

## Tutorial

# Building Comprehension Skills of Young Children With Autism One Storybook at a Time

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**Purpose:** Reading involves the ability to decode and draw meaning from printed text. Reading skill profiles vary widely among learners with autism spectrum disorder (ASD). One fairly common pattern is relative strength in decoding combined with weak comprehension skills—indicators of this profile emerge as early as the preschool years. In order for children with ASD to develop a facility with language that prepares them for reading success, practitioners must intentionally create and provide appropriate instruction practices.

**Method:** In this tutorial, we describe ways in which practitioners can support language development and comprehension skills for children with ASD within the context of shared reading activities. We begin by providing known information about the reading performance of children with ASD using the

Simple View of Reading as our guiding conceptual framework. Next, we present a number of practical, evidence-based strategies that educators can implement within the context of shared book reading activities. Case studies are embedded throughout the tutorial to demonstrate how practitioners may apply these strategies in their instructional settings.

**Conclusions:** Shared book reading interventions are a well-studied, developmentally appropriate approach for bringing about change in language and literacy in early childhood. The success of shared reading depends upon rich communication and interaction between the adult reader and the child. Many children with ASD will require strategies to support social communication and emergent literacy skill development (e.g., vocabulary knowledge, language comprehension) that are specifically linked to future reading comprehension.

Many children in the United States will enter elementary school with significant delays in language and early literacy. Children who qualify for special education services are distinctly at risk for reading and language difficulties, with one study reporting that approximately 40% of preschoolers in special education require intensive intervention (Carta et al., 2015). Young children with autism spectrum disorder (ASD) have particular difficulty developing communication skills, which hinders their ability to acquire the early language and literacy skills fundamental to future reading (Mundy, 2016). Findings from a growing number of studies consistently show that this population of learners is highly likely to experience reading problems (e.g., Åsberg Johnels et al., 2019; Brown

et al., 2013; Grimm et al., 2018; Henderson et al., 2014; McIntyre, Solari, Gonzales, et al., 2017; McIntyre, Solari, Grimm, et al., 2017; Nation et al., 2006; Ricketts et al., 2013; Solari et al., 2019). Although the research on early literacy development of young children with ASD is rather limited (Westerveld et al., 2016), emerging evidence suggests that many children with ASD begin to show signs of reading difficulties during the preschool years (Fleury & Lease, 2018; Westerveld et al., 2017).

The Simple View of Reading is a well-evidenced model of reading development (Catts, 2018; Hogan et al., 2011) that is consistent with current research on the reading profiles associated with ASD (e.g., Lucas & Norbury, 2014; Ricketts et al., 2013). The Simple View of Reading maintains that reading is the product of (a) decoding and (b) language comprehension (Gough & Tunmer, 1986). That is, effective readers apply code-focused skills (i.e., alphabet knowledge, phonological awareness) that support the mechanics of reading text and meaning-focused skills that support their ability to comprehend text. Recent research bolsters the view that indicators of future reading difficulty may be evident as early as the preschool years. Westerveld

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et al. (2017) found that 40%–75% of preschool children with ASD performed within expected range in code-focused emergent literacy skills (i.e., alphabet knowledge, print knowledge, phonological awareness) whereas only 15% scored within the expected range for meaning-focused emergent literacy skills (i.e., vocabulary knowledge, listening comprehension). Children with ASD tend to be particularly strong in one particular aspect of code-focused skills: alphabet knowledge (Davidson & Ellis Weismer, 2014; Lanter et al., 2012; Westerveld et al., 2017). Other code-focused skills—print concept knowledge and phonological awareness—reveal heterogeneity (Davidson & Ellis Weismeyer, 2014; Dynia et al., 2019, 2014; Lanter et al., 2012; Westerveld et al., 2017). The marked variability associated with emergent literacy performance is particularly noteworthy and appears to relate to language ability, nonverbal cognition, and autism symptom severity (Dynia et al., 2019, 2014; Westerveld et al., 2017).

Although the reading development of children with ASD is highly variable, the majority of school-age learners with ASD will struggle to understand what they read (i.e., meaning-focused skills; Brown et al., 2013; Grimm et al., 2018; McIntyre et al., 2018; McIntyre, Solari, Gonzales, et al., 2017; McIntyre, Solari, Grimm, et al., 2017; Nation et al., 2006; Ricketts et al., 2013). Because reading comprehension is in part dependent on language comprehension, the focus of this tutorial will be on facilitating language comprehension skills of young learners with ASD in the context of shared reading activities. We emphasize building language comprehension skills in early childhood, as these skills influence the future reading comprehension skills of typically developing learners and learners with ASD. Importantly, language development progresses rapidly in the preschool years, making this a favorable time to intervene (Grimm et al., 2018). We begin with an overview of the comprehension process in general, followed by a description of what is known about comprehension skills of learners with ASD specifically. The remainder of this tutorial will focus on using shared reading as a context to facilitate the development of skills that will support children's language comprehension. We will describe strategies that practitioners can use to maximize the learning of young children with ASD who represent a range of language ability and skill levels. We couple that with case examples to demonstrate the application of the strategies.

