

The Reading Professor

Volume 41 | Issue 1

Article 21

January 2018

Improving Reading Comprehension Skills of Students with Autism Spectrum Disorder: A Supplemental Guide for Early Childhood Educators in Inclusive Settings

Neal Nghia Nguyen
Florida Atlantic University

William Garnett
California State University at Fresno

Patrick Leytham
Touro University Nevada

Jeff Gelfer
University of Nevada Las Vegas

Follow this and additional works at: <https://scholar.stjohns.edu/thereadingprofessor>



Part of the [Language and Literacy Education Commons](#)

Recommended Citation

Nguyen, Neal Nghia; Garnett, William; Leytham, Patrick; and Gelfer, Jeff (2018) "Improving Reading Comprehension Skills of Students with Autism Spectrum Disorder: A Supplemental Guide for Early Childhood Educators in Inclusive Settings," *The Reading Professor*. Vol. 41 : Iss. 1 , Article 21.

Available at: <https://scholar.stjohns.edu/thereadingprofessor/vol41/iss1/21>

This Article is brought to you for free and open access by St. John's Scholar. It has been accepted for inclusion in The Reading Professor by an authorized editor of St. John's Scholar. For more information, please contact fazzinol@stjohns.edu.

Improving Reading Comprehension Skills of Students with Autism Spectrum Disorder: A Supplemental Guide for Early Childhood Educators in Inclusive Settings

Neal Nghia Nguyen, William Garnett, Patrick Leytham, and Jeff Gelfer

Abstract

National data trends illustrate more students with Autism Spectrum Disorder (ASD) are provided academic and behavioral services in the inclusive general education environment. Reading is a unique skill in which some young students with ASD perform at or above their typically developing peers. However, as the curriculum shifts from decoding to advanced comprehension, these same students with ASD begin to struggle. One probable reason for this hindrance might be due to the perspective of Theory of Mind and the two cognitive deficits such as Weak Central Coherence and Executive Functioning. This article provides four suggested instructional practices or mini lessons as a supplemental guide that an early childhood educator can implement in a one-on-one type of instruction within an inclusive setting to address these above deficits and ameliorate the comprehension abilities of students with ASD. Lastly, directions for future empirical studies to validate the above four suggested instructional practices are briefly discussed.

Keywords: *reading comprehension for ASD, reading mini-lessons for ASD, priming with visual supports, pre-teach vocabulary, graphic organizer*

Pause and Ponder

- How does each of the two cognitive deficits (*Weak Central Coherence, Executive Functioning*) and the perspective of Theory of Mind influence the way that students with Autism Spectrum Disorder (ASD) comprehend text at a higher-order level (e.g., access and build background knowledge, making connection to the text, and summarizing/generating main ideas of the text)?
- How do early childhood educators use mini lessons as their day-to-day effective instructional practices in a one-on-one setting within an inclusive general education classroom or a resource setting to assist students with ASD?

Introduction

Autism Spectrum Disorder (ASD) is characterized as a neurological disorder with deficits in social skills, communicative ability, and restricted and repetitive interests (American Psychiatric Association, 2013). According to the United States Centers for Disease Control and Prevention (CDC; 2015), the prevalence of children diagnosed with ASD has escalated to 1 out of every 68. One outcome of this increase is the number of children with ASD ages 3-5 receiving intensive early intervention services (Office of Special Education Programs, 2007, 2012). For the past decade, the rates of ASD diagnosis proliferated in the United States and Canada (Lindsay, Proulx, Scott, Thomson, 2014; Office of Special Education Programs, 2007, 2012). Moreover, the number of students age 6-11 in the U.S with ASD receiving special education services in the general education environment increased from 37.93% in 2007 to 41.30% in 2012 while services in the self-contained environment decreased from 38.11% to 36.14% over the same time.

Some students with ASD demonstrate commensurate reading profiles with their typical peers up until about the age of 8 (Nation, Clarke, Wright, & Williams, 2006; Whalon & Hart, 2011b). In their findings, Newman and colleagues (2007) suggested that children with ASD and hyperlexia surpass their typically developing peers in sight word recognition, phonemic awareness, and phonics skills in the early years. It is critical, however, for educators to understand that proficient ability to decode in the early years might not be an adequate predictor of reading comprehension ability in later years (Nation et al., 2006). As students with ASD progress in the reading curriculum, specifically the Common Core State Standards (CCSS), the instruction shifts from answering literal questions about the text and retelling the events of a story to higher-order thinking skills such as accessing and building background knowledge, generating main ideas, and determining cause/effect relationships (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). Roberts (2013) accentuated reading comprehension as a covert task (i.e., students understand the texts within their minds). Thus, educators ought to consider daily instructional practices that enable them to examine, overtly, the equivalent levels of reading comprehension and the use of prior knowledge to demonstrate thorough understanding of texts (Harvey & Goudvis, 2013). Educators can therefore use the early grades when students with ASD are ahead in their reading abilities to teach advanced comprehension

skills.

