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# Teaching Written Expression to Students With Autism Spectrum Disorder and Complex Communication Needs

***Robert C. Pennington and Megan Carpenter***

Written expression is critical to the full participation of individuals with autism spectrum disorder and complex communication needs in a wide range of educational and community contexts. Unfortunately, the extant research on teaching writing to this unique population is limited and, thus, provides little guidance to practitioners in the design of instruction. In this article, the authors present a set of recommendations extracted from the available research literature on teaching writing to students with autism spectrum disorder, offer examples of their successful application, and suggest areas of future research. **Key words:** *autism spectrum disorder*, *communication*, *written expression*

THE DEVELOPMENT of skills in the area of written expression is critical for full participation in a range of environments and may be related to higher quality-of-life outcomes (Graham et al., 2018). Unfortunately, individuals with autism spectrum disorder (ASD) and other developmental disabilities often have difficulty acquiring effective written communication skills, especially those with complex communication needs (CCN) (Dockrell, Ricketts, Charman, & Lindsay, 2014; Griswold, Barnhill, Myles, Hagiwara, & Simpson, 2002; Mayes, & Calhoun, 2003). Learners with ASD and CCN have difficulty using and understanding speech (Simpson, 2019) and may present with characteristics that further impede their development of writing skills and teachers' attempts at mediating these weaknesses via traditional approaches to teaching writing. For example, these individuals may have (a) a limited vocabulary from which to draw when writing (Chen & Kuo, 2017), (b) a comorbid intellectual disability (ID) that negatively impacts their recall and organization of events and ideas (Schuchardt, Gebhardt, & Maelher, 2010), (c) difficulty turn taking and sharing information (Rowley et al., 2012), and (d) a decreased interest in reinforcers that typically serve to maintain writing behavior (e.g., reader feedback; American Psychiatric Association, 2013).

These challenges may serve to exclude these unique individuals from educational opportunities in general education contexts where students are often required to demonstrate what they have learned through the generation of written permanent products. This restricted access to the general education context may produce lasting negative repercussions including weaker academic outcomes (Dessemontet, Bless, & Moren, 2012) and decreased social competence (Harrell, Kamps, & Kravits, 1997). Further, reduced opportunities to engage in high-quality writing instruction may produce additional deleterious effects as data suggest that

***Author Affiliation:*** *University of North Carolina, Charlotte.*

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***Corresponding Author:*** *Robert C. Pennington, PhD, BCBA-D, Cato College of Education, 9201 University City Blvd, Charlotte, NC 28223 (Robert.pennington@uncc.edu).*

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opportunities to write may improve learners' vocabulary development across written and vocal response topographies (Graham & Hebert, 2011; Pennington & Rockhold, 2018).

In addition, these individuals will likely confront barriers in obtaining and maintaining employment, as many jobs require at least some competency in written communication. Written expression is often required to obtain an interview for employment and then subsequently to complete tasks, interact with others, or document ones' efforts throughout the work day. This added obstacle exacerbates an already seemingly immutable problem as rates of employment for persons with disabilities have consistently been disproportionately low as compared with other populations (Shattuck et al., 2012).

Finally, written expression has increasingly played a greater role in the navigation of social contexts. With the rapid proliferation of mobile technology, individuals have shifted a greater proportion of communicative exchanges from vocal to written topographies via texting and social media platforms (Lenhart, Ling, Campbell, & Purcell, 2010). The absence of a writing repertoire by individuals with ASD and CCN sufficient to participate in these digital exchanges may preclude their inclusion in a large number of potential communicative interactions, reducing opportunities to acquire critical communication skills and to build peer relationships outside of the classroom setting. This restricted access likely compounds a troubling pattern of isolation within this population (Howlin & Moss, 2012).

Despite the importance of teaching individuals with ASD and CCN to write, there have been relatively few studies related to this endeavor. Early on researchers focused primarily on the acquisition of spelling skills (Pennington & Delano, 2012) and taught learners to spell from memory using match to sample procedures that circumvented the writer's need to encode sounds to letters during transcription. For example, Stromer, MacKay, Howell, McVay, and Flusser (1996) used a computer-assisted delayed match to sample procedure to teach a 21-year-old man to touch letters on a computer screen to spell the name of pictured stimuli. During instructional trials, the computer first presented a written word on the computer screen. Subsequently, the participant touched the word resulting in its disappearance and the presentation of an array from which he selected letters to spell the word. The computer provided differential feedback for correct and incorrect responses. Several other research teams have implemented variations of this procedure in which they taught participants to copy words in the presence of models and then to spell them once the models are removed or gradually faded (Cuvo, Ashley, Marso, Zhang, & Fry, 1995; Purrazzella & Mechling, 2013; Schlosser & Blischak, 2004; Schlosser, Blischak, Belfiore, Bartley, & Barnett, 1998). Although fluent spelling can play a key role in supporting the generation of written communication, it may be far removed from the arrangement of words to produce a message resulting in a meaningful outcome for the writer. That is, learners can be taught to select letters in a specific order to match a written model and be no closer to the generation of text for a functional outcome.