### ***The Comprehension Process***

To comprehend, learners generate a mental model of text. Creating a mental model is the same whether listening to text read aloud or independently reading text (Cain & Barnes, 2017). To form a mental representation, one applies one's understanding of language, including narrative, grammar, and depth of vocabulary knowledge, and higher order language processing tasks, including inference making (Cain & Barnes, 2017; Kim, 2017). This process of forming mental models of text is evident in the preschool years, including the ability to generate causal inferences (Cain & Barnes, 2017; Tompkins et al., 2013). Such inferences often require

theory of mind (ToM; e.g., the ability to recognize and understand the mental states of self and others to explain and predict behavior; Begeer et al., 2003) as the learner identifies and interprets the evolving motivations, thoughts, feelings, and perceptions of an author or a character and the corresponding causal actions (Cain & Barnes, 2017; Tompkins et al., 2013).

The beginning research on the emergent literacy profiles of young children with ASD suggests their comprehension difficulties emerge in preschool (Fleury & Lease, 2018; Westerveld et al., 2017) as they have difficulty acquiring the advanced language skills predictive of future reading comprehension (National Early Literacy Panel, 2008). Specifically, young children with ASD have trouble developing oral narrative understanding and production (Westerveld & Roberts, 2017) and definitional vocabulary knowledge (Dynia et al., 2014; Fleury & Lease, 2018). These patterns persist once learners with ASD enter school. Their comprehension difficulties are linked to low scores on measures of vocabulary (e.g., Brown et al., 2013; Nation et al., 2006), oral language comprehension (e.g., Norbury & Nation, 2011), and inferencing (e.g., Grimm et al., 2018; Lucas & Norbury, 2014; Norbury & Nation, 2011). The foundational characteristics associated with ASD, including deficits in social communication (McIntyre, Solari, Gonzales, et al., 2017; McIntyre, Solari, Grimm, et al., 2017; Norbury & Nation, 2011), are associated with poor reading comprehension. Moreover, performance on ToM tasks that involve perspective taking have also been linked to the reading comprehension of children with ASD (McIntyre et al., 2018; Ricketts et al., 2013). Together, these skill deficits influence reading development as the improvement rate in reading of school-age children with ASD is significantly slower than that of students with learning disabilities without ASD (Wei et al., 2011) and the growth rate of learners with ASD on measures of comprehension appears to decline over time (Wei et al., 2011, 2014).

Consequently, the early childhood years present a unique opportunity to build foundational emergent literacy skills that may prevent future reading failure (Kim, 2017). Consistent with the Simple View of Reading, language comprehension is an important instructional target and a complex process that builds on several cognitive and linguistic skills, including vocabulary knowledge, inference making, and perspective taking or ToM (Kim, 2017). One developmentally appropriate approach used to build these skills in the preschool years is interactive shared reading (Hogan et al., 2011).

### ***Shared Reading Activities***

Reading aloud to children emerged as a key facet of family literacy programs and the central focus of several public library outreach efforts (e.g., the Carnegie Library's *Beginning to Read* program, Reading is Fundamental, Washington Learning Systems; see Segel & Friedberg, 1991; <http://www.rif.org/>; <http://www.wlearning.com>). It continues to be widely recommended as a developmentally appropriate practice to support language and early literacy

development in all children, with and without disabilities. The benefits of adult–child shared reading practices on children’s oral language skills is based on the premise that book reading allows children to hear adults use rich language and, in that setting, are provided ample opportunities to themselves practice using language. Research conducted in the past few decades has stressed that the quality of book reading is more important than the quantity of book reading (e.g., Scarborough & Dobrich, 1994). That is, the manner in which children are read to affects their engagement during book readings and what they take away from the experience. A situation in which an adult simply reads the text on the page positions the child as a passive listener, rather than an active participant in the reading. Compare this to a book reading interaction that involves the adult describing illustrations and asking the child questions about what they see and understand about the story. In this second scenario, the child has the opportunity to engage with the text and is expected to do so. Therefore, quality shared reading involves supporting children in an interactive dialogue, with the adult asking questions, making comments, expanding on all child communication acts, and adjusting their level of communication to match the child’s need (Cunningham & Zibulsky, 2011). The child becomes an active participant with the adult, the book, and the entire process of reading. Through quality adult–child shared reading interactions, children not only gain access to a variety of books but are also provided opportunities to develop a number of emergent literacy skills, specifically oral language (e.g., Mol et al., 2009; National Early Literacy Panel, 2008).

### **Reading With Children With ASD**

Interactive shared reading interventions that are designed to generate active discussions about text can present a range of challenges for young children with ASD. For example, observational studies of caregivers reading with their preschool-age children revealed that children with ASD responded to adult questions and comments posed during reading at lower rates (Fleury & Ford, 2020) and demonstrated higher rates of disengaged behavior (e.g., looking away from the book) and disruptive behavior (e.g., pushing book away) than their typically developing peers (Fleury & Hugh, 2018). These difficulties children with ASD have in participating in shared reading are consistent with the social communication characteristics foundational to the disorder. Rather than viewing these difficulties as impediments to participating in shared reading, we instead consider how adults can use shared reading as an opportunity to develop children’s social communication broadly and emergent literacy skills (e.g., vocabulary knowledge, language comprehension) that are specifically linked to future reading comprehension (Bean et al., 2019).

