


Teaching Students With Intellectual Disability to Use a Self-Questioning Strategy to Comprehend Social Studies Text for an Inclusive Setting

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Abstract

Using a modified system of least prompts, two classroom teachers taught three participants with moderate intellectual disability to generate questions about United States history. After reading brief portions of the text aloud to the participants, the teachers taught participants to identify if the answer to the question was in the book or not in the book. Finally, participants were taught to answer the literal questions that could be answered from the book. Participants had a graphic organizer with WH question words, the text section heading, and a self-monitoring sheet. All participants improved the number of questions generated and answered from baseline to intervention. Additionally, probes collected in a general education setting indicated students improved their question generation and comprehension skills during lessons taught in a fifth grade classroom.

Keywords

listening comprehension, inclusion, system of least prompts, moderate intellectual disability, social studies, alternate achievement literacy

Learning to comprehend text is a critical component of the school experience (Mastropieri & Scruggs, 1997). Without this skill, students are unable to understand the meaning of information they read or hear. Both listening comprehension (the ability to understand language) and reading comprehension (the ability to decode and develop meaning from text) are necessary components of literacy. The English-Language Arts Common Core State Standards (CCSS; Common Core State Standards Initiative, 2010) emphasize comprehension for both narrative and expository texts. Engaging students in texts read aloud is one way to improve listening comprehension skills for all students (R. Vacca, Vacca, & Mraz, 2011). For students with intellectual disability who have limited reading skills, listening may be the primary means of access to general education texts for their assigned grade level.

In their comprehensive review, Hudson and Test (2011) found read alouds to be an evidence-based practice for teaching literacy skills to students with moderate and severe disabilities. One of the earliest demonstrations of how to make a read aloud applicable to texts for older students was the work of Browder, Trella, and Jimenez (2007), in which teachers learned to follow a task analysis to engage middle school students with intellectual disability in the reading of novels adapted with summaries and picture supports. The task analysis included comprehension skills, like making a prediction and answering a literal recall question.

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Mims, Hudson, and Browder (2012) applied a similar strategy with students with autism spectrum disorders who also had an intellectual disability in reading aloud autobiographies. Mims et al. measured comprehension of a variety of questions and taught students to follow a least intrusive prompting strategy to locate the answer. This prompting involved rereading the paragraph, then a sentence, and then the word itself as needed to help the student pinpoint the answer. Others have applied this same least intrusive prompting strategy to teach comprehension of text to students with moderate intellectual disability (Browder, Hudson, & Wood, 2013; Hudson & Browder, 2014; Hudson, Browder, & Jimenez, 2014; Mims, 2009). In all of these studies, the text was modified by lowering the readability level to promote understanding.

Because creating parallel materials for all general education resources is an arduous undertaking, it is important to consider whether students might be able to use some original sources with modifications, such as reading small passages or using advanced organizers. In a study by Shurr and Taber-Doughty (2012), students with moderate intellectual disability were taught to comprehend grade-aligned texts read aloud to them that were not adapted. Shurr and Taber-Doughty selected texts from *SRA Specific Skills Series: Getting the Main Idea* (Boning, 1997). The brief, expository texts included high-interest topics, such as biographies of famous people and science. To support the students' understanding of the texts, Shurr and Taber-Doughty presented students with a picture strip with five photos related to text elements (e.g., settings, characters). The interventionist asked students to describe the pictures on the strip prior to reading the text aloud. All three students improved in the number of comprehension questions answered correctly after receiving the picture discussion intervention. Shurr and Taber-Doughty's finding contributed to the small amount of research on teaching expository texts to students with developmental disabilities. An even smaller number of studies have examined interventions for teaching social studies texts specifically (Zakas, Browder, Ahlgrim-Delzell, & Hefner, 2013). Zakas et al. (2013) examined the effects of a modified graphic organizer to improve social studies text comprehension for students with developmental disabilities. The authors found all three participants increased in comprehension scores after receiving systematic instruction in the use of the graphic organizer.

Two studies have examined teaching the meaning of question words to support the comprehension of individuals with intellectual disability. Morgan, Moni, and Jobling (2009) conducted an action research study to preteach question words using a graphic organizer to young adults with Down's syndrome. Participants were taught the concept of the question words (who, what, where, when, why, how) and related definitions. Browder et al. (2013) extended this research by teaching middle school students with moderate intellectual disability to pair question words with a definition using constant time delay procedures. Participants learned to use the graphic organizer with the question words and definitions to locate specific types of answers in adapted texts.

While reviewing text elements is one form of an advanced organizer, another option that has produced large effect sizes in studies of students with learning disabilities is teaching students to generate questions (Mastropieri & Scruggs, 1997). Research supports that developing questions facilitates the acquisition of comprehension skills by helping students consider their understanding of text material before, during, or after exposure to the text (e.g., Berkeley, Marshak, Mastropieri, & Scruggs, 2011; Faggella-Luby, Schumaker, & Deshler, 2007). Through generating questions, students are asked to identify and understand the main idea of a text, make predictions, summarize content, and activate prior knowledge, which promotes reasoning skills.

A few studies have examined the effects of question generation on the listening comprehension of expository text. Manset-Williamson, Dunn, Hinshaw, and Nelson (2008) taught students in upper elementary and middle school with reading disabilities to answer questions about expository text read aloud to them. First, students listened to the first sentence of the text. Next, students were asked to generate a question about the text based on the content of the beginning sentence. The students then listened to the text read aloud to them. Finally, they were asked to determine whether their sentence could be answered based on the information they heard read aloud. Results indicated the students who received the training in generating questions prior to hearing the text read aloud had the greatest gains in listening comprehension.

Both the Bulgren, Marquis, Lenz, and Deshler (2011) and Berkeley et al. (2011) studies used graphic organizers to teach students to generate questions about expository text. Bulgren et al. taught students in

high school with learning disabilities, other health impairments, and without disabilities to use a graphic organizer to develop questions about text read aloud to students during lecture-style instruction. Similarly, Berkeley et al. taught students in middle school with and without disabilities to use a graphic organizer to generate questions about social studies texts in an inclusive social studies classroom. Using a pretest post-test experimental design, Berkeley et al. compared the effects of the question generating strategy and typical classroom instruction on the multiple choice and open-ended responses to comprehension tests. Results indicated a significant main effect for condition in favor of the question generating condition for both multiple choice responses, $t(55) = 3.40, p = .001$, and open-ended responses, $t(55) = 5.96, p < .000$.

Given the level of support for question generation on comprehension, it is surprising that no studies exist extending this intervention to students with moderate and severe disabilities. One reason is that comprehension instruction has been underemphasized in research with this population (Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006). Another may be that students may lack the language skills to generate questions in general. Teaching the skills to generate questions may be especially critical to promote students' participation in general education classes. With a few exceptions (Hudson & Browder, 2014; Hudson et al., 2014), most of the research on read alouds for students with moderate and severe disabilities has been conducted in special education settings.

