requirements varied. Once the instructor obtained eye contact and the response "I'm ready" from the student, the procedure antecedent was delivered. For single-exemplar instruction probes, the antecedent was "Please read the passage silently. After reading the passage silently you will answer ten
comprehension questions. The antecedent for multiple instruction was "You will read the following passages three ways: silently, aloud and listening. You will then answer ten comprehension questions after reading the passage." Instructional sessions were to be continued until a mastery criterion was met (80% or better for three consecutive sessions or 100% for one session). A new passage and comprehension questions were given to the student for each session. New passages and questions were given each session to eliminate confounding variables that could occur after reading the same passage multiple times. The student would be instructed to return to the previous probe if three consecutive scores were below 50%.

Pre-Experimental Probe (Phase 1). The student was presented with two passages with 12 comprehension questions each from the research-based Comprehension Assessment of Reading Strategies (CARS) booklet. The student was instructed to read the passage silently and answer the 12 comprehension questions that corresponded to each passage. No reinforcement or correction procedure was delivered for questions answered. The instructor presented the passage and comprehension questions to the student, waited for the student to complete the task, and then proceeded to the next probe.

Single Exemplar Instruction (Phase 2). The student was present with a new passage and new comprehension questions. The instructor began each session by explaining to the student the different types of comprehension questions he would have to answer after reading the passage. The student was then instructed to read the passage silently and answer the comprehension questions. Reinforcement in the form of verbal praise was given for comprehension questions answered correctly. For incorrect questions, the correction procedure consisted of the experimenter reading the question, explaining the objective for the question, referring to the section of the passage that provided the answer, then providing the student with the correct
answer. Verbal praise was not delivered for questions answered incorrectly. The mastery criterion was 80% across three consecutive sessions or 100% for one session. Following mastery, a probe was conducted on the topography that had been taught.

*Post Single Exemplar Probe (Phase 3).* The same procedural condition as in phase 2 was implemented, expect no reinforcement or correction procedure were delivered for questions answered. The instructor presented the passage and comprehension questions to the student, waited for the student to complete the task, and then proceeded to the next probe.

*Multiple Exemplar Instruction (Phase 4).* MEI across three reading topographies (silently, aloud, and listening) was implemented. The order in which each topography was introduced was rotated each time. Rotation order was predetermined so that the student was not required to read the passage the same way two times in a row. Verbal praise was not delivered for questions answered incorrectly. A mastery criterion was 80% across three consecutive sessions or 100% for one session. Following achieving the mastery criteria, a probe was conducted to be conducted on the topography that was taught.

*Post Multiple Exemplar Instruction Probe (Phase).* The same procedural condition in phase 2 was implemented. The student was presented with a new passage to read silently and comprehension questions. Expect no reinforcement or correction procedures were delivered for questions answered. The instructor presented the passage and the comprehension questions to the student, waited for the student to complete the task and then proceeded to the next session.

**Interobserver Agreement**
Data were collected on the student's answers to comprehension questions for each condition. Correct responses were recorded by making a plus (+) on the data sheet, and incorrect responses were recorded with a minus (-) on the data sheet.

*Interobserver Agreement.* IOA was computed by taking the number of agreements for comprehension questions answered correctly and incorrectly between the instructor and research assistant and dividing it by the total number of agreements plus disagreements for comprehension questions answered correctly and incorrectly.

*Fidelity Checks.* A fidelity checklist was used to ensure that all sessions were implemented correctly and to evaluate the student's accuracy of responding. Fidelity checks were performed on 50% of the sessions. 100% accuracy was attained for both the instructor and student rate per minute for correct and incorrect responses.