### **Strategies to Help Children With ASD Learn From Shared Reading Activities**

The nature of shared reading in which the adult and child share in an interaction focused on a single storybook

is a social act (Bus, 2003). These interactions promote learning and interpersonal relationships (Cunningham & Zibulsky, 2011). Importantly, shared reading can serve as a context in which children with ASD can learn a variety of behaviors that may lead to improved educational outcomes, broadly, and reading outcomes, specifically. For example, a recent study indicated that when parents engaged their children with ASD in shared reading activities that involved making predictions and commenting and questioning about story grammar (i.e., characters, setting, events, problem, solution), the verbal participation of young children with ASD was higher (Westerveld et al., 2020). Previous research has also shown a positive correlation between mothers’ clarifying talk about affective states (“He is crying because he’s sad that he missed the party.”) during shared reading and the performance of their child with ASD on ToM during reading (e.g., “She is so happy!”), however, did not yield similar affects (Slaughter et al., 2007), suggesting that the quality of the interaction established during shared reading is important for young children with ASD. Here, we describe a number of research-based strategies that professionals can use during shared reading activities to encourage active participation and build language skills needed for comprehension. We provide fictional case examples to illustrate how practitioners can use the presented strategies with children with varying communication needs to achieve different instructional goals related to comprehension: (a) building joint attention skills, (b) building vocabulary skills, and (c) building inferring skills (Flynn, 2011).

### ***Read With Intention: Identify the Learning Objective***

Optimizing learning opportunities begins with identifying the goal of the shared reading activity. The interactive to independent literacy model (Kaderavek & Rabidoux, 2004) can be used to identify appropriate literacy goals and interventions for children with atypical or severe levels of communication impairments. The model conceptualizes emergent literacy into two levels. The first level focuses on giving children opportunities and support to develop and maintain a joint focus of attention to a literacy event, such as books or other written/visual materials that are meaningful to the child. At this stage, it is essential that the object of literacy reflect the child’s interests. Learning objectives at this level include (a) maintaining attention to a book and literacy partner for a specified amount of time; (b) decreased off-task behaviors during storybook reading; (c) directing gaze at pictures, turning pages, and manipulating flaps in a lift-the-flap book; (d) motoric turn-taking during shared book reading; and (e) using emergent writing (e.g., scribbles, simple drawing) to tell a story or share an experience. The second level of the interactive to independent literacy model concerns the development and maintenance of interactive and communicative routines within a balanced exchange between the emergent reader and their literacy partner. The literacy partner (e.g., parent, teacher) builds on the child’s

communicative actions—such as pointing, vocalizations and verbalizations—during literacy activities, making sure to follow and expand on the child’s initiations. If the adult excessively directs the student, the balance in the interaction risks becoming lost. At this level, possible learning goals include the following: (a) a student interacts with verbal, gestural, or signed communication within a shared literacy interaction; (b) a student initiates communication during a literacy interaction; and (c) a student demonstrates a range of pragmatic communication skills (e.g., describing, requesting, responding) during a literacy interaction. The interactive to independent literacy model emphasizes the importance of engagement and social interaction in young children’s emergent literacy development. Importantly, shared reading activities provide a context to teach-specific social communication skills that are characteristically difficult for learners with ASD but are essential to later comprehension. Creating individualized instructional goals for learners helps guide instruction. The strategies that practitioners implement during shared reading will vary depending on their learner’s needs and the instructional target. Examples of learning targets that are appropriate to teach within a shared reading context are presented in Table 1.

### ***Arranging the Learning Environment***

Preparations for successful learning experiences begin well before a learner steps foot in the instructional setting. High-quality learning environments serve as the foundation for tiered instructional models for young children with special needs (Sandall et al., 2019) and has necessitated the development of tools that practitioners can use to evaluate—and improve upon—their learning environments (e.g., Early Literacy and Language Classroom Observation Tool; Smith & Dickinson, 2002). These tools typically focus on evaluating children’s access to adult-led learning activities, opportunities for independent exploration, the variety and quantity of materials available, and the arrangement of the classroom and learning materials. High-quality environments play an important role in early learning for all children, but experts argue that it is particularly critical for vulnerable populations, such as children with disabilities (Sandall et al., 2019)

Oversensitivity or undersensitivity to sensory stimuli is a clinical feature of ASD (American Psychiatric Association, 2013) that can influence individuals’ behaviors in learning environments. Accordingly, young learners may grow preoccupied with irrelevant stimuli in their environment and be prevented from attending to relevant stimuli that promote learning. Environmental arrangements are particularly impactful for individuals with ASD, as they commonly thrive in structured settings that are carefully arranged to highlight relevant features of the environment, while minimizing aspects that may distract from learning (Schopler et al., 1995). A well-structured environment supports children’s independence and engagement; overreliance on adult directives becomes far less likely when the environment serves as a cue for the expected behavior. For instance, the

use of individualized carpet squares indicates to children where they are to sit without an adult directing them. Structuring the environment to support learners with ASD includes careful furniture arrangements (e.g., seating, segmenting space), removal of extraneous stimuli that can distract learners, and the incorporation of visual stimuli that draw children’s attention to stimuli relevant to their learning.

