DADD Online Journal

Research to Practice

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Research to Practice in Autism, Intellectual Disability, and Developmental Disabilities

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On January 17 – 19, 2018, the Council for Exceptional Children Division on Autism and Developmental Disabilities (DADD) sponsored its Eighteenth International Conference: Research Informed Practice in Autism, Intellectual Disability and Developmental Disabilities. The conference was held at the Sheraton Sand Key Resort in Clearwater, Florida. The DADD Board of Directors decided to devote this issue of the *DADD Online Journal* to conference papers. The conference brought together educators from school and college classrooms from all over the world. The conference included pre-conference training institutes and strands on assistive and adaptive technology, autism spectrum disorder, intellectual disability, mental health, paraprofessionals, parental engagement, post-secondary transitions, and multiple disabilities. The conference provided many parents, teacher educators, researchers, teachers, and other practitioners an opportunity to gather to learn the most current information related to providing services for individuals with autism, intellectual disability, and developmental disabilities.

This issue of the *DADD Online Journal* can enable those who attended the conference to see expanded papers, prepared by presenters, and also give those who were unable to attend an opportunity to benefit from the thoughtful work done by conference participants.

Presenters were asked to submit papers based on their conference presentations. Papers submitted went under a blind review process by the Guest Reviewers and Guest Editors who selected the papers for publication. We think the selection of papers represents an interesting assortment of topics and formats ranging from discussion papers to data based research to descriptions of classroom techniques. The papers selected do not necessarily represent all the topics covered at the conference but they do give a good idea of the variety and quality of the presentations. We would like to thank those authors who submitted papers for their efforts in making this issue of the *DADD Online Journal* possible.

In the first article, "Using Multi-Tiered Systems of Support for Students with Autism Spectrum Disorders in Inclusive Classrooms," Debra Leach evaluates using a multi-tiered system of supports (MTSS) framework to improve classroom performances for students with autism spectrum disorders (ASD). One major focus of this article is to explore the implications of using an ASD profile tool. The author notes that because a variety of interventions are often needed by this unique population, the use of an ASD profile can directly impact educational decision-making. An ASD profile not only offers insight on the child's academic, social, and behavioral motivations,

it will also support the employment of appropriate educational interventions through the MTSS framework. This framework, typically a three-tiered system, offers a research-based approach that educators can use to determine appropriate levels of support and intervention for students with ASD in inclusive classrooms. The author takes care to emphasize the importance of appropriate screening and progress monitoring to determine the best, research-based instruction for all students.

Teachers of students with developmental disabilities often rely on evidence based instructional practices to improve academic and functional outcomes for their students. Collaboration and group work has been shown to be an effective way to improve the academic achievement of students with intellectual disability. In the next article, "Engage or Not to Engage: Comparing Instructional Strategies in a Post-Secondary Education Program with Students with Intellectual Disability," Adrian Christopher-Allen, William Hunter, Laura Casey, James N. Meindl, and Robert Williamson, examined the effectiveness of peer-mediated instructional strategies to encourage peer collaboration and feedback to enhance students' knowledge of skills. Using an alternating treatment design, the authors were able to discover strategies that can be used to increase the on-task behavior and employability skills of three students with a diagnosis of intellectual disability in a segregated post-secondary classroom.

In "Teaching College Students with Autism Spectrum Disorders (ASD)," Jacqueline Lubin discusses the increasing population of students with ASD at the collegiate level. Historically, colleges provide typical classroom accommodations, but are not known for inclusionary techniques. If faculty are better prepared to implement research-based, universally designed strategies that are comparable to k-12 settings, they will be better equipped to meet the needs of all students in their classrooms. This literature review addresses faculty who are not prepared to work with students with ASD; for starters, they often are unaware of the typical strengths and challenges that come with this population, as well as legal concerns and evidence-based practices that are appropriate for diverse learners in the college classroom. Lubin's article offers a foundation to employ practical steps to help students with ASD transition to the collegiate environment, navigate academic expectations, and increase self-determination skills. The author notes however, although the increasing numbers of students with ASD moving on to colleges and universities indicate an increased need for research in this area, the available literature is limited at this time.

Conversation can be a complex social activity for students with autism. In the next article, "Conversation Club: Teaching the 'How' and 'Why' of Conversation to Children with Level 1 Autism and Other Social Cognition Challenges", authors Eve Müller, Lynn R. Cannon, Jonna Clark, Courtney Kornblum, and Michal Powers describe a curriculum designed to increase skills and understanding in this area. While many communication programs focus on teaching skills, conversation club emphasizes the simultaneous teaching of skills and the underlying concepts of communication in order to increase robustness of the skill. This paper not only underlines the need for comprehensive intervention, but also the benefit of helping students with autism understand the nuances and rationale for certain social behaviors for deeper learning.

Many students with autism struggle with the demands of obtaining and keeping a job. For some, this is related to difficulty in

understanding and limited practice in social and emotional skills. The article, "Integrating Social and Emotional Learning Instruction into Core Academic Instruction for Students with ASD", by Melissa Spence and Amy Tseng, describes the impetus for integrating such skills into daily instruction. Additionally, the authors outline some of the most essential strategies, with backing in the research, for addressing this content as well as special considerations for successful implementation of social and emotional skills instruction in the classroom.

The inclusion of students with developmental disabilities goes beyond simply placing a student in a general education classroom. In fact, classrooms need to be structured with specific images of disability using a range of resources to further include all students in the classroom. Picture books are an essential resource often used as a teaching tool to teach a variety of topics. In their article, "*Same but Different*: Characters with Developmental Disabilities in Current Juvenile Literature," Tina Taylor Dyches, Kellie Egan, Kimberly Moss, Hannah Grow, Sharon Black, and Mary Anne Prater add to our understanding of authentic depictions of students with developmental disabilities. The authors argue that many children first encounter individuals with developmental disabilities through children's literature and that accurate character depiction is essential. The researchers evaluated 38 books written for children and adolescents for their portrayals of characters with developmental disabilities and found that most characters portrayed in books tend to have autism and are male. The authors add that characters with developmental disabilities in these books are portrayed positively and realistically, but that many remain static throughout the stories.

In the next article, "Autism Program Improvement: Identified Themes for Areas of Growth within Public School Self-Contained Classrooms for Students with Autism," Stacy Lauderdale-Littin and Mary Haspel discuss how schools are meeting the needs of students with autism spectrum disorders (ASD). The author collected information from 35 self-contained classrooms serving students with ASD and discusses her findings regarding public school autism programs. While existing literature often takes a narrower focus, the author designed her study to produce a broader perspective of program quality. The article aims to identify common challenges experienced by programs who serve students with ASD. Focusing on the 10 identified domains of the Autism Program Environment Rating Scale (APERS), the author identifies consistent issues within the selected programs and emphasizes the need for a framework in schools that can further define expectations of leadership and appropriate organization of faculty and staff.

The use of evidence-based practices is widely examined in the field of special education, but how can researchers help support the adoption of these practices by special education teachers? In their study, Nicole K. Caldwell and Smita Shulka Mehta examine the adoption of video modeling, one evidence-based practice identified in the literature, by classroom special education teachers. The authors discovered that the adoption of evidence–based practices does not occur automatically. In fact, limited research exists that examines the applied use of video modeling by practitioners. To expand on these findings, the researchers use a survey instrument in which they collected data from 510 autism professionals across various disciplines. Data showed that many respondents were familiar with video modeling, were interested in the strategy, and utilized it with their students or clients with autism spectrum disorder. The researchers used factor analysis to examine the

underlying structure of the survey instrument, revealing that Board Certified Behavior Analysts and Speech and Language Pathologists perceived video modeling as more accessible compared to special education teachers.

Students with autism spectrum disorders often have difficulty navigating social contexts such as those in and around school. In the next article, "Use of Social Narratives as Standalone Strategy to Decrease Shouting Out Behaviors of a Child with Autism in the General Education Setting", authors Maggie Winkle, Stanley H. Zucker, Sarup R. Mathur, and Samuel A. DiGangi describe an intervention which addresses this issue. Social narratives can be described as short stories that explain a situation or context and the behavioral rules or expectations. While social narratives have much support in the research, the majority of studies include additional interventions, and therefore do not isolate the effect of social narratives on student behavior. In this article, a social narrative is used exclusively to effect the shouting out behavior of a third-grade boy with autism in a general education classroom. Results of this ABAB single subject design indicate that the social narrative was indeed effective in decreasing the shouting out behavior. The authors further discuss the results, limitations, and future directions for the use of this intervention in the classroom.

Joint Attention, the simultaneous focus of an adult and child on an object or activity, is a critical component for early childhood development. Typically young children with autism do not innately participate in such activities and therefore often miss out on important learning opportunities. In the next article, authors, Kate E. Zimmer, Katie E. Bennett, and Melissa K. Driver explore strategies to increase the use of this activity to support the acquisition of developmental

language skills in "Training Caregivers to Establish Joint Attention in Children with Autism through Storybooks". In this study, caregivers were trained to facilitate interactive read alouds with their children diagnosed with autism. The researchers measured both the caregiver use of different interaction strategies as well as the response and initiations of the child during the activity. Results indicated that the caregivers picked up the strategies quickly and could apply them to other books with no additional training. Additionally, when the strategies were used, children in the study displayed more interaction and express language.

Research examining the use of evidence-based practices for students with developmental disabilities continues to identify ways to improve outcomes for students with disabilities. However, one of the many challenges that confront parents and special educators of students who have intellectual and developmental disabilities is the implementation of toileting protocols. With no clearly established evidence-base to guide families as they initiate toilet training, many struggle to discuss toileting practices aimed at improving toilet training readiness. To aid parents and teachers and to increase the knowledge base of research in this field, Kelly M. Carrero, April Haas, and Samana Hussain described a study in their article, "Effects of an In-Home Intensive Toileting Protocol for a Young Child with Autism," that examined the effectiveness of a modified intensive toileting protocol consisting of multiple components that varied within and across days. The authors used an A/B design with a gradual component withdrawal that included specific components of the protocol including: (a) a leveled sit schedule, (b) programmed consequences for successful eliminations, (c) fluid-loading, (d) communication training, and (e) positive practice for accidents. The intervention was

conducted at the child's home and his parents were directly involved in the intervention implementation. The participant was successfully taught how to use a toilet and accidents discontinued.

The final article, "Contextual and Structural Modifications in Cognitive Behavioral Therapy for Youth with Autism Spectrum Disorder and Comorbid Obsessive-Compulsive Disorder: A Review and Analysis of the Research" is the first review of its kind to examine the effects of modified cognitive behavioral therapy (CBT) on people with autism spectrum disorders (ASD) who also experience obsessive-compulsive disorders (OCD). Leman Kaniturk Kose and Lise Fox analyze the structure of CBT, evaluate its content, and define contextual and structural CBT modifications. The article suggests that

modified CBT will reduce OCBs for people with ASD. They are careful to note that further work is needed to further outline clear guidelines and practical solutions that address cognitive, emotional, and social needs of people with ASD. They also state a need to create autism-specific guidelines for the selection and use of modifications to maximize treatment outcomes and treat individual symptoms.

The conference provided educators and researchers with the opportunity to explore current research, topical issues, and best practices relating to autism, intellectual disability, and development disabilities. We hope readers of this research to practice issue of the *DADD Online Journal* find the information valuable and timely.

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Using Multi-Tiered Systems of Support for Students with Autism Spectrum Disorders in Inclusive Classrooms

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Students with autism spectrum disorders (ASD) are increasingly being served in general education classrooms. This manuscript provides information and tools educators can use to identify student needs to then develop interventions and supports that will improve classroom performance using a multi-tiered system of supports (MTSS) framework. An ASD profile tool can be used to fully understand how ASD impacts each student to ensure the proper interventions and supports are in place. After an ASD profile is completed, the MTSS framework is used to align necessary supports and interventions across Tier 1, 2, and 3 levels to meet the unique needs of each student with ASD using evidence-based practices.

Students with autism spectrum disorders (ASD) are increasingly being served in general education classrooms. According to the United States Department of Education's National Center for Education Statistics (Snyder, de Brey, & Dillow, 2018), approximately 40% of these students are spending 80% or more of their time in such settings. To best support these students and to continually increase the percentage of students with ASD served in inclusive classrooms, it is essential that general education teachers, special education teachers, related services providers, and families work together to ensure the proper interventions and supports are in place to meet the unique needs of students with ASD using multi-tiered systems of support (MTSS) (Magyar & Pandolfi, 2012; Neitzel, 2010).

Today, most states and school districts are using MTSS to address academic and behavioral needs of all students. When implementing MTSS, the aim is to deliver effective, research-based instruction to all students and increase the level of academic and behavioral support for some learners based on needs identified through screening and progress monitoring (Copeland & Cosbey, 2008). The most common MTSS model being used is the three-tiered system. This system includes the delivery of universal instruction (Tier 1) for all students to prevent challenging behavior and optimize learning, targeted intervention (Tier 2) and supports for some students who require additional supports and/or specialized instruction, and individualized interventions and supports (Tier 3) for the few students who continue to require intensive specialized instruction (Shinn, 2013). While there is some controversy in regard to whether or not Tier 3 supports and interventions fall under special education services, most special education teachers generally understand these frameworks as initiatives to meet the needs of all learners across the three tiers (Gallagher & Coleman, 2009). This is a logical way of viewing MTSS frameworks because students with disabilities do not always need Tier 3 supports. In fact, some students with ASD only require quality Tier 1 supports to be in place, others require Tier

1 and Tier 2 interventions and supports, and some may need intervention and support across all three levels. Thus, MTSS can be utilized to align the appropriate levels of support and intervention for individuals with ASD in inclusive classrooms.

Understanding the Characteristics of Students with ASD

Research has shown that teachers have low to intermediate levels of knowledge about the characteristics of ASD and effective instructional practices for meeting the needs of these students (Hendricks, 2011). To identify the appropriate supports and interventions needed, educators must first understand how the different characteristics associated with ASD impact each student's academic and behavioral performance in the classroom. This can be referred to as the student's "ASD profile." When developing a student's ASD profile it is important to first identify the student's unique strengths and interests to allow teams to utilize this information to create learning activities that motivate students with ASD. Using a strengths and interests based approach to teaching may limit frustration and disengagement of students by tapping into their talents and passions as opposed to using a deficits-based approach and primarily involving them in activities that are extremely difficult and/or boring.

It is also important for teachers to understand the various challenges that students with ASD may face. Students with ASD may have deficits in joint attention, social reciprocity, and trouble understanding social rules and meeting social expectations (i.e. waiting, turn taking, sharing, giving and accepting compliments, offering and accepting help). They may also have language and communication impairments resulting in difficulties with auditory processing, receptive communication (understanding language), expressive communication (articulation and syntax), and pragmatics or the social use of language (i.e. interpreting and using facial expressions, body language, use of gestures, eye contact, personal space, voice volume, perspective taking). Sensory processing problems may also be a challenge for students with ASD. Some students may be hypersensitive to environmental stimuli (over-stimulated) and/or hyposensitive (under-stimulated) depending on the way their bodies respond in different situations. Emotional regulation difficulties may cause students with ASD to experience heightened levels of anxiety and fear, and they may get upset, frustrated, or angry very quickly without the ability to use coping strategies to control such emotions. Executive functioning difficulties can result in challenges with regulating behavior and carrying out goal-directed tasks due to problems with inhibition, flexibility, working memory, organization, planning, and self-monitoring. Difficulties with focus and attention is quite common in students with ASD, and additionally, they may have trouble with shifting attention to something new when focused on a specific activity. Students with ASD may have a restricted range of interests and be very limited to a narrow range of passions and fascinations as opposed to having more global interests across a variety of topics. Due to their need for sameness, students with ASD may thrive on consistent schedules and have difficulties when schedules change. They may want various things to remain the same such as seating arrangements, play routines, and instructional formats. Students with ASD may display repetitive behaviors such as stereotyped or repetitive speech, motor movements, play behaviors, and/or visual repetitive behaviors such as watching the same video clips over and over again. Cognitive and academic deficits common in students with ASD include difficulty with

abstract reasoning, reading comprehension, written expression, and mathematical problem solving. Finally, students with ASD may have difficulties with fine and/or gross motor skills, experience seizures, gastrointestinal problems, allergies, sleep disorders, and/or have side effects from medications. A more detailed explanation of these characteristics and how they may impact performance in the classroom is provided in the book, *Behavior Support for Students with ASD: Practical Help for 10 Common Challenges* (Leach, 2018).

Figure 1 shows an ASD profile tool that teachers can use to describe which ASD characteristics specifically impact the student and identify various supports needed to address the student's individual needs. Figure 1 is completed for a sample student to demonstrate how to use the tool, but keep in mind that students with ASD may not demonstrate difficulties in all of the areas listed on the tool.

Figure 1. *ASD Profile*

ASD Characteristic	Impact on the Student	Supports Needed
Social Skills Deficits	Impairments in joint attention and social reciprocity	Script/fading procedures during structured partner activities
Communication Impairments	Difficulty understanding complex verbal directions	Give directions in writing to allow time to process.
Difficulties with Focus and Attention	Has trouble focusing during independent work	Self-monitoring tool and prompting/fading procedures
Medical Conditions	Has fine motor impairments	Allow the student to type written work
Restricted Range of Interests	Has a fascination with baseball cards	Embed baseball cards into academic lessons and activities.

Need for Sameness	Wants the same seat in the cafeteria each day	Allow it. Having the same seat can provide consistency the student needs.
Repetitive Behaviors	Asks the same questions multiple times a day	Use these initiations to expand the conversation.
Cognitive/ Academic Deficits	Has difficulty with abstract concepts	Teach at the concrete level first to ensure understanding.
Sensory Processing Problems	Experiences sensory overload after lunch and recess	Safe place for the student to recalibrate after recess
Emotional Regulation Difficulties	Emotions escalate quickly when frustrated with difficult work	Emotional thermometer and a safe place for de-escalation
Executive Functioning Difficulties	Difficulty with completing multi-step tasks	Task analysis on a checklist to use as a self-monitoring tool

Tier 1 Interventions and Supports for Students with ASD

There are some essential Tier 1 supports and interventions that students with ASD require that that will also benefit most other students in the inclusive classroom. First, it is important to set clear academic, behavioral, and social expectations for all routines and activities and systematically teach those expectations in a manner students with ASD

will understand. This may include the use of explicit instruction (Archer & Hughes, 2011), visual supports (Bryan & Gast, 2000), social narratives (Gagnon 2001; Gray, 1994; 2010), and/or video modeling (Bellini & Akullian, 2007). Table 1 provides a description of how these instructional approaches can be used at the Tier 1 level to teach expectations to all students.

Table 1. *Tier 1 Supports for Students with ASD*

Evidence-Based Practices	Description for Use at the Tier 1 Level When Teaching Academic, Behavioral, and Social Expectations
Explicit Instruction	1. State the learning objective. 2. Model how to demonstrate the new skill using multiple examples. Provide opportunities for the students to imitate as you model. 3. Engage students in guided practice using most-to-least prompts to provide the necessary levels of scaffolding. Gradually fade out prompts as the students reach independence. Provide immediate positive or corrective feedback for each response. 4. Provides opportunities for independent practice with immediate positive or corrective feedback. 5. Provide closure by reviewing what was learned. 6. Plan for fluency, maintenance, and generalization activities to support students in moving through the various stages of learning.
Visual Supports	Pictures, written words, objects, arrangement of the environment, visual boundaries, schedules, maps, labels, organization systems, timelines, and scripts.
Social Narratives	Visually presented stories that describe expectations for specific situations using language at the student's level of understanding. Examples of social narratives include Social Stories™, modified social stories, Comic Strip Conversations™, Power Cards™, or thought bubbles.
Video Modeling	Capture short video clips of students demonstrating the expectations/skills, and show the clips immediately before the students are expected to use the skills. Involve the students with ASD in the videos (video self-modeling) using behind the scenes prompting when necessary.

Academic, behavioral, and social expectations must be taught and reviewed on an ongoing basis and teachers should deliver very specific praise when students meet the various expectations using a minimum ratio of 4:1 positive comments to any corrective feedback. This frequent delivery of specific praise not only reinforces the students receiving the praise but also continues to communicate the expectations for the entire class in a positive, supportive, encouraging manner. When students do not meet expectations, teachers should use a hierarchy of supportive consequences (Leach & Helf, 2016) to positively redirect. With this approach, teachers refrain from using punitive consequences that often increase problem behavior of students with ASD and other behavioral challenges. Instead, consequences should be delivered that encourage the student to engage in the desirable behavior. Below is an example:

1. Planned Ignoring: Do not attend to the problem behavior. Provide specific praise to a student demonstrating the desired behavior who is sitting closest to the student demonstrating the problem behavior. Use positive affect and body language to encourage the student to correct his or her behavior. Provide specific praise to the student when he or she begins to demonstrate the desired behavior.
2. Non-verbal Reminder: Use a cue card, picture, gesture, symbol, or signal to remind the student of the expectation in an encouraging manner.
3. Verbal reminder: State the expectation in an encouraging manner.
4. Provide Assistance or Modify the Task: If the task is too challenging, provide

assistance and fade out support once the student is able to comply or modify the task to support compliance.

5. Conference with the Student: Meet with the student privately to find out if there is something bothering the student that is impeding the student's ability to comply.

6. Provide a Safe Place for De-escalation: Allow the student to go to a pre-determined place in the classroom to de-escalate (regulate emotions). When the student is calm, encourage the student to rejoin the class activity.