**Results**

The purpose of this study was to determine if multiple exemplar instruction (MEI) increased reading comprehension for a student with a significant reading delay. Results indicated that after implementing MEI the student’s reading comprehension scores for passages read silently increased. The student’s reading comprehension at baseline was 67%. The student answered 8 out of 12 comprehension questions correctly for two consecutive sessions. This score was extremely low for an 8th grade student. Based on the student’s scores during the pre-experimental probe, it was determined that comprehension was an area of concern and this intervention might be beneficial for him. The student answered all comprehension questions correctly (100%) after receiving single-exemplar instructions; e.g., the student met mastery the criteria after one session.
**Post-Single-Exemplar Probe.** On each of two sessions, the student received a 50% (4 out of 8) during the post-single exemplar probe. Two additional sessions were implemented to help reach the mastery criteria. The participant received 63% (5 out of 8) however; these two sessions were omitted from the data and will be explained in the discussion session. The student did not meet mastery criteria during the post-single-exemplar instruction probe and was required to move on to MEI.

**Multiple Exemplar Instruction.** Three sessions were conducted in the multiple exemplar instruction probe. Each session resulted in an 83% (10 out of 12). The student achieved mastery criteria and move on to the last probe.

**Post Multiple Exemplar Instruction Probe.** There were two sessions presented in this probe. Session 1 resulted in a 67% (8 out of 12). Session 2 showed an increase of 8% with a score of 9 out of 12 (75%). Although the student did not meet mastery criteria, there was some variability shown in the scores following the Multiple Exemplar Instruction. The data are significant because, before the MEI probe, the participant had not demonstrated any variability between sessions. The data was consistent (as shown in figure 1). Whereas for the post-MEI probe, showed an increase in the number of comprehension questions answered correctly. There was no variability in the student’s scores during the first session of MEI. Results showed an increase in the student’s comprehension scores after MEI.

**Second Multiple Exemplar Instruction Probe.** After the Post-MEI phase, an additional five sessions were conducted to show additional data on the effectiveness of MEI. The first two sessions resulted in a 60% (6 out of 10). The student received an 80% (8 out of 10) for the third session, and a 90% for the fourth and fifth session.
Figure 1. Shows the percentage of questions answered correctly in each session for each probe.

**Discussion**

The current study sought to determine if multiple-exemplar instruction increased silent reading comprehension. Based on the results, it was hard to conclude that MEI could have a significant effect on the student’s reading comprehension due to the limited amount of MEI sessions. The student was identified as having comprehension problems during baseline (67%). The student received 100% during the first single-exemplar instruction probe. Two additional sessions were conducted during this time, but were omitted to keep consistency in the amount of sessions analyzed for each probe. The difference in these scores showed that when the student received detailed instructions on identifying different types of comprehension questions comprehension scores were higher, however independent silent reading comprehension scores were lower. This observation is normal with 1st to 5th grade students. However, by 8th grade
students are expected to work and comprehend material independently when required to do so. Our participant however needed additional support in this area. Additionally, three limitations were identified at the time of the study.

The student’s motivational level during session was low. After the student completed the comprehension questions, he was asked to choose a reinforcer. After a few instances of receiving the same reinforcer, satiation of the reinforcer could have affected their motivation level to read and complete the comprehension questions to the best of his ability. Future research should implement preference assessments to identify more reinforcers. Preference assessments may increase the student’s motivational level during sessions. Three passages with comprehension questions were completed each session. Decrease in the student's motivation levels could have also been caused because the student’s response effort during each session was too high. Lastly, due to the amount of time and the participating dropping out, the study's fluency and generalization/maintenance probes were not implemented. In this study, it was noticed that the mastery criteria was difficult to meet. Mastery criteria were set at 90% for two sessions; this was difficult to obtain when asked to complete 12 comprehension questions. For example, ten correct answers out of 12 possible questions are equal to an 83%, which does not meet mastery criterion. Future research should focus on only doing ten comprehension questions to make sure that mastery criteria could be met.