In the last decade, researchers have shifted their attention to evaluating instructional methods for teaching learners with ASD to produce and improve the quality of written texts. From this work, two general distinct lines of research have emerged: one in the application of Graham and Harris' (1989) self-regulated strategy development (SRSD) to students with generally intact communication skills (often referred to as high functioning) and the other in the application of behavioral response prompting techniques (e.g., time delay and system of least prompts) to students with ASD and significantly limited communication functioning. These parallel lines of research have demonstrated the powerful potential of focused writing interventions in the development of writing skills by learners with ASD.

Self-regulated strategy development involves explicitly teaching rules, procedures,

or steps that learners can apply across contexts to solve problems (Graham & Harris, 1989; Whitby, Travers, & Harnik, 2009). Asaro-Saddler (2016) reviewed the literature on the use of SRSD for learners with ASD and identified 11 investigations demonstrating the intervention package's efficacy. For example, Asaro-Saddler and Bak (2012) taught six elementary students with ASD mnemonics for use while generating persuasive essays. The researchers used rehearsal and visual supports to teach the POW (i.e., Pick your ideas, Organize your notes, and Write) and TREE (i.e., pick a Topic sentence, give Reasons, Explain your reasons, and provide a strong Ending) mnemonics and associated self-management strategies such as goal setting, self-evaluation of performance, and self-talk, and provided scaffolded support until the students used them independently. Data indicated that all six participants increased their use of persuasive essay elements and the overall quality of their writing. The use of strategy instruction for writers with ASD has accumulated empirical support for the generation of persuasive essays (Asaro-Saddler & Bak, 2012; Delano, 2007; Mason, Kubina, Valasa, & Cramer, 2010) and stories (Asaro & Saddler, 2009; Asaro-Saddler, 2014, Asaro-Saddler & Saddler, 2010; Delano, 2007), and has emerged in the literature as a frequently recommended practice (Cannella-Malone, Konrad, & Pennington, 2015; Joseph & Konrad, 2009; Pennington & Delano, 2012; Whitby et al., 2009).

As aforementioned, another line of research has emerged focusing on the development of writing skills in students with ASD and limited communication repertoires. The development of written expression skills may have a greater impact for this population, as it may serve to ameliorate impairments in the development of vocal communication skills (Lavigna, 1977; Pennington & Rockhold, 2018). There are relatively few experimental evaluations of interventions to teach written expression skills, beyond spelling and handwriting, to this unique population. An electronic search of the existing literature combining the terms autism and written expression (e.g., narrative, sentence, and essay writing) yields few results, especially when students without severe communication impairment or ID are excluded. Overall, researchers in this line of work have sought to expand the use of systematic response prompting strategies (e.g., simultaneous prompting, system of least prompts, and constant time delay) into the area of written expression. These well-established procedures derived from the field of applied behavior analysis (Touchette, 1971; Wolery, Ault, & Doyle, 1992) have been used to teach discrete and chained sequences of behaviors across a range of skill domains including functional life skills (Walker, 2008), communication (Pennington, Ault, Schmuck, Burt, & Ferguson, 2016), mathematics (Spooner, Root, Saunders, & Browder, 2018), science (Spooner, Knight, Browder, Jimenez, & DiBiase, 2011), and reading (Browder, Ahlgrim-Delzell, Spooner, Mims, & Baker, 2009; Knight & Sartini, 2015).

In one of the first experimental applications of these procedures to teaching writing to students with ASD and CCN, researchers conducted a series of investigations on the efficacy of simultaneous prompting and computer-assisted instruction to teach nine elementary students with ASD and limited vocal repertoires to generate simple stories (Pennington, Ault, Schuster, & Sanders, 2011; Pennington, Collins, Stenhoff, Turner, & Gunselman, 2014; Pennington, Stenhoff, Gibson, & Ballou, 2012). During instruction, the classroom teacher prompted students to select words from a digital array to construct simple sentence stories (e.g., Monkey lived in a zoo. Monkey ate bananas. Monkey felt sleepy.). All nine participants, across the three studies, learned to construct stories. More recently, researchers have used response prompting strategies to teach students with ASD and other developmental disabilities to construct sentences (Pennington, Flick, & Smith-Wehr, 2018; Pennington, Foreman, & Gurney, 2018; Pennington & Rockhold, 2018), use story grammar elements in their narratives (Pennington & Koehler, 2017), write resume cover letters (Pennington, Delano, & Scott, 2014), write opinions and

informational papers in response to text (Lee, Browder, Hawley, Flowers, & Wakeman, 2016; Mims et al., 2017), and construct text messages (Pennington, Saadatzi, Welch, & Scott, 2014). Overall, these investigations demonstrated functional relations between interventions and improved student outcomes, though nonparametric measures (Tau-U; Parker, Vannest, Davis, & Sauber, 2011) showed a range of intervention effects across studies (0.62 [weak] to 0.97 [strong]) and participants (0.21–1.00). Further, the majority of these studies have been conducted by a single research group, precluding the capacity to demonstrate a practice or component as evidence-based (Horner et al., 2005). These studies reflect a "scratching of the surface" of the needed research directed at teaching this population the amalgam of skills required to be proficient in writing, but do afford a glimpse into potentially critical components of writing instruction for this unique population.