Tier 2 Interventions and Supports for Students with ASD

When Tier 1 instruction is robust utilizing the approaches discussed in the previous section, some students with ASD will need no further intervention to meet academic, social, and behavioral expectations within the classroom. However, solid Tier 1 instruction does not preclude the necessity for Tier 2 interventions and supports for many students with ASD. Consider the following vignette:

Austin is a fourth grade student with ASD who is fascinated with dinosaurs, has above grade level reading fluency skills, enjoys drawing, and is compliant with academic directions as long as he understands the expectations and has the skills needed to complete the tasks. He benefits from explicit instruction of behavioral, social, and academic skills showing the most success when visual supports and video modeling are utilized to teach specific expectations. When teachers use strategies to keep him actively engaged during group instruction, tapping into his strengths and interests as much as possible, Austin participates and follows directions during group instruction. For example, if he is permitted to draw during a science lesson to demonstrate what he is

learning, he is better able to engage in the lesson as opposed to just sitting and getting information. Also, if teachers call on Austin to read aloud during a group instruction lesson, that helps to keep him engaged and focused, An area that Austin continues to struggle in, however, is working collaboratively with partners and groups. The Tier 1 instruction provided to the students includes clearly stated expectations for partner or group behavior, modeling and guided practice to demonstrate the expectations, and immediate feedback during partner and group work to reinforce students meeting expectations and provide support as needed. While this level of instruction and support is effective for most students in the class, Austin continues to struggle with working collaboratively with partners and groups due to his deficits in joint attention, social reciprocity, expressive communication skills, and pragmatics. He either disengages from his partner or group and draws or tries to talk about dinosaurs instead of completing the task. Thus, it is necessary to implement Tier 2 interventions and supports to address Austin's needs in this area. His objective for Tier 2 intervention is, "Austin will participate in partner or group activities for a minimum of five minutes engaging in on-topic reciprocal interactions and completing the required task in collaboration with his partner or group." The criterion for mastery is that he would meet the expectations of the objective in four out of five opportunities. The intervention and supports put in place consist of the following:

- *Use video-modeling to teach the expectations of the partner or group activity.*
- *Use peer-mediated interventions to teach peers how to positively redirect Austin when he disengages from the*

activity or tries to talk about dinosaurs.

- *Give a specific role to Austin for each partner or group activity utilizing his strengths and interests (e.g. reader, fact finder, illustrator).*
- *Provide adult facilitation throughout the partner or group activity to provide positive reinforcement and positive redirection as needed fading out facilitation gradually as Austin is able to engage independently with the partner or group.*

When Tier 2 supports are needed, they should be embedded within instructional and non-instructional routines to add an additional layer of support to what is already being implemented at the Tier 1 level. Fortunately, the literature comprises decades of research on evidence-based practices for students with ASD and there are high quality free resources available to support teachers in implementing such practices through the National Professional Development Center on Autism Spectrum Disorders (NPDC) web site (http://autismpdc.fpg.unc.edu/) and the Autism Internet Modules (AIM) web site (http://www.autisminternetmodules.org/).
The Tier 1 practices described in Table 1 can also be used to design Tier 2 interventions and supports by using them with more intensity and/or frequency to target a specific academic, behavioral, or social need of a student. In addition to those practices, other strategies that are often needed at the Tier 2 level include a variety of behavioral teaching strategies such as prompting/fading procedures, time-delay, differential reinforcement, shaping, task analysis, and chaining (Alberto & Troutman, 2012; Cooper, Heron, & Heward, 2007). Other interventions and supports that are often useful at the Tier 2 level include behavioral momentum (Mace et al., 1988), discrete trials

(Lovaas, 1987), self-management strategies (Coyle & Cole, 2004), script-fading procedures (Krantz & McClannahan, 1993), priming (Koegel, Koegel, Frea, & Green-Hopkins, 2003), social problem-solving strategies (Lavoie, 2006; Myles & Simpson, 2001), emotional regulation strategies (Attwood, 2004; Buron & Curtis, 2003), use of augmentative and alternative communication (AAC), functional communication training, increased choice-making opportunities, and peer-mediated instruction and intervention (DiSalvo & Oswald, 2002; Odom & Strain, 1984). Find free training modules on many of these approaches on the NPDC and AIM websites and go to the following link to access research-to-practice briefs that describe each approach: http://www2.winthrop.edu/rex/rex/core_module.html#EDCO_202._Supporting_Exceptional_and_Gifted_Learners_in_the_General_Education_Classroom

At the Tier 2 level, decisions for selecting and designing interventions and supports are made through informal academic, behavioral, and social assessments beginning with analyzing the student's ASD profile to determine how the student's characteristics may be impacting performance in the classroom. Table 2 shows an example of what a Tier 2 plan may entail for an individual student.

Tier 3 Interventions and Supports for Students with ASD
If a student continues to have academic, behavioral, or social challenges after appropriate Tier 1 and Tier 2 interventions and supports are put in place, more intensive assessment and intervention approaches can be used at the Tier 3 level. This would involve conducting more formal academic, behavioral, and social assessments using a

Table 2. *Sample Tier 2 Intervention Plan*

Area of Difficulty: Relevance to ASD Profile	Interventions and Supports Needed
Trouble following directions: Receptive communication impairments resulting in difficulty understanding the directions.	• Simplify language when giving directions to the whole class using clear, consistent language. • Model the expectation instead of just giving verbal directions. • When feasible, write simplified directions on a note card before announcing them to the group, giving the note card to the student when verbally stating the directions to the group. • Deliver positive reinforcement when the student follows directions.
Difficulty engaging during group instruction: Sensory processing problems resulting in over-stimulation when presented with too much environmental stimuli and under-stimulation when there are long periods without opportunities for movement.	• Refrain from using fluorescent lighting during group instruction. • Permit student to sit on a balance ball, stand, or pace during group instruction. • Use co-teaching with the special education teacher to split the class into two groups to reduce sensory overload. • Deliver group instruction in sectioned off parts of the classroom to reduce visual stimuli.

functional behavior assessment approach to more carefully analyze the factors that are influencing the student's challenges. It is likely that teachers will then be able to learn more about the student's ASD profile to make more informed decisions about the interventions and supports the student may need. There are resources available that provide technical assistance for conducting meaningful functional behavior assessments for students with ASD (e.g. Dunlap et al., 2009; Leach, 2018) and for conducting academic, communication, social, and adaptive behavior assessments to inform plans for Tier 3 interventions (Bellini, 2006; Leach, 2010; Quill & Stansberry-Brusnahan, 2017).

After gathering information about the root causes of the persistent academic, behavioral, and/or social challenges, Tier 3 interventions and supports are then developed. While there aren't necessarily additional evidence-based practices needed at the Tier 3 level beyond the approaches described for Tier 1 and 2

interventions and supports, the level of individualization, specificity, and intensity when using the various strategies is much more defined at the Tier 3 level. Consider the following vignette:

Alex is a third-grade student with ASD who has been having great difficulty following directions throughout the school day. Tier 1 instruction included using clear, concise language, visual supports, and modeling when giving directions as well as providing positive reinforcement when students follow the directions and positive redirection when they do not. Since Alex continued to have trouble following directions even with the Tier 1 supports in place, Tier 2 interventions and supports were designed for Alex and some other students also having difficulty following directions. This included giving the directions 1:1 and an individualized token reinforcement system for following directions. While this helped Alex to increase his compliance with some

directions, he continued to have problems following many directions throughout the school day. Thus, his team conducted a functional behavior assessment (FBA) to determine why Alex is unable to follow directions consistently throughout the day. At the onset of the FBA, the team examined his ASD profile to determine what characteristics may be impacting his ability to follow directions. They predicted that difficulties with receptive communication may be impacting his compliance, but they needed more information to make that hypothesis. Thus, they tested out different scenarios to determine if eliminating or reducing barriers related to his receptive communication challenges would increase his compliance. First, they assessed if Alex is better able to follow directions when the teacher simplifies her language. Data from this assessment show that Alex follows 80% of directions that are given using very simple sentences and only 20% of directions that involve more complex language. The team then compared his compliance with directions that are given regularly throughout the school day, such as, "Stand up and push in your chair," or "Come sit on the carpet, and put your fingers on your lips." vs. more unfamiliar directions. Data show that Alex follows familiar directions 90% of the time but is unable to follow unfamiliar directions without prompting. Finally, the team assesses Alex's compliance when environmental cues are present when giving directions compared to directions that are given verbally without any additional cues. Data show that Alex often needs several reminders to follow directions when environmental cues are not present, but he does use environmental cues to attempt to follow directions. For example, when the

teacher gives directions to get ready for a lesson, such as telling the students to get out their math folders, calculators, and colored pencils, Alex responds only after he sees the peers around him getting those materials as opposed to responding to the verbal directions as soon as they are given. Because of this, he is usually still attempting to gather the necessary materials when the teacher is ready to begin instruction. Based on the FBA data collected, the hypothesis for Alex's difficulty with following directions is: "Alex has trouble following directions due to his receptive language impairments. He is usually able to comply when directions are given using simplified language or when they are very familiar, but Alex is unable to comply or relies on environmental cues to follow directions when they are unfamiliar."

Table 3 show Alex's Tier 3 intervention plan. Some students may need multiple interventions such as the one shown in Table 3 to address their different areas of need (Leach, 2010). Go to www.bringingaba.com to access more examples of Tier 3 interventions that can be used for students with ASD in the inclusive classroom.

Conclusion
Because of their multitude of social, communication, emotional, physical, medical, and adaptive behavior challenges, students with ASD often need a variety of interventions and supports to meet their unique needs in the classroom setting. Taking the time to assess how a student's ASD profile can impact performance in the classroom will allow teachers to make meaningful decisions when designing Tier 1 instruction and developing Tier 2 and 3 interventions and supports for those students who require more individualized, intensive

Table 3. *Sample Tier 3 Intervention*

Objective	Alex will follow directions throughout the school day.
Criterion for Mastery	90% compliance for five consecutive school days
Data Collection Procedures	Percentage data: Divide the number of directions followed without prompting (followed before needing to implement step 5 of the teaching procedures) by the total number of directions given across the school day.

Teaching Procedures	1. Give directions to Alex 1:1 using simplified language prior to giving directions to the whole class.
	2. If the direction requires multiple steps, write the steps on a note card before announcing the directions to the whole class. Give the note card to Alex when verbally stating the directions to the group. For example, hand Alex a note card that has the words math folder, calculator, and colored pencils written on it when stating, "Students, it is now time to get out your math folder, get a calculator from the back table, and get three different colored pencils from your pencil pouches."
	3. If Alex follows the direction, provide positive reinforcement.
	4. If Alex doesn't follow the direction, restate the direction and use time-delay.
	5. If still no response, use the following least-to-most prompts hierarchy:
	  a. Use a gestural prompt (e.g. point to something he needs to get, point to the written direction)
	  b. Use modeling/request imitation to show Alex what to do and then ask him to imitate your model
	  c. Help Alex get started then have him finish the direction independently
	6. Provide positive reinforcement after Alex complies, even if prompting was needed.

instruction in addition to the robust Tier 1 instruction provided. Using the MTSS framework allows educators to not only meet the needs of all students in the classroom but to also deliver specially designed instruction for students with ASD to optimize their academic, behavioral, and social success.

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Engage or Not to Engage: Comparing Instructional Strategies in a Post-Secondary Education Program with Students with Intellectual Disability

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Actively engaging students with intellectual disabilities (ID) addresses the deficits the students display by promoting constant practice and application of skills being taught. To accomplish this task, researchers suggest the use of instructional strategies like Numbered Heads Together (NHT), a peer-mediated instructional strategy (PMI), which encourages peer collaboration and feedback to enhance students' knowledge of skills, unlike traditional teaching methods (e.g., lecture and note-taking) which focus on rote memorization. In this study, an alternating treatment design, with a final best treatment phase, was used to ascertain the most effective strategy, NHT and/or lecture with Guided Notes (GN) is this a strategy used with people who have ID?, for increasing on-task behavior and employability skills content quiz scores of three students with a diagnosis of ID in a segregated post-secondary classroom Study results showed an increase in percentage of time on-task and employability skills content quiz scores for all participants in the NHT phase. Based on the results, NHT was then implemented in isolation as the best treatment in which the previous results were verified. Study limitations, implications, and future research to extend our findings are also discussed.

Intellectual disability (ID) is classified as a neurodevelopmental disorder by *The Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM–5; American Psychiatric Association, 2013) "characterized by deficits in general mental abilities, such as reasoning, problem solving, planning, abstract thinking, judgment, academic learning, and learning from experience" (p. 31). The criteria to identify people with ID includes IQ scores at a minimum, two standard deviations below the mean and deficits in adaptive functioning skills. . Due to these deficits, individuals with ID generally begin their academic careers significantly behind their counterparts without disabilities (Agran, Cavin, Wehmeyer, & Palmer, 2006; Erickson, Noonan, Zheng, & Brussow, 2015), and have a difficult time achieving success in classrooms where traditional teaching methods (i.e. lecture and note-taking) are the standard for instructional delivery.

Post-secondary education for individuals with ID is "education after the secondary level that offers students with ID options of enrollment to include community colleges, four-year universities, vocational-technical colleges, as well as other various forms of adult education" (Hart, 2006, p. 2). The PSE programs were created to place individuals

with ID in suitable and age-compatible educational settings, as well as eliminate the need for them to remain in high school classrooms until the age of 22 (Zaft, Hart, & Zimbrich, 2004). The enactment and evolution of educational legislation like the Higher Education Opportunity Act (HEOA) between1965 and 2008 can be credited with ensuring individuals with ID access to PSE by reducing the financial burden on their families (access to federal funding) and mandating the termination of segregation of students with ID on college campuses by creating more specialized PSE programs on both two and four-year college campuses (Hart, 2006; Neubert, Moon, & Grigal, 2002; Neubert, Moon, Grigal, & Redd, 2001; VanBergeijk & Cavanagh, 2012; Yell, 2012).

While access to these programs is a great first step for students with ID, in order to reap all of the benefits, participation within post-secondary classrooms is vital (O'Connor, 2013). However, some instructors in PSE programs encounter problems with eliciting participation from students due to their dependence on traditional teaching strategies like Initiation-Response-Feedback (IRF; Jones, 2008). Initiation-Response-Feedback is a teacher-directed strategy in which the teacher poses a question, randomly selects students to answer, and offers feedback (O'Connor, 2013). While this strategy has demonstrated some positive results as it relates to academic achievement and on-task behavior, eliciting active student engagement during IRF is a challenging feat. The use of IRF requires memorizing abstract concepts, and potentially discounts the fact that individuals with ID enter school significantly below grade level and their peers; thus, not having the same prerequisite understanding/ knowledge of their typically developing counterparts (Agran et al., 2006; Erickson et al., 2015), both of which make it difficult for students with ID to be successful (Ellis, 1978;

Lifshitz, Kilberg, & Vakil, 2016). Increasing active student engagement in PSE classrooms provides students with ID opportunities to collaborate with their peers and instructors as they reflect on and extend their knowledge of the subject being taught, an essential element in the process of learning for individuals with ID (McCarthy & Anderson, 2000; McKeachie, 1999). Additionally, promoting active student engagement permits individuals with ID to rehearse skill application and interact with peers that offer different perspectives on a subject in an attempt to ease the comprehension process for the individual with ID (McCarthy & Anderson, 2000).

Opportunities to Respond
Opportunities to respond (OTR) is an active engagement strategy that elicit an assortment of student responses (e.g., verbal, written, or gestural) and encourage explicit teacher-student interactions, introduction of an instructional cue (e.g., question) and obtaining a student response (e.g., unison response, guided notes, or thumbs up/down; Haydon, Macsuga-Gage, Simonsen, & Hawkins, 2012; Hunter, Dieker, & Whitney, 2016; Sutherland, Wehby, & Yoder, 2002). Providing students with increased opportunities to respond helps reduce some of the barriers that inhibit the learning process (Haydon et al., 2012; Sutherland & Wehby, 2001). Research has shown an increase in academic achievement and on-task behavior when rates of OTR are increased (Blackwell & McLaughlin, 2005; Christle & Schuster, 2003; Haydon et al., 2012; Sutherland, Alder, & Gunter, 2003). Despite these findings, both secondary and post-secondary teachers continue to lean towards lecture and note-taking as their primary methods of instruction (Creed, 1986; McLeskey et al., 2017). For teachers that are loyal to traditional teaching methods, researchers suggest the use of OTR strategies

like guided notes to sufficiently instruct students with ID (Haydon et al., 2012; Heward, 1994; Lazarus, 1993; Sweeney, Ehrhardt, Gardner, Jones, Greenfield, & Fribley, 1999).

Guided Notes

Guided notes (GN) are an evidenced based practice that have yielded positive results as it relates to academic achievement and on-task behavior (Konrad, Joseph, & Eveleigh, 2009). Guided Notes teacher created worksheets that are used to accommodate students with note taking during lecture and are identical to the content being taught (Adamson, 2013; Haydon et al., 2011; Heward, 1994). Guided notes offer visual cues by providing a blank space, that serves as a stimulus, for students to write key details (Adamson, 2013; Lazarus, 1996; Sweeney et al., 1999), which they can refer to later for subsequent tasks (e.g., tests and quizzes) and application (Anderson, Yilmaz, & Wasburn-Moses, 2004). Moreover, an increase in academic achievement and on-task behavior has been documented when GN have been implemented with students with disabilities (Blackwell & McLaughlin, 2005). Similar results have been yielded when peer-mediated instructional strategies that include opportunities to respond have been implemented with students with disabilities (Utley et al., 2001).

Numbered Heads Together

Numbered Heads Together (NHT), an emerging practice, deriving from Spencer Kagan's cooperative learning strategies (Haydon, Maheady, & Hunter, 2010; Hunter & Haydon, 2013; Maheady, Mallette, Harper, & Sacca, 1991; Maheady, Michielli-Pendl, Mallette, & Harper, 2002; Maheady et al., 2006; McMillen et al., 2016). A peer-mediated instructional strategy, NHT features a unique method of questioning that has yielded positive results on student engagement and academic achievement of students (Maheady, Michielli-Pendl, Harper, & Mallette, 2006). Additionally, NHT offers several benefits: a) provides chances to relate new skills to prior knowledge, b) promotes student engagement, c) creates opportunities for teachers to enrich students' learning by posing higher-order thinking questions, and (d) encourages the use of peer collaboration to generate answers (Haydon et al., 2010; Hunter & Haydon, 2013; Maheady et al., 1991; Maheady et al., 2002; Maheady et al., 2006; McMillen et al., 2016).

Implementation of NHT. Numbered Heads Together consists of 11 steps and requires relatively minimal preparation and implementation time (Hunter et al., 2015). Numbered Heads Together is an instructional process that involves the teacher placing students in three to four-member heterogeneous learning groups (one higher achieving, one lower achieving, and one average achieving student). Next, the teacher randomly gives each student in each group a designated number (1-4). Then, the teacher reviews the rules associated with the NHT activity (e.g., respect everyone's opinion, speak at a level that does not disturb other groups). Following this, the teacher asks questions associated with the skill and directs the students to "put their heads together" to collaborate and generate a response. Finally, the teacher offers feedback on the answers given by re-teaching if needed (incorrect answer) or providing positive feedback to group (correct answer) responses (Haydon et al., 2010). There have been six previous studies that included the teacher feedback and student response component of NHT. Each of the six studies demonstrated positive academic outcomes for students with disabilities in elementary and secondary educational settings.

Literature Review

Currently, there have been six studies using the NHT strategy in primary and secondary educational settings (Haydon et al., 2010; Hunter & Haydon, 2013; Maheady et al., 1991; Maheady et al., 2002; Maheady et al., 2006; McMillen et al., 2016). Prior studies, by Maheady et al. (1991) used an alternating treatment design, comparing the effects of NHT and Whole Group Question and Answer (WGQ&A) strategy upon on-task behavior and social studies quiz scores. Results of the study showed an increase in both on-task behavior (WGQ&A, *M*=39%; NHT, *M*=71%) and social studies quiz scores (WGQ&A, *M*=68.5%; NHT, *M*=84.3%) during the NHT condition in comparison to the WGQ&A condition. In a subsequent study, Maheady et al. (2002) used an alternating treatment design to extend the previous study by comparing the effects of NHT with the use of Response Cards (RC) and WGQ&A strategies upon on-task behavior and chemistry quiz scores of 21 cultural, linguistic, and diverse ability sixth grade students (four students with disabilities, four students received remedial reading services, and two students were ESL). Results of the study indicated increased quiz scores (WGQ&A, *M*=73.2%; NHT, *M*=81.6%; RC, *M*=81.5%) and on-task behavior (WGQ&A, *M*=80% vs. RC, *M*=90%, vs. NHT, *M*=98%) during the RC and NHT conditions as compared to the WGQ&A condition.

In addition, a 2006 study by these authors, utilized an A-B-BC-B-BC design, to compare the effects of WGQ&A, NHT and Numbered Heads Together plus Incentives (NHT+I) on chemistry quiz scores of 23 cultural, linguistic, and diverse ability sixth grade students (two students had a disability and eight were ELL students) in the third study. Results of the study showed that chemistry quiz scores were the highest during

the NHT+I condition as compared to the NHT and WGQ&A conditions (WGQ&A, *M*=72.4%; NHT, *M*=80.3%; NHT+I, *M*=89.2%).

Haydon, Maheady, and Hunter (2010) furthered this study using an alternating treatment design to examine the effects of a Baseline (BL), NHT and NHT+I condition upon on-task behavior and language arts quiz scores of three students with disabilities in a seventh-grade self-contained special education classroom. Results of the study showed an increase in both on-task behavior (BL, *M*=66%; NHT, *M*=97%; NHT+I, *M*=96.6%) and language arts quiz scores during the NHT and NHT+I conditions as compared to the BL condition.

Hunter and Haydon (2013) used an alternating treatment design to extend the previous study by investigating the effects of NHT and NHT+I with four students identified with Emotional Behavior Disorder (EBD) in a self-contained middle school classroom. The authors extended the study by adding a preference assessment during the NHT+I phase and adding a new content area, math. Students demonstrated the highest outcomes during the NHT+I condition as compared to the NHT and BL conditions as it relates to both time on-task (BL, *M*=48.3%; NHT, M=76.5%; NHT+I, M=93.9%) and math quiz scores (BL, *M*=26.2%; NHT, *M*=63.5%; NHT+I, *M*=80.1%).