Given the various academic profile of students with ASD, comprehension is one pertinent building block of effective reading instruction that is problematic to acquire (Chiang & Lin, 2007; Nation et al., 2006; Whalon & Hart, 2011a, 2011b). Of other cognitive factors that affect the comprehension deficits for students with ASD (e.g., communicative output, language processing, repetitive behavior), the above difficulty in reading comprehension for students with ASD may be affected by: (a) Theory of Mind, (b) Weak Central Coherence, and (c) Executive Functioning (Gately, 2008; Williamson, Carnahan, & Jacobs, 2012). Theory of Mind (ToM) is defined as the ability to understand others' point of view (Frith, 2012). From a Theory of Mind (ToM) perspective, students with ASD may find it difficult to understand a character's point of view, understand that the author may have a different perspective from theirs, and may not be able to make inferences or use context to make predictions. Weak Central Coherence (WCC) refers to the inability to bring details together into a whole idea or concept (Williamson, Carnahan, & Jacobs, 2012). Weak Central Coherence deficits might impact the students' ability to summarize or identify the main idea of an event (Happe & Frith, 2006; May, Rinehart, Wilding, & Cornish, 2013; Williamson et al., 2012). Finally, Executive Functioning (EF) is defined as the process of organizing, planning, and monitoring progress with a situation (Carnahan, Williamson, & Christman, 2011). Students with ASD may exhibit EF deficits as they try to create sequences of events, access and make connections to prior knowledge, and create mental images of the text being read (Carnahan et al., 2011).

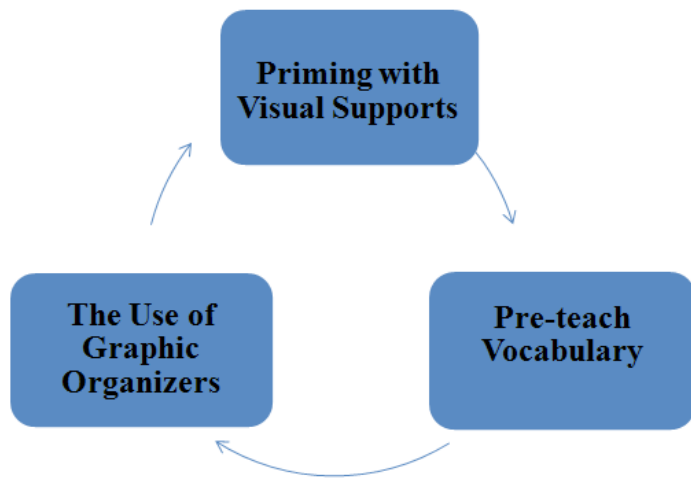
As previous early childhood and special educators, we know and aware of (1) the rote nature of some instructional practices for students with disabilities, and (2) the prominence to assist educators in identifying and selecting appropriate instructional practices to improve the overall comprehension abilities of students with ASD. This consolidated knowledge of students with ASD (increasing participation in the general education environment, the pressing need to teach advanced comprehension skills in the early grades, the three main cognitive deficits) will assist educators in recognizing and selecting appropriate instructional practices to improve the overall comprehension abilities of students with ASD. While some of the suggested instructional practices in this article are standard practices, it is pertinent for an educator to follow the sequences in skill acquisition for these students (See Tables 1-3). Additionally, it is critical and worthwhile for educators to examine and consider the following items prior to the actual implementation of each of the suggested mini lessons: (1) the current sufficient reading/language skills that children with ASD are expected to have before the implementation of the following mini lessons, (2) the appropriate selection of books for each individual student with ASD based on his/her current reading/language level or skill, and (3) the various cognitive factors and levels of their interactions with students with ASD (i.e., not just the abstract engagement in teacher-directed of sequential lessons or mini lessons with isolated text and/or visual supports). While future

empirical studies are indispensable to substantiate the impact of the following instructional strategies on reading comprehension, the authors of this article thought that it might be helpful for educators of young children with ASD to begin or attempt to use these evidence-based strategies in their classrooms. The purpose of this article is to provide early childhood educators four suggested instructional practices that can be implemented as supplemental mini lessons in a one-on-one inclusive setting.

Individualized or One-on-One Mini-Lessons

According to the CCSS College and Career Readiness Anchor Standards for Reading, all students in grades K-5 are expected to (a) understand key ideas and details, (b) understand craft and structure of text, (c) integrate knowledge and ideas, and (d) improve their range and level of text complexity (2010). The following instructional practices focus on the first set of anchor standards (understanding key ideas and details) and is presented in the form of mini lessons that educators can implement in a one-on-one type of instruction in the inclusive learning environments. Figure 1 illustrates the conceptual framework of a few of the various sequential instructional practices to teach reading comprehension to students with ASD.