### **Case Example: Setting Up Paul’s Learning Environment**

Paul is a 4-year-old with ASD who primarily uses single-word utterances to label pictures and objects. His receptive language skills are slightly higher than his expressive language skills, especially in the area of single-word vocabulary knowledge. Paul is easily distracted by his surroundings. He attends well during sessions with his speech-language pathologist (SLP) in her office because he finds few distractions there. However, his classroom teacher experiences difficulty engaging him in reading sessions in the main classroom. She asks the SLP for guidance. The SLP suggests that the teacher select a corner of the room to designate as the “reading nook.” She rearranges a book shelf to create a physical boundary for the space and brings in child-size seating. The reading nook is located adjacent to a window, which the teacher blocks with butcher paper. All superfluous items are removed from the space. The SLP uses a visual support that depicts desired behaviors for reading (e.g., sit on seat, eyes on book, listen to reader) during her sessions, which she provides to the classroom teacher. The teacher posts the visual support on a wall at children’s eye level and uses the support to review the expectations prior to reading.

### ***Build Joint Attention Skills***

Because the learning of young children with ASD is often impeded by an inability to establish a common frame of reference and initiate and engage in learning with others, strategies to secure joint attention should be embedded in shared reading. Joint attention refers to the ability to coordinate one’s attention between people and objects (Mundy, 2016). For children not yet using speech as their primary mode of communication, joint attention is an important instructional target as it often precedes first words (Koegel & Ashbaugh, 2017). Joint attention skills include attending to social partners, shifting eye gaze, and sharing affect. Shared reading naturally provides opportunities to establish joint attention by pairing a point of focus with a label of items, objects, events, emotions, and so forth that are depicted in pictures and text. This act of engaging in joint attention can enhance vocabulary learning in the context of shared reading (Farrant & Zubrick, 2012). In fact, along with exposing children to new and varied vocabulary and familiarizing them with books, joint attention is also thought to enhance early language and literacy skills through the act of reading aloud with caregivers (Pentimonti et al., 2013). Although there is not a direct link between joint attention and reading comprehension difficulties among learners with

**Table 1.** Summary of instructional targets and strategies.

Domain	Links to reading	Example of potential instructional targets	Example embedded strategies
Joint attention	<ul style="list-style-type: none"> <li>Joint attention is associated with language development and social cognition (Mundy, 2016)</li> <li>Evidence of joint attention facilitating vocabulary learning during shared reading (Farrant &amp; Zubrick, 2012)</li> </ul>	<ul style="list-style-type: none"> <li>Orient toward others during shared reading</li> <li>Shift gaze between people and objects (i.e., book)</li> <li>Pair gesture with gaze to show or share</li> <li>Use gaze to respond a gesture</li> </ul>	<ul style="list-style-type: none"> <li>Follow child’s focus and model language</li> <li>Repeat child action and model language</li> <li>Introduce an expectant time delay (expectant look paired with an intentional pause)</li> <li>Prompt for joint attention by pairing a gesture with a vocalization</li> <li>Interrupt the routine</li> </ul>
Social communication	Reading comprehension is linked to social communication and theory of mind (ToM) of learners with autism spectrum disorder (ASD; e.g., McIntyre et al., 2018; Norbury & Nation, 2011; Ricketts et al., 2013)	<ul style="list-style-type: none"> <li>Increase contingent responding</li> <li>Increase spontaneous communication attempts</li> <li>Initiate interactions with others</li> <li>Generate questions</li> <li>Turn take</li> <li>Maintain an interaction</li> <li>Identify emotions, feelings of characters</li> </ul>	<ul style="list-style-type: none"> <li>Expand child’s language and ask child to repeat expansions</li> <li>Contingent imitation of child’s verbal or nonverbal communication acts immediately following the act</li> <li>Open-ended questions using dialogic reading (DR) prompts</li> <li>Model contingent responding</li> <li>Interrupt the reading routine to encourage an initiation</li> <li>Expectant time delay to encourage initiations</li> <li>Visual supports to encourage an initiation</li> <li>Question starters to encourage the child to generate questions</li> <li>Including peers and establishing a balanced turn-taking routine</li> <li>Model initiating comments</li> <li>Level 1 DR prompts (e.g., What is this? What is he doing? What is this for? What does this do?)</li> <li>Prompt as needed to elicit a correct response</li> <li>Introduce a three-term contingency to ensure the child elicits the target vocabulary term or definition</li> <li>Use themes to expose children to the same words in a number of different contexts</li> <li>Provide opportunities to use the word during and after shared reading</li> </ul>
Vocabulary knowledge	<p>Young children with ASD score poorly on measures of definitional vocabulary (i.e., label and function of word)</p> <p>The comprehension difficulties of school-age learners with ASD are linked to vocabulary knowledge (e.g., Davidson et al., 2018; Lucas &amp; Norbury, 2014; Nation et al., 2006)</p>	<ul style="list-style-type: none"> <li>Identify functions/attributes of words from various parts of speech, for example, nouns, verbs, adjectives, adverbs, prepositions (e.g., on, under), mental-state terms (e.g., think, know, guess), emotion words (e.g., sad, excited, angry, worry, frightened)</li> </ul>	<ul style="list-style-type: none"> <li>Use themes to expose children to the same words in a number of different contexts</li> <li>Provide opportunities to use the word during and after shared reading</li> </ul>
Inference making	<p>Inference making is essential to reading comprehension (e.g., van den Broek et al., 2011)</p> <p>Difficulty children with ASD experience related to comprehension is linked to inference making (e.g., Grimm et al., 2018; Norbury &amp; Nation, 2011)</p> <p>Causal inferencing often requires ToM (Cartwright &amp; Guajardo, 2015)</p>	<ul style="list-style-type: none"> <li>Increase responding to literal and inferential questions</li> <li>Accurately generate causal inferences</li> <li>Identify emotional states of self and others</li> <li>Identify cause of emotional state of self and others</li> </ul>	<p>Questioning to include</p> <ol style="list-style-type: none"> <li>Causal questions (e.g., What is the problem? Why did he do that? Why is he sad?)</li> <li>Informational (e.g., What time of day is it? What do you think this word means?)</li> <li>Evaluative (Why is that a mean thing to do?)</li> </ol> <ul style="list-style-type: none"> <li>Corrective feedback that includes modeling how an inference is made</li> <li>Systematic instruction to include prompting such as a system of least prompts</li> </ul>

ASD, there are links between joint attention and social communication as well as language development that impact reading comprehension (Mundy, 2016).