Most recently, using an A-B-A-B withdrawal design, McMillen and colleagues (2016) investigated the effects of NHT on science quiz scores with 18 ninth- grade students, including two students with disabilities. Results of the study showed instant improvements in science quiz scores, which was replicated in successive phases. Additionally, social validity data showed

both the teacher and participants rated NHT favorably.

NHT has had positive academic and behavioral outcomes for students with and without disabilities in elementary, and secondary settings. Based on the review of the literature, there has not been an NHT study investigated within a post-secondary setting for students with or without disabilities. The earlier studies set the precedent for this current work to be done in a different setting and with a new outcome measure.

Purpose of Study

The current study extends the previous studies by: (a) working with students with a diagnosis of ID only, (b) investigating a new setting (post-secondary education), (c) examining a new content domain (employability skills), and (d) implementing a best treatment phase in which NHT was implemented in isolation, as well as answers the following research questions: a) Within the instructional content area of employability skills, what are the effects of two differing academic interventions (Numbered Heads Together or Guided Notes) on on-task behavior of students with intellectual disabilities in a segregated post-secondary educational program classroom?, b) Within the instructional content area of employability skills, what are the effects of two differing academic interventions (Numbered Heads Together and Guided Notes) on the scores of teacher-created quizzes on employability skills content of students with intellectual disabilities in a segregated post-secondary educational program classroom?, and c) Could the on-task behavior and scores on teacher-created quizzes on employability skills content be maintained in the Numbered Heads Together or Guided Notes best treatment condition for three consecutive sessions?

Method
Participants and Settings
The PSE program of study was a 60-semester hour Comprehensive Transition and Post-secondary Program geared towards educating individuals with ID, stationed on the campus of a four-year university in an urban city in Tennessee. The demographics of the student population in the PSE program were 62% African American, 36% Caucasian, 1% Asian American, and 1% Indigenous Persons. The study took place in a segregated post-secondary education program classroom on the campus. The primary investigator worked as an instructor for the PSE program and recruited the participants of the study due to their participation in the PSE program. Written consent was obtained from all participants (teacher and students) prior to the implementation of the study. Additionally, the primary investigator received approval to conduct the study from the Institutional Review Board (IRB).

The teacher expressed interest in receiving assistance in providing effective instruction to her students with the goal of assisting the students to obtain and maintain employment. The teacher was an African American female with no prior K-12 teaching experience. She held a bachelor's degree in Professional Studies and was pursuing a master's degree in applied behavior analysis, had previous work experience as an early childhood education paraprofessional, and served as a teacher for the specialized post-secondary education (PSE) program for 2 years.

Three students met the eligibility criteria to participate in the study. To be considered to participate in the study, the students had to have a solitary diagnosis of ID, be incoming new students to the specialized PSE program with no prior knowledge of the curriculum and demonstrate a severe need for supplemental support in acquiring

knowledge related to employability skills. Additionally, all participants were administered intelligence assessments to obtain an accurate depiction of their IQ prior to participating in the study (Spring 2017). Table 1 illustrates the demographics of the three target students (names are pseudonyms) who participated in the study.

Materials

For the study, the authors used small dry erase boards and markers, 1 pair of dice (for the purpose of randomizing which student in a group would be responsible for answering the NHT question), an interactive whiteboard with projector, Microsoft PowerPoint, YouTube video index cards, and curriculum content from the Life Centered Education (LCE) curriculum. The LCE curriculum was created by professional members of the Council for Exceptional Children (CEC) and is divided into three categories: daily living skills, self-determination and interpersonal skills, and employability skills (Council of Exceptional Children, 2017). Additionally, the LCE curriculum pairs classroom instruction with community application to assist the students with transitioning to adulthood and becoming productive citizens.

Dependent Variables

On-task behavior. Maheady and colleagues (1991) operationally defined on-task behavior as "(a) eyes directed toward the teacher while she was speaking, (b) students

reading and/or writing in response to a teacher directive, (c) students discussing content-related material, and (d) students raising hands to respond to questions" (p. 27). Examples of on-task behavior included students looking at a peer while they were collaborating or students writing the answer to the question after the group collaboration.

Quiz Scores. The teacher administered a 10-item multiple choice quiz to the students following each lesson. The purpose of administering the quizzes was for the primary investigator to ascertain whether or not the students were grasping the concepts being taught in each lesson. The content from the lessons and quizzes were obtained from the Life Centered Education (LCE) curriculum (Council of Exceptional Children, 2017). The quiz items were related, but not identical to, the material reviewed during the lesson. The students were assessed based on the total number of correct answers that were given on the quiz.

Independent Measures

Guided Notes. Prior to the study, the teacher informed the primary investigator that the use of GN was a regular practice in her class in order to accommodate her students with fine motor deficiencies. The teacher and primary investigator collaboratively created the PowerPoints from information gathered from the LCE curriculum (Council of Exceptional

Table 1
Student participant demographic information

Participant	Gender	Age	IQ	Disability Category	Ethnicity
Anthony	Male	26	49	ID	AA
William	Male	19	54	ID	AA
Roger	Male	18	75	ID	AA

Note: AA= African American, ID= Intellectual Disability

Children, 2017). At the beginning of each class the teacher passed out a worksheet of guided notes that was identical to the PowerPoint that the teacher was using for that lesson. The worksheet contained blank spaces which served as a stimulus for the students to write important information (i.e., vocabulary, definition, etc.; Lazarus, 1988). The students received a visual prompt with the projection of the PowerPoint and a verbal cue from the teacher when it was necessary for them to document information.

Numbered Heads Together. The NHT strategy was randomly implemented in an alternating manner. The teacher created PowerPoint presentations containing information from the lesson, which were displayed on the whiteboard. After reviewing the rules and procedures, the teacher asked a question and prompted the students to collaborate with their peers to produce an answer and set a timer for 30 seconds. After the time expired, the teacher identified which student would be responsible for answering the question by rolling a dice. The student with the identified number wrote the answer on the dry erase board and was responsible for presenting it to the teacher. The teacher would then review the answer, provide positive feedback, and proceed to the next question. The teacher continued in this fashion until all 10 questions were answered.

Recording Procedures. Momentary time sampling was used to measure students' percentage of time on-task. Each session was conducted over a 30-minute period and divided into 10-second intervals. At the end of each 10-second interval, the investigators viewed the first student to determine if the student was on-task. When the next 10-second interval elapsed, the investigators looked at the second student to determine if the student was on-task. This process continued until the investigators had

observed each student, then the process was repeated until the end of the session (Alberto & Troutman, 2013; Kennedy, 2005). A cell phone timer was used as the alarm to signal the elapse of time and keep track of the intervals. If the students were observed to be on-task, the investigator would document the interval with a (+). In contrast, if the student was observed not to be on-task, the investigators documented the interval with a (-). Percentage of time on-task was calculated for each student by dividing the total number of intervals that the student was documented as on-task (+) by the total number of intervals in the session (i.e., (+) on-task & (-) off-task) then multiplying by 100.

Inter-observer Agreement
Data for inter-observer agreement (IOA) and inter-rater reliability was gathered to make certain that the investigators were collecting data in an accurate and consistent manner. When both investigators counted a student in an identical manner (i.e. both investigators record a student as on-task), this was counted as an agreement. However, if both investigators counted a student differently (i.e., one investigator records on-task and one investigator records off-task), this was counted as a disagreement. IOA was calculated by dividing the number of agreements by the total number of agreements and disagreements and multiplying by 100. Alberto and Troutman (2013) note 80% agreement by investigators as acceptable IOA results however, 90% or greater is preferred. Inter-observer agreement data were collected during 50% of the sessions. The IOA mean for on-task behavior was 92% (range 86%–98%).

Study Design
An alternating treatment design with a final best treatment phase was used to investigate the effectiveness of NHT as compared to lecture with guided notes on on-task behavior

and employability skills content quiz scores. The use of an alternating treatment design was rationalized because it offers a more educated control for internal validity due to two interventions being used on the same population at the same time (Barlow & Hayes, 1979). The implementation of a best treatment phase was used to reduce the likelihood of multiple treatment interference (Cooper, Heron, & Heward, 2007) as well as to verify the original findings of the most effective treatment (Cooper et al., 2007; Richards, Taylor, & Ramasamy, 2013).

Experimental Procedures Teacher Training. The primary investigator conducted two 60-minute professional development trainings for the participating teacher. The professional development trainings encompassed the implementation process of the Numbered Heads Together strategy. The primary investigator conducted a 15-minute training with the students on the NHT process. The student training consisted of the primary investigator showing the students a video of the implementation of the NHT strategy and having a discussion practice with a paraprofessional. The student trainings occurred prior to each NHT activity during the alternating treatment phase to accommodate the students' deficits with working memory (Ellis, 1978; Lifshitz et al., 2016). Following the two professional development trainings, the primary investigator and the participating teacher met frequently (i.e., at least bi-weekly) to reflect and plan lessons.

Lecture with Guided Notes. The primary investigator adopted and modified the procedures established by the Hunter and Haydon (2013) study. At the beginning of each lecture with guided notes (GN) session, the teacher reviewed the classroom rules and procedures and posed questions on employability skills content to activate prior knowledge. Next, the participating teacher provided the students with the guided notes handouts. During the instruction, the students received visual prompts from the PowerPoint in the form of bold red font, while the teacher simultaneously issued verbal prompts to the students to record the details that were in bold red font on the designated blank lines of the guided notes handout. Finally, the teacher randomly chose students to answer questions posed by the teacher related to employability skills.

Numbered Heads Together. Prior to implementing the study, the teacher used the Present Level of Performance information gathered from the students' Individualized Education Plans (IEP) and results of the Wechsler Adult Intelligence Scale-Fourth Edition (WAIS-IV) to construct theheterogeneous learning groups. Once the students were placed in the heterogeneous learning groups, each student in each group was assigned an index card with a number (1 to 4) to accommodate the students' deficits in their short-term and working memory (Swanson, 1994). Next, the teacher reviewed the rules and procedures for the NHT condition. Then, the students watched a video of students participating in a NHT activity. Following the video, the teacher then discussed the process of a discussion, emphasizing the collaboration component of the discussion and allowed the paraprofessionals to model and practice the process, prompting the students to participate as needed. The teacher then delivered instruction on employability skills content (i.e., counting money, interviewing for employment, conflict resolution, etc.). Following the delivery of the employability skills instruction, the teacher implemented the NHT intervention, by posing a question, instructing students to "put their heads together" and collaborate, and offering positive corrective feedback. The process

continued until the students answered 10 multiple choice questions. Following the NHT activity, the teacher administered a 10-question multiple choice quiz. The quizzes were read aloud to the class and paraprofessionals circulated the class and assisted the students as needed. The primary investigator graded the quizzes and returned them to the teacher the following day.

Data Collection

The primary investigator and another graduate student from the same department served as data collectors for the study however, the outcomes were in no way influenced by or had an impact to the program or the primary investigator's employment as an instructor/researcher. During each 30-minute session, the primary investigator used partial interval recording, in which visual sweeps were conducted every 10-seconds on each student to determine if they were on-task. For example, when 10-seconds elapsed from the timer, each investigator would look at Student A and document whether or not the student was on-task. When the next 10-seconds elapsed, the investigators would look at Student B and document whether or not the student was on-task. This process continued until the investigators had observed each student, then the investigators began the process again with Student A, for the duration of the 30-minute session.

Additionally, the students were administered a 10-item multiple choice quiz following each session to measure the percentage correct on employability skills content. The questions were read aloud to the students by the teacher and paraprofessionals circulated around the classroom monitoring the progress of the students and assisting as needed. Percentage correct was calculated by dividing the number of correct responses by the total number of responses and multiplying by 100. The quizzes were graded by the primary investigator and returned to the class the following day.

Treatment Integrity

The primary investigator collected treatment integrity data each session. A checklist was created for the NHT (i.e., review class procedures, place students in heterogeneous groups, activate prior knowledge) and lecture with GN (review class procedures, teacher poses questions and randomly selects students for answers) conditions to ensure that each treatment was implemented accurately and consistently (Haydon et al., 2010). Treatment integrity data showed that each condition was implemented with 100% adherence.

Social Validity

Following the completion of the study, both the participating teacher and students were asked to complete social validity surveys to assess the effectiveness and suitability of the NHT and lecture with GN conditions. The teacher social validity survey concentrated on the instructional execution component of each strategy, while the students' practice and engagement with both strategies was the focus of the students' survey. The student surveys were read aloud to them as a whole group by the teacher, however paraprofessionals assigned to the classroom also assisted with reading, as needed by the students. No accommodations were given for writing because the students were only required to draw a circle around the score of their choice for each question. Both the teacher and students rated NHT more favorably as compared to the lecture with GN condition.

Results

As noted in Table 2 and Figure1, mean scores for percentage of time on-task and employability skills quiz scores were collected across all conditions. Changes in level and trend

among all participants. On-task behavior was highest for all three participants (Anthony, William, and Roger) during the NHT condition, 79%, 67%, and 74% respectively, thus prompting the primary investigator to select NHT as the best treatment phase. Some variability was noted for Anthony and William during the lecture with GN condition and for Roger during the NHT condition. Likewise, quiz scores were highest in the NHT condition for all three participants, 40%, 63%, and 93% respectively. Some variability was documented for Roger and William during the lecture with GN condition. A comprehensive explanation of the data for each participant is reported below.

Participant 1: Anthony. Anthony's highest levels of on-task behavior were displayed during the NHT condition as compared to the GN condition. The mean percentage of on-task behavior for Anthony during the GN and NHT conditions was 49% (range = 33%-64%) and 73% (range = 59%-90%) respectively. During the GN condition, the data showed a marginally decreasing to stable trend at a moderate level with high variability. However, the data displayed an increasing trend at a moderate to high level with low variability during the NHT condition. As it relates to quiz scores on employability skills content, Anthony's percentage correct were slightly greater during the NHT condition as compared to the GN condition. The mean percentage of answers correct on quizzes on employability skills content for Anthony during the GN and NHT conditions was 30% (range = 20%-40%) and 40% (range = 30%-50%) respectively. During both conditions, the data showed a decreasing trend at a low level with low variability.

Participant 2: William. William's highest levels of on-task behavior were displayed during the NHT phase. The mean percentage of on-task behavior for William during the GN and NHT conditions was 56% (range = 40%-66%) and 67% (range = 58%-71%) respectively. During the GN condition, the data showed a slightly decreasing to stable trend at a moderate level with high variability. During the NHT condition, the data displayed a stable to slightly increasing trend at a moderate level with low variability. As it relates to quiz scores on employability skills content, William's percentage correct were slightly greater during NHT condition in comparison to the GN condition. The mean percentage of answers correct on quizzes on employability skills content for William during the GN and NHT conditions was 55% (range = 40%-70%) and 63% (range = 50%-80%), respectively. During the GN condition, the data showed a decreasing trend at a moderate level with high variability. An increasing trend at moderate level with low variability was observed during the NHT condition.

Participant 3: Roger. Roger also displayed his highest levels of on-task behavior during the NHT condition as compared to the GN condition. The mean percentage of on-task behavior for Roger during the GN and NHT conditions was 46% (range = 33%-53%) and 74% (range = 44%-95%) respectively. During GN and NHT conditions, the data showed an increasing trend at a moderate to high level with high variability. As it relates to quiz scores on employability skills content, neither treatment (GN or NHT) was more effective than the other. Roger's mean percentage of answers correct on quizzes on employability skills content was 86% (range = 70%-100%) and 90% (range = 70%-100%) for GN and NHT respectively. The data showed an increasing trend at high level with moderate variability during the GN condition. An increasing trend at a high level with low variability was observed for Roger

during the NHT condition.

Four months following the study, the teacher and students completed modified versions of 6-point Likert scale surveys regarding social validity. The teacher completed the Intervention Rating Profile (IRP-15) and the students completed the Abbreviated Acceptability Rating Profile. Following the protocol of Tarnowski and Simonian (1992) both surveys were modified by removing and rephrasing questions to make the surveys relate to the current study. Results from the social validity data revealed that both the teacher and students preferred the use of NHT over lecture with GN, with both stating that they would use the strategy again.

Discussion

The purpose of the current study was to further investigate the effectiveness of the NHT strategy on on-task behavior and employability skills content quiz scores of three students with ID. As it relates to on-task behavior, there was an increase in percentage of time on-task for all three participants during the NHT condition as compared to the lecture with GN condition. Likewise, employability skills content quiz scores increased during the NHT condition as compared to the lecture with GN condition. These findings support the literature that

NHT increases on-task behavior and academic achievement for students (Haydon et al., 2010; Hunter & Haydon, 2013; Maheady et al., 1991; Maheady et al., 2002; Maheady et al., 2006; McMillen et al., 2016). The initial results were verified and maintained during the best treatment phase in which NHT was implemented in isolation. It is important to note that this study was the first NHT study to implement a best treatment phase. The findings of this study are noteworthy because research shows actively engaging students with ID addresses the deficits associated with the diagnosis (Hart, Grigal, & Weir, 2010), unlike traditional teaching methods that rely on rote memorization of insignificant facts (Jacques, 1992; McCarthy & Anderson, 2000). Social validity data showed both the teacher and students preferred the use of NHT over lecture with GN. This supports the findings of Maheady et al. (2001), in which the authors found students with disabilities consistently favor the use of peer-mediated instructional strategies rather than traditional teaching methods.

Limitations and Future Research

Although NHT showed signs of being the most effective strategy between the two interventions, there was a limitation to

Table 2
Mean Percentages and Ranges for Dependent Variables

Student	Guided Notes		NHT		Best Treatment	
	On-Task M(Range)	Quiz M(Range)	On-Task M(Range)	Quiz M(Range)	On-Task M(Range)	Quiz M(Range)
Anthony	49% (33%-64%)	30% (20%-40%)	79% (59%-90%)	40% (30%-50%)	86% (83%-89%)	67% (30%-90%)
William	56% (40%-66%)	55% (40%-70%)	67% (58%-71%)	63% (50%-80%)	81% (74%-86%)	57% (40%-70%)
Roger	46% (33%-53%)	86% (70%-100%)	74% (44%-95%)	90% (70%-100%)		

Note. M=Mean

Figure 1. On-task Behavior and Quiz Scores for All Participants
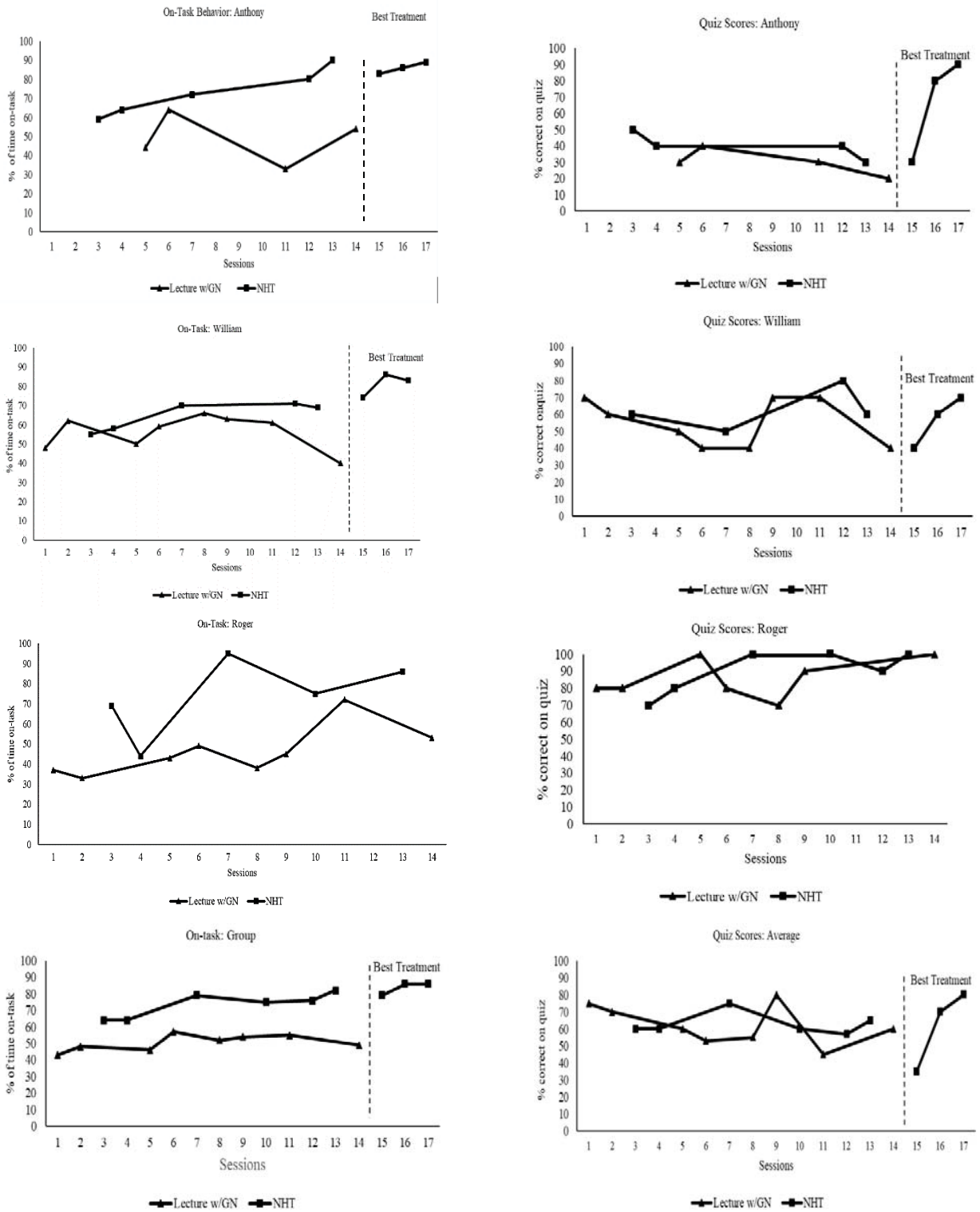
the study. Two of the participants' (Anthony and William) mean quiz scores were below the standard passing score of 70% during the NHT phase. The deficits the necessary cognitive strategies required to attain success in academic areas like reading, writing, mathematics, and language arts (Gathercole, Alloway, Willis, & Adams, 2004; Numminen, Service, & Ruoppila, 2002) is a possible explanation for the two participants' performance on the quizzes. Additionally, both Anthony and William have IQ scores at least two standard deviations below the mean (i.e., below 70) which can contribute to the participants acquiring academic skills and knowledge at a slower pace as noted by the severity specifiers of the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM–5; American Psychiatric Association, 2013). Furthermore, the Life Centered Education curriculum was created for individuals operating on a sixth to eighth grade level. While the primary investigator was not able to ascertain the participant's grade level, their low performance on the quizzes indicate that the grade level they are functioning on is below sixth grade.