The purpose of this article is to distill from the available research literature a set of guidelines for the design of writing instruction for students with ASD who have significant impairments in communication and/or other comorbid conditions (e.g., ID). We are cautious in that there has yet been enough accumulated evidence to deem any single practice or instructional component to be evidence-based, but purport that, in light of the powerful role that written expression plays in connecting people to the world around them, a set of recommendations is warranted. Further, it is our intent that this article will serve as both a spring board for researchers interested in replicating and refining existing work in this area and as a call to explore the many areas of written expression about which we know little as an eye toward the promotion of success for students with CCN.

## FIVE GUIDELINES FOR DESIGNING INSTRUCTION

Although the literature on teaching written expression to this subset of students with ASD is small, the available studies are consistent in their application of several key components including (1) teaching skills within a meaningful context, (2) organizing instruction around predictable routines, (3) employing technology-based supports, (4) teaching explicitly, and (5) using self-management strategies. These instructional components are a logical fit for learners with ASD and CCN, as these learners may (a) be less interested in interacting with others (Ganz, 2015), (b) have intellectual disabilities affecting organization, memory, and attention (Luyster, Kadlec, Carter, & Tager-Flusberg, 2008), (c) require selection-based opportunities to communicate (Ganz, 2015), (d) have weaknesses in fine motor skills and coordination (Falk-Ross, Iverson, & Gilbert, 2004), (e) have difficulty attending to relevant instructional and environmental stimuli (Lovaas, Koegel, & Schriebman, 1979), and (f) have difficulty in evaluating their own performance during academic tasks (Myles, 2005). Further, many of these components are present in the research literature related to teaching other topographies of communication and academic skills and some have been deemed evidence-based practices for children with ASD (Wong et al., 2014).

In the following sections, we discuss each component and offer related strategies to support learners with ASD and CCN during writing. We also provide examples of the application of these components from within the research literature. Finally, each section concludes with a scenario depicting a teacher removing a barrier to a student's writing development by addressing one of the components in their instructional design.

### Teaching writing skills within meaningful contexts

One of the most powerful acknowledgements when designing writing instruction for all students, including those with more severe disabilities, is that writing, as a form of communication, involves meaningful interactions between a writer and a reader (Greer & Ross, 2008). Unfortunately, many

students with ASD and CCN may be relegated to the practice of writing skills in contexts far removed from communicative interaction (e.g., tracing the letters of their name and copying words; Skinner, 1957). For these students, these tasks remain arbitrary, difficult, and likely aversive, potentially resulting in decreased progress toward skill acquisition.

When designing instructional opportunities to teach written (or vocal) communication skills, it is critical that practitioners strongly consider the functional properties of targeted responses (Skinner, 1957). Instead of merely targeting syntactic arrangements (e.g., subject + verb) within a vacuum, one must consider the potentially reinforcing properties of the consequences that learners experience for writing. For most, the consequences for writing come in the form of social interaction (e.g., praise, feedback, and access to information) and are often delayed. Unfortunately, these contingencies may not be sufficient for supporting the writing behavior of learners with more severe disabilities, especially those with ASD. First, many developing learners with ASD and CCN may not find typical consequences for writing (e.g., teacher feedback and text message from a peer) reinforcing enough to facilitate engagement (Koegel, Singh, & Koegel, 2010). Challenges in the development of skills related to social interaction have been identified as a cardinal feature of ASD (American Psychiatric Association, 2013). Further, the duration of time between the writers' production of text and the potentially reinforcing feedback is often too long to produce any reinforcing effect. The extant research literature on teaching new skills to this population prescribes the immediate delivery of carefully planned consequences that include powerful reinforcing stimuli (Simpson, 1989).

For many learners with ASD, it might be prudent to develop a writing curriculum that begins with teaching the generation of written requests. By teaching learners to produce these requests, teachers may help learners to establish a writer–reader relationship. That is, when one writes, there is a response mediated by a reader. Teachers might initially design instructional opportunities where students exchange, copy, or write words that result in the immediate delivery of a requested reinforcer. Pennington, Flick, and Smith-Wehr (2018) designed an instructional protocol in which students were taught to use technology to construct sentences (i.e., I want the_____) to request preferred items. Prior to instructional trials, the teacher conducted a preference assessment (multiple stimulus w/o replacement; DeLeon & Iwata, 1996), and directed the learner to write a sentence asking for what they wanted. Subsequently, she used a system of least prompts procedure to teach students to write requests by selecting words from an array on a computer tablet. All three students learned to construct written requests and generalized their sentence construction skills when asked to write for access to novel reinforcers. It is important to highlight Pennington et al.'s (2018) use of a preference assessment prior to instruction, as it may be difficult to identify powerful reinforcers for this population. Fortunately, there are a range of techniques available for identifying potential reinforcers for students across the range of disability severity (see Cannella-Malone, Sabielny, Jimenez, & Miller, 2013).