Figure 1. A Conceptual Framework for Inclusive Early Childhood Educators to Use Mini-Lessons to Enhance Reading Comprehension for students with ASD



Reading comprehension is the process of making connections between students' prior knowledge and new information from the text, become aware of the thinking process during daily reading, and actively react to reading texts (Harvey & Goudvis, 2013; Rasinski & Padak, 2008). While typically developing students may be able to associate their background knowledge to the text being read, students with ASD may encounter difficulties due to their restricted and repetitive behaviors or interests (RRBs) (Harrop, 2015; Kirby, Boyd, Williams, Faldowski, & Baranek, 2017; Mancil & Pearl, 2008). One possible approach to expand these restricted interests is to implement the following standard instructional practices to: (a) help the students access and build their background knowledge on the text to be read, (b) help the students create their own mental images, and (c) help them make connections to their background knowledge.

From a WCC perspective, students with ASD may encounter difficulty accessing and building background knowledge. The first two instructional practices that might be helpful for students with ASD access and build upon background knowledge is (1) priming (Williamson & Carnahan, 2010) with visual supports (Hume, 2013) and (2) pre-teach vocabulary. During the first instructional practice (i.e., priming), the educator pre-reads the text with the student and identifies two to three concepts/details (Additional examples or details of this first instructional practice are provided in Table 1) that need to be learned from the text (e.g., settings, events, solutions, problems, characters). Next, the educator draws (See Figures 2 and 3) or creates an image of each detail (A duck and a fish-characters of the story) on two separate index cards (with the help of the student). Then, while in the individualized or one-one-one setting, each index card is presented to the student such as, "This is a duck Joe. Touch the duck." (i.e., primarily for students with language delays or non-verbal) or "This is a duck. Say out loud the word duck." (i.e., for students with sufficient reading/language ability and repeat the process for the index card with the fish with student). Each student is reinforced for completing the command and this process is repeated until consistent responding is established. Once the first detail index card is learned (the duck), the next detail index card (the fish) is presented to the student as a means of teaching him/her to discriminate between the already learned detail and the new detail. The learned index card is placed closer to the student while the new index card is placed farther away and the entire process starts over again. As each student demonstrates success with identifying the correct detail, the educator moves the new index card closer to the student and repeats the process until the student can successfully identify the correct details (repeat the above process for other details such as settings, events, solutions, and problems). As the educator can assist the student to access and build upon their background knowledge, the student with ASD is likely to help himself or herself to conquer the existing WCC deficits by acquiring the ability to recognize details of both words and images from the reading texts. Table 1 shows a number of sequences that an educator can teach the student with ASD to access and build upon his/her

background knowledge.

Figure 2. An example of a picture on an index card created by the student with the teacher's assistance during "Priming"

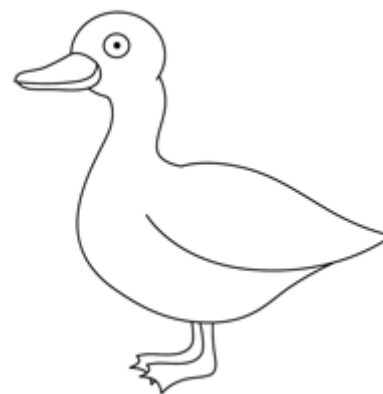


Figure 3. An example of a second picture on an index card created by the student with the teacher's assistance during "Priming"



Table 1

Access and Build Upon Background Knowledge for Students with ASD in an Inclusive Early Childhood Classroom

Sequence	Teacher	Student
1	<p>Priming with visual supports: (Hume, 2013; Williamson & Carnahan, 2010)</p> <p>Pre-reads text and identifies key concepts/ details.</p> <p>“Joe, who are the characters in the story (character)?”, “Where does this story take place (setting)?”, “What are some of things that happened in the story (events)?”, “Did the baby duck get lost from her Mom (problem)?”, “What do you think Joe? How did the mother duck find her lost baby (solution)?”.</p>	<p>Reads with the educator during a shared-reading to choose two or more concepts/details from the story.</p> <p>Respond to the educators’ questions or brief discussions (prompted and encouraged by the educator).</p>
2	<p>Draws or creates images of concepts/ details on index cards.</p> <p>“Help me draw a duck and a fish, Joe”.</p>	<p>Helps the educator draw the pictures of a duck and a fish (characters) on 2 separate index cards.</p>
3	<p>Presents first index card to the student and states: “This is a duck Joe. Touch the duck” and/or “Say out loud the word duck”.</p>	<p>Touches index card (e.g. touches the duck) or say out loud the word ‘duck’ and is reinforced. (May need to be repeated until response is consistent).</p>
4	<p>Introduces new index card to the student and states: This is a fish. Touch the fish Joe” and/or “Say out loud the word fish”.</p>	<p>Touches the correct second index card (e.g. touches the fish) or say out loud the word ‘fish’ and is reinforced.</p>
5	<p>Places learned index card (e.g. duck) close to student, and new index card (e.g. fish) away from student and states: “Touch the duck again Joe” and/or “say out loud the word duck again”.</p>	<p>Touches the correct or learned index card (e.g. touches the duck) again and/or say out loud the word ‘duck’ and is reinforced.</p>
6	<p>Moves new index card closer to student and states: “Now touch the fish and/or “say out loud the word fish, Joe.”</p>	<p>Touches the correct new index card (e.g. touches the fish) or say out loud the word ‘fish’ and is reinforced.</p>
7	<p>Repeats process until new index card (fish) is next to learned index card (duck).</p>	
8	<p>Introduces new index cards for (settings, events, solutions, and problem) and repeats steps 1 through 7 with student with the above different concept or details</p>	

Note. Adapted from Hume, 2013; Williamson & Carnahan, 2010.