The purpose of this study was to examine the combined effects of a system of least prompts and a graphic organizer on the ability of students with moderate intellectual disability to generate and answer questions about social studies text. In addition, this study examined the generalization of these skills, taught initially in a special education classroom, to whole-group instruction in a fifth-grade classroom. Research questions are as follows:

Research Question 1: What is the effect of systematic instruction on the number of questions generated and correctly answered by students with ID?

Research Question 2: Do students generalize question generation skills to a general education classroom lesson?

Research Question 3: Do students generalize skills to correctly answer questions to a general education classroom lesson?

Method

Participants

Three participants were selected from an urban, public middle school in a large, metropolitan school district in the Southeast through teacher nominations. Two participants received the majority of their instruction in self-contained special education classrooms, and the third participant received the majority of his instruction in a general education classroom. All participants were in Grades 4 to 5. To be eligible, the participants must have an IQ of 55 or below and meet the federal criteria for intellectual disability. The special education teachers helped procure parental consent. The lead researcher then confirmed the students had a listening comprehension score between a 1.0 and 2.0 grade equivalency (GE) by administering the listening comprehension subtest from the Woodcock Language Proficiency Battery–Revised (WLPB-R; Woodcock, 1991): Letter-Word Identification and Passage Comprehension.

Jerry (P1) was an 11-year-old boy in the fifth grade with an IQ of 48, as measured by the Wechsler Intelligence Scale for Children–Third Edition (WISC-III; Wechsler, 1991). He scored a 1.3 GE on the WLPB-R Listening Comprehension subtest. Kevin (P2) was an 11-year-old boy in the fifth grade with an IQ of 51, as measured by the Leiter International Performance Scale–Revised (Leiter-R; Leiter, 1997). He scored a 1.5 GE on the WLPB-R Listening Comprehension subtest. Caryn (P3) was a 10-year-old girl in the fourth grade with an IQ of 48, as measured by the WISC-III. She scored a 1.3 GE on the WLPB-R Listening Comprehension subtest. All three participants communicated verbally. None of the participants demonstrated persistent off-task behaviors.

Two special education teachers and one general education teacher were recruited for the participation in the study based on interest in participation and enrollment of at least one student meeting eligibility criteria.

Jerry and Caryn's teacher, Ms. Paul, was in her sixth year of teaching special education. Ms. Paul was the classroom teacher for a specialized classroom for students with intellectual disability. Ms. White was in her 17th year as a special education teacher, serving as a resource teacher for students in the third and fourth grade. Ms. White had worked with Kevin for 5 years, providing special education services to support his placement in general education settings. Finally, Mr. Moore was in his 8th year of teaching elementary aged students in general education. Mr. Moore had taught students in the fifth grade for the past 3 years.

Setting

Baseline and intervention probes were administered in the participants' homeroom classroom. For Jerry and Caryn, these sessions occurred in Ms. Paul's special education classroom at a circular table in the back corner of the classroom. For Kevin, these sessions occurred in Ms. White's resource classroom at a U-shaped table in the back of the room behind a partition. During the study, Jerry and Caryn received their typical reading instruction that included daily story-based lessons (read alouds), direct instruction in sight word reading, and lessons in Reading Mastery. Similarly, Kevin received instruction in Reading Mastery and sight word reading. None of the participants received systematic instruction in how to answer WH questions or generate questions outside of the intervention, nor had they received instruction in generating questions prior to this study. Generalization probes occurred one time per week in Mr. Moore's fifth-grade general education classroom. Ms. Paul and Ms. White were the interventionists in the study. Mr. Moore helped collect data during generalization probes, and the first author, a special education doctoral student with 6 years teaching experience with students with intellectual disability, collected interobserver agreement (IOA) and fidelity data.

Materials







The text used in this study was the fifth-grade textbook *Social Studies Alive! America's Past* (Teacher's Curriculum Institute, 2010). The chapters of the textbook were divided into several smaller sections of approximately half a page in length, or between 150 and 250 words. Examples of chapter topics included the following: United States Geography, Native Americans, Exploration of the New World, Early English Settlement, The First Colonies, and Slavery. The lead author developed three literal questions (the answer could be located in the text) and correct response options for every section of the text. For example, for the question, "What did American Indians wear to keep warm?" acceptable text-based answers included "animal skins" or "furs." The questions and responses were reviewed and validated by a reading expert (the third author). The content expert verified the questions were (a) literal and (b) derived from the target passage (i.e., no other content knowledge was needed to answer the question). In addition, a graphic organizer was developed (see Figure 1) that the interventionist and participant used to create, record, and evaluate questions generated during each baseline and intervention session. Graphic organizers were not used in the general education probes. Instead, participants in the study as well as students without disabilities used small question journals created by the first author. These journals were small squares of notebook paper stapled together with a piece of construction paper folded across the front and back as a cover. Students wrote the questions they generated during general education probes in their journals. Peers in general education helped write questions that students with disabilities dictated.

Research Design

A multiple probe across participants' single-case design (Gast, 2010; Kratochwill et al., 2010) was used. All students received baseline probes measuring the number of points earned during each session. Points were assigned for (a) correctly generating questions (4 possible points per session) and (b) identifying whether the answer was in the book and answering the question (6 possible points per session). Once all students showed stable baselines, the first student began the system of least prompts and graphic organizer intervention. When the dependent variable showed a clearly accelerating trend, the second student began intervention. This was repeated for the third student. Once participants met the mastery criteria of 80% independent

Self-Questioning Graphic Organizer

Student ID: _____ Date: _____ Initials: _____ Chapter: _____ Section: _____

					
who	what	when	where	why	how

Heading: _____




	Question	Answer	 In the book	 Not in the book	 I don't know
Q1					
Q2					
Q3					

Figure 1. Graphic organizer used in invention phase of study.

Note. WH words and definitions were used for instruction and as reference for generating questions. Teachers recorded section headings and questions on the organizer. Students checked boxes to indicate whether the answer was “in the book,” “not in the book,” or “I don’t know.”

correct responses for 3 days, participants exited intervention and maintenance data were collected for generating questions, identifying the location of the answer, and answering questions one time per week for the remainder of the intervention.

Participants listened to two sections from two chapters read aloud by the special education teacher each session. Chapter sections were randomly selected so that participants were not listening to content in

succession across days. As with maintenance probes, generalization probes were conducted one time each week. During these sessions, Ms. Paul, Mr. Moore, and the first author recorded the number of questions generated and answered in the general education setting. These data (number of questions generated and answered) were graphed cumulatively across students for the duration of the study.