It also is important to consider the range of potentially reinforcing contexts when implementing writing instruction. For example, some individuals may prefer writing their name to gain access to a preferred activity (e.g., computer time and field trip) in lieu of practice worksheets. Others may be motivated to learn to spell words associated with interesting stimuli (e.g., sports, celebrities, and movies) so that they may be accurately typed into a web browser. Finally, many learners with ASD do enjoy interactions with others and may be motivated to practice writing when they receive direct feedback from peers and loved ones. For example, Collins, Branson, Hall, and Rankin (2001) used peers to teach personal letter writing to three high school students with moderate to severe disabilities. All three participants improved their

use of letter components and peers reported having generally favorable experiences in supporting their peers with disabilities. Similarly, Pennington et al. (2014) taught three students with moderate to severe disabilities, including one with ASD, to generate text messages that were sent to a familiar communicative partner. All of the participants learned to generate text messages. Interestingly, the participant with ASD persisted in using a previously acquired and reinforced approximation of a text message and did not make improvement until a self-monitoring component was introduced. When possible, teachers should take every opportunity to use written expression as a direct means of communication between peers, as digital interactions have become commonplace across school, social, and employment settings.

Finally, it is plausible that providing opportunities to engage in writing activities within the context of powerful reinforcers may serve to condition writing activities as pleasurable for some students. Researchers previously have demonstrated the positive effects of conditioning literacy materials as reinforcers (e.g., books; Singer-Dudek, Oblak, & Greer, 2011; Tsai & Greer, 2006) on the engagement of students with ASD. It is likely that some learners with and without ASD have been exposed to instructional arrangements less than optimal for facilitating motivation and as a result have suffered in the development of writing competence.

*Enrique, a 7-year-old boy with ASD and CCN, is nonverbal but manually copies letters and familiar words with a modified pencil. In fact, he often will write the names of Disney movies multiple times when given writing tools (e.g., paper, crayons, and markers) and an opportunity to work independently. Unfortunately, when provided a directive to write about a picture, activity, or text, he lists a Disney movie or refuses to write at all. His teacher decides to capitalize on his copying skills to teach him to write in response to a directive/prompt. First, she conducts a preference assessment and identifies edible Goldfish as a powerful reinforcer. She then presents a Goldfish, the directive "Use your pencil to tell me what you want," and then an index card depicting the word fish, from which he can copy. After some guidance, Enrique learns to copy the word on each index card to make requests for preferred items. Gradually, his teacher fades the use of the cards. After several weeks of learning to write about preferred items, his teacher starts presenting familiar classroom and environmental items with a written model but still provides access to reinforcing items for a period of time until she gradually thins the schedule of reinforcer delivery.*

### Organizing instruction around predictable writing routines

Patterns are essential to all writing tasks from spelling to the generation of complex text structures (Bear & Templeton, 1998; Fitzgerald & Teasley, 1986). For many learners, these patterns are taught explicitly, as teachers model the pattern, guide students to use the pattern through practice, and then ask them to produce the pattern independently (Graham & Harris, 2005). Once acquired, learners apply these patterns covertly during the planning and drafting of text, while gradually building upon them to increase the complexity of their written products. Unfortunately, many learners with ASD and other disabilities appear to struggle in learning and applying these patterns in their writing. This may be in part due to broader challenges associated with the development of other language skills. For decades, researchers have targeted the acquisition of these writing patterns for learners with mild disabilities through the use of strategy instruction (Graham & Harris, 1989; Graham, Harris, & Mason, 2005). Using strategy instruction, researchers have taught students formulas for producing a range of texts. In general, students are taught a specific formula or strategy, provided a mnemonic for the strategy, taught to recite the mnemonic, and then provided scaffolded support as the students apply it during writing. As aforementioned, this approach has been demonstrated

to be effective for learners with ASD and milder communication impairments (Asaro-Saddler, 2016; Taft & Mason, 2011).