Although NHT did appear to be the most effective strategy, there are more questions that could be answered. Future research could examine the incorporation of a service learning component in which the participants would go out into the community and apply the skills after a NHT lesson instead of taking a quiz. Moreover, research has demonstrated that students with disabilities tend to take a passive role in class participation (Tucker, Sigafoos, & Bushell, 1998).

Future research could also investigate the use of other high-leverage practices (McLeskey et al., 2017) to encourage student engagement in the PSE program. Additionally, it has been noted that individuals with disabilities benefit from collaborating with their non-disabled peers (Clegg, Murphy, Almack, & Harvey, 2008; Griffin, Summer, McMillan, Day, & Hodapp, 2012; Grigal, Hart, & Weir, 2012; Grigal, Neubert, & Moon, 2001; May, 2012), therefore future research could investigate the use of NHT in an inclusive PSE classroom where students with ID are registered as traditional students and working for course credit. Finally, NHT has not been studied with regard to any inter or intra-cultural differences. Our study consisted of only three participants, all of which were African American. Future research could specifically seek to understand if the effectiveness of NHT is influenced by any differences in participants' racial or cultural backgrounds.

Conclusion

Individuals with ID are enrolling in PSE programs in remarkable numbers despite the academic and community obstacles they face (Hart, 2006; Papay & Griffin, 2013; Plotner & Marshall, 2014; Thoma, 2013). There has been little research conducted on instructing students with ID in PSE settings, however, quite the opposite is true for primary and secondary educational settings. Previous research has investigated NHT in isolation (Maheady et al., 1991; McMillen et al., 2016), in comparison to other educational interventions (i.e., response cards, Numbered Heads Together plus Incentives; Haydon et al., 2010; Hunter & Haydon, 2013; Maheady et al., 2006; Maheady et al., 2002), using various single subject designs (i.e., alternating treatment, A-B-A-B withdrawal, A-B-BC-B-BC), and with a variety of disability categories (i.e., EBD, learning disability). An adaptation of the Hunter and Haydon (2013) study, the results of the current study verified the findings from previous studies as it relates to on-task behavior, as well as extended the literature by investigating students with ID,

a new population, a PSE program, a new setting, and employability skills, a new content area. However, there is an absence of distinct outcomes as it relates to quiz scores for two of the participants, therefore further investigation is needed. Despite the lack of clear findings on quiz scores for two of the participants, a great testimony to the NHT strategy's effectiveness and the overall success of the PSE program for individuals with ID occurred when the third participant obtained competitive employment at the conclusion of the study.

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Teaching College Students with Autism Spectrum Disorder (ASD)

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According to Wei, Wagner, Hudson, Yu & Javitz (2016), approximately 33% of students diagnosed with autism spectrum disorder (ASD) in the K-12 setting pursue higher education. As more children are being identified in schools, more are transitioning into postsecondary settings (Gelbar, Smith, & Reichow, 2014). While college personnel working in counseling, disability, and guidance offices may have some familiarity with working with students with ASD, many faculty do not. This increase in the number of students with ASD present on college campuses makes it pivotal that professors understand the population with whom they are working (Barnhill, 2016). This literature review aims to increase faculty awareness on working with college students with ASD through a discussion on the typical characteristics and challenges of college students with ASD, legal requirements, and evidence-based practices that may be incorporated into postsecondary settings. It will include practical tips for faculty on ways to help students transition from high school to college life by catering to their social and academic needs. Finally, it will highlight ways to foster self-determination skills in students with ASD so as to increase the probability of college success.

For the past decades, there have been a growing number of students diagnosed with autism spectrum disorder (ASD). According to Center for Disease Control and Prevention [CDC], (2012), in the United States, 1 in 68 children has been identified with ASD as opposed to 1 in 2000 in 1980s. The increase in prevalence may be due to many factors, including broader definition of ASD, greater awareness and/or improved diagnosis. However, irrespective of the reason, the increase in prevalence of students with autism spectrum disorder (ASD) will have a direct impact on postsecondary settings. Researchers have reported that there is an upsurge of students with ASD attending college (Cox et al., 2017; Gelbar, Smith, & Reichow, 2014; Grogan, 2015; Longtin, 2014). Many children with ASD have great interest in attending college (Dente & Coles, 2012; Longtin, 2014). Although the exact number of students with ASD in higher education is unknown (as many do not self-identify or have not been identified), approximately 33% of students diagnosed with ASD in the K-12 setting pursue higher education (Wei, Wagner, Hudson, Yu & Javitz, 2016). Shattuck et al. (2012) confirms these findings with an estimate that approximately one-third of high school students with ASD are likely to attempt college within six years of leaving high school. Based on the overall population of college students, White, Ollendick and Bray (2011) estimated that "between 0.7% and 1.9% of students may meet the criteria" of ASD (p. 683).

Autism is more prevalent in higher education than most were aware. Previously, students with ASD who attended post-secondary education were classified under terminologies such as individuals with Asperger's Syndrome, High Functioning

Autism [HFA]; (Barnhill, 2014; Sayman, 2015), but according to the *Diagnostic and Statistical Manual of Mental Disorders- 5* [DSM-5]; (APA, 2013) all subcategories have been subsumed under the umbrella of autism spectrum disorder (ASD), with the majority of college students on the spectrum falling within the Level 1 ASD. The increase in prevalence combined with the name-change calls for greater alertness from higher education personnel. Faculty, in particular, need to understand college student with ASD as they have direct contact with these students and directly impact how successful they become in adulthood. Teaching students with ASD in postsecondary settings involves understanding many aspects including legal obligations, social-emotional challenges, and academic needs of students (Cullen, 2015). Gobbo and Shmulsky (2014) explain that faculty need to "understand the scope of challenges as well as strategies for success" when working with college students with ASD (p. 21). Therefore, the purpose of this paper is two-fold:

    i.   to bring awareness and sensitization of the challenges of college students with ASD;

    ii. to provide foundational knowledge to faculty on ways to help make college life more successful for students with ASD.

It is hoped that this literature review will provide higher education faculty with knowledge on the characteristics and difficulties of college students with ASD, awareness of legal mandates, and strategies to accommodate students with ASD.

Currently, the vast amount of literature on support for college students with ASD discusses roles of support providers, such as social workers, school psychologists, college counsellors, disability service personnel (Cullen, 2015; Dente & Coles, 2012; Dipeolu, Storlie, & Johnson, 2015; Longtin,

2014; Zager & Smith, 2012), but very little literature exists on how professors should support students with ASD within their classrooms (Burgstahler & Russo-Gleicher, 2015).This upsurge in the number of students with ASD present on college campuses makes it pivotal that professors understand the population with whom they are working (Barnhill, 2016). Cox et al. (2017) recommended that all postsecondary employees know how to work with students with ASD. The traditional disability support services are inadequate to meeting the needs of students with ASD in postsecondary settings (Cai & Richdale, 2016). Although faculty members agree that postsecondary programs should serve students with ASD, many lack knowledge on what these programs should entail (Gibbons, Cihak, Mynatt & Wilhoit, 2015). Many want to provide effective instruction to students with ASD but do not know where to start (Odom & Wong, 2015). In fact, many feel unprepared to teach students with autism spectrum disorder (Dipeolu et al., 2015; Francis, Duke & Chiu, 2017; Odom & Wong, 2015). Lack of understanding about ASD on college campuses may negatively impact students' performance (Gillespie-Lynch et al., 2015). Newman et al. (2011) explained that within 8 years of leaving high school, only 39% of students with autism completed postsecondary education. Shattuck et al. (2012) had more gloomy numbers with an estimate of only 20% graduating from college.

In order to provide faculty with relevant and current data on working with students with autism spectrum disorder, literature on educational life of college students with ASD between 2012-2017 was reviewed systematically in the following areas: legal considerations; characteristics; challenges; best practice/instruction; and self-determination skills. The review of literature

over the past five years revealed that a limited theoretical and empirical research exist, and the focus has been on challenges, with very little on best practice for faculty, and self-determination skills. With additional understanding of college students with ASD, professors and instructors become uniquely qualified to be able to provide more effective instruction that may qualm the social anxiety faced by students and increase college success.

Transitioning to College: Changes and Legal Considerations

The transition from high school to college brings a myriad of changes and a decrease in legal protections for students with autism spectrum disorder. The high school environment provides students with ASD with some protections. High school provides a highly structured parent-teacher scaffolded environment, where parents and educators advocate for student, and are intensely involved in the child's education (Cai & Richdale, 2016; Dente & Coles, 2012). At college, individuals with ASD are placed in an unstructured environment where they are required to self-advocate and this may be unsettling for many individuals with ASD (Dente & Coles, 2012; Grogan, 2015; Longtin, 2014). In high school, there are legal mandates that ensure that students with ASD receive services to ensure academic success. However, most of these legal obligations dwindle in higher education environment settings, which restricts the decision-making power of parents and educators (on students' behalf) as they have no legal access to child's educational records without consent (Dente & Coles, 2012; Longtin, 2014).

Several laws that guide the life of students with ASD in the K-12 setting, either becomes irrelevant, ineffective, or diminishes in scope once students enter college. The Family Educational Rights and Privacy (FERPA) that addresses the rights of students to have access to educational records, and limits communication between school and parents, without written permission from student (Dente & Coles, 2012; Dipeolu et al., 2015; Longtin, 2014). The Individuals with Disabilities Improvement Education Act of 2004 (IDEIA, 2004) or PL 108-446 that legally mandates that K-12 schools to provide accommodations and adaptations, and develop Individual Education Plans (IEPs) for every student, do not follow students into higher education as they must initiate a request for accommodations and advocate for these services if they are to be provided (Gibbons et al., 2015; Longtin, 2014; Zager & Smith, 2012). If students, do not self-disclose, services are not automatically provided. The American with Disabilities Act (ADA, 1990), PL 110-325, and Section 504 (Gibbons et al., 2015; Zager & Smith, 2012) guarantees services to students with ASD who are in postsecondary institutions that receive federal funds, but services are not detailed. According to the ADA, students with disabilities must be provided with reasonable accommodations. Section 504C of the Rehabilitation Act (1973) guarantees that students have equal access to all educational services, which means that students must be provided with modifications and accommodations so that they attain academic success (Dente & Coles, 2012; Dipeolu et al., 2015; Longtin, 2014; Zager & Smith, 2012). Finally, the Higher Education Opportunity Act of 2008 (HEOA, 2008) or PL 110-315 has granted students with ASD greater access to post-secondary institutions and the resources available there (Gibbons et al., 2015). However, there is no legislation that provides specific guidelines on the type of accommodations, type of instruction or type of support that should be provided in higher education settings (Cullen, 2015).

In college, disability services provide services for students with ASD but students have to self-identify (Longtin, 2014). Many do not (Cai & Richdale, 2016; Cox et al., 2017; Sayman, 2015; Van Hees, Moyon & Roeyers, 2015). In fact, Newman et al. (2011) reported that approximately 13% of students with autism who attend college do not self-disclose (p. 39). This may be because they lack self-determination skills (to advocate for themselves), lack understanding of college processes, anxiety, and/or want to appear "normal" (Cox et al., 2017; Grogan, 2015). Students' decision to disclose their disability is usually the answer to the question: is the cost greater than the benefit? (Dipeolu et al., 2015; Van Hees et al., 2015). Cox et al. (2017) explained that college students with ASD take a pragmatic approach to self-disclosure as they typically revealed their diagnosis only as needed to acquire formal accommodations and/or when circumstances require it. Van Hees et al. (2015) expounded that students self-disclose when they feel safe, need a specific support or are overstressed. For students who self-disclose approximately one-quarter (23.2%) did not find college services provided to be helpful towards school work (Newman et al., 2011). One of the most challenging factor for professors (in terms of delivering effective instruction) is an individual's resistance to disclose, as support cannot be provided without it (Dipeolu et al., 2015; Francis et al., 2017). Students' reluctance to self-identify may be due to faculty's negative attitudes and beliefs about students with ASD. Gibbons et al. (2015) reported that faculty surveyed (*N*= 1400) seemed stressed about having students with ASD in their classrooms as approximately 50% believed students with ASD would disturb class routine and require more attention, while an additional 25% held the view that students with ASD would make other students uncomfortable. Generally, faculty perceive students with ASD to have

problems that interfere with the learning process, such as social skills deficits, critical thinking skills challenges, executive functioning problems, and anxiety issues (Gobbo & Shmulsky, 2013).

General Challenges
Teaching students with ASD in postsecondary settings present many challenges as they transform the dynamics of the classroom. This may be because of many reasons including characteristics of students themselves, faculty not fully understanding the disability and/or faculty not having the training to teach individuals with ASD (Barnhill, 2014; Gobbo & Shmulsky, 2014). Generally, students with ASD at college level have average to above average intellect but their major difficulty lies in with dealing with social-emotional situations (Cullen, 2015; Dente & Coles, 2012; Longtin, 2014; Sayman, 2015).

The characteristics of postsecondary students with ASD may differ significantly but there are some common physiognomies of social awkwardness and repetitive behavior. Their atypical behaviors are usually evident in the social-emotional domain (Sayman, 2015). Their social deficits include self-concept, self-awareness, social perception, and negotiation (Dipeolu et al., 2015; Sayman, 2015). They have difficulty with reciprocal conversation, accurately reading nonverbal social cues of teacher and peers, knowing when appropriate to ask questions and how to address professors, and theory of mind (Burgstahler & Russon-Gleicher, 2015; Dente & Coles, 2012; Francis et al., 2017; Gobbo & Shmulsky, 2014; Longtin, 2014). They may ask many questions on a topic, monopolize a discussion, or make off-topic comments. Unlike many students with above average intellectual capabilities, these students may encounter challenges locating social support at the postsecondary level.

Many have poor communication and social skills which affects their ability to take on the increase college roles of being independent and self-determined.

Students with ASD may exhibit problems with executive functioning, such as planning, organization, and time management (Burgstahler & Russon-Gleicher, 2015; Cai & Richdale, 2016; Dente & Coles, 2012; Francis et al., 2017; Longtin, 2014; Sayman, 2015). They have weak central coherence, i.e., may have an intense focus on details and not the big picture (Gobbo & Shmulsky, 2014). They tend to have difficulty with critical thinking and deficits in cognitive flexibility (Gobbo & Shmulsky, 2014). Social interaction problems may be exacerbated by ineffective problem solving, oratory, and collaborative skills (Cullen, 2015; Dente & Coles, 2012).

Individuals with ASD may suffer from mental health issues and sensory overload (Accardo, 2017; Cai & Richdale, 2016; Francis et a., 2017; Gobbo & Shmulsky, 2014; Van Hees et al., 2015). Students may feel overwhelmed, stressed, depressed and anxious all the time (Cai & Richdale, 2016). Overall, they have an inability to manage anxiety (Gobbo & Shmulsky, 2014). Van Hees et al. (2015) explained that the stress and anxiety may be so overwhelming that students are unable to balance studies and college student life. The challenge of trying to "hide" the disability may exacerbate the stress and anxiety that students face.

College students with ASD may have difficulty working on group projects, participating in discussions, and seeking assistance when needed (Cullen, 2015; Gobbo & Shmulsky, 2014; Longtin, 2014). Therefore, although they may be unclear about class, many may not visit faculty during office hours to seek assistance (Burgstahler & Russon-Gleicher, 2015; Dente & Coles, 2012). They face challenges in advocating for themselves, as many do not understand the disability themselves (Sayman, 2015).

Effective Pedagogical Practices
The best practice for students with autism spectrum disorder proposed for postsecondary settings are similar to that used in the K-12 settings. Researchers, together with legislative bodies, have recommended the use of universal design interventions and approaches in college to help meet the needs of all learners (Burgstahler & Russon-Gleicher, 2015; Grogan, 2015; HEOA, 2008; Taylor & Colvin, 2013). These strategies help create a conducive class climate, foster engaging interactions, utilize multiple delivery methods (see Table 1), allow the use of technology (such as iPad, smartphones, computer-aided design programs, 3D printers, apps that enable text-to-speech), the use of frequent and relevant feedback, and utilize multiple modes of assessment (see Table 1). Burgstahler & Russon-Gleicher (2015) proposed that professors utilize principles of Universal Design for Learning [UDL]; (i.e., providing students with several ways to express, engage, represent, and take action in class) and Universal Design of Instruction [UDI]; (i.e., using pedagogy and tools that reaches all students, as much as possible, without the need for modification); [see Tables 1 & 2]. UDL (see Table 1) and UDI (see Table 2) practices are designed to benefit all students and thus, minimizes the risk of course standards being altered to meet the needs of students with ASD. These strategies help maintain the academic integrity of college programs as universal practices try to ensure that all educational activities are accessible to the great majority of students without the need for accommodations.

Individuals with ASD will need support in two key areas: in executive functioning; and in the social-emotional arena (Longtin, 2014). Although every individual with ASD is different, the literature revealed some UDL and UDI practices that support staff presently use which can be incorporated by faculty when working with college students, and so students with autism spectrum disorder attain gains, even when they do not self-identify. Researchers recommends that instructors provide specific schedule, study outlines, exam preparation, preview assignments and establish routines (Barnhill, 2014; Burgstahler & Russon-Gleicher, 2015; Dipeolu et al., 2015; Francis et al., 2017; Gobbo & Shmulsky, 2014; Van Hees et al., 2015). These will help curb the difficulties of executive functioning that many children with ASD encounter, which will assist students to plan, prioritize, organize, problem solve, complete task, and synthesize information more effectively.

Other universal design and approaches that professors may utilize include:
- preparing student in advance (if possible, at least one class prior) for any changes in the class routine;
- outlining specific and detailed feedback on assignments and exams;
- assisting student in assigning priority to assignments;
- providing extra preparation time for oral exams;
- stipulating a wider distribution spread between exams (ideally with a couple of days between every exam);
- allowing access to a separate exam room;
- providing the option of doing alternative assignments instead of group work;

Table 1. *Universal Design of Learning (UDL)*

Areas	Examples
Multiple means of Representation	• Explicitly explain instruction various forms including orally, in handout, on computer/tablets, on black or white boards • Provide outlines for lecture • Present information using several formats including, video, audio, pictures, written work • Use mnemonic devices to help students remember lots of information
Multiple means of Engagement	• Repeat directions • Have group learning, peer-partner learning and individual learning opportunities • Provide examples that includes student interest as well that textbook material
Multiple means of Action & Expression	• Use of graphic organizers to have students organize notes and thoughts • Use multiple forms of assessment including time-tests, portfolio, quizzes, individual & group presentations, written work, interviews, observations • Have students respond in multiple formats including orally, using apps, written (e.g. essays, poems, paragraph), pictorially/graphically (e.g. concept maps).

Source: Burgstahler & Russon-Gleicher (2015)

Table 2. *Universal Design of Instruction (UDI)*

Areas	Examples
Establishing Rapport	• Share contact information with student- written in syllabus, orally in classroom • Explicitly invite student to discuss problems or queries
Group Discussion Rules	• Give clear, specific directions on discussion expectations in your classroom • State the number of questions that may be asked during one session • Have a repertoire of strategies to politely redirect discussion, when necessary • Provide a variety of ways to participate in group discussion, such as use of a cad, writing, orally, use of apps
Dealing with Sensory Issues	• Allow flexible seating arrangement • Have frequent breaks • Allow use of protective eye-wear • Record lectures and make available online or asynchronously
Language Use	• Minimize use of figurative language, innuendos, and jargons • Give step-by-step directions • Use task analysis • Make due dates and expectations clear • Present information logically

Source: Burgstahler & Russon-Gleicher (2015)

- allowing students to communicate through multiple modes (i.e., email, face-to-face);
- acknowledging and reinforcing acceptable classroom behaviors;
- increasing verbal response time;
- providing concrete examples for abstract or complex topics- using concrete language, avoiding or limiting use of figurative language, such sarcasm, idioms, innuendos;
- using strategies such as mnemonic devices, graphic organizers, and essay prompts

(Burgstahler & Russon-Gleicher, 2015; Francis et al., 2017; Gobbo & Shmulsky, 2014; Sayman, 2015). See also Table 2. Van Hees et al. (2015) reported that the most requested academic accommodations from college students with ASD were additional time for exams, option of alternative room for exam, option for alternative to group work, and wider spread between exam days.

In the social-emotional domain, instructors have to develop "with-it" skills, i.e. identify situations and tasks that are likely to cause stress, develop awareness of the emotional state of students, and notice agitation while it is still low (Gobbo & Shmulsky, 2014). Instructors may use UDL and UDI practices that include periodic breaks to deescalate

emotional environments and establish peer mentors to help student with ASD navigate the educational task (Barnhill, 2014; Cai & Richdale, 2016; Cullen , 2015, Dipeolu et al., 2015). Instructors may use role play, with or without script, to have students practice various social skills. They can also demonstrate the skill (Dipeolu et al., 2015). The literature suggests that most importantly, professors should get to know their students-strengths, weaknesses, interests- and tailor instruction to meet their needs (Barnhill, 2014; Gobbo & Shmulsky, 2014). With this in mind, class size may be a challenge in getting to know students. Therefore, in cases where students have self-disclosed, students may be advised to enroll in classes where faculty-student ratio is smaller. Dipeolu et al. (2015) emphasized that faculty members should make connection with special talent/topic of intense interest and class instruction. Instructors should be flexible, as long as it will not compromise quality of content.