Measurement

Dependent variables. Three dependent variables were measured throughout the study. The first dependent variable was the number of points participants earned during baseline and instructional sessions. In each session, participants were given an opportunity to generate four questions and answer six questions about two sections of the social studies textbook read aloud by the interventionist. For each section of text, participants were asked to generate a question (first possible point) and then listen to see whether the answer was in the text. To earn a point for correctly generating a question, the participant needed to include (a) a question word; (b) linking verbs, as needed (e.g., the participant was *not* given credit for “Who Columbus?”); and (c) content related to the section topic. Participants were given 5 s to begin generating a question correctly. If the student was not able to generate a complete question, the interventionist said, “I can think of a question,” and then stated a question from the list of literal questions prewritten for the target text. After reading the section the first time, the interventionist asked the participant whether the answer to the question was in the book. If the answer to the question was not in the book (e.g., if the student generated a question prior to hearing the text and the answer could not be derived from listening to the text), the participant received a point for correctly identifying the answer was not in the text. If the answer to the question was in the text, the participant was required to (a) respond “yes” when asked whether the answer was found in the text, and (b) correctly answer the question (second possible point). Participants were given 5 s to respond. Next, for the second read of the passage, the interventionist always provided a question and told the participant to listen to determine whether the answer was in the text. If the participant indicated, when asked, that the answer to the question was in the book and stated the correct answer, the participant earned another point (third possible point). Finally, for the third read of the passage, the interventionist repeated the initial procedures of asking the participant to generate a question prior to hearing the final read (fourth possible point) and listening to see whether the answer was in the text. Again, the interventionist provided a literal question from the list of questions if the student was not able to generate a question independently. Following the third read of the text, the participant received a point for correctly stating (a) if the answer could not be found in the text or (b) the answer was in the text and then correctly stating the answer (5th possible point). Following completion of the procedures for reading one passage three times, the procedures repeated for a new section of text, totaling 10 possible points earned per session. Only independent correct responses (+) were graphed. See Table 1 for a description of the possible points earned per session.

The second dependent variable was the number of comprehension questions asked in the general education social studies class. During these sessions, participants had the opportunity to ask two questions, each one prior to hearing a section of text read aloud by the lead researcher. First, the lead researcher read the chapter introduction to the class, described the pictures for the target section, and read the section title aloud. Following these whole-group procedures, all students were asked to generate a question about the text. The same criteria applied as stated above: Participants were required to meet the three components of question generating to receive credit (+) for asking each question correctly. As in baseline and intervention, participants were given 5 s to respond to all directional cues. In these sessions, if the participant was unable to ask a question, the teacher did not provide a model. Participants were divided into small groups with peers from the fifth-grade classroom. Only one participant was in each group. The rule in the classroom was participants in the study were always the first to ask and answer questions. This rule prevented participants from hearing other students model the skills prior to data collection for each session. The lead researcher, one of the special education teachers, and the general education teacher all collected data during these sessions, with one adult assigned to one of the participants throughout the duration of the study. These data were graphed cumulatively on separate graphs.

The third dependent variable was the number of comprehension questions the participants answered or identified as “not in the text” during generalization probes in the fifth-grade classroom. After viewing the

Table 1. Procedures, Student Response, and Possible Points Earned During Instructional Sessions.

Least intrusive prompting key		
Generating questions	Answering questions	
<ul style="list-style-type: none"> A. Task demand: "Ask a question about the text." B. First prompt (after 5 s): Verbal reminder of how to generate a question. C. Second prompt (after 5 s): Model of how to generate a question. 	<ul style="list-style-type: none"> A. Task demand: Asked a literal comprehension question from the book. B. First prompt (after 5 s): Reread of the sentence with the answer. Repeats the question. C. Second prompt (after 5 s): Says the answer and points to the answer in the book. 	
Teaching procedures	Student response	Points
1. Read chapter intro.		
2. Point to target section title; talk about picture.		
3. Point to and read WH words on graphic organizer.		
4. Tell student to ask a question about the text (Question 1). (If student is not correct, use verbal direction and if needed model a question. Only give point for independent correct.)	Asks a complete question	1
5. Read text (first read); tell student to listen for the answer and use stop sign if needed.		
6. Reread Question 1 and ask whether student hears the answer in the book. Tell students to use the graphic organizer to indicate whether the answer is "in the book," "not in the book," or "I don't know." (If student is not correct or does not know, say "I heard it in the book" or "I didn't hear it in the book.")	Uses graphic organizer to indicate if "in the book"	
7. If in the book, ask student to answer the question. (Use least prompts rereading if needed to help student answer. Only give point if correct before prompts.)	Answers question	1
8. If needed, finish reading the section to complete the first read.		
9. Model asking a question and record on graphic organizer (Question 2). (This was used to be sure there was at least one question that could be answered from the book.)		
10. Reread text (second read); tell student to listen for the answer and use stop sign if needed.		
11. Reread Question 2 and ask if student hears answer in the book. Tell students to use the graphic organizer to indicate whether the answer was "in the book," "not in the book," or "I don't know" (Same prompts as Step 6).	Uses graphic organizer to indicate if "in the book"	
12. Ask student to answer the question (if it is in the book). Same prompting as Step 7.	Answers question	1
13. If needed, finish reading the section to complete the second read.		
14. Tell student to ask a question about the text (Question 3). (If needed, same prompts as Step 4.)	Asks a complete question	1
15. Read text (third read); tell student to listen for the answer and use stop sign if needed.		
16. Reread Question 1 and ask whether student hears answer in the book. Tell students to use the graphic organizer to indicate if the answer was "in the book," "not in the book," or "I don't know."	Uses graphic organizer to indicate "in the book"	
17. Ask student to answer the question (if it is in the book). (If needed, same prompts as Step 6.)	Answers the question	1
REPEAT all steps (1-17) with a new section of text.		

Note. Items with white cells and a "1" point allocation indicate a student could earn a point for the indicated student response; items in gray indicate no points could be earned. Students could earn up to 10 points each session.

pictures on the page and hearing the title, the students were instructed to ask a question about something they hoped to learn from the text. After given this opportunity to ask questions about this section of unfamiliar text, the lead researcher read the text aloud to the whole group. Then, in small groups, each member of the group took a turn (a) answering the question generated prior to hearing the text, (b) stating “not in the book,” or (c) saying “pass.” The lead researcher, one special education teacher, and the general education teacher listened to each respective assigned participant respond to a directional cue provided by a peer in a group (“Can you answer your question?”). If the participant had not been able to ask a question prior to hearing the passage read aloud, the participant automatically received a score of incorrect (–) for the subsequent opportunity to answer the question. As two passages were read during each generalization probe, participants had two opportunities to answer their question during these sessions. These data were also graphed cumulatively on a separate graph.

Data collection. The lead researcher collected data during the baseline sessions and during the generalization probes. The special education teachers collected instructional data during the instructional sessions; no additional probes were collected once a participant entered the instructional phase, except for the data collected during weekly generalization probes. Maintenance data were collected by the special education teachers one time per week until all participants completed the comprehension intervention and each participant had at least one set of maintenance data (i.e., one data point from an instructional session and one data point from a generalization probe).