Students with more severe disabilities and CCN may have difficulty responding to strategy instruction interventions because these interventions often require learners to have a functional vocabulary sufficient to comprehend, match, and ultimately apply each strategy step related to a mnemonic. In addition, they must recall and apply the steps of the strategy in a specific order, which may be difficult for some learners with ID who demonstrate difficulty with cognitive processes like memory. In light of these barriers, several research teams have taught students to adhere to writing patterns through the repetition of instructional opportunities designed around predictable writing frames or templates and the provision of differential feedback. For example, Pennington, Forman, and Gurney (2018) taught students with ASD to write three types of sentences in response to pictured stimuli (i.e., The [subject] is [adjective]; The [subject][verb]; The [subject] feels [adverb]). During intervention, the teacher presented instruction on a single sentence type until the student met a predetermined criterion, and then began instruction on the next sentence type. During sessions, the teacher presented a picture and a model of a sentence about the picture (i.e., on an index card) that conformed to the prescribed sentence type, directed the student to copy the sentence, and provided praise for accurate responses. Gradually, the teacher faded the response prompts. Several other research teams have used similar procedures to teach students to write sentences (Pennington et al., 2018; Pennington & Rockhold, 2018), simple stories (Pennington, Ault, Schuster, & Sanders, 2011; Pennington et al., 2012; Pennington, Collins, Stenhoff, Turner, & Gunselman, 2014), and text messages (Pennington, Collins et al., 2014). Across all of these studies, the researchers observed at least some generalized responding (i.e., responding in the presence of different stimuli without training), highlighting a potential benefit of using predictable syntactic frames. Because only the words representing the names and features of stimuli were manipulated within each frame, students learned to use the frame and insert new words in the presence of new stimuli, thus the frame served to mediate generalization (Stokes & Baer, 1977).

A few research teams have used predictable writing patterns and additional visual supports to assist learners in producing longer papers. Lee et al. (2016) used graphic organizers and a writing template to support students in the planning and writing of informational texts. During intervention, they taught students to complete a graphic organizer about an article they had read and then match parts of the graphic organizer to a writing template. Students then completed the template, which included sentence starters and a predetermined structure for composing the text. For some students with ASD and weaknesses in working memory, these visual anchors may assist in the evocation of a cohesive text. Pennington and Koehler (2017) taught students to generate stories that followed a particular pattern that proceeded with the introduction of a character in a location, two related events that occurred in a logical order, and description of how the character felt. During each session, the researcher presented a brief video vignette depicting a simple story and then prompted (e.g., "Who was the character, let's write it here") the student through the completion of a story template that included sentence starters. Finally, the researcher provided an opportunity to write a story independent of the template. Both Lee et al. (2016) and Pennington and Koehler (2017) used the completion of templates to teach a writing formula and as a step to independent writing. This "fill in the blank" approach is consistent with Engelmann and Silbert's (1985) recommended scope and sequence for teaching sentence writing and may serve as a critical step in developing longer units of writing for students with severe disabilities.

*Sharday, a middle schooler with ASD and ID, has learned to produce single simple*

*sentences about classroom instructional stimuli (The flag is red) and personal experiences (I went fishing), but struggles when required to generate a cohesive paper. Her teacher, Mr. Lo, decides that Sharday and many of her classmates could benefit from learning to write with a predetermined text structure. During small group instruction, he presents each student with a writing template containing anchoring conventions (e.g., topic sentence and linking words). After reading a brief passage to the students, he completes a template on the board while asking the students to copy his model. For several days, after reading a passage, he models the completion of the template. Gradually, he fades the completion of the template and scaffolds support as students complete the templates on their own. After a month of practicing this routine in response to different passages, Mr. Lo notices the emergence of the template structure when students are asked to write in the absence of the template.*

## Employing technology supports

The ubiquity of technology in schools has provided many new avenues of support for struggling students with and without disabilities. The research literature is replete with evaluations of technology-based instructional packages to teach a range of skills to students with ASD, including written expression (Grynszpan, Weiss, Perez-diaz, & Gal, 2014; Knight, McKissick, & Saunders, 2013; Pennington & Delano, 2012). In addition, technology-based communication supports are often deemed a good match for individuals with ASD and CCN (Ganz, 2015). Technology offers several potential benefits to learners with ASD. First, researchers have suggested that the use of technology may increase engagement during instruction, as learners may find characteristics of technology-based packages (e.g., graphics and sounds) to be reinforcing (Neely, Rispoli, Camargo, Davis, & Boles, 2013; Pennington, 2010). Considerations around motivation play a critical role in the design of writing instruction for all students (Graham et al., 2005); thus, the incorporation of technology supports might be used to augment weaker reinforcers (e.g., feedback and interaction) for writing behavior. Further, technology can be used to decrease response effort and potentially aversive qualities of writing tasks. For example, teachers might permit students with fine motor weaknesses to type or speak their responses into speech- to- text software (MacArthur, 2009).

Second, technology can be used to circumvent or augment individuals' weaker skill repertoires during writing. For example, researchers have often employed the use of digital word banks to support students with weak spelling or text generation repertoires during writing (Basil & Reyes, 2003; Yamamoto & Miya, 1999). The selection of words from an array (i.e., word bank) may help learners rely less on working memory, as they are provided with a static visual display of choices and the constructed text. Fortunately, there are a wide range of software products available for use in writing (e.g., *Clicker Sentences*, Pennington, Flick, & Smith-Wehr, 2018; *Pixwriter*, Pennington, Collins et al., 2014) and many students with ASD may already be using selection-based speech-generating devices to interact with those around them (Kagohara et al., 2013). Further, some students might use features within commercially available software to support their writing. For example, Kagohara, Sigafoos, Achmadi, O'Reilly, and Lancioni (2012) taught students with ASD a series of steps for using spellcheck to correctly spell words during writing tasks that included (a) click the word processing icon to launch application, (b) type the word as you think it is spelled, (c) if a redline appears under the word, right click with the mouse to find suggestions and select appropriate spelling, but if the line is green then the word is spelled correctly, and (d) show the word to the trainer when you think it is spelled correctly. Some students may find word prediction more efficient and helpful than spellcheck software, especially those whose spelling approximations are distant from the intended word (e.g., dns = dance; MacArthur, 2009).