Students with ASD in postsecondary settings have expressed need for coaching in several areas including making choices, selecting study techniques, maneuvering group activities, organization, and collaborating with others (Van Hees et al., 2015; Zager & Smith, 2012). UDI practices that have proven effective include explicit, structured and individualized instruction (Barnhill, 2014; Burgstahler & Russon-Gleicher, 2015; Francis et al., 2017; Gobbo & Shmulsky, 2014). It is important to note that modification does not eliminate academic integrity as the same standards should remain for all students including students with ASD (Zager & Smith, 2012).

Fostering Self-Determination Skills
According to Wehmeyer (2005) self-determination is "volitional actions that enable one to act as the primary causal agent

in one's life and to maintain or improve one's quality of life" (p. 117). The elements self-determination include choice-making, decision making, problem-solving, goal setting and attainment, self-management skills, self-advocacy skills, leadership skills, self-awareness and knowledge. Self-determination skills are pivotal if students with ASD are to survive and be successful during college years. In fact, students with ASD are willing to become self-directed learners and decision-makers but many simply do not know how [without support]; (Van Hees et al., 2015). Research has shown that students without self-advocacy skills are likely to drop out of college (Sayman, 2015). In order for students with ASD to be successful at college, they need to possess skills where they can socialize and live independently.

College students with autism spectrum disorder need additional options of support-from both the disability office and faculty to develop independent skills such as self-determination and self-management skills (Cai & Richdale, 2016). Sayman (2015) explained that students who learn how to make choices, problem solve, set goals, take risks, and advocate for self tend to be more successful post-high school. Newman et al. (2011) reported that approximately 34% of students with autism in postsecondary settings sought help/accommodations on their own. This means approximately two-thirds may not receive support to help them be more successful at college.

Instructors may help students become more successful by recommending the use organizational tools such as planners, colored folders, and planning software. Additional universal approaches can be used to develop self-determination skills by having students complete strengths and weaknesses checklist in cognitive, emotional, social & physical

domain (Grogan 2015; Sayman, 2015; Zager & Smith, 2012). Grogan (2015) explained that faculty has to tap into student's interests and use multimodal techniques to utilize individual strengths. They will need to provide students with choices within instructional activities, and use instructional strategies such as role play, peer mentors, coaching, audio and video behavioral modeling (Sayman, 2015). Mentoring can help students develop skills such as "task analysis, goal setting, time-management and study-skills techniques, self-management skills" (Grogan 2015, p. 12). Other ways to help build self-determination skills include having students engage in self-reflection and encouraging the use stress management techniques, e.g. mindfulness, and exercise. Zager & Smith (2012) explained that college education is about fostering self-determination skills.

Conclusion

This literature review provides simply foundational knowledge on working with college students with ASD. Presently, literature on the topic is limited. However, as the population of students with ASD who enter higher education increases, there becomes a greater need and urgency for faculty to know how to teach and support these students to succeed academically. Colleges need to move beyond merely providing formal accommodations, but be inclusive of individual needs within the classroom. Professors need to strategically and systematically implement universal strategies similar to that used in inclusive K-12 settings. This can only be done through faculty training on how to implement best practices, as many faculty members may be expert in their disciplines but are not knowledgeable of teaching pedagogy to meet the needs of learners with ASD (Accardo, 2017; Burgstahler & Russon-Gleicher, 2015). Future research has to focus not only on practical strategies to enhance teaching but also on ways to foster self-determination skills in college students with ASD as there is a dearth of literature on the topic.

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Conversation Club: Teaching the "How" and "Why" of Conversation to Children with Level 1 Autism and Other Social Cognition Challenges

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Conversation is a key means of building and maintaining relationships, especially friendships with peers. In this article, we explain why it is important to teach not only conversation skills (or the "how" of conversation) but also the rationale underlying each skill (or the "why" of conversation) when providing conversation instruction to students with Level 1 autism and other social cognition challenges. We then describe the "Conversation Club" curriculum, a fun and highly motivating approach to teaching elementary school students on the autism spectrum to converse with their peers. Finally, we provide pre/post outcomes data for three students based on quantitative analysis of video footage of their conversation skills at baseline and post-intervention. Findings indicate that students' peer interactions increased over time, as did the number of questions they asked, their use of "wh" words, attention gaining strategies, and conversation repair strategies. These findings are consistent with outcomes reported in an earlier study of Conversation Club, and suggest that the curriculum and its innovative social cognitive approach may offer a promising means of teaching children on the autism spectrum to engage successfully in conversations with peers.

Conversation is one of the key ways in which people interact with one another, and is arguably one of the most universal forms of human interaction (Turnbull, 2003). Conversation can be used to exchange information, discuss topics of mutual interest, give and receive instruction, constructive feedback and praise, and develop deeper, more meaningful connections with family members, friends, romantic partners, and colleagues. Ochs (1992) suggests that conversation also impacts our very identities, transforming who we are, and in turn allowing us to transform our conversation partners through the co-constructive process of shared talk.

For all of these reasons, it is vital that we develop and test effective means of teaching children with Level 1 autism and other social cognition challenges to engage in successful conversations. By teaching these children how to converse, we are not only teaching them a constellation of skills, we are also enabling them to develop and maintain intimate connections with the people most important to them.

Background

The purpose of this article is three-fold: First, we identify our framework for understanding conversation behaviors, describe the conversational challenges faced by individuals on the autism spectrum, provide an overview of existing conversation skills interventions for this population, and argue the importance of including a social cognitive component as part of conversation instruction when working with children with Level 1 autism. The second section of the article provides a description of the "Conversation Club" curriculum, which is designed to teach

a constellation of skills deemed critical for conversational success, as well as the rationales underlying each skill. Examples of activities for each unit of the curriculum are also provided. The third section of this article describes program outcomes for three students with Level 1 autism based on the analysis of video footage collected at baseline and again at post-intervention. This study seeks to replicate the quantitative findings from an earlier study of four students with Level 1 autism and other social cognitive challenges which measured the frequency with which participants engaged in peer-directed interactions, asked questions, used "wh" words, used attention gaining strategies, and attempted to repair conversation breakdowns. We go one step further, however, by comparing skill levels under two post-intervention conditions: 1) with reinforcement, and 2) without reinforcement. Although these data are limited, they provide preliminary information that instructors may use when considering the value of this approach for supporting their students with social cognitive deficits to become more competent conversationalists.

Conversation and Autism

Conversation Club: Teaching Children with Autism Spectrum Disorder and Other Social Cognition Challenges to Engage in Successful Conversations with Peers, the curriculum we designed and are highlighting in this article, is based on a *social pragmatic* conversation model (Cannon, Clark, Kornblum, Müller, & Powers, 2018). This model posits that conversation is an interpersonal, dialectical, co-constructive process (Turnbull, 2003). It is transactional and assumes that meaning is produced in response to the specific social context and unique characteristics of one's conversation partner. It also assumes that what/how we contribute to a conversation is heavily influenced by what/how our partner

contributes, and vice versa, and that we are constantly—not to mention automatically and typically without conscious effort—negotiating meaning with one another from the very beginnings of a conversation through to its conclusion.

Because of the transactional nature of conversation, it is critical that conversation partners understand why conversation is important, know how to read and respond to one another's social cues, and are able to adapt their conversational contributions accordingly. This poses an extremely serious challenge to individuals with autism—including those with Level 1 autism—most of whom have trouble engaging in spontaneous, unscripted conversation (Baltaxe & D'Angiola, 1992; Capps, Kehres & Sigman, 1998; Mundy & Crowson, 1997; Paul, Orlovski, Marcinko, & Volkmar, 2009; Prizant & Rydell, 1993; Tager-Flusberg & Anderson, 1991). Prior to developing the Conversation Club curriculum, we noticed that our students failed to understand some of the most basic fundamentals of conversation. For example, they did not seem to understand why conversation was important or that it was a critical part of making and keeping friends, did not know what conversational "topics" were or how to sustain conversation on a single topic over multiple conversational turns, failed to orient their bodies toward their conversation partners or use their eyes to "check in" with their partners to make sure they were paying attention and interested in the conversation, and did not recognize or know how to repair even the most basic conversation breakdowns. All of these challenges are related to deficits in *social cognition*, or the processes by which we read and navigate the social world around us. According to Klin and colleagues (2003), unlike typically developing individuals, individuals with autism lack the ability to focus spontaneously, and without any

conscious effort, on socially salient stimuli (e.g., facial expression, tone of voice, nuances of speech). This makes it extremely difficult for them to respond quickly and flexibly to the many and varied social stimuli involved in conversation. Work by Goddard and colleagues (2007) also finds that individuals with autism process memories in ways that make it harder for them to retrieve detailed information about themselves and others. This makes it exceedingly difficult for these individuals to be responsive to their partners, to remember what they've already shared with their partners, and to build on what they already know about their partners from previous conversations.

A small but growing body of literature is dedicated to teaching children with autism to engage successfully in conversation. However, few studies have either (1) addressed the unique instructional needs of students with Level 1 autism, or (2) been able to demonstrate meaningful gains in spontaneous conversation with peers (Bellini, Peters, Benner, & Hopf, 2007). Most of this literature falls into one of three categories, each with its own limitations.

Some studies take what we have termed a "piecemeal" approach, by teaching students with autism to master one or two discrete conversational skills such as initiating or asking a question (e.g., Leaf et al., 2009; Sansosti & Powell-Smith, 2006). While these studies may result in increases in use of the target skill, they don't appear to translate into the ability to engage in spontaneous, multi-turn conversation with peers. Although this approach may be appropriate for students with more significant cognitive and/or communication impairments, we do not believe it sets the bar high enough for children with Level 1 autism.

Another group of studies includes conversation skills as part of a larger menu of social skills (e.g., Barry et al., 2003; Tse, Strulovich, Tagalakis, Meng & Fombonne, 2007). Most of these include only one or two sessions devoted to conversation, which limits the number of opportunities for scaffolded practice interacting with peers. This is a significant shortcoming, since experts recommend increases in both intensity and duration of social skills interventions in order to genuinely impact children's long-term skills acquisition (Bellini et al., 2007).

A third group of studies teaches conversational scripts (e.g., Barry et al., 2003; Sarakoff, Taylor, & Poulson, 2001). While many children are able to master these scripts, we argue that scripting results in neither an increase in naturalistic dialogue, nor the ability to respond flexibly to a variety of possible conversational contexts. Again, given that individuals with Level 1 autism are expected to engage in more sophisticated exchanges, we do not believe this approach is a good fit for them.

Three recent conversation studies, however, were designed to directly address the underlying social cognition deficits associated with Level 1 autism. For example, a pre/post study by Crooke et al. (2008) provided a rationale underlying each social skill taught to six students with Level 1 autism (i.e., why the skill mattered and how to apply the skill appropriately a wide range of social contexts), and changes over time were statistically significant. Only a few skills taught and assessed, however, pertained to conversation specifically. A second study (Dotson, Leaf, Sheldon, & Sherman, 2010), using a single-subject multiple baseline model, looked specifically at how the Teaching Interaction Procedure (TIP) framework—which teaches the "how"

as well as the "why" of each skill—impacted the conversation abilities of five students with Level 1 autism. However, only three conversational skills necessary for successful conversation were taught, and no information on duration of intervention was provided. Third, a pre/post study by Müller et al. (2016) looked specifically at the impact of Conversation Club on four students with Level 1 autism. The intervention was similar to those described by Crooke et al. (2008) and Dotson et al. (2010), in terms of including a rationale for each skill as a key part of instruction, but provided increased levels of both comprehensiveness and duration. Based on findings, it appeared that students demonstrated gains over time in peer-directed interactions, questions asked, use of "wh" words, attention gaining behaviors, and attempts at conversation repair.

The present study seeks to replicate the quantitative findings from Müller et al. (2016). However, in this study, we go one step further by comparing skill levels under two post-intervention conditions: 1) with reinforcement, and 2) without reinforcement (see section titled *Questions Guiding Evaluation* for more details).

Description of the "Conversation Club" Curriculum

Scope and Sequence. The main goal of Conversation Club is to teach students the "how" and "why" of conversation, thereby providing them with the necessary tools for spontaneous, unscripted talk with peers in naturally occurring social contexts such as lunch break and recess. Each unit introduces a new skill or set of skills, and each unit builds on the preceding unit. Units teach the following skills:

- *Unit 1: Getting Ready for Conversation* – Students learn what conversation is (i.e., sharing and learning information with your partner) and why it is important (e.g., it's fun and helps you connect with friends). They also learn to pay attention to the conversation space, and to position their bodies appropriately.
- *Unit 2: Selecting and Staying On Topic* – Students learn what topics and subtopics are, how to brainstorm topics of interest, and how to select a topic of mutual interest to their partners.
- *Unit 3: Keeping the Conversation Going* – Students learn how to use the "wh" words (i.e., "who," "what," "where," "when" and "why") in order to maintain on-topic conversation.
- *Unit 4*: *Using Our Eyes and Ears to Think About Our Conversation Partner* – Students learn how to get their partner's attention, use their eyes to "check in" with their partner, and use "key" words from what their partner just said to continue the conversation.
- *Unit 5*: *Repairing Conversation Breakdowns* – Students learn strategies for identifying and repairing simple conversation breakdowns.
- *Unit 6*: *Remembering What Your Conversation Partner Said* – Students learn to create a mental picture in their heads in order to help them remember what their conversation partner said, and learn how others feel when students remember what they said (e.g., it makes our partners feel good, and makes them want to spend more time with us).
- *Unit 7*: *Expanding the Depth and Breadth of Conversation* – Students learn to use new question words for continuing on-topic conversation (e.g., "Did" and "Can"), acknowledging phrases (e.g., "Mmm hmm," and "Wow"), and bridging phrases (e.g., "That makes me think of a time when….").
- *Unit 8*: *Bringing It All Together* – Students practice sustaining multi-turn conversation, acknowledging and integrating shifts in topic, recalling

information from previous conversations and using it in follow-up conversations, and identifying subtopics and using bridging statements/questions to shift the conversation.

Selecting Participants

Conversation Club is designed for use with elementary-aged children with Level 1 autism and other social cognition challenges. Because the goal is for club members to engage in spontaneous, unscripted conversation with peers, it is critical that they have adequate expressive and receptive communication skills to engage in extended interactions with peers. Ideally, instruction is provided to two club members at a time, but larger groupings can be used if need be—although this means that club members will have fewer opportunities to practice skills, and more conversation partners to focus on at one time. We have found that it is beneficial to pair club members with different peers throughout the week if possible, in order to encourage generalization of skills. We have also found it useful to partner club members with similar likes and interests, and that compatible pairs acquire skills more quickly, since connecting with like-minded peers is intrinsically motivating.

Lesson Structure

Conversation skills are introduced gradually over the course of an academic year, and club members ideally receive instruction three to four times per week for 15- to 20-minute sessions. There are approximately 40 lessons included in the curriculum, and lessons are repeated until instructors feel that club members have mastered the target skill. Skills are cumulative, with later lessons integrating and building on what club members have learned during earlier lessons. The structure of each lesson is based on the TIP framework and includes the following key components: (1) description of the skill,

(2) rationale for why the skill is important, (3) breakdown of the skill into more basic parts, (4) modeling of the skill by instructor, (5) time to practice the skill with scaffolded support from instructor, and (6) feedback and positive reinforcement (Leaf et al., 2009).

Team Planning

Conversation Club was developed by an inter-disciplinary team, and while not always possible, we believe implementation of the curriculum is strengthened by the inclusion of multiple professional perspectives. Team members can include students' classroom teachers, related service providers (e.g., speech and language pathologists, occupational therapists, mental health providers, social learning coordinator), and any other classroom staff. Instructors can work with two to three students at a time. To ensure fidelity of implementation, teams should meet weekly or bi-weekly to review lesson plans and discuss student progress and/or specific challenges that may come up.

Social Motivation, Engaging Students and Making Conversation Fun

Conversation Club makes use of extrinsic motivation while at the same time cultivating intrinsic motivation. Throughout the program, club members receive specific and contingent praise, and earn points for demonstrating target skills. As the program progresses, and skills increase in complexity, club members continue to be reinforced for skills learned earlier in the year, as well as for mastering new skills.

Ideally, however, we want conversation to be experienced as a reward in itself. In order to nurture intrinsic motivation, and inspired by the Superflex character developed by Madrigal and Winner (2008), authors created a kid-friendly cast of Conversation Club characters. These included Friendly Freddy (who helps club members select and maintain

on-topic conversation with friends), Paco the Parrot (the club mascot who helps club members use "wh" words to keep the conversation going), the twins Listening Lisa (who helps club members listen for key words in what their partners just said and use these words in follow-up questions/comments) and Looking Louie (who helps club members use their eyes to check in with their partners and make sure they are paying attention), Fix-It Farrah (who helps club members fix conversation breakdown), Good Memory Maria (who helps club members remember what their partner said), and New Words Nate (who helps club members expand their conversation using bridging statements and acknowledging phrases).

In addition to making activities feel more like games than lessons, Conversation Club characters serve as anchors for the rationale underlying each skill and can be used by instructors to remind students during club meetings as well as throughout the day to use their skills. For example, club members are taught that Friendly Freddy wants us to choose a topic of interest to our partner, because it "makes our partner feel good, and want to spend more time with us." These club characters also provide something concrete to "hook" concepts to when asking questions like, "What would Fix-it Farrah want you to do right now?" or praising students for a job well done with phrases like, "Good Memory Maria would be super proud of you right now for remembering what your partner said."

Sample Activities
In the following section, we provide sample activities from the Conversation Club curriculum.

Unit 1: Getting ready for conversation. Successful conversations rely on the conversation partners to acknowledge one another, read each other's social cues and think about each other's needs and interests. Children with social cognitive deficits often do not use nonverbal communication skills to reference their conversation partners, check in to see if their conversation partners are listening, or assess if their partners are interested in the conversation. The following activity is designed to support environmental awareness and body readiness (Unit 1: Activity 2). To support children in their ability to scan the environment, establish who is available for a conversation, and position their body to start a conversation, children can play the "Getting Ready for Conversation" game. In this game one child selects a movement card that directs the child to move across the room in a fun way and face away from the other players (e.g., skip to the corner of the room). The other child selects a question card and moves to the first child, secures their attention by positioning their body in front of the child, making eye contact and posing the question from their card. The two children exchange questions and answers. After the exchange is complete the children reflect on the strategies they used to gain attention, how they knew their partner was ready for conversation and what they learned about one another.

Unit 2: Selecting and staying on topic. Children with social cognitive deficits often initiate conversation based on a few highly preferred topics and use repetitive vocabulary or phrases when navigating the interaction. The following activity involves the creation of Conversation Club "files," and is designed to help children expand their repertoire of conversation topics, as well as to acknowledge the interests of their conversation partners and take these in to account as they select and maintain a conversation (Unit 2: Activity 6). During club members' time together the children complete conversation club files about themselves and their friends. These files

include information about their likes, dislikes, preferred activities, and topics they enjoy talking about. With the support of the teacher, children analyze these files to establish commonalities, identify topics they would like to know more about, and use this information to help select topics to converse about. At the conclusion of the conversation, children assess their conversation, reflect on what they learned about one another, and how it made them feel when their partner thought about their interests when selecting topics for the conversation.

Unit 3: Keeping the conversation going. In this unit we focus on helping students maintain a conversation, and elicit more information from their conversation partner by asking key questions. The skill of maintaining a conversation and tracking the gestalt of the conversation while simultaneously thinking about what additional information you would like to know requires partners to think flexibly and shift back and forth from big picture to detailed information. This skill can be difficult for students with social cognitive deficits.

The following activity provides club members with key question words to elicit additional information during a conversation. Paco the Parrot, the conversation club mascot, introduces students to the five "wh" words: who, what, where, when and why. In the "Where Are They?" activity, one student selects a picture card that only they can see. The other students pose questions using the "wh" words to gather information about the picture. Once they have enough information, they make a guess as to what the picture is showing. This activity not only provides students an opportunity to practice asking and answering "wh" questions, but also supports the development of theory of mind or the idea that one person has information

inside their mind that the other person does not have, and that in order to access that information you have to ask questions.

Unit 4: Using our eyes and ears to think about our conversation partner. Children with social cognition deficits often have difficulty initiating and continuing a conversation. They may not acknowledge the information that has been shared with them, and may change the topic abruptly or fail to respond. Additionally, they may begin talking without having the attention of their partner. In this unit, club members will continue to practice maintaining a conversation by identifying the main idea of the conversation, as well as active listening and looking skills to gauge their partner's engagement.

The following activity reinforces the idea that when club members check in with their eyes it shows they are thinking about their partner. Club members take turns selecting a topic card (e.g., numbers, letters). The club member sets a goal (e.g., count to 20, name each letter in the alphabet), and players pass the turn from one club member to another by making eye contact.

Unit 5: Repairing conversation breakdowns. Even the most successful conversations consist of communication breakdowns in which conversation partners are required to problem solve in the moment by using skills such as assessing nonverbal cues, metacognitive thinking, executive functioning, flexibility and perspective taking. Children with social learning deficits often do not use or understand nonverbal communication skills to reference their conversation partners, check in to see if their conversation partners are listening, or assess if their conversation partners are interested in the conversation. And even if they are verbally involved in the conversation, they

may not be aware that their conversation partner is not listening or that a breakdown occurred. As a result, conversation may start and stop very frequently, or appear one-sided.