Procedures

Baseline. The lead researcher followed the established procedures for collecting points data during the baseline sessions held in the special education classrooms. Sessions occurred daily around 9:00 a.m. and lasted approximately 15 min. These sessions occurred in a 1:1 format in a special education classroom. The other students in the class worked on literacy skills (small group instruction in reading or prereading skills) in either an adjoining classroom or the other side of the classroom. The graphic organizer used during instructional sessions was on the table next to the participants during baseline sessions, but the graphic organizer was not referenced or used by the interventionist. The interventionist randomly selected text selections from chapters 1 to 9 and 16 to 22 of the social studies textbook. Chapters 9 to 12 were reserved for use during the generalization probes, as these were the chapters the general education teacher was scheduled to teach during the duration of the study. Prior to reading each section, the interventionist first read the first section of each chapter. These sections were not included as possible target sections. Instead, these sections were read to provide the student with background information about each target section. The summary sections were only read one time per section of text, and the summary sections were read in their entirety. After reading the summary section, the interventionist showed the participant the pictures related to the summary text, read the heading of the target section of text, and pointed to pictures related to the target text. Next, the interventionist asked the student to ask a question about the target, and continued with the established procedures for the 10 possible points per session, which included reading each target section three times each. Two sections were read per session during baseline sessions. No prompting, feedback, or error correction was delivered to participants during any baseline session, but participants received verbal reinforcement for on-task behavior.

Training teachers. The special education teachers both received two 1 hr training sessions prior to beginning intervention procedures. The lead researcher trained each teacher in separate sessions. During the initial session with each teacher, the lead researcher explained all procedures using a scripted session guide. The lead researcher demonstrated an instructional session, including data collection procedures. In addition, the lead researcher taught teachers to follow procedures for reading the text, including (a) read all of the text in a section, (b) insert definitions of unknown vocabulary words, and (c) read with enthusiasm. The teachers practiced implementing the procedures during this initial session. During the second session, teachers first asked questions about the procedures, as needed, and then demonstrated proficiency implementing the

instructional procedures. Teachers demonstrated two consecutive sessions of 100% accuracy on fidelity measures before implementing procedures with participants. The lead researcher, the general education teacher, and the special education teacher (Ms. Paul) who participated in the generalization probes met for 30 min the day before the first generalization session. During this meeting, the lead researcher described the generalization probe procedures, including the criteria and procedures for data collection. Both teachers demonstrated two consecutive practice sessions of 100% accuracy in data collection procedures prior to the first generalization probe.

Intervention. The special education teachers were the interventionists for all instructional sessions. The teachers followed the data collection procedures as previously described. Session occurred daily around 9:00 a.m. and lasted approximately 30 min. As in baseline, these sessions occurred in a 1:1 format in a special education classroom while other students in the class worked on reading or prereading skills with other teachers or paraprofessionals. As in baseline, the lead researcher randomly selected two sections of text for each instructional session. For each section, the interventionist read the first section of the chapter, pointed to pictures related to the text, and read the section heading before asking the student to generate a question. In addition, the teacher used the graphic organizer throughout each session. Immediately before asking the participant to generate a question about the text, the teacher pointed to and read the words and meanings of the question words on the top of the graphic organizer (see Figure 1). During instructional sessions, the teacher implemented a system of least prompts procedure if the student waited for 5 s following the cue to ask a question or identify whether the answer to the question was in the text. If the student waited after being asked to generate a question, the teacher provided the first prompt (verbal) after 5 s. The teacher said, "To make a question, first think about the words in the heading. Then pick a WH word to ask about the heading." If the student waited for a second prompt (model), after 5 s, the teacher said,

I'm going to make a question. First, I'm going to think about the words in the heading, _____. Next I'm going to find a WH word to help me ask a question about the heading. Then, I'll say the whole thing and make sure it sounds good.

The teacher modeled picking a question word and pairing it with heading words to form a question (using a question from the prewritten list of literal questions) and then asked, "What's my question?" If the student made an error at any point, the teacher said, "No, watch me," and proceeded by demonstrating the model prompt. After a question had been generated (either by the participant or the teacher), the teacher recorded the question on the graphic organizer and instructed the student to listen for the answer. In addition, participants were told to raise a small red stop sign (made out of cardboard and popsicle sticks) if they heard the answer in the book. When the participant raised the stop sign during the reading or when the teacher finished reading the passage (whichever occurred first), the teacher immediately asked the participant, "Did you hear the answer to the question in the book, not in the book, or do you not know?" The teacher instructed the participant to respond to this question by circling response items on a self-monitoring chart included on the graphic organizer. Options included pictures and words for "in the book," "not in the book," and "I don't know." If the participant correctly answered, "not in the book," no further instruction occurred for this question. If the participant answered "not in the book" in error, or if the participant responded "I don't know," and the answer was in the book, the teacher responded by saying, "I heard the answer in the book." Then the teacher pointed to the answer in the book while repeating the question and stating the answer. The teacher then asked the participant to repeat the answer. If the participant indicated "in the book," and the answer was in the book, the teacher asked the participant to answer the question. A system of least prompts procedure was used to help the participant answer the comprehension question if the participant waited for help. After a 5-s delay, if the participant had not answered the question, the teacher provided the first prompt (verbal): "I heard the answer in the book. Listen to this sentence again." The teacher then reread the sentence with the answer and repeated the question for the participant. If the participant waited without responding, after another 5-s delay, the teacher provided the second prompt (model): "I heard the answer in book." Then the teacher pointed to the answer in the book, stated the answer, and repeated the question for the participant to answer. Finally, if the student selected "in the book" or "I don't

know,” and the answer was not in the book, the teacher said, “The answer is not in the book. We need more information to answer this question.” For all procedures, participants received specific verbal praise for all independent correct and prompted correct responses. Participants did not receive praise for errors. See Table 1 for a list of the procedures, systematic instruction used, and possible points earned across each instructional session.

These procedures repeated across three reads of each section and across two sections each session. For the second read of each session, the teacher immediately modeled how to generate a question prior to the second read. Although the teacher simply stated this question in baseline sessions, in instructional sessions, the teacher used the graphic organizer to fully model how to generate a question by pointing to a question word and words from the heading when generating a question.

Maintenance. Maintenance data for instructional sessions were taken once a week following completion of the comprehension intervention for each participant. The procedures were the same as baseline sessions; that is, random text sections were selected across chapters 1 to 9 and 16 to 22. Participants remained in maintenance until all three participants completed the comprehension intervention and the teacher had collected maintenance data on all participants at least once. In addition, generalization probes continued until maintenance data were collected on all participants in the general education classroom at least one time.