Finally, technology can be used to provide engaging models during writing instruction. Video-based modeling has emerged within the research literature as a powerful intervention for teaching new skills to students with ASD (Wong et al., 2014). Video modeling is unique in that it can be accessed by students via a computer, tablet, or phone in the absence of a teacher and thus may facilitate self-determination. Despite the extensive body of literature on video modeling and ASD, there have been only three studies involving the application of some form of video-based models during writing instruction. Kinney, Vedora, and Stromer (2003) used video models of correct spelling to teach a young girl with ASD to spell. During instruction, the participant observed an adult spelling the words on a whiteboard, then practiced the words, and finally received reinforcement in the form of engaging video clips for correct spelling. Delano (2007) used video modeling to teach students with ASD to use an SRSD strategy (i.e., TREE). After co-creating the video with a researcher, participants watched the video prior to writing during intervention sessions. Data suggested that the intervention was effective in increasing the participants' use of functional essay elements during writing. Finally, Pennington and Koehler (2017) provided learners with short video clips depicting a brief cartoon and then asked students to complete a template based on the cartoon. Again, all three participants improved their writing performance during intervention. Overall, the use of video models offers great potential for supporting students with ASD during their writing, as they may serve to provide not only a model of a complete written product but also of the process taken to yield that product.

*Despite their best efforts, Harry's interdisciplinary instructional team failed in teaching him to spell words. Harry is a sight word reader but has not acquired sufficient knowledge of letter sounds to spell. To circumvent this barrier, Harry's team decides to introduce word selection software by which he can construct texts by selecting words from a word bank. Harry uses augmentative alternative communication to interact with others and ultimately, the team decides to integrate this system into his writing instruction. They are amazed as Harry learns to emit increasingly complete messages using his system.*

### Teach explicitly

For many young writers, exposure to text, access to writing tools, and feedback are sufficient for helping them through a progression of early skills in writing (Calkins, 1986). In learners with ASD, impairments in the development of communication skills may preclude their entry into and matriculation through this typical developmental process, leaving them unprepared to participate in the numerous writing opportunities and assignments in school (Kushki, Chau, & Anagnostou, 2011). This lack of readiness for writing serves as a barrier to participation in a range of academic activities and for opportunities for students to practice and refine their writing skills. These challenges are exacerbated as these students may have difficulty attending to and benefiting from instructional practices that fail to provide clear expectations, useful supports, and meaningful feedback during writing activities.

Many struggling writers with and without ASD benefit from a model of instruction referred to as explicit instruction (Archer & Hughes, 2011; Brophy & Good, 1986). When using explicit instruction, teachers carefully design instructional sequences or steps so that students meet mastery on critical skills before progressing to new and more complex ones. In addition, instruction is characterized by the provision of clear expectations, model demonstrations of expected performance, supported practice with feedback, and repeated opportunities for practice until mastery is achieved (Archer & Hughes, 2011).

Almost the entirety of research on teaching writing skills to students with ASD has involved practices in alignment with the principles of explicit instruction. For learners with intact vocal repertoires, researchers

have taught them the purpose of writing strategies, modeled the strategies, provided scaffolded support, and then assessed mastery (e.g., Asaro & Saddler, 2009; Asaro-Saddler, 2014, 2016). For students with weaker communicative repertoires, researchers have almost exclusively used a class of procedures referred to as systematic instruction, specifically chaining (e.g., forward and backward) and response prompting (i.e., constant time delay, simultaneous prompting, and system of least prompts). These procedures involve near-errorless learning strategies, in which instructional materials and prompts are initially presented together such that students have a high probability of success and contact with reinforcers. For example, Pennington and Rockhold (2018) presented students a request to write, a picture, and an index card depicting a sentence about the picture from which students could copy. Students were provided several opportunities to write in the presence of the model and received positive feedback for emitting the correct response. After the students demonstrated the ability to write sentences, prompts were faded by inserting a brief interval between the presentation of the picture and the prompt, permitting students the opportunity to write independently.

There are many systematic instructional procedures that may be applicable to writing instruction for learners with ASD (see Collins, 2012; Collins, Lo, Park, & Haughney, 2018, for detailed procedural descriptions), but four have been evaluated in the research literature on writing for this population. Constant time delay (Wolery et al., 1992) is one of the most common systematic instructional procedures and has been applied across a range of contexts. When using this procedure, an instructor initially presents a direction and/or an instructional/environmental stimulus followed by a controlling prompt (i.e., one that ensures a learner will respond correctly) and then reinforces the learner's prompted correct response. After multiple sessions, the instructor will present a brief interval (i.e., prompt delay) following the presentation of the instructional stimuli and wait for the student to respond. If the student responds correctly, the teacher delivers a reinforcer, but if the student does not respond within the interval or makes an error, the teacher delivers the controlling prompt. For example, a teacher might ask a student to complete a story template about a picture. After reading the sentence, "Once there was a _____," the teacher immediately points to a character in the picture to prompt the student to complete the sentence. In subsequent sessions, the teacher reads the sentence starter and waits 5 s for the student to start writing the answer.