The following activity supports students to fix the problem in the moment (Unit 5: Activity 5). The core goals of this activity are to help club members identify when communication breakdowns occur, understand what caused the breakdown, and explore ways to repair the conversation. Club members use a flow chart that breaks down the possible reasons for conversation break down (e.g., my partner did not hear me, my partner did not understand me, or my partner was not looking at me). Using their conversation club files, children begin a conversation, and at random points the teacher inserts comments that cause the conversation to break down. Children use the problem solving flow chart to select a strategy to repair the conversation to keep it going. The teacher keeps track of how many repair strategies the children use, and celebrates their use of these strategies at the conclusion of the conversation.

Unit 6: Remembering what your conversation partner said. Children with language processing deficits often have a difficult time remembering and integrating previously learned information into their conversation. In this unit, club members practice using active listening strategies, visualization techniques, and other visual supports to remember and use previously learned information to initiate and sustain conversations.

In this activity, club members are challenged to listen and use the key words they hear to create an image in their minds of what their conversation partner is saying. One club member reads a silly sentence aloud and identifies the key words. The second club member draws a picture, illustrating the silly sentence. After club members have each had a turn to ask questions about the silly sentences, they are challenged to recall information from each sentence, highlighting that when club members recall information, it is because they used their listening strategies and made a mental picture.

Unit 7: Expanding the depth and breadth of conversation. In order to facilitate more natural conversations club members learn additional question words to increase their repertoire of words to use when initiating and maintaining conversations. Additionally, club members will practice the natural shift between topics as new information is introduced using bridging statements. Bridging statements that they can insert between two topics include, "That reminds me of….," "That makes me think of….," or "Oh yeah, did you know that…?"

The following activity offers club members an opportunity to practice bridging statements. Each player will have five topic cards in their hand. The goal of the game is to get rid of all the topic cards. The instructor will set the timer for five minutes, and Player 1 starts by putting down one topic card. The instructor will use a conversation chart to track the conversation players have about the first topic. When the timer goes off, Player 2 will throw down a new topic card. But first, Player 2 has to use a bridging sentence to change the topic. The game ends when all the topic cards have been used.

Preliminary Evaluation of Program Outcomes
Questions Guiding Evaluation. Six key questions guided our evaluation of program outcomes:
- Did the number of focus participants' peer-directed 1) interactions, 2) questions asked, 3) use of "wh" questions, 4)

attention gaining behaviors, and/or 5) attempts at conversation repair increase between baseline and post-intervention?

- Was there a difference in focus participants' post-intervention performance during lunch periods when reinforcement was provided versus lunch periods when no reinforcement was provided?

Participants

Participants were three elementary aged children whose ages ranged from 10.3 to 11.7 years at the beginning of the program (see Table 1). Review of participants' educational records indicated that one was diagnosed with autism spectrum disorder (ASD), one was diagnosed with ASD as well as orthopedic impairment, and a third was diagnosed with a combination of mixed receptive/expressive language disorder, cerebral palsy, and attention deficit hyperactivity disorder. All three had intelligence quotients (IQs) within the low-average range (i.e., IQs of approximately 70-85) and were performing at or near grade level. In terms of language skills, participants' speech and language therapy records indicated that all experienced significant pragmatic deficits, as well as mild to moderate deficits in receptive and/or expressive language. Participant 1's scores on the *Clinical Evaluation of Language Fundamentals (CELF-4)* were below average in terms of receptive, expressive, and

pragmatic skills. Participant 3's scores on the *Test of Auditory Processing Skills (TAPS-3)* were below normal limits for sentence memory, auditory comprehension, and auditory reasoning. We were unable to locate any formal communication test scores for Participant 2.

The three participants attended the same specialized education program for students with autism and/or other social cognition deficits, were familiar with their conversation partners at the time of the study, and had prior experience with reinforcement systems like that used as part of the Conversation Club curriculum (i.e., earning points in response to demonstrating desired behaviors, and then being allowed to exchange their points for a preferred activity like sitting with a favorite teacher for lunch). The Conversation Club was developed in response to the fact that most students spent their lunch periods in near silence and/or repeating scripts from TV and video games, and engaged in almost no spontaneous peer-directed interactions throughout the day. Prior to the study, none of the participants engaged in spontaneous conversation with peers.

Data Collection

At baseline, pairs of focus participants were each videotaped twice having lunch together for 20-25 minutes (total number of minutes per pair varied based on scheduling issues). Focus participants were asked to remain at

Table 1. *Focus Participant Characteristics*

Participant	Gender	Age at time of intervention (years, months)	Diagnosis	Intellectual Functioning
P1	Male	11;7	ASD/OI	Low Average
P2	Male	10;8	MRELD/CP/ADHD	Low Average
P3	Male	10;3	ASD	Low Average

Note: ASD=autism spectrum disorder, OI=orthopedic impairment, MRELD=mixed receptive expressive language disorder, CP=cerebral palsy, ADHD=attention deficit hyperactivity disorder

the lunch table for the entire lunch period, but received no instruction as to how to interact with one another. Instructional staff was asked to sit at separate tables during baseline data collection, and to interact with focus participants only if they needed help with lunch or were experiencing behavioral difficulties. In order to measure conversation skills post-intervention, the same pairs of focus participants were again videotaped having lunch together for 20-25 minutes (again, total number of minutes per pair varied due to scheduling) once *with* reinforcement, and twice *without*. During post-intervention videotaping, instructional staff sat at separate tables, and focus participants received no instruction or immediate feedback. Prior to the first post-intervention videotaping, however, focus participants were told that they *would* receive reinforcement for engaging in conversation with their lunch partner, and during the second two post-intervention video-tapings, focus participants were told that they *would not* receive any reinforcement. Baseline and post-intervention videotapes were transcribed verbatim, including as many paralinguistic features of discourse as were visible (e.g., eye gaze, gestures such as hand waving or giving a "thumbs up"). Unintelligible utterances were excluded from analysis.

Data Analysis

Coding of transcripts took place in two phases as described by Müller et al. (2016) in an earlier study of Conversation Club. Participants' utterances were first highlighted in yellow. The first author then used the following codebook to code utterances for evidence of participants' use of five conversation behaviors taught as part of Conversation Club:

1. Peer-Directed Interactions: Each utterance directed to participants' lunch partners or to other peers in the room was coded as a peer-directed interaction (PI). Utterances directed toward instructional staff were not included in the analysis. PIs included non-verbal acknowledgements such as head nodding used to indicate a "yes" response. Boundaries between utterances were identified based on sentence completion and/or pauses in speech of more than two seconds.

2. Questions: Each peer-directed interaction that was also a request for additional information and/or ended with an upturn in intonation was coded as a question (Q).

3. "Wh" Queries: Each question was further coded as a "wh" query (WH) if it included one of the following "wh" words: "who," "what," "where," "when," "why," or "how" —and was designed to elicit additional information on a particular topic. "Wh" questions were not coded as WH if they were only intended to acknowledge a peer's bid for attention as in: "Hey, Mitchell!" "What?" —or used idiomatically as in "You know what?"

4. Attention Gaining Strategies*:* Each peer-directed interaction that also included an explicit means of securing a peer's attention—e.g., using the peer's name, or saying "Hey!" or "Guess what?"— was coded as an attention gaining strategy (AG).

5. Conversation Repairs*:* Each peer-directed interaction that also included an attempt at conversation repair—e.g., requesting or providing clarification, or repeating or requesting repetition of an utterance—was coded as conversation repair (CR).

Frequency of each of the five conversation behaviors was established by counting the total number of times each behavior occurred. Because length of lunch sessions varied, authors calculated how many times

they occurred *per 20 minute interval* to enable comparison over time, as well as across participants. Authors then compared baseline and post-intervention averages to determine if frequencies of participants' behaviors changed over time.

Inter-rater reliability was assessed by having the second author code a random sample of each participant's conversation (at least 20% of each of the participants' utterances during baseline and/post-intervention). Inter-rater reliability was calculated for each of the five conversation behaviors by dividing the total number of agreements by the total number of agreements plus total number of disagreements, and multiplying by 100. Reliability was 98% for peer-directed interactions, 98% for questions, 100% for "wh" queries, 100% for attention grabbers, and 99% for attempts at conversation repair.

Results

In this section, we summarize frequency of focus participants' use of five conversation behaviors at baseline and post-intervention. We also compare whether focus participants' performance on each of these measures differed between lunch periods when reinforcement was provided for

demonstrating these behaviors, versus when no reinforcement was provided.

Peer-directed interactions. Although figures varied considerably from participant to participant, the number of peer-directed interactions grew from an average of 6.7 per 20 minute interval at baseline (range of 1.2 to 13.3) to 68.4 per 20 minute interval at post-intervention *with* reinforcement (range of 66 to 71) and 45.6 per 20 minute interval at post-intervention *without* reinforcement (range of 26.1 to 73.4, see Figure 1). All three participants demonstrated growth in this area between baseline and post-intervention. In terms of reinforcement, Participants 1 and 2 initiated interactions more frequently with peers when reinforcement was provided, and Participant 3 initiated interactions slightly more frequently when reinforcement was not provided.

Peer-directed questions. The number of peer-directed questions grew from an average of 3.6 at baseline (range of 0.4 to 9.7) to 38.1 at post-intervention *with* reinforcement (range of 14.1 to 71) and 15.1 at post-intervention *without* reinforcement (range of 11.1 to 21.5, see Figure 2). Again, all three participants demonstrated growth in this area

Figure 1. *Peer-Directed Interactions*
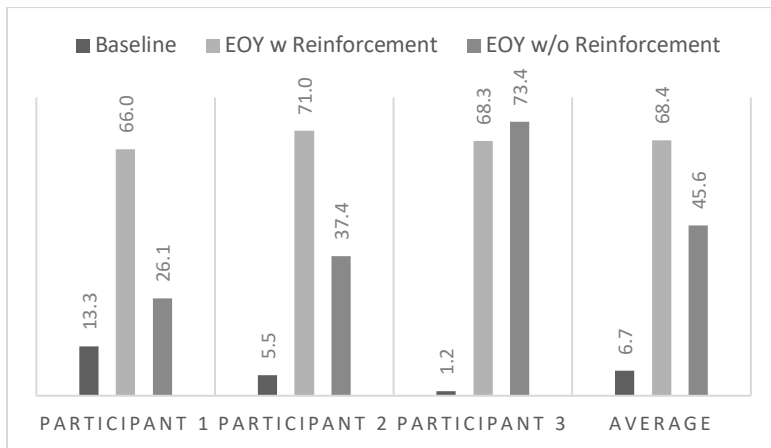
between baseline and post-intervention, but all were more likely to ask peer-directed questions when reinforcement was provided.

"Wh" queries. The number of "wh" queries used to introduce new topics or maintain existing topics grew from an average of 0.4 at baseline (range of zero to 0.9) to 13.2 at post-intervention *with* reinforcement (range of 4.7 to 21.2) and 10.3 at post-intervention without reinforcement (range of zero to 16.3, see Figure 3). All three participants demonstrated growth in this area between baseline and post-intervention when reinforcement was provided, and Participants

2 and 3 demonstrated growth between baseline and post-intervention when reinforcement was *not* provided, but Participant 3's numbers actually decreased very slightly between baseline and post-intervention *without* reinforcement (i.e., from 0.9 to zero).

Peer-directed gaining attention strategies. The number of strategies used to gain peers' attention grew from an average of 1.6 at baseline (range of zero to 3.9) to 4.9 at post-intervention with reinforcement (range of 1.2 to 8.7) and 4.9 at post-intervention without reinforcement (range of zero to 11.4, see
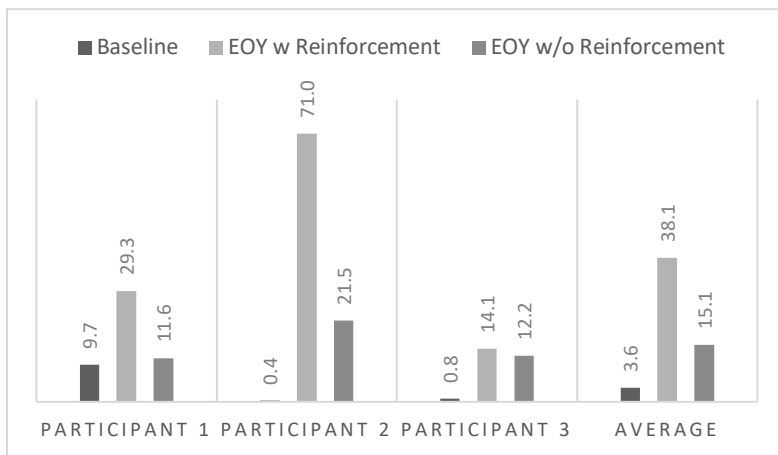
Figure 2. *Peer-Directed Questions*

Figure 3. *Peer-Directed "Wh" Queries*

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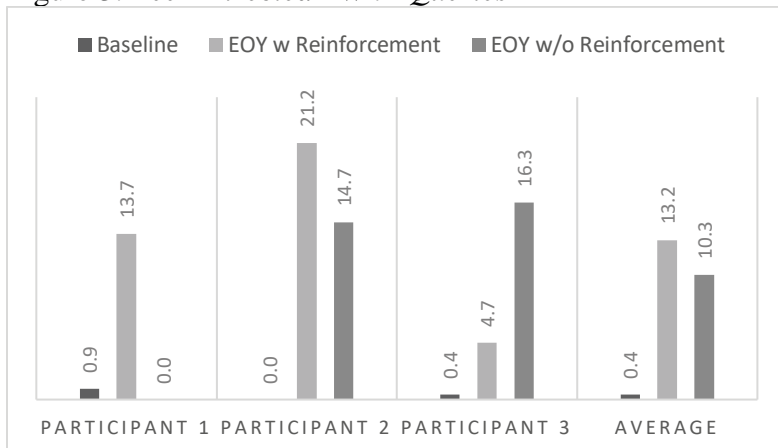
Figure 4). Again, all three of the focus participants demonstrated growth between baseline and post-intervention *with* reinforcement, and Participants 1 and 2 actually demonstrated even more dramatic growth between baseline and post-intervention *without* reinforcement. Participant 3, however, did not show any growth between baseline and post-intervention *without* reinforcement.

Peer-directed attempts at conversation repair. The number of peer-directed attempts at conversation repair ranged from 0.1 at baseline (range of zero to 0.4) to 6.3 at post-intervention with reinforcement (range of 3.7 to 13.1) and 3.0 at post-intervention without reinforcement (range of zero to 4.9, see Figure 5). Again, all three participants demonstrated growth in this area between baseline and post-intervention with reinforcement, but Participant 1 actually regressed very slightly between baseline and post-intervention *without* reinforcement (i.e., from 0.4 to zero).

Discussion
The following section discusses key findings from this study, provides possible explanations for findings, and summarizes

limitations of the current study as well as implications for future research. Findings from this study are promising, and suggest that Conversation Club may be a highly motivating and effective means of teaching students with Level 1 autism and other social cognition challenges to converse with their peers. Conversation Club is the first curriculum of its kind to provide both a social cognitive approach to conversation instruction (i.e., not only teaching the "how" but also the "why" of conversation skills), as well as to follow the recommendations of Bellini et al. (2007) for frequent instruction with opportunities for scaffolded practice throughout the academic year. We were also able to replicate the quantitative findings from Müller et al. (2016) which strengthen our argument that Conversation Club may fill an important gap in the field of conversation curricula for students with Level 1 autism.

One of the key findings from this study had to do with the fact that in most (but not all) cases, focus participants demonstrated more robust use of conversation skills post-intervention when reinforcement was provided as opposed to when it was not provided. This suggests that extrinsic motivation remained a factor influencing

Figure 4. *Peer-Directed Attention Gaining Strategies*
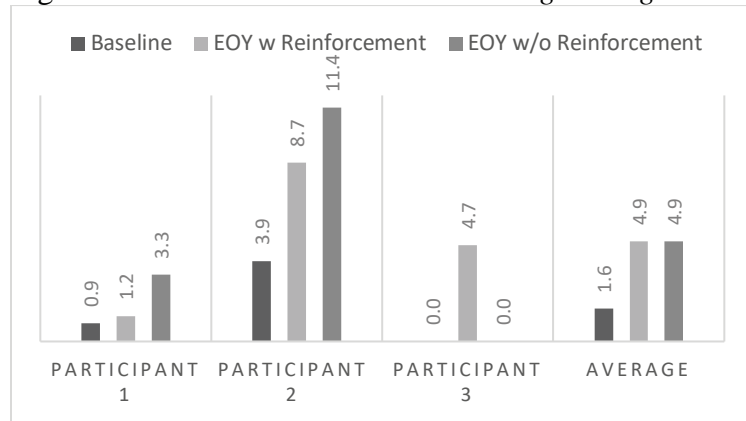
Figure 5. *Attempts at Conversation Repair*
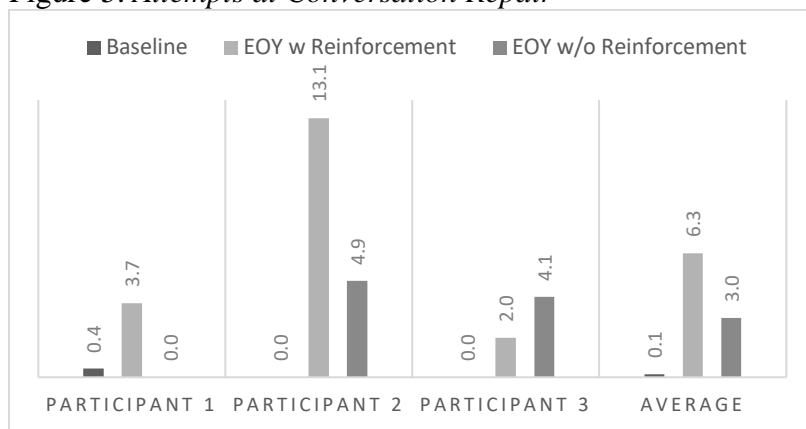
participants' demonstration of skill mastery, and that even if they had a lot of fun during Conversation Club, and learned to enjoy conversing with their peers, participants were even more motivated by conversing with peers when there was also the opportunity to earn points. An exploration of whether participants become more intrinsically motivated over time would be an interesting follow-up to the present study.

Although authors did not conduct formal qualitative analysis of the transcripts, an informal analysis indicated that the three focus participants, who were extremely reticent at baseline, had metamorphosed into enthusiastic conversationalists by the end of the intervention. For example, two focus participants developed a playful friendship, and much of their conversation revolved around sharing and laughing at jokes. The third participant liked to tease in an affectionate and non-threatening way. Further, informal analysis suggested that by the end of the program year, focus participants were able to sustain topics over multiple turns, and transition smoothly between topics. Instructors who observed these interactions confirmed that these friendly, spontaneous interactions never would have occurred prior to participation in Conversation Club.

In spite of these positive shifts, however, participants continued to experience some ongoing conversational challenges. For example, their funds of knowledge on particular topics were often limited, which prevented extended discussion on these topics. Further, there were often awkward pauses in between bursts of interaction, when neither partner seemed to know what to say next.

While results of this study are promising, they should be interpreted with the following limitations in mind: First, because the authors were unable to secure a control group, it was not possible to assert with confidence that there was a causal link between participation in Conversation Club and mastery of the five conversation skills measured as part of this study. Informal discussions with focus participants' instructors, however, helped quell any doubts about this, as instructors reported that Conversation Club was the only time when participants received direct instruction in these skills, and that they felt confident that changes over time were not due so much to maturation as to regular participation in the club. Second, there were only three participants in the study, and even when combined with findings for the four students included in the Müller et al. (2016) study, the overall sample remains small.

Third, all three participants attended a specialized program for students with social cognition challenges. The program did not provide opportunities for students to interact with their typically developing peers, and this may also have impacted study findings (e.g., a significant body of research suggests that peer modeling and peer supports can have a positive impact on the social interactions of individuals with Level 1 autism). Fourth, we were unable to gather long-term generalization data. In future, it would be helpful to explore whether or not the skills learned during Conversation Club are maintained throughout the next year—even in the absence of direct skills instruction. Finally, several of the authors also served as instructors, which opens the possibility of bias. We used the codebook developed by Müller et al. (2016) which the first and second authors used to independently code all conversation behaviors, but the possibility of bias remains as an intrinsic part of school-based research whenever the roles of curriculum developers, implementers and evaluators overlap.

Concluding Remarks
Building on an earlier study by Müller et al. (2016), outcomes from this study suggest that Conversation Club may be an effective means of teaching conversation to students with Level 1 autism and other social cognition challenges. The study addresses several of the limitations of other approaches to conversation instruction by explaining the underlying purpose of each skill (or the "why" of conversation), and offering frequent and extended opportunities to practice skills over time in the context of natural conversation with peers. We recommend further investigation of outcomes using a more rigorously controlled experimental design, in order to ascertain whether outcomes can indeed be attributed to participation in Conversation Club.

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Integrating Social and Emotional Learning Instruction into Core Academic Instruction for Students with ASD

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Thirty-five percent of young adults with ASD have neither held a job nor received a post-grad education after high school (Shattuck et al., 2012). Many of these individuals experience challenges with social development leading to difficulty building meaningful connections with individuals in their environment (i.e., peers, colleagues; Booker & Starling, 2011; Zimmerman et al., 2016). Incorporating social and emotional learning (SEL) instruction in school is imperative in building necessary skills to promote success after high school. With the daily integration of SEL concepts into core academic instruction, students engage in more positive social behaviors, experience less emotional distress, and have increased academic success (Bridgeland et al., 2013; Durlak et al., 2011). This can be challenging with the academic time constraints placed upon teachers (Bridgeland et al., 2013). The implementation of Common Core State Standards allows a pathway to infuse SEL skills instruction into core curricular content (Johnson & Wiener, 2017). This article gives practitioners strategies to assimilate SEL teaching into daily academic instruction while addressing the five SEL core competencies from the 2017 CASEL Framework. The strategies presented in this article are expected and unexpected behaviors, Zones of Regulation, and size of the problem.