Generalization. Prior to beginning generalization probes, the lead researcher conducted a pretraining session with the students in the general education classroom and the participants in the study. The lead researcher explained the purpose of the activity would be to learn how to ask and answer questions about social studies. The lead researcher divided Mr. Moore’s students into six groups, and the participants were asked to each pick a group to join. Three other students from Ms. Paul’s special education classroom joined the activity each week, and these students each joined one of the groups the participants had not joined. Groups were then asked to decide on a team name and design a team logo. Next, roles were described. For each group, one student (a) read the section heading and led a discussion about relevant pictures—“The Picture Person”; (b) asked each group member whether he or she could ask a question about the text—“The Question Asker”; and (c) asked each group member whether he or she could answer the question he or she had asked—“The Answer Man (or Woman).” Each group had five to seven group members, so roles rotated across text sections and across sessions. Participants from the study took turns performing each role just like the other members of their group. The adults in the classroom monitored to ensure the participants understood their role and performed the steps correctly. Each group member recorded his or her own questions in a personal social studies question journal, provided by the lead researcher. All participants received the same task demands and completed the same activities, even if they were still in baseline; no systematic instruction or feedback was delivered during the generalization sessions at any time. At the end of each question, the group with the highest number of relevant questions that were both asked and answered earned time playing games on an iPad. Each session concluded with an activity related to the content read aloud. Examples of activities included completing Venn diagrams comparing and contrasting colonies and playing charades to identify key vocabulary from the readings.

Social validity. The special education teachers, the general education teacher, and the participants in the study completed social validity questionnaires about the procedures, materials, and outcomes used in this study. The teachers were asked to rate nine statements using a 5-point Likert-type scale. Specific items asked teachers to rate statements including the following: (a) students with intellectual disability can learn to ask questions, (b) students with intellectual disability can learn to answer questions about grade-aligned text, (c) asking questions is a difficult skill for many students with intellectual disability, (d) answering questions is a difficult skill for many students with intellectual disability, (e) the social studies content was appropriate for my students, (f) the materials used were appropriate for my students, (g) systematic instruction was effective for teaching question asking and answering, (h) my students benefited from asking and answering questions during instructional session, and (i) my students benefited from asking and answering questions in the fifth-grade classroom. Participants responded to four items using a 3-point rating scale (*I liked it, I*

didn't like it, I don't know). Items included the following: (a) I asked questions about social studies, (b) I answered questions about social studies, (c) I used a fifth-grade social studies textbook, and (d) I worked in groups with other students in Mr. "Moore's" classroom.

Data Analysis

The number of independent correct responses (points) for generating and answering questions was graphed for all phases (i.e., baseline, intervention, and maintenance). Data were analyzed visually for increasing levels and trends and to determine the presence or absence of a functional relation between the intervention and participants' ability to generate and answer questions. The two measures collected during generalization probes, the number of questions generated and the number of questions answered, were graphed on separate cumulative graphs. Social validity responses were summarized and described descriptively.

IOA. IOA reliability for participant responses was collected for 25.43% of the sessions across each participant and phase by a doctoral student (for baseline session), the lead researcher (for intervention sessions), and the lead researcher and special education teacher (for the generalization probes). IOA was calculated by dividing the number of agreements by the sum of agreements and disagreements and multiplying by 100. Criterion for acceptable agreement was 90% or greater. IOA was 100% for baseline probes, 96.54% for instructional and maintenance probes, and 100% for generalization probes.

Procedural fidelity. Procedural fidelity was also collected for 28.73% of sessions by the same observers who collected IOA data. The observers recorded the number of steps in each procedure the interventionist implemented correctly. Steps were scored as correct (+) or incorrect (-). To calculate procedural fidelity, the interventionist divided the number of steps implemented correctly by the total number of procedural steps, and multiplied the quotient by 100 (Billingsley, White, & Munson, 1980). Criterion for acceptable fidelity was set at 90%. Procedural fidelity was 98.87% for baseline, 93.46% for instructional and maintenance probes, and 100% for generalization probes.

Results

Participant Data

Overall, the mean number of points earned generating and answering questions increased from baseline to intervention (i.e., $M = 1.04-5.67$). In addition, the overall mean number of points earned during maintenance increased from the overall mean during intervention (i.e., $M = 5.67-7.5$; see Figure 2). Jerry increased in the number of points earned from baseline ($M = 1$; $R = 0-2$) to intervention ($M = 5.67$; $R = 0-9$). Jerry also increased in the mean number of points from intervention to maintenance ($M = 9.5$; $R = 9-10$). Kevin increased in the number of points earned from baseline ($M = 1$; $R = 0-2$) to intervention ($M = 5.56$; $R = 1-8$). Kevin also increased in the mean number of points from intervention to maintenance ($M = 7.5$; $R = 7-8$). Caryn increased in the number of points earned from baseline ($M = 1$; $R = 0-2$) to intervention ($M = 5.79$; $R = 1-9$). Caryn's mean number of points earned decreased slightly from intervention to maintenance ($M = 5.5$; $R = 5-6$).

Generalization

The cumulative measures of questions generated and answered during generalization probes revealed an overall increase in questions generated and answered from baseline to intervention (i.e., $M = 0-4$ questions generated; $M = 0-2$ questions answered; see Figures 3 and 4). Jerry and Kevin did not generate any questions during generalization probes that occurred while they were still in the baseline phase of the study. Caryn generated one question in the general education social studies classroom during baseline. None of the participants answered questions in the general education classroom while in baseline. Once participants entered the instructional phase of the study, all three increased the number of questions generated and