In summary, the present study showed that there was an effect on reading comprehension during the post-MEI probes. Even though this intervention could be implemented in a classroom to help students struggling with reading comprehension while reading silently, it is difficult to tell whether individual schools would utilize the intervention in their curriculum.
Future research in this field or similar areas should focus on selecting more students, which could potentially help with the generalization and replication of data found. Future researchers may also consider replication across different grade levels. Comprehension Assessment of Reading Strategies (CARS) passages were used, researchers should consider a variety of age appropriate reading passages for the student(s) they are working with. Fluency building instruction and probes should be incorporated to examine multiple-exemplar instructions effects on fluency when instructed to read aloud. Future researchers should also conduct more sessions for each probe, to see if there is any variability between the probes. Additional research and replication using this method is recommend for future researchers and projects.
References


http://www.readingrockets.org/helping/target/comprehension


Hill-Powell, J. M. (2015). *The effect of reading intervention to teach silent reading with comprehension on the speaker-as-own-listener capability among third grade students*


http://nces.ed.gov/nationsreportcard/naepdata/
Appendix A: Data Sheet

<table>
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**PARTICIPANT NAME:**  
**SCORER's INITIALS:**  
**DATE:**  
**BEGIN/END TIME:** ________ : ________
Appendix B: Sample Passage

Read this fable about two frogs. Then answer questions about the fable. Choose the best answer for Numbers 1 through 12.

There was once a big frog and a little frog. They lived together in a small pond for many years. One summer the weather was very hot. There was no rain. The small pond dried up. The frogs had to find a new place to live.

The frogs went in search of a new home. Many days passed. The frogs were tired from traveling. They finally came to a deep well. The little frog smiled. “This looks like a good place to live,” he said. “The well is wet and will keep us warm.”

The big frog looked down into the well. “I am not so sure,” he said. The little frog hopped up and down. “Let’s jump in and see,” he said. But the big frog was much wiser than the little frog.

“Not so fast,” the big frog said. “What if this well dries up like the pond? How will we get out?”

The little frog learned an important lesson that day. The lesson was this:

Always look before you leap.
## Appendix C: Sample Comprehension Questions

### Finding Word Meaning in Context

7. The word *search* means
   - A. “look for.”
   - B. “find out.”
   - C. “warm and deep.”
   - D. “very hot.”

### Understanding Author’s Purpose

10. What does the author probably want you to know?
   - A. Frogs like to live in ponds.
   - B. Ponds can dry up in summer.
   - C. People should learn more about frogs.
   - D. Some ideas are not as good as they seem.

### Drawing Conclusions and Making Inferences

8. You can tell that frogs like to live in places that are
   - A. deep and cool.
   - B. warm and dry.
   - C. wet and warm.
   - D. cold and wet.

### Interpreting Figurative Language

11. The fable says: *Always look before you leap*. What does this mean?
   - A. Never jump into a well.
   - B. Not all frogs can jump high.
   - C. Think about something before you do it.
   - D. Be careful when you move to a new place.

### Distinguishing Between Fact and Opinion

9. Which of these tells what someone thinks or believes?
   - A. The pond dried up.
   - B. A well is a great home for frogs.
   - C. The frogs need a new home.
   - D. Two frogs lived in a pond.

### Distinguishing Between Real and Make-believe

12. Which of these could really happen?
   - A. Two frogs speak.
   - B. Two frogs live in a pond.
   - C. Two frogs build a deep well.
   - D. Two frogs buy a new house.
Comprehension Procedure

Test Item #: C8, C9

Item: What is the student’s level of reading comprehension when reading silently.

Testing methods: Short Reading Comprehension Passages followed by answering multiple-choice questions

Materials:
1. Two or three selected worksheet passages from grade level CARS book
2. Two or three selected worksheet passages from grade appropriate CARS books
3. 6-10 comprehension questions
4. Timer
5. Data Sheets

Instructions:
1. The examiner hands out a copy of the selected worksheet passage from CARS
2. The examiner says, “Please read the following passage silently.
   a. Time/record how long students take to read the passage
3. Upon completion of reading the passage, instruct the student to turn the passage worksheet over (there should be 6-10 comprehension questions reflecting the main idea, purpose, or general information after reading the passage).
4. Provide 3-8 minutes for the student to answer the comprehension questions.
   a. Time/record how long students take to complete comprehension questions
5. After students answer questions, pick up the student’s worksheet and score the number of questions the student answered correctly and incorrectly.

Data Collection
1. Score (+) for correct answers to questions
2. Score (-) for questions answered incorrectly

*Percentage (# of correct responses to questions divided by total # of questions answered)