Research on joint attention interventions for children with ASD indicates that, following targeted instruction, young children with ASD enhance their joint attention skills (e.g., Fletcher-Watson et al., 2014; Murza et al., 2016; White et al., 2011). For example, studies incorporating Joint Attention Symbolic Play Engagement and Regulation by educators in preschool classrooms (e.g., Chang et al., 2016; Lawton & Kasari, 2012) have included a number of strategies to encourage joint attention, such as waiting for communication (intentional pause to encourage joint attention initiations), contingent language (labeling what the child is attending to), imitating the child's play actions (imitating an action with a toy/object while child is focused on that toy/object), and modeling and prompting for joint attention (e.g., "Look!" paired with a point). Similar strategies can be applied in shared reading interventions. Whalon et al. (2015) used similar strategies to establish joint attention of young children with ASD in shared reading activities, which yielded increased correct, spontaneous responses to adult questions, and increased initiations related to content.

#### **Case Example: Building Ella's Joint Attention Skills**

Ella is a 3-year-old child with ASD and complex communication needs. Ella uses approximately 15–20 single words to label highly preferred objects and activities. Most of her words are nouns, with the exception of "go," "eat," "drink," and "no." She uses physical manipulation of others' hands and bodies to request items that are out of reach. Ella's attention during instructional activities varies from 2 to 5 min with prompting. In collaboration with Ella's caregivers, the Individualized Education Program team determined that Ella could benefit from low-tech augmentative and alternative communication voice output devices to support her communication. Ella's teachers and related service providers use BigMack/LittleMack switches, a Go-Talk 4+, and a seven-level Communication Builder to model new vocabulary and provide opportunities for communication.

Ella's SLP and teacher advise that Ella learn to comment and build vocabulary through literacy activities. Ella's teacher and SLP decided to read individually with Ella to give her ample opportunities to communicate using her low-tech device. The SLP and Ella's teacher have identified several books with topics familiar to Ella and programmed her low-tech device with relevant vocabulary so that Ella can immediately communicate during the reading. Today, Ella's teacher presents her with a choice of two books. Ella selects the story *Brown Bear, Brown Bear, What Do You See?* by Bill Martin, Jr. With the low-tech device available, Ella's teacher intentionally pauses and points to an illustration every two to three pages. For example, When Ella's teacher turns to the page with the red bird image, she pauses and looks expectantly at Ella. Ella looks at the page but does not initiate. Her teacher then points to the bird and says, "Look!" while pointing enthusiastically to the red bird and pausing looking back at Ella's low-tech communication

device. Ella touches "bird" on her device, and her teacher confirms and adds, "Yes, red bird," while modeling by touching "red" and "bird" on her communication device.

#### **Building Language Skills**

There is ample evidence that language skills are strongly related to later reading skills (Catts et al., 1999). One particular interactive reading approach, called *dialogic reading* (DR; Whitehurst et al., 1994), has a robust research base demonstrating its effectiveness in building young children's oral language skills, specifically in vocabulary knowledge (U.S. Department of Education, 2007). The majority of DR research has traditionally focused on typically developing children who are at risk for academic failure due to circumstances that could jeopardize their ability to complete school, such as homelessness, transiency, and caregiver incarceration (U.S. Department of Education, 2007). Researchers are increasingly investigating the benefits of adapted versions of DR on the early language and literacy development of young children with ASD. A number of adaptations have been evaluated, such as the addition of systematic instructional procedures in the form of a least-to-most prompting hierarchy (Fleury & Schwartz, 2017; Whalon et al., 2016, 2015), decreasing language demands (Fleury et al., 2017; Hudson et al., 2017), prompts to secure attention (Whalon et al., 2016, 2015), and conducting DR using a tablet (Coogler et al., 2018). These studies reveal a number of promising findings for children with ASD that include improvements in verbal participation rates (Fleury et al., 2014; Fleury & Schwartz, 2017; Whalon et al., 2015), receptive and expressive vocabulary (Hudson et al., 2017), book-specific vocabulary (Coogler et al., 2018; Fleury & Schwartz, 2017), listening comprehension (Hudson et al., 2017), and correct responding to question prompts (Whalon et al., 2016, 2015).

Practitioners can use DR to stimulate foundational language skills during early childhood that lead to improved listening comprehension, a developmentally appropriate precursor of later reading comprehension. Hogan et al. (2011) explain how specific language constructs indirectly and directly relate to reading comprehension through listening comprehension. Specifically, these authors identify both "lower level" and "higher level" language skills that support children's listening comprehension. Pertinent to this article is the finding that these skills can be developed within the context of shared reading activities.