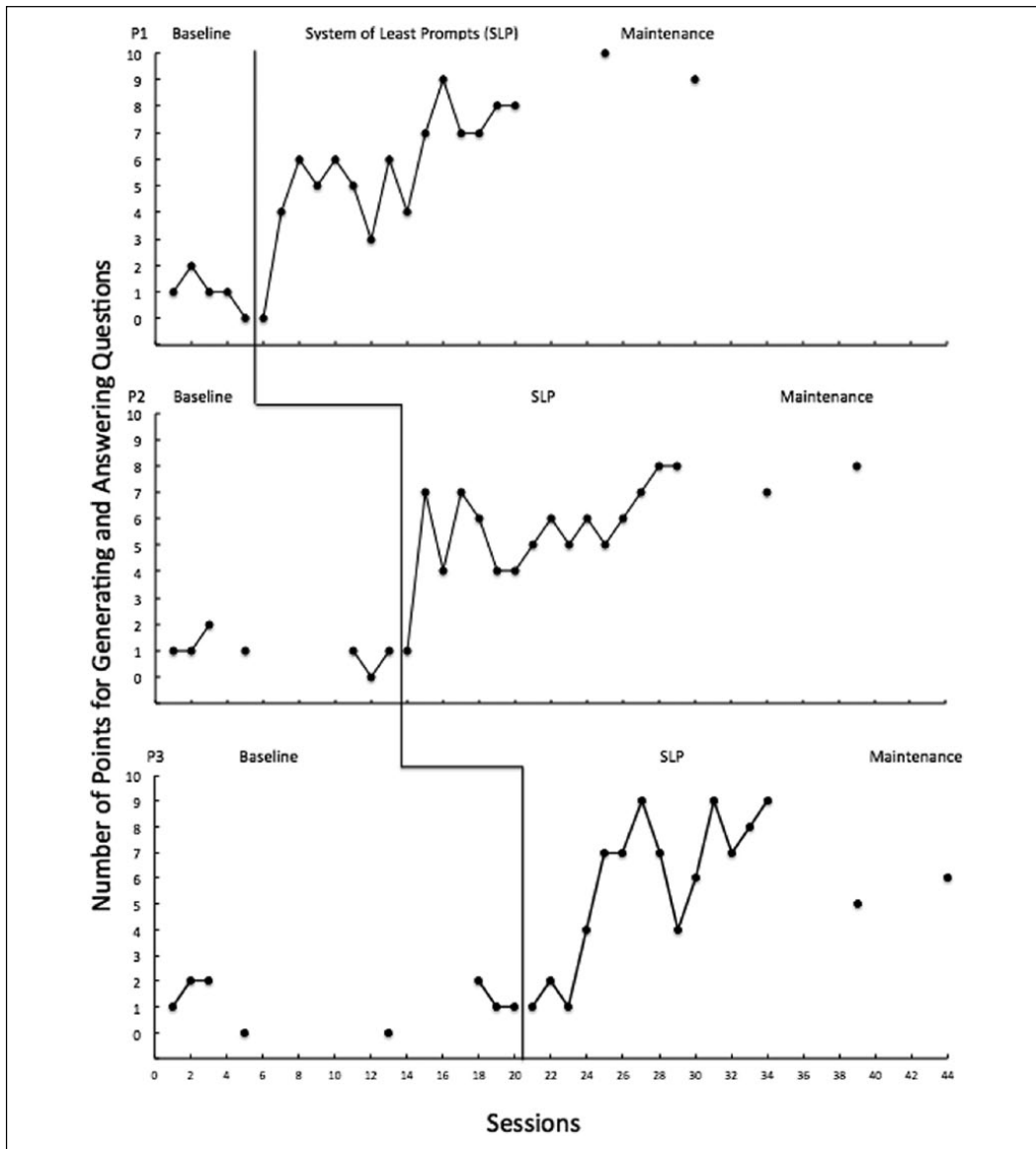


Figure 2. Graph of points earned generating and answering questions during baseline, instructional sessions, and maintenance probes.

answered while in the social studies class. Jerry generated six questions across generalization probes and correctly answered three questions. Kevin generated six questions across generalization probes and correctly answered one question. Caryn generated six questions across generalization probes and correctly answered two questions.

Social Validity

Teachers' social validity responses. Ms. Paul and Ms. White responded to all nine items on the social validity form with the rating “agree” or “strongly agree.” Mr. Moore was asked to respond to only the final question

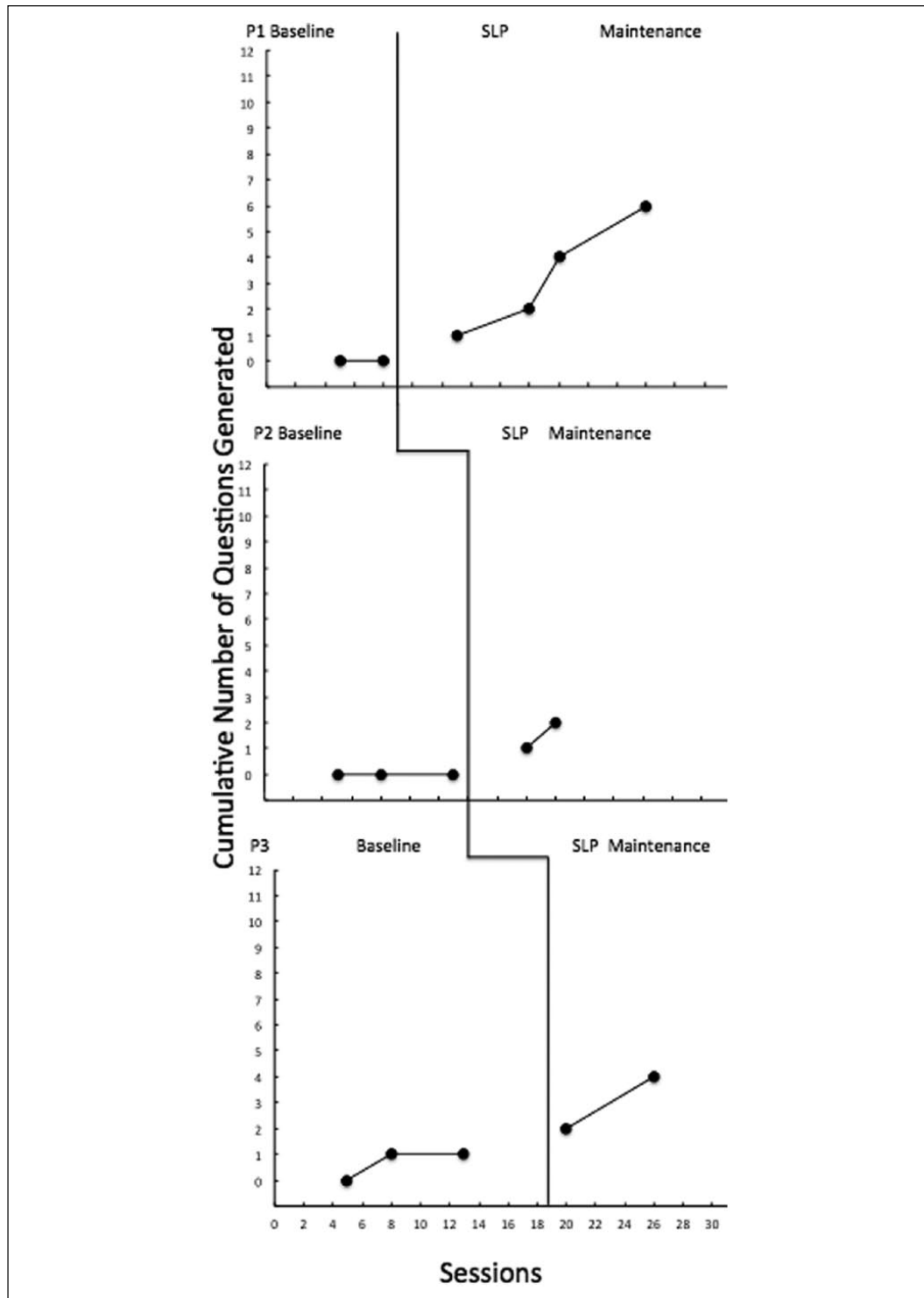


Figure 3. Cumulative graph of the number of questions generated in the general education classroom.