Prior to the Common Core State Standards (CCSS), each state operated independent learning standards. In doing so, states defined for themselves the necessary skills and knowledge students must have to be successful upon graduation. Such independence created a lack of consensus as to what skills constituted "proficiency" in learning (CCSS Initiative, 2018a). More specifically, each state could use their own individual criteria to guarantee that all its students had access to learning standards that ensured a successful path after high school, whether that path was college or a career.

To promote standardization among states, the U.S. Department of Education (DOE) created learning standards to ensure that "…every student in [the] country…regardless of socioeconomic status, race, or geographic location—is held to high learning standards that will ensure students have the skills to compete in today's global, knowledge-based economy" (DOE, 2017). The K-12 Common Core State standards (CCSS) standards later incorporated these College-and Career-Ready Standards (CCSS Initiative, 2018a), furthering uniformity. Today, 41 states have fully adopted CCSS (CCSS Initiative, 2018b) and the idea of students becoming college- and career-ready is the new educational rhetoric. Yet, clearly defining the criteria, and further the curriculum, for ensuring students are college- and career-ready is not only daunting, but also rife with complexity. While the DOE acknowledges that students need more than basic, academic skills to flourish as adults (DOE, 2017), they have not clearly defined those additional skills beyond

increasing the rigor of academic standards themselves in the form of CCSS.

There is a strong sentiment that preparing students to be college- and career-ready involves the infusion of social and emotional learning (SEL) into the instructional day (Bridgeland, Bruce, & Hariharan, 2013; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Jones & Kahn, 2017). Discussion surrounding the incorporation of SEL is rapidly growing, as the benefits of doing so are becoming quite apparent (see Table 1). Research findings show increased outcomes in college- and career-readiness in students exposed to instruction incorporating SEL (Johnson & Wiener, 2017; Jones & Kahn, 2017).

Durlak et al.'s 2011 publication generated a large interest in incorporating SEL instruction into schools. In a meta-analysis of 213 studies, the authors found an 11 percentile-point increase in academic achievement for those students participating in SEL programs. This gain was observed across grade spans, from elementary to high school, and the reported gains remained constant for 6 months after implementation. Further studies have concluded that recipients of SEL instruction have higher graduation rates (Fink & Geller, 2013) and a better grasp of academic content knowledge (Bridgeland et al., 2013). SEL instruction is also linked to increased engagement in

student learning (Durlak et al., 2011), improved motivation (Bridgeland et al., 2013), fewer challenging behaviors, reduced emotional distress (Bridgeland et al., 2013; Durlak et al., 2011), and fewer reported incidences of bullying and fights (Bridgeland et al., 2013). The research strongly supports the use of SEL instruction in school, prompting the National Commission on Social, Emotional, and Academic Development to conclude that robust social and emotional development is imperative for the future academic and social success of young individuals by creating perseverance, problem solving skills, and a sense of purpose (Jones & Kahn, 2017).

Incorporating SEL instruction is particularly salient for individuals with Autism Spectrum Disorders (ASD). This population has abysmal post-secondary outcomes (Eaves & Ho, 2008; Shattuck, Cooper, Sterzing, Wagner, & Taylor, 2012; Taylor & Selzer, 2011). Thirty-five percent of young adults, from ages 19-23, neither have held a job nor received a post-grad education after high school (Shattuck et al., 2012). For those who do obtain jobs, employment rates fall between 4.1 and 11.8% (Taylor & Selzer, 2011). These rates are lower when compared to individuals with other disabilities, including individuals with an intellectual disability (Shattuck et al., 2012). Underdeveloped SEL skills may account for such outcomes. Students with ASD show an

Table 1

Positive Outcomes for Incorporating SEL into School Curriculum

Short-Term Outcomes	Behavioral/Academic Outcomes
Acquisition of the five SEL competence areas	Increased social behavior
Improved attitudes towards self, others, and learning	Improved academic success
Increased engagement and participation in the school environment	Decrease in disruptive behaviors

under-development of growth in social-emotional skills when compared to their non-ASD peers (American Psychiatric Association [APA], 2013; Booker & Starling, 2011; Zimmerman, Ownsworth, & O'Donovan, 2016). In particular, individuals with ASD show a lack of perspective taking (Booker & Starling, 2011), inflexibility in social repertoires (APA, 2013), limited problem solving skills, and a lower frustration tolerance for social situations (Zimmerman et al., 2016). SEL instruction thus becomes imperative for students with ASD in order to improve post-graduation outcomes.

What is SEL?
The Collaborative for Academic, Social, and Emotional Learning (CASEL, 2017), defines five core competencies that constitute SEL. The five competencies are self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (see Table 2). The first competency is self-awareness which encompasses learning how to identify one's thoughts and emotions and acknowledge how thoughts and emotion influence one's behavior. For example, when you are angry, you have a lower frustration tolerance and are more likely to lash out at others. It is important to note that teaching the identification of emotions goes beyond a simplistic understanding of happy, angry, and sad. True SEL instruction incorporates complex emotions and the multifaceted interaction of emotions and behaviors. The simplification of emotions detracts from the vast array of existing feelings, clouding one's ability to perceive the subtle shades in a situation necessary for successful social navigation (Elias, 2014). For example, using 'happy' takes away from the rainbow of alternative, more descriptive positive emotions such as 'joyful,' 'elated,' 'glad,' or 'upbeat.'

Once individuals have awareness of their thoughts and emotions, they move forward to the second competency: self-management of one's emotions. For example, if one can recognize they are angry, they can then engage in calming strategies (i.e., deep breathing, exercising, etc.). Social awareness is the third competency and involves the understanding of others' thoughts and emotions. This includes knowing that one's own thoughts and emotions may differ from someone else's at any point in time. This competency also focuses on valuing the different thoughts and emotions of others. This is imperative in helping students understand that everyone thinks and responds to situations differently.

The first three competencies are the foundation for the fourth: relationship skills. Relationship skills blend an understanding of the emotions, behaviors, and communicative skills necessary to begin and maintain healthy relationships with others. The fifth competency involves skills necessary for responsible decision-making. Being responsible means that one is making healthy choices regarding emotions and subsequent behavioral reactions to ensure safe and healthy relationships and participation in social situations. This includes careful analysis of situations and applying appropriate problem solving skills when needed. These competencies are interdependent upon each other and should be taught congruently. A student cannot manage emotions if they are not able to identify their current emotion. Further, relationship skills will fall flat if self-awareness, self-management, and social awareness are non-existent.

Embedding SEL into Core Curricular Instruction
Beyond the core competencies, is the consideration of context. Who is teaching

Table 2. *Five Core Competencies of SEL (CASEL, 2017)*

Core Competency	Skills
Self-awareness	Identify emotions True self-perception Recognizes own strengths Self-confidence Self-efficacy
Self-management	Impulse control Stress management Self-discipline Self-motivation Goal-setting Organizational skills
Social awareness	Perspective taking Empathy Value diversity Respect for others
Relationship skills	Communication Social engagement Relationship building Teamwork
Responsible decision-making	Analyze situations Identifying problems Solving problems Evaluating Reflecting Ethical responsibility

SEL skills and when? Successful SEL instruction incorporates multiple environments from the home and surrounding community to the classroom and school (CASEL, 2017). This necessitates that SEL instruction find a place in school-based instruction. This becomes problematic. SEL instruction is not consistently occurring in schools even though the literature supports SEL instruction benefitting student outcomes (Bridgeland et al., 2013; Durlak et al., 2011; Fink & Geller, 2013). Bridgeland et al. (2013) found 93% of surveyed teachers' believed that SEL instruction is important in order to observe improvements in attendance, higher graduation rates, college and job readiness, and overall academic achievement. Yet, 81% of surveyed teachers also expressed resistance to incorporating SEL instruction into their academic day and an additional 19% stated they thought SEL should not be taught in schools due to the time constraints and resulting decrease in attention to academic instruction (Bridgeland et al., 2013). Essentially, teachers are concerned about what happens to the mandated curriculum when incorporating an additional layer of instruction over an already substantial academic load.

An additional barrier to implementation is the age group in which SEL instruction is currently occurring. Almost half (49%) of pre-K and elementary school teachers stated they are implementing SEL instruction while middle school teachers fell slightly below that at 43% (Bridgeland et al., 2013). There was a rather drastic decrease in SEL instruction for high school teachers, where only 28% of teachers reported teaching SEL skills (Bridgeland et al., 2013). There may be a perception in upper grades that SEL skills are covered in elementary school; therefore,

there is no reason to take additional time to continue teaching them once students enter high school (Bridgeland et al., 2013). Together, these findings indicate the need to provide teachers with manageable ways to implement SEL instruction. If time is the primary obstacle, why not incorporate such instruction into what is already occurring in classrooms? That is, integrate SEL instruction into core curricular content.

Incorporating SEL instruction into core curricular content allows teachers to continue their instructional pace while increasing the likelihood of more consistent implementation of SEL instruction across grade levels. Further, the CCSS necessitate an understanding and development of SEL skills. The opposite is also true. Academic instruction lays the foundation for SEL skills and encourages development among the five SEL competencies (Johnson & Wiener, 2017). As a whole, the CCSS require increased dialogue across subjects between students and their teachers and peers (Elias, 2014; Johnson & Weiner, 2017). Students are routinely asked in English Language Arts (ELA) to determine text meaning, reconcile varying points of view amongst characters, and take the perspective of characters (Elias, 2014). Math standards necessitate students to present and defend arguments while critiquing the arguments of others (Johnson & Wiener, 2017). Science standards require students to collaborate for evaluating evidence or investigating a problem (Johnson & Wiener, 2017). Therefore, teachers can incorporate SEL into multiple topics across the K-12 span (Bridgeland et al., 2013; Elias, 2014; Johnson & Wiener, 2017).

The increased focus on class discussions is a source of difficulty for students with ASD. The act of engaging in a discussion with peers requires students to have social skills to navigate peer relationships and interactions (Social Awareness and Relationship Skills). This also requires reflection and focus (Self-Regulation) and management of emotions and responses (Self-Awareness and Self-Management) (CASEL, 2017; Elias, 2014; Johnson & Wiener, 2017). Increased class dialogues may result in strong feelings of frustration, anger, and anxiety for students with ASD so it is necessary to practice SEL competencies in multiple contexts to ensure mastery and generalization.

How to Incorporate SEL Instruction into Core Curricular Content

Social-emotional skills can be explicitly taught to student with ASD using the following strategies: expected/unexpected behaviors, Zones of Regulations, and size of the problem. These strategies also lend themselves as curricular tools to teach core academic content. We first provide a description of each strategy, followed by suggestions to incorporate each strategy into academic instruction.

Expected and unexpected behaviors. Expected and unexpected behaviors come from the work of Michelle Garcia Winner and operate under the belief that "…one person's behaviors impacts another person's feelings causing them to have their own behavioral reactions" (Garcia Winner, 2008, p. 35). Expected behaviors are behaviors that are appropriate, and thus expected, in a given situation and/or environment. For example, the expected behaviors while sitting in a doctor's waiting room include sitting, reading, scanning one's phone, and having a quiet conversation with the person sitting next to you. Unexpected behaviors are those behaviors that are not appropriate, and thus unexpected, in any given situation and/or environment. Returning to the doctor's waiting room example, unexpected behaviors include singing loudly, jumping around, and greeting patients loudly when they walk into

the office. When one engages in expected behavior, others around you are comfortable while unexpected behavior makes others uncomfortable. Expected and unexpected behaviors incorporate more than physical behaviors. They can also include language and conversation topics. Most individuals learn these social norms via observational learning and can regulate their behavior to conform to social situations. However, individuals with ASD have difficulty with such incidental learning and must be explicitly taught expected and unexpected behaviors in different situations and contexts (Erdodi, Lajiness-O'Neill, & Schmitt, 2013; Garcia Winner, 2008).

Incorporating expected and unexpected behaviors into core curriculum is especially easy for ELA instruction. Many of the ELA standards call for student understanding of character development, motivation, and perspective taking (Elias, 2014; Johnson & Wiener, 2017). Expected and unexpected behaviors facilitate discussions of how the behavior of one character affects the behavior of other characters. This strategy is also useful in history or government courses to examine the decisions made by past and present leaders and the resulting responses from citizens. Table 3 provides two more examples of incorporating the expected and unexpected behaviors strategy into academic instruction.

Zones of regulation. Drawing upon the work of Garcia Winner (2008), Leah Kuypers (2011) developed the Zones of Regulation to teach students with ASD how to become self-aware of their emotions and then engage in self-management strategies if needed. The first stage is teaching students to identify how their body and brain feel by categories of colors, with each color representing a different state of being (See Table 4). The

four Zones are Blue, Green, Yellow, and Red. The Blue zone represents when one is feeling sluggish and not operating to full capacity. Some corresponding emotions include tired, bored, and sad. The Green Zone is when one is in control of their body and emotions and incorporate feelings of being calm and focused. Being in the Green Zone is optimal for academic and social success. The Yellow Zone is the beginning of loss of control. Individuals in this zone feel frustrated, worried, or even silly. One is in the Red Zone when there is a total loss of control of body and emotions. Red Zone emotions include rage and elation.

The second part of Zones of Regulation is teaching students to manage their emotions if they are in the Blue, Yellow, or Red Zone. It is important for students to recognize when they are in these Zones so they can more easily engage in self-management strategies to return to the Green Zone. When in the Red Zone, it is often too late and much more difficult to engage in coping strategies. Students learn that what they are thinking plays a large role in determining their current Zone, which thus influences the choices they make (see Table 5). The Zones also connect to expected and unexpected behaviors; others are comfortable when we are in the expected Zone at the expected time. For example, one's classmates do not expect Red Zone behaviors at school. When a student engages in such behaviors, people become uncomfortable. It is therefore important for students to learn to manage emotions and behaviors.

Similar to expected and unexpected behaviors, the Zones of Regulation can assist instruction in ELA, government, and history. Students can use the Zones to analyze characters' actions in stories as well as to make predictions about characters and plot, hypothesizing what

Table 3. *Examples of Using Expected and Unexpected Behaviors in Instruction*

Academic Area	Standard	Examples
Science: Constructing Explanations and Defining Solutions	Gather and synthesize information via observational skills	Have students watch videos to observe that unexpected behaviors cause people to feel uncomfortable or act abnormally
Math: Statistics and Probability	Use random sampling to draw inferences about a population. Draw informal comparative inferences about two populations	Students hypothesize about how two populations will respond to expected or unexpected behavior and collect data to confirm or reject hypothesis.

Table 4. *The Zones of Regulation (Kuypers, 2011)*

Zone	Emotion
Blue: low states of alertness	Bored Sad Sick Tired
Green: regulated state of alertness	Happy Cooperative Focused Calm
Yellow: heightened state of alertness	Worried Frustrated Silly/wiggly Excited Confused
Red: extremely heightened state of alertness	Rage Terrified Elated Hitting/screaming/kicking

Table 5. *The Link between Thinking, Feeling, and Making Choices*

How we *think*	How we *feel* (current Zone)	Choices we make
Tomorrow is the Halloween dance. I think all my friends will be there.	I feel happy! (Green Zone)	Go to the dance
I am terrible at dancing and I do not like to dress up for Halloween.	I am nervous and worried (Yellow Zone)	Do not go to the dance

situations would put characters in various zones as they are reading the text. For example, what were the various Zones the Joad family found themselves during their journey to California in the novel, *Grapes of Wrath*? What events could happen for them to change Zones? Students can use the Zones to analyze both past and present governmental decisions. An example might include analyzing the Zones President Kennedy was in during the Bay of Pigs event in terms of the planning, the invasion itself,

and its aftermath. The Zones also work for science concepts as students can analyze plant life: what would need to happen for a plant to become dormant (Blue Zone), wither (Yellow Zone), or die (Red Zone)?

Size of the problem. Another strategy developed by Garcia Winner, the size of the problem is used to teach students that various "Problems require different reactions, emotions and solutions based upon their size" (Garcia Winner, 2008, p. 44). There are four types of problems: small, medium, big, and huge (see Table 6). In order for a student's reaction to be expected, the size of the reaction must match the size of the problem. With students with ASD, there is often a mismatch between the size of the problem and the student's reaction. This mismatch is unexpected behavior, making others uncomfortable and interfering with friendship development (Kuypers, 2011). For example, a student does not like what the teacher has assigned and begins screaming and hitting. Disagreeing with the teacher is a small problem warranting a small solution. In this scenario, screaming and hitting are unexpected and probably makes the other students in the classroom feel awkward. However, seeing your neighbor's house on fire is a huge problem that warrants a huge solution such as screaming for help and calling the fire department.

Students can engage in the size of the problem to examine the actions and decisions of story characters, figures in history, and/or current political leaders. For example, what was the size of each problem the Joads encountered and did the respective characters have an appropriately sized reaction? What was the size of the problem during Bay of Pigs and did President Kennedy's reaction match?

Putting it All Together
While the above three strategies can be used separately, there is much overlap, allowing for simultaneous targeting within core curricular instruction. Table 7 provides an example of incorporating principles from expected and unexpected behaviors, Zones of Regulation, and size of the problem into the instruction of one history standard.

Friendship. Teaching the stages of friendship is another approach to synthesize all three strategies. For SEL, students with ASD are learning how to maintain friendships and relationships. This also teaches that losses to friendships happen but what is important are the steps one takes to resolve problems in order to continue growing the relationship. Academically, graphing the highs and lows of friendship is practicing a math skill. The example in Table 8 and Figures 1 and 2 demonstrate how one can graph the progression of a friendship, creating a visual representation of actions and behavior impacting the intensity of the friendship. In addition, students can graph the progression of relationships of fictional characters throughout the various events in a story as well as political figures and their time in power.

Table 6. *Size of the Problem (Garcia Winner, 2008)*

Size of the problem	What can you do?
Small	Problems that can be solved by yourself
Medium	Problems that can be resolved with peer support
Big	Problems that can be resolved with adult support
Huge	Problems that may need emergency support, fast action, or may not be able to be resolved even with help

Table 7. *Incorporation of Strategies for a CCSS*

CCSS History: Students use a variety of maps and documents to identify physical and cultural features of neighborhoods, cities, states, and countries and to explain the historical migration of people, expansion and disintegration of empires, and the growth of economic systems. Target Population: Ancient Sumerian	
Expected/unexpected behavior	Are these behaviors that would have been expected in Sumer but are unexpected in our culture? Are there behaviors that are expected or unexpected in both cultures?
Zones of Regulation	Make a graphic organizer for an ancient Sumerian showing what events or interactions would put him or her in the Blue, Green, Yellow, and red Zones.
Size of the problem	What problems did an average Sumerian face? Rank them from largest to smallest. What problems did a Sumerian ruler face? Rank them from largest to smallest. Provide a rationale for each.

Table 8: *Progression of Friendship*

Event no.	What happened
1.	The teacher assigns Jorge and Michael to work together on a class project.
2.	As they work together more they find they both love baseball. By the time they present their project, they have become acquaintances.
3.	After the class project ends, Michael invites Jorge to eat lunch with him.
4.	Jorge invites Michael over after school to play video games.
5.	Jorge and Michael have a fight at school over sharing work supplies. Jorge calls Michael names.
6.	Jorge apologizes to Michael.

Conclusion

The creation of CCSS has generated a natural space to incorporate SEL skills into already established curriculum. This is fortunate, as SEL skill development is imperative to guarantee quality outcomes for students with ASD upon high school graduation. It is therefore incumbent upon teachers to ensure they are incorporating SEL instruction to meet the needs of these students. Unfortunately, current implementation of SEL education is uneven, with more instruction occurring in elementary rather than high school, with time reported as a very real hurdle (Bridgeland et al, 2013). The time constraints of the profession overwhelms teachers and adding more instruction is simply not an option. Through strategies such as expected and unexpected behaviors, Zones of Regulation, and size of the problem, teachers can infuse SEL content into established curriculum. This increases the change that students with ASD are gaining the skills they need to ensure the greatest chance possible at a successful post-high school experience.

Figure 1. Graphing the changes in intensity of a relationship in response to actions and behavior.
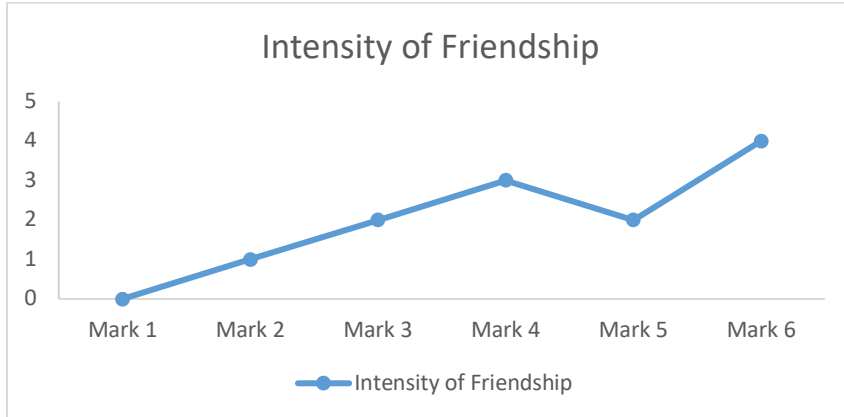
Figure 2. A visual graph of the intensity of relationships.
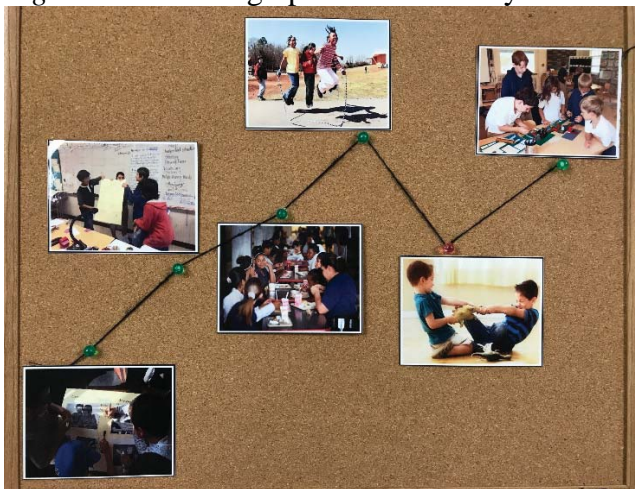
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Same but Different: Characters with Developmental Disabilities in Current Juvenile Literature

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As many children first encounter individuals with developmental disabilities (DD) through characters in children's literature, these individuals must be depicted authentically. Using descriptive analyses, we evaluated 38 books written for children and adolescents (11 picture books, 17 chapter books) for their portrayals of characters with developmental disabilities, comparing the portrayals against those published in three previous studies. All books considered were eligible for the 2018 Dolly Gray Children's Literature Award. Data were analyzed regarding personal portrayal, social interactions, and exemplary practices. Results indicated that most characters portrayed have ASD (80%) and the majority are male (65%). Generally, characters with DD are portrayed positively and realistically, but many remain static throughout the stories. They engage in positive social relationships and are included in integrated settings. Implications for educators, authors/publishers, and researchers are provided.