The second instructional practice is to pre-teach vocabulary (Koppenhaver, 2010) using a picture-to-text matching strategy (Fossett & Mirenda, 2006). First, the educator writes or prints on index cards the words (See Figures 4 and 5) of the details taught during the above priming with visual supports lesson (with the help of the student). For instance, if the picture on the index card were a duck, the corresponding text index card would have the word “duck” written/typed on it. Next, the educator teaches the student to identify the text using the same procedure as outlined in the priming lesson. The educator then creates a series of additional index card(s) (See Figure 6) that has the two to three details taught using the priming with visual supports lesson printed on the left-hand side of the page with the matching vocabulary words on the right-hand side (with the help of the student). Each new index card contains the same pictures and words, but the order in which they are presented is varied. Once the student can identify the vocabulary words, the educator presents the index cards to the student and says, “Draw a line to match the picture with the word.” Reinforcement can be provided after each successful match, and this process is repeated until the student is able to correctly match the pictures with the vocabulary words for any additional details of the stories (e.g., settings, events, problems, solutions) besides the presented characters (duck and fish). Priming the students’ background knowledge and pre-teaching key vocabulary will most likely remediate the WCC deficits exhibited by students with ASD as key details of the text are taught (See Table 2 below).

Figure 4. An example of a picture with a word on an index card created by the student with the teacher’s assistance during “Pre-teach Vocabulary”

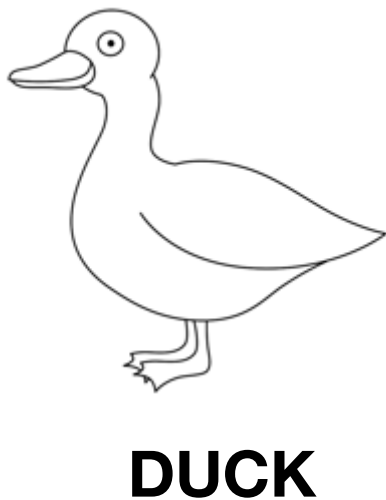


Figure 5. An example of a second picture with a word on an index card created by the student with the teacher’s assistance during “Pre-teach Vocabulary”

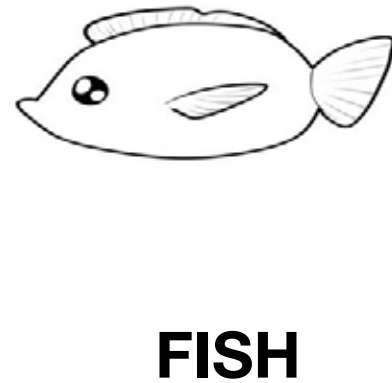


Figure 6. An example of pictures with words on an index card created by the student with the teacher’s assistance during “Picture-to-text matching”

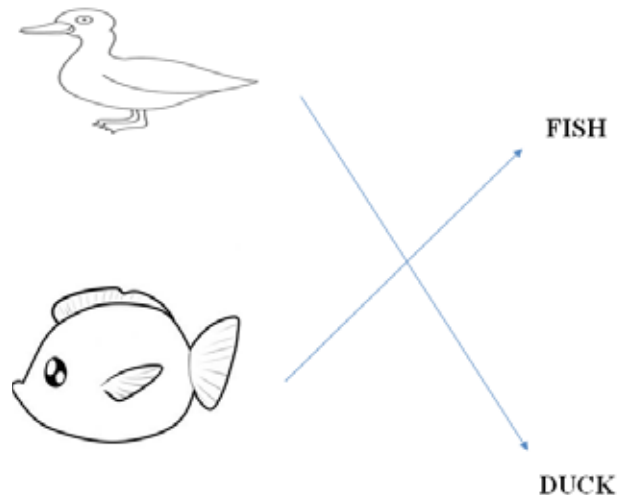


Table 2

Pre-teach Vocabulary for Students with ASD in an Inclusive Early Childhood Classroom