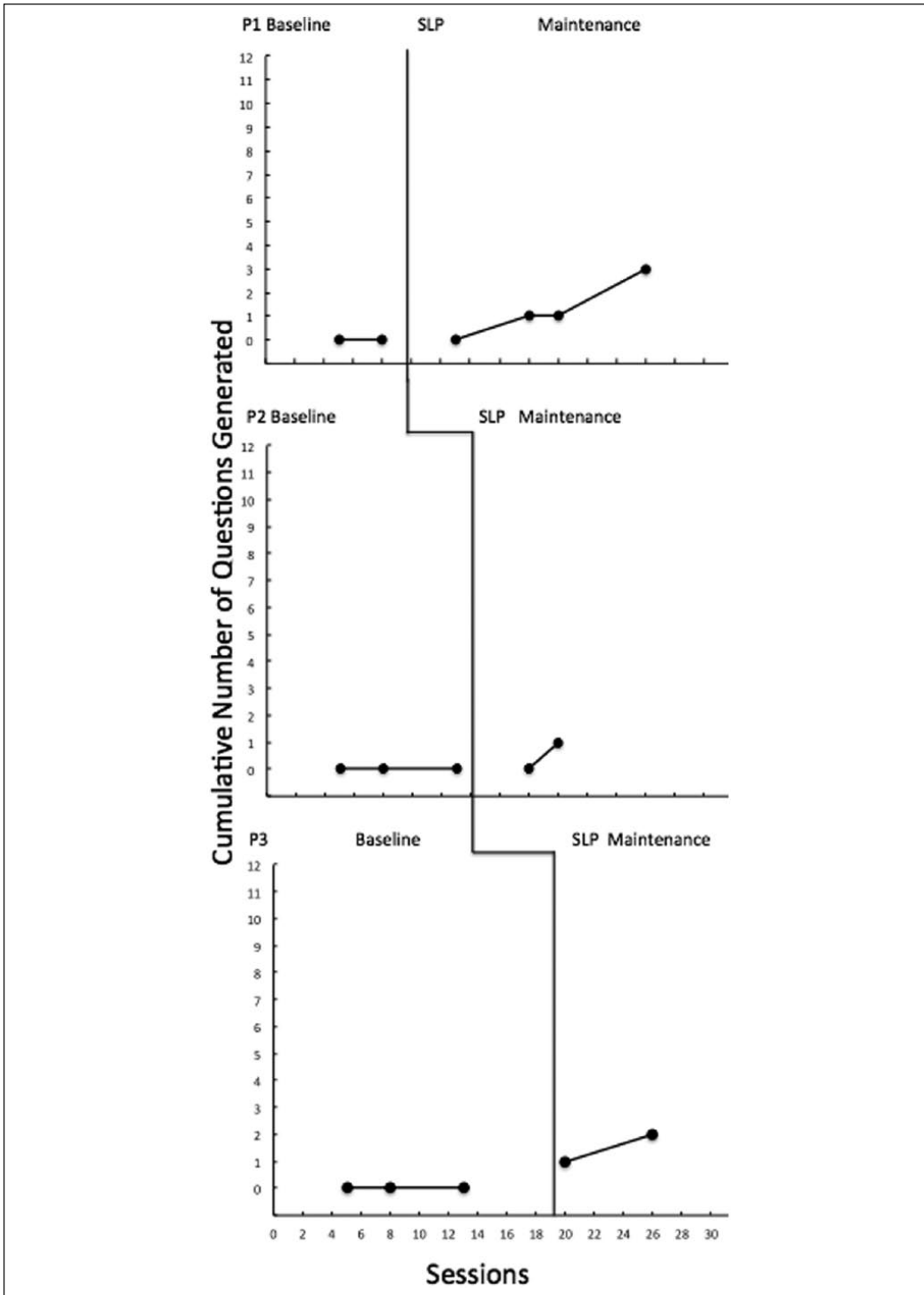


Figure 4. Cumulative graph of the number of questions answered across generalization sessions.

of the questionnaire. Mr. Moore selected “*strongly agree*” for the item: “My students benefited from asking and answering questions in the fifth-grade classroom.”

Participants’ social validity responses. The responses from all three participants were positive as well. All three participants rated “I liked this” in response to all four items. Anecdotally, when asked following the final session how they liked the weekly sessions, students in Mr. Moore’s classroom responded with the following comments: “I liked asking questions. It made us smarter!” “Playing charades was fun!” and “I felt good about working with kids with disabilities. I hadn’t done this before.”

Discussion

The data indicate a functional relation was established between the system of least prompts and graphic organizer intervention and the number of points earned for correctly generating and answering questions. Each participant demonstrated a change in level for points earned from baseline to intervention. Each participant also demonstrated increases from baseline to intervention for cumulative measures of both number of questions generated and answered in the general education classroom. Finally, the teachers, students with disabilities, and students in the fifth-grade classroom all responded favorably through questionnaires or anecdotal conversations. After completing his questionnaire, Kevin added, “Asking questions makes me smarter!”

This study adds to recent research in which students with severe disabilities are gaining access to and understanding of grade-aligned texts. Similar to Mims et al. (2012) and Hudson et al. (2014), participants in this study were taught to find answers in the text through a system of least prompts procedure. The current study extended the research on teaching listening comprehension by incorporating instruction in question generating, taught via a graphic organizer with question words and picture symbols. The graphic organizer may have provided participants with a visual reminder of the question. Students with intellectual disability often have difficulty retaining information. Similar to the procedures of Berkeley et al. (2011), who taught question generating to students with LD, the teacher used the graphic organizer to provide a visual model for creating a question during all instructional sessions. The parts of the question (question words, the section heading) along with the question itself (written by the teacher upon development of the question by the student or teacher) remained on the graphic organizer throughout the session. Perhaps, the process of generating a question about the text and listening for the answer ultimately increased the ability of students to understand the content they heard. Finally, students used small stop signs to signal the teacher to stop reading the moment the student believed he or she heard the answer to the target question. By stopping the teacher immediately to provide the answer, the likelihood students provided a correct answer to comprehension questions may have increased. In addition, the stop signs were highly motivating. All three participants stated they liked using the stop sign, and this form of active engagement may have increased the participants’ engagement in question answering.

The increase in points across participants represents an increase in both questions asked and answered. In addition, the points represent the ability of students to indicate whether the answer to the question could, or could not, be derived from the text. The points represent aptitude in not only learned content but also learned skills. Participants in this study demonstrated comprehension skills typically taught to students without disabilities or with mild disabilities (e.g., Berkeley et al., 2011). While the points represent the participants’ ability to both generate and answer questions, a component analysis of the points scored indicated students answered more questions ($M = 30$) than they generated ($M = 18$) throughout the intervention phase. It is important to note that students sometimes generated questions that could not be answered from the text alone (e.g., “What did Christopher Columbus eat for breakfast”), and sometimes they answered questions they did not ask (i.e., the questions the teacher generated as a model each session).