#### **Lower Level Language Skills: Building Vocabulary**

Vocabulary knowledge supports comprehension. Having a well-developed vocabulary includes knowing the meanings of words, attending to what is relevant about a certain word in the text, and applying what is known about the word to support comprehension (Oakhill et al., 2015). This level of flexibility with vocabulary is referred to as depth—as opposed to breadth—of vocabulary knowledge. Vocabulary breadth is the size of one's vocabulary, and depth is one's ability to define, use, and connect words.

Vocabulary depth is more strongly associated with comprehension than breadth (Oakhill et al., 2015). Although some young children with ASD may learn to receptively label words (e.g., Westerveld et al., 2017), evidence suggests they score poorly on measures of definitional vocabulary (i.e., labeling and explaining the function of a word; e.g., Davidson & Weismer, 2014; Dynia et al., 2014; Fleury & Lease, 2018), indicating that young children with ASD may experience challenges related to depth of vocabulary knowledge. Moreover, the comprehension difficulties faced by school-age learners with ASD have been linked to vocabulary (e.g., Davidson et al., 2018; Lucas & Norbury, 2014; Nation et al., 2006). Given the direct link between vocabulary learning and comprehension as well as emerging evidence that suggests young children with ASD have difficulty developing depth of word knowledge, vocabulary knowledge should be directly targeted early. Storybooks provide a number of opportunities to engage in interactive discussions about words and word meanings (van Kleeck, 2008).

In general, children with wider vocabulary knowledge learn more words in shared reading interventions than do those with a more limited vocabulary (Swanson et al., 2011). This suggests that some learners may require greater intensity, such as reading in smaller groups and direct instruction of target vocabulary words (Barnes et al., 2016; Dickinson et al., 2019). Teaching vocabulary knowledge requires direct instruction of word meanings as well as strategies that support a child's ability to infer word meanings from text (Oakhill et al., 2015). When selecting words to teach, educators should consider words that (a) support comprehension of text, (b) occur frequently in language and readings, and (c) help children acquire new words (Oakhill et al., 2015). To determine if a child knows a word, it is important to ask questions that elicit their depth of knowledge or ability to define and use the word (Dickinson et al., 2019). Oakhill and colleagues developed a list of questions to gauge the extent to which a child "knows" a word (see Table 2) and suggest that Level 4 and higher indicate depth of knowledge. To build word knowledge, the teacher should be intentional about including instruction on key vocabulary, which may include a variety of strategies, including drawing the child's attention to a word, defining the word in child friendly language, pairing the definition with gestures or other actions as applicable, providing

multiple contextualized examples of word use, and providing multiple opportunities to use the word (Dickinson et al., 2019). In shared reading, deep learning of new words often includes higher order questions that facilitate child inferences about the meanings, using the story context (van Kleeck, 2008).

*Increasing vocabulary depth through DR.* DR is a particular type of shared book reading strategy that incorporates a number of question prompts that adults use to generate a dialogue during reading (Whitehurst et al., 1994). Importantly, the types of question prompts used in DR generate opportunities to teach and assess children's knowledge of the vocabulary presented in the books. Initial DR sessions are largely directed by the adult reader, with the expectation that the adult will gradually reduce their input and allow the child to assume an increasingly active role in the conversation. The acronym PEER represents discrete steps along the DR instructional sequence. Adults prompt (P) children to actively participate by asking a question about the book. After the child responds to the adult question, the adult evaluates (E) the response and expands (E) upon the child's verbal response. Finally, the adult requests that the child repeat (R) the expanded response. This sequence allows children opportunities to both hear—and use—increasingly sophisticated language.

In DR, the focus on building vocabulary breadth and depth is systematically incorporated in repeated readings of the same text. Prompts that begin the PEER sequence focus on asking Level 1 vocabulary questions so as to teach labels and functions of words depicted in pictures (e.g., "What is this?" "What is it for?" "What is this part called?"). After children begin to label the vocabulary, Level 2 open-ended questions are added (e.g., "What do you see?" "What is happening?") to give the child an opportunity to use the newly learned words in context. Once children begin using the words, Level 3 questions are introduced to encourage the child to apply their word knowledge to make inferences and relate the story to their own experiences (see Flynn, 2011). Because vocabulary knowledge in young learners with ASD has been linked to inferencing skills, it may be especially important to systematically extend their vocabulary learning—the dual benefit being improved understanding of word means plus enhanced inferencing ability (Lucas & Norbury, 2015). Explanations and examples of the DR instructional sequence and scaffolded question prompts are provided in Table 3.

*Case example: Building Paul's vocabulary.* Paul labels familiar pictures and objects to comment and make requests but has difficulty labeling their functions and attributes. Paul has access to core language boards, picture symbols, and an iPad with the TouchChat communication app. The SLP has decided to incorporate DR strategies during small group book readings with three students. She begins with *Pete the Cat: I Love My White Shoes* written by Eric Litwin and James Dean. It represents a sound choice because of the repeated storylines and Paul's interest in *Pete the Cat: I Love My White Shoes*. Before reading the story on the first day, she

**Table 2.** Levels of vocabulary depth.

Level	Defined
1	Have heard or seen the word
2	Have a "gist" of the meaning
3	Uses the word in a sentence
4	Can give examples of the word
5	Can explain the meaning of a word or provide synonyms
6	Can give a theoretical definition

*Note.* Children's understanding of vocabulary ranges in terms of basic knowledge (Level 1) through deep knowledge (Level 6).