Sequence	Teacher	Student
1	<p>Pre-teach vocabulary (Koppenhaver, 2010) using a picture-to-text matching strategy (Fossett & Mirenda, 2006). Writes/prints words for learned images from previous lesson on index cards. “Joe, it is time for us to work on writing words”.</p> <p>Creates index cards where the learned images of details/concepts are on the left side and the word for each learned image of the detail/concept is on the right side.</p> <p>The images and words should be varied and be placed in a different order than previously presented.</p>	Helps teacher write/print words on index cards (from the first instructional practice “priming”).
2	Presents first index card to the student and states: “This is the word duck. Touch the word duck” and/or “Say out loud the word duck”.	Touches index card (e.g. touches index card with the word ‘duck’ on it) and/or say out loud the word ‘duck’ and is reinforced.
3	Introduces the second index card to the student and states: This is the word fish. Touch the word fish” and/or “Say out loud the word ‘fish”.	Touches index card (e.g. touches index card with the word ‘fish’ on it) and/or say out loud the word ‘fish’ again and is reinforced.
4	Places learned index card (e.g. duck) close to student, and new index card (e.g. fish) away from student and states: “Touch the word duck” and/or “Say out loud the word duck again Joe”.	Touches index card (e.g. touches index card with the word ‘duck’ on it) and/or say out loud the word ‘duck’ again and is reinforced.
5	Moves the second index card closer to student and states: “Touch the word fish” and/or “Say out loud the word fish again Joe”.	Touches index card (e.g. touches index card with the word ‘fish’ on it) and/or say out loud the word ‘fish’ and is reinforced.
6	Repeats process until new index card (fish) is next to learned index card (duck)	
7	<p>Pre-teach vocabulary (Koppenhaver, 2010) using a picture-to-text matching strategy (Fossett & Mirenda, 2006).</p> <p>After all words have been learned, presents index cards to student and states: “Okay Joe, now draw a line to match the picture with each of the words”.</p>	Student draws a line from image on the left of the index card(s) to the corresponding word(s) on the right of the index cards and is reinforced for correctly matching the image(s) to the corresponding word(s).
8	Introduces new index cards for (settings, events, solutions, and problems) and repeats steps 1 through 7 with student with the above different concepts or details	

Note. Adapted from Fossett & Mirenda, 2006; Koppenhaver, 2010

After conducting the first two mini-lessons or instructional practices, the next step is reading the text with the student. The main objective during this phase of instruction is to help the student with ASD make connections to the text, “to become critical, curious, strategic readers” (Harvey & Goudvis, 2013, p. 434). Making connections to the text can be accomplished by connecting text-to-self (TS), text-to-text (TT), or text-to-world (TW). A student with ASD may have difficulty with all three ways to make connections due to his/her existing WCC and EF deficits discussed earlier (Happe & Frith, 2006; May et al., 2013).

A third instructional practice that can address all three connections (TS, TT, TW) is the use of a graphic organizer. A graphic organizer, sometimes referred to as a story map, is an effective visual representation (display, diagram, or outline) of a story structure or concept being studied and shows the relationship between information (Baker, Gersten, & Scanlon, 2002; Fisher & Schumaker, 1995; Sam & Rajan, 2013; Whalon, Hanline, & Woods, 2007). One known evidence-based strategy to proliferate the ability to “make connections from text” is to generate graphic organizers (Stringfield, Luscre, & Gast, 2011). Graphic organizers have been used to teach students with ASD to comprehend social studies content (Schenning, Knight, & Spooner, 2013; Zakas, Browder, Ahlgrim-Delzell, & Heafner, 2013), science content (Knight, Spooner, & Browder, 2013), and to improve reading scores for students with ASD (Stringfield, Luscre, & Gast, 2011). To implement this third mini lesson, the educator would first select the graphic that matches the book being read. Continuing the example from the first two mini-lessons, the student is reading a fiction book where one of the characters is a duck. Using a Venn Diagram, the pictures and/or words (e.g., duck, fish, drink, water, every day) learned during the priming and pre-teaching vocabulary mini lessons would already be printed on one side of the diagram (See Figure 7). While the educator reads the book with the student, s/he would identify similarities and differences between the student responses (i.e., I drink water every day) and the pictures/vocabulary words previously learned (e.g., the duck also drink water out of the lake daily). As each similarity/difference is identified, the student would attempt to draw/write the shared details or idea on his/her graphic organizer (i.e., the duck and I both drink water for survival) with the assistance of the educator (the Venn Diagram should be partially filled out by the educator for the student with insufficient reading/language level or skill to begin with). For TT and TW, the educator could also use a similar Venn Diagram to work with the student to identify, distinguish, and discuss similarities and differences in details from the current fiction book with any other books that the student has read in the past (with a duck, fish or both as characters). Secondly, with the student’s acquired knowledge about the two characters (duck and fish), the educator might want to extend the conversations (see additional examples from table 3) and/or activity with the student (for comparative purpose with the use of the Venn Diagram) regarding the important roles of these animals to the world (e.g., people eat fish as part of their daily healthy diet).