The findings also indicated a pattern in the types of questions generated and answered by the participants in this study. The majority of questions generated and answered by all three participants were *what*, *who*, or *where* questions. Specifically, most of the questions generated by Jerry were *who* (33.33%), *what* (21.21%), or *where* (16.67%) questions, and the questions he correctly answered the most were *what* (58.06), *where*

(22.58%), or *who* (16.13%) questions. Most of the questions generated by Kevin were *what* (36.84%), *where* (31.58%), or *who* (26.32%) questions, and the questions he correctly answered the most were *what* (37.5%), *who* (31.25%), or *where* (28.13%) questions. Most of the questions generated by Caryn were *what* (41.18%), *who* (35.29%), or *where* (17.65%) questions, and the questions she correctly answered the most were *what* (40.0%), *who* (30.0%), or *where* (23.33%) questions. Overall, the most common type of questions generated or answered was *what*. The three participants generated or answered very few *why*, *when*, or *how* questions. These findings are similar to the findings of Browder et al. (2013) who analyzed the types of questions answered by students with moderate intellectual disability and found the most common types of questions participants answered correctly were *where*, *what*, or *who*.

Unlike related studies, the procedures used in the generalization probes included integration in ongoing general education activities. The cumulative data indicated participants asked and answered an increasing number of questions throughout the duration of the study alongside their peers in a general education social studies class. Of note, the participants generated more questions than they answered. In this setting, the participants appeared comfortable generating questions, and often asked questions that could not be answered from the text alone. They did not appear as confident answering questions in front of their peers (e.g., they often fidgeted or quickly said "I don't know"). Despite this possible discomfort, many efforts were made to fully include the participants with disabilities in the classroom activities, and the students were not distinguished from their peers by their role or assignment. Instead, all members of each group shared the responsibilities and procedural roles. Students with disabilities were asked to generate and answer questions just like the other members of the group. The collaborative efforts of three adults, the lead researcher, a special education teacher, and the general education teacher, allowed for regular monitoring of each group. Through this monitoring, adults ensured all of the students were on-task and following the procedures of the weekly activities.

Another distinct element of the current study is the use of texts that were not adapted. With the exception of Shurr and Taber-Doughty (2012), most current research on comprehension for students with severe disabilities incorporates the use of adapted texts. While adapting texts is an innovative and often necessary procedure for ensuring all students have access to age and grade appropriate content, the findings from this study suggest teachers may also be able to use some nonadapted texts for students with severe disabilities by following basic guidelines: (a) Read small sections of text at a time (approximately 150-250 words), (b) insert definitions for difficult or unknown vocabulary words, (c) begin the reading by noting and briefly discussing related pictures, charts, or diagrams, (d) teach students to ask questions about the text prior to listening to the text, and (e) provide students with a procedure for stopping the reader to answer a question as soon as the answer is known.

Limitations and Future Research

Several limitations and suggestions for future research are worth consideration. One limitation of this study was the small sample size of participants. Due to the nature of single-case design, generalizability to other students with moderate intellectual disability needs to be evaluated through additional research.

A second limitation of the study is the independent variable had multiple treatment components. The treatment package included (a) a system of least prompts procedure for teaching question generation and question asking; (b) the use of a graphic organizer to generate questions, reference questions as needed, and self-monitor if the answer was in the book or not in the book; and (c) the use of a small stop sign to indicate the participant heard the answer in the book. Future research is needed to determine the contribution of each component of the intervention.

The third limitation is that the intervention was conducted primarily in a special education setting with weekly probes occurring in an inclusive general education setting. Some studies have conducted the entire intervention in general education (e.g., Jameson, McDonnell, Johnson, Riesen, & Polychronis, 2007; Jameson, McDonnell, Polychronis, & Riesen, 2008; Jameson, Walker, Utley, & Maughan, 2012; McDonnell et al., 2006). Another limiting factor is the data from the generalization probes were sparse due to student absences in the afternoons (Caryn repeatedly went home early, and Kevin was often pulled for related

services). Future research is needed to determine the effects of this intervention over a longer period of time. In addition, future research is needed to determine whether this intervention could be embedded in general education using peer, paraprofessional, or co-teaching support. Finally, in addition to further exploration of generalizing across settings and people, future research is needed to determine whether this intervention could be used to teach a broader array of social studies texts (e.g., biographies, current events) or other texts across content areas (e.g., science texts, high-interest novels).

Implications for Practice

Several implications for practice are worth consideration. Overall, the students with moderate intellectual disability who participated in this study increased in the number of questions generated and answered about fifth-grade social studies content both during instructional sessions and generalization probes. All three students in this study were verbal, had the physical dexterity to lift the stop sign, and had the endurance to participate in sessions lasting up to 35 min. These students were not yet reading independently, although they each knew several sight words. Students with similar characteristics may benefit from the comprehension strategies used in this study. Teaching students to generate questions using a graphic organizer may promote comprehension of grade-aligned, expository text. Teaching students to use a stop sign to indicate when the answer is heard may provide students with moderate intellectual disability a means for providing an answer immediately rather than waiting and possibly forgetting the answer. Another implication is the use of original text. Similar to Shurr and Taber-Doughty (2012), the texts in this study were original but not as complex as some students may encounter (e.g., novels). Teachers were taught to utilize the natural supports built into the text (i.e., pictures, headings) and embed additional supports to the text (i.e., reading with enthusiasm, inserting definitions). Although students with severe disabilities often require adapted texts, some existing grade-aligned texts may be utilized with a few simple, cost-effective strategies. A final implication for practice is the use of small group procedures for including students with moderate intellectual disability in inclusive social studies lessons. Students with moderate intellectual disability can learn group roles that allow them to be full participants in academic activities. By teaching students strategies derived from research for students with mild disabilities or without disabilities, all students (students with and without disabilities) might benefit from the instructional methods used in the lesson.

In summary, a system of least prompts procedure with a graphic organizer was used to teach students with moderate intellectual disability to generate and answer questions about grade-aligned social studies text. Students with moderate intellectual disability demonstrated an ability to learn strategies for increasing listening comprehension. In baseline, students were not able to generate questions. Through systematic instructional procedures, each student learned to generate questions throughout the study. By the end of the study, each participant learned to answer literal questions about a fifth-grade social studies text. Perhaps the most notable aspect of this study was the ability of the students to perform these same skills as members of small groups alongside their grade-level peers. Findings from this study suggest students with moderate intellectual disability may gain critical comprehension skills through systematic instruction increasing their ability to fully participate in the school experience.

Authors' Note

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Declaration of Conflicting Interests

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