**Table 3.** Dialogic reading instructional sequence.

<b>P</b>	<b>PROMPT</b> the child to participate by asking a question. Level 1 <ul style="list-style-type: none"><li>• <i>Wh</i>-questions—Who, what (function and attributes), and when</li><li>• Completion questions—Students fill in a missing word at the end of a sentence</li></ul> Level 2 <ul style="list-style-type: none"><li>• Recall questions—Questions about the events or main idea of the story</li><li>• Open-ended questions—Questions about what is happening in the story</li></ul> Level 3 <ul style="list-style-type: none"><li>• Distancing questions—Children relate events to their own experiences</li><li>• Inferencing/predicting/why/how/where—Higher level questions</li></ul>
<b>E</b>	Verbally <b>EVALUATE</b> the child's response (incorrect/correct).
<b>E</b>	<b>EXPAND</b> on the child's response (add more language).
<b>R</b>	Ask the child to <b>REPEAT</b> the expanded response.

reviews and highlights vocabulary in the story using a small sticky note. She programs Paul's TouchChat iPad app with preselected core words and key vocabulary so Paul is able to participate and communicate during shared book reading. The vocabulary selected includes a variety of nouns, verbs, adjectives, and mental-state terms (i.e., sad, think).

On the first day of reading, Paul's SLP will focus primarily on vocabulary building. As she reads aloud, she models key vocabulary and repeated phrases on Paul's device. She also asks questions that explicitly target the key vocabulary, such as "What is Pete doing?" "Why do you do that?" "What is this?" "What do you do with a guitar?" When Paul is unable to answer, his SLP introduces a least-to-most prompting hierarchy. For example, today when she gets to the page where Pete is walking down the street, she asks, "What is Pete doing?" When Paul does not respond, she gestures to Paul's iPad. When he still does not respond, she presents a choice of two responses that are modeled on his device: "walking" or "running." When Paul does not select one of the two options, she provides a full model of the correct response ("walking") on his device and repeats the question, giving Paul an opportunity to respond. If Paul gives an incorrect response, his SLP models the correct response verbally and on his iPad: "No, Pete is not running. Pete is walking." Regardless of the level of prompting, his SLP repeats and expands the correct response: "Pete is walking." She adds, "We will walk to lunch. Say 'Walk to lunch.'" The PEER sequence is followed throughout the book reading as the SLP continues to ask a variety of *wh*- and completion questions.

This continues over the next few days. As Paul becomes more familiar with the vocabulary, his SLP begins asking Level 2 recall and open-ended prompts that give Paul an opportunity to use the vocabulary he has learned. Next, she introduces Level 3 questions to give Paul a chance to make inferences (e.g., "What turned Pete's shoes brown?" "What color will Pete's shoes turn next?"). Each day, the SLP uses the least-to-most prompting hierarchy to support

Paul's communication. Over time, these prompts can be faded as students begin to generate correct responses independently. The SLP models these strategies with Paul's caregivers and his classroom teacher to promote skill generalization.

### ***Higher Level Language Skills: Focus on Inferencing***

The difficulty children with ASD have with reading comprehension has been linked to their trouble-generating inferences (e.g., McIntyre, Solari, Gonzales, et al., 2017; McIntyre, Solari, Grimm, et al., 2017; Norbury & Nation, 2011). Inference making substantially impacts any child's ability to comprehend text and develops in the preschool years (Kendeou et al., 2019). To generate an inference, one has to interpret information from the text and integrate that information with their prior knowledge (Kendeou et al., 2019). Inference generation is essential to building a mental model of text as the learner infers causal relationships that are not explicitly stated (van den Broek et al., 2011). Such causal connections develop in preschool as young children infer character feelings and emotions and link those to causal events/actions. This type of inference is related to ToM (Cartwright & Guajardo, 2015), which impacts comprehension among typically developing learners (e.g., Atkinson et al., 2017; Guajardo & Cartwright, 2016; Kim, 2017) and learners with ASD (e.g., McIntyre et al., 2018; McIntyre, Solari, Gonzales, et al., 2017; Ricketts et al., 2013). Because this ability to infer causal events develops in the preschool years, it is an important instructional target for young children, including children with ASD, because the latter are at risk for reading comprehension failure (McIntyre, Solari, Grimm, et al., 2017).

Sharing storybooks presents an opportunity to help children generate social inferences that require ToM (i.e., interpreting the thoughts, feelings, and perspectives of others and their causes; Cartwright & Guajardo, 2015). One effective intervention to support comprehension is questioning (van den Broek et al., 2011). In interactive shared reading, questions prompt inferences by (a) highlighting relevant information and (b) facilitating integration of background knowledge (Kendeou et al., 2019). van Kleeck (2008) identified three types of inferencing questions that can be asked during interactive book reading: causal (e.g., "What is the problem?" "Why did he do that?" "Why is he sad?"), informational (e.g., "What time of day is it?" "What do you think this word means?"), and evaluative ("Why is that a mean thing to do?"). The questions that require causal inferencing are most influential to comprehension (van Kleeck, 2008) and help children remember causal events (van den Broek et al., 2011). It is important for educators to control the difficulty of the text. Preschool children are generally able to make causal inferences, while making predictions based on character perceptions/emotions are more challenging especially when the character's emotions and actions are seemingly contradictory (Cain & Barnes, 2017).