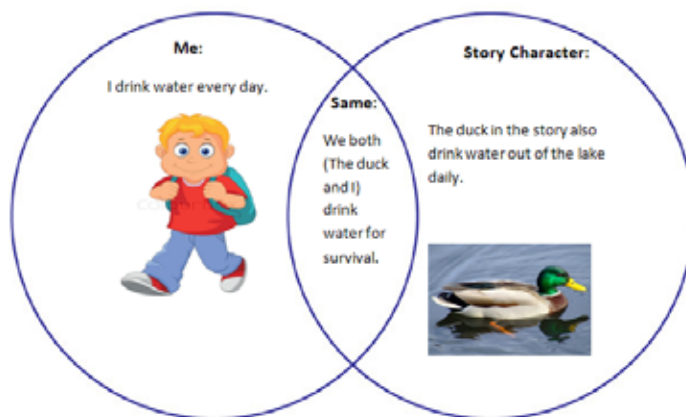


Figure 7. An Example of a Venn Diagram for Linking Text to Self (TS) for Students with ASD in An Inclusive Early Childhood Setting

Table 3

Using Graphic Organizers (Venn Diagram) for Students with ASD in an Inclusive Early Childhood Classroom

Sequence	Teacher	Student
1	<p>Graphic organizer (Baker, Gersten, & Scanlon, 2002; Fisher & Schumaker, 1995; Sam & Rajan, 2013; Whalon, Hanline, & Woods, 2007)</p> <p>Selects graphic organizers that best fits the text (e.g. A Venn diagram for showing differences/similarities)</p>	
2	Add pictures/words learned on the graphic organizer (e.g. prints pictures/words on one side of the Venn diagram)	
3	<p>Reads text and identifies similarities and differences between concepts/details with the student “Joe, ducks drink water, and you drink water too. So you both drink water. That’s how you are the same.”, “Do you remember any stories that we have read in the past with ducks in it?”, “Do you think ducks are the same everywhere in different countries?”, “If ducks are not the same from different places, what might be some of the differences?”</p>	<p>Writes details (with the assistance from the educator at the beginning) on the graphic organizer. (e.g. On Venn Diagram where one circle is the student and the other one is the story character, the educator assist the student to write “I drink water” in his/her circle, and “Ducks drink water” in the story character circle. Then, where the circle intersects, the educator helps the student to writes, “We both drink water.”</p>
4	Continues to identify differences and similarities for the rest of the text with other characters with the student	Continues to practice writing differences and similarities for the rest of the text (with the assistance from the educator at the beginning)

Note. Adapted from Baker, Gersten, & Scanlon, 2002; Fisher & Schumaker, 1995; Sam & Rajan, 2013; Whalon, Hanline, & Woods, 2007).

A fourth instructional practice is the use of an adapted story map to organize and summarize texts (another type of graphic organizer) (See Figure 8). Story maps have long been utilized as pre- and postreading tools to assist emerging readers to “organize” and/or “recall” facts (Diehl, Bennetto, & Young, 2006) or to figure out the main ideas or events that happen throughout the story. Gately (2008) found that the use of story maps proliferates the length and multiplicity in narratives of students with ASD. In their findings, Stringfield and colleagues (2011) suggested that the use of story maps might be useful for elementary teachers to teach reading for students with High Functioning Autism (HFA). To date, according to Nguyen and colleagues (2015), no literature has been published on how to teach students with ASD to summarize texts at a comprehension level that is higher than solely recalling facts. Perhaps, practitioners or educators of students with ASD could use the suggested and adapted story map (See Figure 8) to begin the above-mentioned task. First, the educator would model, engage, and assist the student to fill out the general information (i.e., book title, student name, date, characters, time of the day, and the location of the story). It is appropriate to allow the student to go back and reread the story (or shared reading with the educator) while completing this initial task. Next, the educator begins to use both open-ended (e.g., why do you think the fish swam ahead from the duck?) and close-ended type of questions (e.g., how many ducks do you see in the story?) to help the student to fill out the sequential events (beginning, middle, and the ending) of the story. Lastly, after reviewing with the student regarding the various events that happened in the story on the filled-out story map, the educator would “practice” with the student on figuring out the main idea of the entire story. The educator would again assist the student to discuss and write down the “one-sentence” main idea on the last box of the story map. It is worth noting that this entire process could become difficult at times for the educator when working with a student with insufficient reading/language skills. However, with consistent practice, the student would most likely become familiar with the process.

Overall, in an attempt to alleviate the current WCC and EF deficits for students with ASD, the above mini lesson that use a variety of graphic organizers such as the Venn Diagram would allow the student with ASD to make TS, TT, and TW connections. Moreover, the additional use of the adapted story map provides a specific approach to help him/her to: (1) recall facts, (2) summarize facts, and (3) stating and writing down the main idea of the story with the educator or independently with additional practices (See Table 3 and Figure 8).

Story Map

Book Title: The Two Best Friends
 Student Name: Joe Smith
 Date: 07/02/2018

Setting

Characters	The duck and the fish
Time of the Day	Late afternoon
Place	The lake in the park

Beginning

- The duck and the fish met each other
- They asked each other’s names
- They swam and played with each other at the lake

Middle

- They became friends
- They ate lunch together at the lake
- They both enjoyed the afternoon

End

- It is getting dark
- The two friends get ready to go back to their families
- The duck and the fish said goodbyes to each other

Main Idea of the Story

- This story is about a duck and a fish met each other at the lake in the park and they became best friends.