Simultaneous prompting (Gibson & Schuster, 1992) is similar to constant time delay in that, during initial instruction, a controlling prompt is delivered immediately following instructional stimuli. It differs in that the instructor continues to deliver the "simultaneous prompt" during instructional sessions until the learner demonstrates mastery in probe sessions. These probes are generally conducted each day prior to instruction. Pennington et al. (2011, 2012) used simultaneous prompting to teach story writing to four elementary students with ASD. During instruction, the teacher prompted students to select words from an array to construct a simple three- to four-sentence story. At the completion of the session, the story was read aloud and the student received praise for writing. Prior to instruction each day, the teacher presented the array and a request to write a story. During the probe, the teacher delivered no prompts. Simultaneous prompting offers a unique advantage in that instructional behaviors do not change based on student performance (Schuster, Griffen, & Wolery, 1992), making this a simple procedure to implement by instructors new to systematic instruction.

The system of least prompts procedure (Wolery et al., 1992) differs from those described above in that prompts are administered along a hierarchy of prompts from least to most facilitative. Following the presentation of the instructional stimulus, the teacher waits a prescribed interval of time for the learner to respond independently and if the student does not respond or makes an error, they deliver the first and least facilitative

prompt and wait for the learner to respond. Again, if the student does not respond or makes an error, they deliver another and more facilitative prompt. This continues until the teacher is required to deliver a controlling prompt. For example, when teaching a student to plan a story, the teacher might first ask the student to select a character to write about and wait 10 s for the student to respond. If the student fails to respond, the teacher might present a laminated page of pictures of characters to the learner from which he or she can select a response. If the student fails to make a selection, the teacher might point to a picture and say, "Let's write about_____." This procedure has a long history of application in the research literature and offers the advantage of demonstrating the progress of students with severe disabilities as they advance from most to least facilitative prompts (Doyle, Wolery, Ault, & Gast, 1988).

Finally, teachers might decide to incorporate one of the above procedures into a backward or forward chaining arrangement. When using this format, the teacher completes all of the steps of a chained task (constructing a sentence, spelling a word) with the exception of the first (i.e., forward chaining) or the last (i.e., backward chaining) step. Once the student can independently complete the initial step, instruction is applied to the next step. For example, a teacher targeting simple sentence construction (e.g., subject + predicate) about a picture might first teach students to complete the sentence "The _____ (subject)." Once the student can successfully complete the sentence, the teacher presents "The _____ (subject) _____ (predicate)," and so on. Chaining can be time consuming but provides opportunities for students to observe modeled correct responses, as the requirements for responding are gradually increased.

These systematic instructional procedures and others (e.g., most to least prompting, graduated guidance, and inclusion of nontargeted information) may help students build stronger foundational skills in writing so that they may participate in a wider range of writing activities. It is important to note that although most of the research reflects the application of these procedures in special education settings and in a one-to-one instructional format, these procedures are likely effective in small group instructional arrangements and embedded within general education settings. Further, these procedures have been successfully implemented by peers without disabilities in general education settings (Jameson, McDonnell, Polychronis, & Reisen, 2008) and may serve as a tool for developing peer-to-peer supports within inclusive contexts.

*Mark is a 15-year-old with ASD and ID. Mark communicates using simple three- to four-word statements and is unable to hold a pencil due to a comorbid physical impairment. Mr. Graham is using constant time delay to teach him to construct a simple written opinion statement (i.e., I liked/didn't like _____ because ___ is _____.). Mr. Graham first designs a digital word bank comprising a sufficient number of words to construct multiple different sentences. Then for 3 days, he reads a brief passage, directs Mark to write about the passage (Did you like the_____, can you tell me why?), and then prompts Mark to construct the statement by pointing to each word in the bank. He delivers praise following each response. On subsequent days, he provides Mark the opportunity to make a selection independently (within a 5 s interval), prior to delivering the prompt. Within 2 weeks, Mark learns to construct opinion statements and Mr. Graham decides to vary the sentence type to introduce variability into the routine (i.e., I thought _____ because he/it _____.)*

### Use self-management strategies

One of the ultimate goals of educational programming is to teach learners to manage their own lives, to be independent and self-determined. For decades, researchers in the area of ASD have taught learners to apply self-management strategies (i.e., self-monitoring, self-graphing of performance data, self-evaluation, self-reinforcement, and self-talk) to improve their performance across a wide

range of skills (Aljadeff-Abergel et al., 2015). They also have been used as a component of SRSD during writing instruction for students with ASD (e.g., Delano, 2007). These strategies are powerful as they provide a mechanism by which students can evaluate and adjust their performance in the absence of direct teacher feedback, promoting self-determined over teacher-directed responding. Further, they may strengthen students' attention and responses to key elements of a given context, which is often difficult for many individuals with ASD (Lovaas et al., 1979). Finally, they may serve to increase motivation as students are able to monitor their progress toward goals and potential reinforcers.