In interactive shared reading, questioning includes immediate corrective feedback to support learner activation of accurate inferences and prevent misunderstandings



(Kendeou et al., 2019). For example, van Kleeck et al. (2006) used questioning during an interactive shared reading intervention to improve the literal and inferential responses of preschool children with language delays. The intervention included literal questions (“What’s that?” “What is he doing?”) and inferential questions (“How do you think he feels?” “What do you think he will do?”) paired with corrective feedback. Specifically, after a correct response the adult expanded (“Yes. He is sad. He is sad because they had a party without him.”) and following an incorrect or no response, the adult modeled the correct answer and how they arrived at that response (e.g., “Look, Bear is sad because they had a party without him.”). This type of inferential talk is essential to promoting comprehension (van Kleeck, 2008).

In a recent study, Henry and Solari (2020) investigated the effects of a 20-week, small group listening comprehension intervention that included repeated reading, comprehension strategies, vocabulary instruction, and written expression. Children with ASD (ages 5–9 years) participating in the intervention outperformed the control group on measures of oral language, narrative, and listening comprehension. Books were read aloud, and comprehension strategies emphasized recall, connecting events in the text and integrating information from the story with background knowledge. As indicative of narrative texts, many inferences required learners with ASD to interpret the character’s perspective based on events. To teach learners with ASD to make such causal inferences, the adult asked questions and provided feedback and scaffolded supports in order to assist learners with ASD, as they reasoned through the impact of story events on character motivations and feelings (Henry & Solari, 2020).

Although learning to make inferences is essential to comprehension, a combination of both literal and inferential talk is likely necessary for children struggling to generate inferences (Zucker et al., 2013). For example, children with ASD are more likely to learn new skills that are just beyond their current repertoire of skills (Schreibman et al., 2015). In DR, the level of question difficulty changes as children are repeatedly read the same book. In later repeated readings, teachers typically pose Level 3 questions that require children to infer details about the plot (e.g., “Why is he sad?”) and relate the story to their own experiences (“What did you see at the zoo?”; Flynn, 2011).

### Case Example: Building Andre’s Inferencing Skills

Andre is a 5-year-old student with ASD who uses flexible phrase speech and sentences to communicate with his peers and teachers at school. Standardized assessments indicate that his expressive and receptive single-word vocabulary skills fall within the average range for his given age. Comprehensive language assessments indicate that Andre has difficulty answering “why” and “how” questions and making inferences. Andre has difficulty describing how characters feel and why they may feel that way.

Andre’s SLP has identified that DR strategies may help him build higher level language skills. She decides to

incorporate Level 3 questions that require Andre to link his background knowledge and experiences to the text. During DR, distancing questions provide an opportunity for students to expand their expressive language skills and connect their understanding to the events or concepts in the story. Examples of distancing questions that the SLP uses in the story *The Little Mouse, The Red Ripe Strawberry, and The Big Hungry Bear* by Don and Audrey Wood are “What kind of fruit do you like to eat?” or “Where have you seen a mouse/bear before?” or “When have you worn a disguise?” Higher level questions are those that require students to make inferences and predictions and use higher order thinking skills. An example of an inferencing question is, “Why does the mouse look scared?” or “How does the mouse feel about strawberries?” or “Why did the mouse share his strawberry with you?” An example of a prediction question is, “Where do you think the mouse will take the strawberry?” or “What do you think will happen next?” Higher order questions provide an opportunity for students to answer questions about the plot or sequence the events of the story (Flynn, 2011).

Practitioners may find that students like Andre need some level of prompting or assistance to be able to generate appropriate responses to these types of questions. SLPs and teachers can incorporate visuals to assist students in identifying and expressing the characters’ feelings or the correct answer choice.

## Conclusions

The cognitive and language profiles that are characteristic of ASD place children with the disorder at increased risk for persistent reading comprehension difficulties. Shared book reading activities can be used to teach young children with ASD a variety of social communication skills and behaviors that serve a foundation for listening comprehension and eventually reading comprehension. The educational benefits children reap from shared reading depend upon rich communication and interaction between the adult reader and the child. We have presented a number of practical, evidence-based strategies that educators can implement within the context of shared book reading activities to help young learners with ASD build a solid foundation for listening comprehension. These strategies are summarized in Table 1. Social communication difficulties that are a defining feature of the ASD can impede learners’ ability to engage in and benefit from shared reading activities. Fortunately, these behaviors are malleable to instruction, as emerging research indicates that learners with ASD can develop emergent literacy skills with targeted high-quality instruction (e.g., Coogle et al., 2018; Dynia et al., 2019; Fleury et al., 2014; Fleury & Schwartz, 2017; Hudson et al., 2017; Whalon et al., 2015). Though shared book reading interventions have robust evidence to improve language development, much of this research is based on a relatively homogenous group of children. Ongoing research is needed to understand the extent to which interactive reading is beneficial to children who vary across backgrounds and language ability (Noble

et al., 2020). Emerging research suggests that shared reading is promising for children with ASD, yet additional research is needed to grow the evidence base. We stress to readers that shared reading, with appropriate adaptations and modifications, is one context to support children's development of early language and literacy skills. It should not be viewed as the sole method that educators or parents rely upon to build these skills. Rather, shared reading should be included as one learning activity that is embedded within a broader curriculum that affords children opportunities to build their language and early literacy skills.

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