Figure 8. An Example of an Adapted Story Map for Text-Summarizing for Students with ASD in an Inclusive Early Childhood Classroom (Stringfield, Luscre, & Gast, 2011)

Directions for Future Inquiry and Concluding Thoughts

The authors of this article acknowledge that the above suggested instructional practices are still in its embryonic phase (not in the context of a case study or an empirical study); however, we strongly believe that it is necessary for educators in early childhood inclusive settings to begin to use sound judgements to adhere to the existing evidence-based practices that are grounded in research for students with ASD. Future studies would not only be needed but it is critical to validate the effectiveness of the above mini lessons, particularly how each of the above strategies or instructional practices enhance reading comprehension abilities of this student population. Next, additional studies should also emphasize on how each of the existing cognitive factors of students with ASD (i.e., EF, ToM, and WCC) influence the way these students understand reading texts with the use of the above four instructional practices.

For the last few decades, educators across the country are expected to provide effective reading instruction for students with ASD, particularly the needed one-on-one instructional practices that occur in the self-contained classroom, the inclusive general education environment or within a resource setting. By focusing on enhancing comprehension skills in the early years, educators may be able to alleviate the deficits in the later years. Furthermore, by providing educators the above four suggested evidence-based mini-lessons as supplemental tools to teach reading comprehension skills to students with ASD, this student population might have the opportunity to acquire these critical skills much earlier.

References

- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.), Washington, DC: Author.
- Baker, S., Gersten, R., & Scanlon, D. (2002). Procedural facilitators and cognitive strategies: Tools for unraveling the mysteries of comprehension and the writing process, and for providing meaningful access to the general curriculum. *Learning Disabilities Research & Practice, 17*, 65-77.
- Carnahan, C. R., Williamson, P. S., & Christman, J. (2011). Linking cognition and literacy in students with autism spectrum disorder. *TEACHING Exceptional Students, 43*, 54-62.
- Centers for Disease Control and Prevention. (2015). Facts about ASD. Retrieved from <http://www.cdc.gov/ncbddd/autism/facts.html>
- Chiang, H., & Lin, Y-H. (2007). Reading comprehension instruction for students with autism spectrum disorders: A review of the literature. *Focus on Autism and Other Developmental Disabilities, 22*, 259-267.
- Diehl, J. J., Bennetto, L., & Young, E. C. (2006). Story recall and narrative coherence of High-functioning children with autism spectrum disorders. *Journal of Abnormal Child Psychology, 34*, 87-106.
- Fisher, J. B., & Schumaker, J. B. (1995). Searching for validated inclusive practices: A review of the literature. *Focus on Exceptional Students, 28*, 1-20.
- Fossett, B., & Mirenda, P. (2006). Sight word reading in students with developmental disabilities: A comparison of paired associate and picture-to-text instruction. *Research in Developmental Disabilities, 27*, 411-429.
- Frith, U. (2012). Why we need cognitive explanations of autism. *Quarterly Journal of Experimental Psychology, 65*(11), 2073-2092.
- Gately, S. E. (2008). Facilitating reading comprehension for students on the autism spectrum. *TEACHING Exceptional Children, 40*, 40-45.
- Happe, F., & Frith, U. (2006). The weak coherence account: Detail focused cognitive style in autism spectrum disorders. *Journal of Autism and Developmental Disorders, 36*, 5-25.
- Harrop, C. (2015). Evidence-based, parent-mediated interventions for young children with autism spectrum disorder: The case of restricted and repetitive behaviors. *Autism, 19*(6), 662-672.
- Harvey, S., & Goudvis, A. (2013). Comprehension at the core. *The Reading Teacher, 66*(6), 432-439.
- Hume, K. (2013). *Visual supports (VS) fact sheet*. Chapel Hill: The University of North Carolina, Frank Porter Graham Child Development Institute, The National Professional Development Center on Autism Spectrum Disorders.
- Kirby, A.V., Boyd, B. A., Williams, K. L., Faldowski, R. A., & Baranek, G. T. (2017). Sensory and repetitive behaviors among children with autism spectrum disorder at home. *Autism, 21*(2), 142-154.
- Knight, V. F., Spooner, F., & Browder, D. M. (2013). Using systematic instruction and graphic organizers to teach science concepts to students with autism spectrum disorders and intellectual disability. *Focus on Autism and Other Developmental Disabilities, 28*, 115-126.
- Koppenhaver, D. A. (2010). Reading comprehension. In C. Carnahan & P. Williamson (Eds.), *Quality literacy instruction for students with autism spectrum disorders* (pp. 355-385). Shawnee Mission, KS: Autism Asperger Publishing.
- Lindsay, S., Proulx, M., Scott, H., & Thomson, N. (2014). Exploring teachers' strategies for including children with autism spectrum disorder in mainstream classrooms. *International Journal of Inclusive Education, 18*(2), 101-122.
- Mancil, G. R., & Pearl, C. E. (2008). Restricted interests as motivators: Improving academic engagement and out-