Several research teams have applied self-management strategies to writing instruction for students with ASD and CCN. In most cases, students were taught to graph their use of targeted skills in their writing. For example, Pennington and Koehler (2017) asked students to graph the number of story elements used within their narratives. It is important to note that studies reflect the graphing of responses after feedback had been given to participants. That is, students did not have the opportunity to independently evaluate their work. In light of the research on teaching self-management to students with ASD in other areas, it is plausible that these students can learn to independently apply these strategies to their writing. Teachers might consider designing instruction that involves the use of checklists that students may use to assess their written products. These checklists may augment the self-evaluation/regulation process by directing students to review specific areas of performance and by reducing their reliance on working memory.

*Petra, a second grader with ASD and mild ID, has flourished this year in the general education class. In the area of writing, she has learned to write multiple sentences about a topic and has increased the range of vocabulary in her written products. Unfortunately, she still often forgets to include punctuation at the end of each sentence. To address this issue, her teacher decides to build a self-monitoring system in which Petra receives points for each sentence she writes that concludes in accurate punctuation. She first creates a point system sheet depicting one of Petra's favorite fictional characters and then presents a narrative in which Petra helps the character earn enough points to access a needed accessory. After modeling the use of the system, the teacher explains that Petra can exchange points for a choice of classroom reinforcers. The teacher is tickled at the system's success and at an unintended consequence. Petra learns that points also are earned by writing additional sentences.*

## CONCLUSION

In the last two decades, researchers have disrupted previously held expectations for the academic achievement of students with ASD, especially those with CCN (e.g., Browder et al., 2009; Spooner et al., 2011). Further, they have established instructional pathways for accessing the general education curriculum and less restrictive instructional contexts. This is especially true in the area of written expression, as it serves as a vehicle for transmitting information across all academic content areas.

The purpose of this article was to provide guidance for practitioners charged with the provision of educational programming for students with ASD and limited communication repertoires. Our broad intent was twofold: (a) to glean a set of recommendations from the available research to assist in the design of writing instruction for this unique population of students and (b) to demonstrate that these students' weaknesses in writing are amenable to high-quality instruction. We presented a set of five recommendations (i.e., teaching skills within a meaningful context, organizing instruction around predictable routines, employing technology-based supports, teaching explicitly, and using self-management strategies) and provided examples from the research literature demonstrating their effectiveness for children with ASD in school settings.

Despite the available research, there is much work to be done in the area of written

expression for individuals with ASD and CCN, and we hope this article may serve as a call to educational researchers to direct their efforts toward helping to fill in the gaps in the available literature. There is need for knowledge and guidance across the vast range of writing skills. For example, we know little about the effectiveness of intervention in teaching these students to engage in the writing process, generate texts for differences purposes, and revise and edit their work. Further, the extant literature provides little information as to the selection of intervention components based on individuals' existing skill repertoires. In light of the complexity and diversity of individuals with ASD, this information is sorely needed to ensure that there is a best fit between a learner and intervention strategies in order to maximize instructional benefit.

There is a need to bolster the existing recommendations presented in this article. For example, the recommendation to begin instruction with writing to make requests is based on a pair of writing studies and the literature on teaching other topographies of communication to students with severe disabilities. Research is needed to verify that if students are indeed taught to make requests first, then there is a benefit to learning to write for other purposes. This could be easily accomplished through the manipulation of the order of instructional conditions using single case research methods (Ledford & Gast, 2018). Similarly, we know little about how the selection and instruction of syntactic patterns and text templates affect the generation of generalized and novel written responses. Across the available literature, researchers taught a limited set of writing responses (e.g., patterns) for a relatively brief period. Although most participants demonstrated some generalized responding, few performed at levels that would be deemed competent by peers or general education teachers. There is a need for the investigation of writing intervention programs of sufficient duration and complexity to facilitate stronger student outcomes in this population.

Finally, and most importantly, it is our wish that this article may serve to recruit educators of students with more severe disabilities, including ASD, away from the sidelines of teaching where students copy or trace arbitrary sets of words and into the game of teaching students to interact with the world around them through meaningful written expression. The available data are clear that these students can indeed become writers, given effective instruction, and as a result may be more likely to have greater access to the world around them. In light of an absence of evidence-based practices specifically aligned to writing instruction for students with ASD and CCN, we suggest that teachers march forward using practices drawn from the existing literature on (a) writing instruction for students with and without ASD and (b) evidence-based practices for teaching other skills to students with ASD, while carefully monitoring their students' progress. It is our opinion that teachers must not wait for the research community to establish writing practices for this population before helping their students develop one of society's most valued skill repertoires.

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