- comes of children on the autism spectrum. *TEACHING Exceptional Children Plus*, 4(6), 2-15.
- May, T., Rinehart, N., Wilding, J., & Cornish, K. (2013). The role of attention in the academic attainment of students with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 43, 2147-2158.
- Nation, K., Clarke, P., Wright, B. J., & Williams, C. (2006). Patterns of reading ability in students with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 36, 911-919.
- National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). *Common Core State Standards for English language arts and literacy in history/social studies, science, and technical subjects*. Washington, DC: Authors. Retrieved from www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf
- Newman, T. M., Macomber, D., Naples, A. J., Babitz, T., Volmar, F., & Grigorenko, E. L. (2007). Hyperlexia in children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 37, 760-774.
- Nguyen, N., Leytham, P., Whitby, P., & Gelfer, J. (2015). Reading comprehension and autism in the primary general education classroom. *The Reading Teacher*, 69(1), 71-76.
- Office of Special Education Programs (OSEP). (2007). Part B: Educational environments [Historical state level IDEA data files]. Retrieved from tadnet.public.tadnet.org
- Office of Special Education Programs (OSEP). (2012). Part B: Educational environments [Historical state level IDEA data files]. Retrieved from tadnet.public.tadnet.org
- Rasinski, T. V., Padak, N. D. (2008). *Evidence-based instruction in reading* (1st ed.). Boston, MA: Pearson.
- Roberts, K. L. (2013). Comprehension strategy instruction during parent-child shared-reading: An intervention study. *Literacy Research and Instruction*, 52(2), 106-129.
- Sam, D. P., & Rajan, P. (2013). Using graphic organizers to improve reading comprehension skills for the middle school ESL students. *English Language Teaching*, 6(2), 155-170.
- Schenning, H., Knight, V. F., & Spooner, F. (2013). Effects of structured inquiry and graphic organizers on social studies comprehension by students with autism spectrum disorders. *Research in Autism Spectrum Disorders*, 7, 526-540.
- Stringfield, S. G., Luscre, D., & Gast, D. L. (2011). Effects of a story map on accelerated reader postreading test scores in students with high-functioning autism. *Focus on Autism and Other Developmental Disabilities*, 26, 218-229.
- Whalon, K. J., Hanline, M. F., & Woods, J. (2007). Using interactive storybook reading to increase language and literacy skills of children with autism spectrum disorder. *Young Exceptional Children*, 11, 16-26.
- Whalon, K. J., & Hart, J. E. (2011a). Adapting an evidence-based reading comprehension strategy for learners with autism spectrum disorder. *Intervention in School and Clinic*, 46(4), 195-203.
- Whalon, K. J., & Hart, J. E. (2011b). Students with autism spectrum disorder and literacy instruction: An Exploratory study of elementary inclusive settings. *Remedial and Special Education*, 32(3), 243-255.
- Williamson, P., Carnahan, C. R., & Jacobs, J. A. (2012). Reading comprehension profiles of high-functioning students on the autism spectrum: A grounded theory. *Exceptional Students*, 78, 449-469.
- Williamson, P., & Carnahan, C. (2010). Reading fluency. In C. Carnahan & P. Williamson (Eds.), *Quality literacy instruction for students with autism spectrum disorders* (pp. 287-314). Shawnee Mission, KS: Autism Asperger Publishing.
- Zakas, T., Browder, D. M., Ahlgrim-Delzell, L., & Heafner, T. (2013). Teaching social studies contents to students with autism using a graphic organizer intervention. *Research in Autism Spectrum Disorders*, 7, 1075-1086.

About the Authors

Dr. Neal Nghia Nguyen is an assistant professor of Early Childhood/Special Education at Florida Atlantic University (FAU). He has been teaching early childhood/special education courses in the Department of Exceptional Student Education. His research interests include early childhood education, early literacy skills acquisition, read-

ing comprehension, social and emotional learning (SEL) of pre-service and in-service teachers, effective inclusive practices, and the reading abilities of students with autism spectrum disorder.

Dr. William Garnett is an assistant professor of Special Education at California State University at Fresno. He has been teaching various special education research and method courses in the Department of Literacy, Early, Bilingual, and Special Education. His research interest includes the examination of the intersection between the criminal justice system and disabilities.

Dr. Patrick Leytham is an assistant professor of Special Education at Touro University Nevada. He teaches a variety of special education and method courses. One of his research interests includes the learning and reading abilities of students with autism spectrum disorder.

Dr. Jeff Gelfer is a full professor of Early Childhood and Special Education at the University of Nevada Las Vegas (UNLV). He has been teaching various early childhood, child development, and special education courses in the Department of Educational and Clinical Studies. His research interests include early childhood education, child development, and inclusive practices.