In 1971, Dolly Gray was born with severe cerebral palsy, unable to walk and unable to speak. Like many other children, she loved stories, and she longed to see herself in the characters and relate to their experiences. She had many of the same feelings, needs, and desires as other children, and although in some ways she was different from her peers, she longed to be included in the world as part of "us" rather than "them." Today Dolly's longings are recognized, and the Dolly Gray Children's Literature Award is given to recognize authors and illustrators who are portraying children with developmental disabilities (DD) in authentic and positive ways.

Books including realistic characters with disabilities are also important for typically developing children, promoting acceptance of and cultivating positive feelings towards individuals with disabilities (Rieger & McGrail, 2015), emphasizing similarities between individuals with and without disabilities, and representing multiple perspectives (Azano, Tackett, & Sigmon, 2017). The title of one of this year's Dolly Gray Award competitors has become the title and purpose for this article: *Same but Different* (Peete, Peete, & Peete, 2016). Dolly Gray was the same as typically developing children in many ways, but the things that made her different should also be considered.

This article describes a study that analyzed books accepted as contenders for the most recent Dolly Gray Award. After considering necessities for character portrayal, we present the study followed by its results, including a discussion of their significance.

Positive Portrayals

Early media portrayal of individuals with disabilities as dangerous and undesirable (Bogdan, Biklen, Shapiro, & Spelkoman, 1982) caused many individuals, especially

children, to fear them, concluding that difference indicated deficiency. Fortunately, today's society and its literature encourage understanding and inclusion of individuals with disabilities.

Trends noted in past studies have indicated positive literary portrayals of individuals with developmental disabilities (Dyches, Prater, & Leininger, 2009). Currently authors encourage readers to treat individuals with disabilities as friends, not outsiders. They consciously (a) teach about the disability, (b) promote sensitivity for those with differences, and/or (c) represent current conditions accurately (Prater & Dyches, 2008).

However, some books may unintentionally reflect negative attitudes toward those with disabilities or fail to endorse exemplary practices in schools and communities. Because their cultural lenses and past experiences impact the way they portray characters with disabilities (Crisp et al., 2016; Kelley, Cardon, & Algeo-Nichols, 2015), some authors fail to consider characters with disabilities as dynamic, unique individuals (Beckett, Ellison, Barrett, & Shah, 2010; Johnson, 2010). Books that portray a neurotypical child convincing her friends to play with a "weird" child with autism or intervening to save her friend from the consequences of his autism support stereotypes. Books that show strong characters with differences working together are ideal.

Understanding and Acceptance
Children's literature can influence children's attitudes (Smith-D'Arezzo & Thomas, 2010) by providing age-appropriate information about different disabilities in non-threatening ways, hopefully leading to positive interactions and acceptance. Quality literature has the power to cultivate positive

feelings and more accurate understanding of the differences that make people unique as individuals (Johnson, 2010), while recognizing and appreciating their similarities as well. In *Superstar* (Davis, 2017), another of this year's Dolly Gray contenders, Lester, who has high functioning autism, is portrayed with his insecurities, rigidity, intolerance, social awkwardness, sensory overload, and meltdowns. But his superstar strengths in math and science enable him to win the fifth-grade science fair and scientifically figure out a kicking technique that wins for his class the coveted kickball trophy.

Teachers must actively promote open discussion so students feel free to ask about things they don't understand (Wilkins, Howe, Seiloff, Rowan, & Lilly, 2016). For example, if they wonder why Lester doesn't just stop rocking, the teacher might need to explain that Lester's brain is very intelligent, but it works differently from theirs, causing him to see and feel things they do not experience. Reviewing descriptions of his breakdowns (pp. 72 and 121) should help readers relate to what Lester is actually experiencing.

Method
Purpose
The Dolly Gray Children's Literature Award (2000), sponsored by the Council for Exceptional Children's Division of Autism and Developmental Disabilities (CEC-DADD), recognizes authors and illustrators of juvenile literature portraying characters with disabilities. Selection is focused on the characterization of individual(s) with a disability as a main or supporting character (Dyches & Prater, 2005; Dyches, Prater, & Cramer, 2001; Dyches et al., 2009; see www.dollygrayaward.com for a list of all past award winners). For this study we used a descriptive design to examine selected picture and chapter books featuring

characters with developmental disabilities (DD), comparing these characterizations with those described in studies of three earlier awards (Dyches & Prater, 2005; Dyches et al., 2001; Dyches et al., 2009).

Book Selection
All books in this study qualified for the 2018 Dolly Gray Children's Literature Award (DGA). Requirements included (a) a main or supporting human character with a developmental disability, (b) an intended audience of children, adolescents, or young adults, (c) a publication date between 2016 and 2017 (or late 2015 for books published after the books were considered for the 2016 award), (d) initial publication in English, and (e) a commercial publisher.

We began by searching for and identifying books including at least one character with a developmental disability. In consultation with children's literature librarians, we selected search terms and variants including *developmental disability*, *mental retardation*, *intellectual disability*, *syndrome, Down syndrome, multiple disability, autism*, and *Asperger syndrome* to locate books in various electronic lists and other online sources such as Amazon.com, Barnesandnoble.com, Goodreads.com. We also reviewed all books submitted to us by publishers for award consideration.

We defined *developmental disability* as a severe lifelong condition resulting from mental impairments, occurring before an individual is 22 years old and limiting the person in at least three of seven major life activities (e.g., receptive and expressive language, learning, self-direction, capacity for independent living), thus requiring an extended duration or lifelong combination of individualized coordinated supports and assistance (Developmental Disabilities Assistance and Bill of Rights Act, 2000).

Consistent with the mission of the CEC-DADD, we excluded strictly physical/orthopedic disabilities (e.g., cerebral palsy without intellectual disabilities), as these align better with the CEC Division on Physical, Health and Multiple Disabilities. We excluded disabilities affecting only social-emotional functioning (e.g., obsessive-compulsive disorder, ADHD, selective mutism, depression), better aligned with the CEC Division on Behavioral Disorders.

More than 100 of the books we found did not qualify because they include non-human characters, have no major characters who clearly have a developmental disability, are not written in story format, are obviously written for adults, or are self-published. We classified as main characters those who are critical to the plot, often as protagonists or antagonists. Major supporting characters are those who are important to the growth of the main characters and plot structure, but may not be essential to the development or resolution of the story climax.

Research Questions
Having considered the aspects of character portrayal described previously, we analyzed the remaining 38 books in terms of three questions:
1. How are the characters with developmental disabilities portrayed?
2. Are the social interactions involving the characters with developmental disabilities primarily positive or negative?
3. What exemplary practices are portrayed?

Instrumentation
An adaptation of the "Rating Scale for Quality Characterizations of Individuals with Developmental Disabilities in Children's Literature"

(www.dollygrayaward.com/home/rating-scale; Dyches et al., 2001) was used to gather the data. This scale includes four primary subscales pertinent to this evaluation: (a) Personal Portrayal, 5 items, (b) Social Interactions, 6 items, (c) Exemplary Practices, 5 items, and (d) Sibling Relationships, 5 items. The 21 items on these subscales are rated on a Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*).

The Personal Portrayal subscale also includes descriptive items such as name/age/gender of the character with a disability, type of disability, nature of schooling, point of view, and types of relationships with others. The Social Interactions subscale additionally includes descriptive items regarding types of relationships involving the character with disabilities (e.g., primary relationships, victim/perpetrator/protector, dependent/caregiver).

Data Analysis

To analyze characterizations of individuals with DD depicted in the stories, the rating scale was applied by a panel of library media specialists and 14 other reviewers, including special education and children's literature professors, a parent and teachers of individuals with DD, adults with developmental and other disabilities, a children's literature author, and undergraduate student researchers. We compiled the reviewers' evaluations into quantitative and descriptive summaries of each analyzed item. Means were figured for each of the four subscales, and positive and negative valence were determined based on a mean score of greater or less than 3 on a scale of 1-5 (greater than 3 = positive; less than 3 = negative). Discrepancies in analysis of the descriptive data (e.g., type of disability, race/ethnicity) were settled by reviewing sections from the books until reaching consensus.

Results and Discussion

Results regarding types of books reviewed, portrayal of characters with DD, social interactions, and exemplary practices are described in this section and discussed with examples from specific books. Comparison with previous studies (Dyches & Prater, 2005; Dyches et al., 2001; Dyches et al., 2009) are also included.

Categories of Books Reviewed

We found 38 books (11 picture books and 27 chapter books) eligible for review for the 2018 Dolly Gray Award—19 for each of the two years included. These totals are substantially higher than the 10 per year published in 2009 (Dyches et al.), more than double the 2005 rate of 8.5 per year (Dyches & Prater), and triple the 2001 total of 6 per year (Dyches et al.).

Main/supporting character level. Of these books, 37 have a main or supporting character with DD, and one (*Gap Life*; Coy, 2016) includes four minor supporting characters with disabilities, which we analyzed as composite characteristics since none of the characters was vital to the plot individually. Seven books (*Bent not Broken, Earth Force Rising, Elemental Island, Gap Life, Just My Luck, Prince Noah and the School Pirates, No One Needed to Know)* include more than one minor character with DD mentioned generally as a group, like a school, classroom, or group home, but not individually critical to the plot; they were not analyzed. Many characters on *Earth Force Rising* (Tesler, 2016) are "bred" to have ASD because of this group's unique strengths and talents; therefore, we analyzed only the main character, Jasper Adams. A few of the books also include characters with other disabilities such as traumatic brain injury (*Bent Not Broken*; Nicholson, 2017) and speech impairments (*No One Needed to Know*; Driver, 2017).

Fiction/nonfiction. A majority of the books (n = 33, 87%) are fiction, with 13% (n = 5) either biography (*The Girl Who Thought in Pictures*, *Pablo Pineda*) or based on a true story (*A Girl Like Tilly*, *Janine and the Field Day Finish*, *MyaGrace Wants to Get Ready*, *Same but Different*). Most of the books analyzed are written in first person (n = 23). Of these, 13 are recounted as the voice of the individual with DD, six as a family member, four as a different individual, and three from dual perspectives (*Afterward, Bent Not Broken, Same but Different*). Twelve of the books are written in third person, with a narrator telling the story. See Table 1 for a list of the books including title, author, illustrator (if applicable), year published, fiction/biography classification, and appropriate reading/interest levels. See Tables 2 and 3 for brief summaries of these characteristics.

Positive Nature of Portrayals

As several dimensions of character portrayal have been analyzed across studies, they have generally shown increasingly positive perceptions of individuals with developmental disabilities: from 71% positive depiction in 2001 (Dyches et al.), to 72% positive in 2005 (Dyches & Prater), and 81% positive in 2009 (Dyches et al.) In the current study, when we averaged and categorized the scores from the rating tables we found positive personal portrayal of the individual(s) with DD in 37 books (97%).

Characters with DD were identified as positively portrayed if they met all or most of the following criteria: (a) emphasizing strengths over weaknesses, (b) making positive contributions, (c) envisioning positive expectations, (d) becoming self-determined, (f) expanding reciprocal relationships, and (e) experiencing full citizenship in the home and community (Turnbull, Turnbull, Wehmeyer, & Shogren, 2016). Positive portrayals were identified in 37 of the books; none had an overall negative portrayal.

Most of the books in the study portray both positive and negative aspects of the character with DD (n = 25, 66%), with many emphasizing the strengths of the individual. For example, *Superstar*'s Lester (Davis, 2017) has difficulty controlling the embarrassing symptoms of his autism, but he is also portrayed as a diligent researcher and gifted young scientist. R. J. in *Same but Different* (Peete et al., 2016) is awkward socially, but he is talented in math and statistics. Lauren, in *Slug Days* (Leach, 2017), experiences what she calls "slug days" when she is having a challenging time coping with the responsibilities of the day, and "butterfly days" when she feels the day goes perfectly. Charlie, in this year's winning chapter book *The Someday Birds* (Pla, 2017), ritualistically scrubs and rinses his hands 11 times per washing, is afraid of new people and situations, and drives his family into deep boredom studying and lecturing about rare birds. But Charlie is a gifted artist and burgeoning biologist, conversing easily with professional scientists.

And these characters do make contributions. R. J. finds ways to use his knowledge of sports statistics to engage with his family. Charlie, the bird scientist, actually discovers two major research communities, one to which he is introduced and one into which he accidentally runs when he is running away from emotions he didn't think he had. Temple Grandin, whose biography won this year's award in the

Table 1. *Books with Main or Supporting Characters with DD Analyzed in this Study*
(Books cited in the article are indicted with *)

Title, Author (Illustrator), Year, Reading/Interest Levels
Autism Spectrum Disorders (30)
Afterward, Jennifer Mathieu, 2016, High School
Albert is My Friend, Linda Barboa & Jan Luck, 2015, Lower Elem.
The Alien Logs of Super Jewels, B. K. Bradshaw (Travis Hanson), 2015, Upper Elem.
Bent Not Broken, Lorna Schultz Nicholson, 2017, Middle School
Blue Bottle Mystery (Graphic Novel), Kathy Hoopmann, 2015, Upper Elem.
*A Boy Called Bat, Elana K. Arnold (Charles Santoso), 2017, Upper Elem.
Chester and Gus, Cammie McGovern, 2017, Upper Elem.
*Earth Force Rising, Monica Tesler, 2016, Upper Elem.
*Elemental Island, Kathy Hoopmann, 2015, Upper Elem./Middle School
*Everyday Hero, Kathleen Cherry, 2016, Upper Elem.
*A Girl Like Tilly, Helen Bates (Ellen Li), 2016, Lower Elem.
*The Girl Who Thought in Pictures: The Story of Dr. Temple Grandin, Julia Finley Mosca (Daniel Reiley), 2017, Lower Elem.
*Isaac and His Amazing Asperger Superpowers!, Melanie Walsh, 2016, Lower Elem.
Just My Luck, Cammie McGovern, 2016, Upper Elem.
Lisa and the Lacemaker (Graphic Novel), Kathy Hoopmann, 2017, Upper Elem.
*No One Needed to Know, D.G. Driver, 2017, Upper Elem.
On Cue, Cristy Watson, 2016, Middle School
*On the Edge of Gone, Corinne Duyvis, 2016, Middle School
*Pearla and Her Unpredictably Perfect Day, Rochel Lieberman (Lloyd Jones), 2016, Lower Elem.
*Same but Different: Teen Life on the Autism Express, Holly Robinson Peete, Ryan Elizabeth Peete & RJ Peete, 2016, Middle School
Slug Days, Sara Leach, 2017, Upper Elem.
*The Someday Birds, Sally J. Pla, 2017, Middle School
Summerlost, Ally Condie, 2016, Middle School
*Superstar, Mandy Davis, 2017, Upper Elem.
Tournament of Champions: Rookie of the Year, Phil Bildner, 2017, Upper Elem.
un/Fair, Steven Harper, 2016, Middle School
*Welcome to the Show: A Mickey Tussler Novel, Frank Nappi, 2016, Middle School
West Meadow Detectives: The Case of the Maker Mischief, Liam O'Donnell (Aurelie Grand), 2016, Upper Elem.
*West Meadow Detectives: The Case of the Snack Snatcher, Liam O'Donnell (Aurelie Grand), 2015, Upper Elem.
The World From Up Here, Cecilia Galante, 2016, Middle School
Down syndrome (3)
*Jon's Bouncing Ball, Marva Dale Bicknell, 2015, Lower Elem.
*Pablo Pineda: Being Different is a Value, Maria Sala & Albert Bosch (Silvia Alvarez), 2017, Lower Elem.
*Prince Noah and the School Pirates, Silke Schnee (Heike Sistig), 2016, Lower Elem.
Intellectual Disability (2)
*Janine and the Field Day Finish, Maryann Cocca-Leffler, 2016, Lower Elem.
*The Silver Gate, Kristin Bailey, 2017, Middle School
Multiple Disabilities (2)
*Gap Life, John Coy, 2016, High School
*Myagrace Wants to Get Ready, Jo Meserve Mach & Vera Lynne Stroup-Rentier (Mary Birdsell), 2016, Lower Elem.
Unspecified or Various Developmental Disabilities (1)
*Scribbles, Theresa Mackiewics, 2017, Lower Elem.

Table 2. *Characterizations in Picture Books (n=11)*

Book	Character(s)	Personal Characteristics	Level	Depiction	Portrayal	Character Development	Point of View
Albert is My Friend	Albert	Elementary boy, ASD	Main	Partially Realistic	Mixed	Slightly Dynamic	Albert's Friend
A Girl Like Tilly	Tilly	Lifespan female, ASD	Main	Realistic	Mixed	Slightly Dynamic	Narrator
*The Girl Who Thought in Pictures	Temple	Lifespan female, ASD	Main	Realistic	Mixed	Dynamic	Narrator
Isaac and His Amazing Asperger Superpowers!	Isaac	Elementary boy, ASD	Main	Realistic	Mixed	Slightly Dynamic	Isaac
Janine and the Field Day Finish	Janine	Elementary girl, ID	Main	Realistic	Mixed	Slightly Dynamic	Narrator
Jon's Bouncing Ball	Jon	Elementary boy, DS	Main	Not Realistic	Mixed	Slightly Dynamic	Jon
Myagrace Wants to Get Ready	Myagrace	Teenage girl, MD	Main	Partially Realistic	Mixed	Slightly Dynamic	Myagrace
Pablo Pineda	Pablo	Lifespan male, DS	Main	Realistic	Positive	Dynamic	Narrator
Pearla and her Unpredictably Perfect Day	Pearla	Elementary girl, ASD	Main	Partially Realistic	Mixed	Slightly Dynamic	Narrator
Prince Noah and the School Pirates	Noah	Elementary boy, DS	Main	Partially Realistic	Mixed	Slightly Dynamic	Narrator
Scribbles	Scribbles	Elementary girl, unspecified DD	Supporting	Realistic	Mixed	Slightly Dynamic	Narrator

Note. ASD = autism spectrum disorder; DD = developmental disability; DS = Down syndrome; ID = intellectual disability; MD = multiple disabilities.
* indicates 2018 Dolly Gray Award winner.

Table 3. *Characterizations in Chapter Books (n=27)*

Book	Character(s)	Personal Characteristics	Level	Depiction	Portrayal	Character Development	Point of View
Afterward	Dylan	11-year old boy, ASD	Supporting	Realistic	Mixed	Slightly Dynamic	Ethan and Caroline (friend and sister)
The Alien Logs of Super Jewels	Jewels	Elementary girl, ASD	Main	Realistic	Positive	Dynamic	Jewels
Bent Not Broken	Faith	Deceased female, ASD	Supporting	Realistic	Positive	Slightly Dynamic	Madeline and Justin (friend and brother)
Blue Bottle Mystery	Ben	Elementary boy, ASD	Main	Realistic	Mixed	Slightly Dynamic	Ben
A Boy Called Bat	Bat	Elementary boy, ASD	Main	Realistic	Positive	Dynamic	Narrator
Chester and Gus	Gus	10-year old boy, ASD	Supporting	Realistic	Mixed	Dynamic	Chester (dog)
Earth Force Rising	Jasper	12-year old boy, ASD	Main	Realistic	Mixed	Dynamic	Jasper
Elemental Island	Jakob	12-year old boy, ASD	Main/ Supporting	Partially Realistic	Positive	Dynamic	Astie (Jakob's cousin)
Everyday Hero	Alice	Pre-teen girl, ASD	Main	Realistic	Mixed	Dynamic	Alice
Gap Life	Kate, Nicole, Brent & Shawn	Varied, Multiple Disabilities	Supporting	Partially Realistic	Positive	Slightly Dynamic	Cray (friend and caretaker)
Just My Luck	George	Pre-teen boy, ASD	Supporting	Realistic	Mixed	Slightly Dynamic	Benny (brother)
Lisa and the Lacemaker	Lisa	Teenage female, ASD	Main	Realistic	Mixed	Slightly Dynamic	Narrator
No One Needed to Know	Donald	16-year old male, ASD	Supporting	Realistic	Negative	Slightly Dynamic	Heidi (sister)
On Cue	Toby	12-year old boy, ASD	Supporting	Realistic	Mixed	Slightly Dynamic	Randy (sister)

On the Edge of Gone	Denise	16-year old female, ASD	Main	Realistic	Positive	Dynamic	Denise
Same but Different	Charlie	15-year old male, ASD	Main	Realistic	Positive	Dynamic	Charlie and Callie
The Silver Gate	Wynn	11-year old girl, ID	Main	Partially Realistic	Mixed	Slightly Dynamic	Narrator
Slug Days	Lauren	Elementary girl, ASD	Main	Realistic	Mixed	Slightly Dynamic	Lauren
*The Someday Birds	Charlie	12-year old boy, ASD	Main	Realistic	Positive	Dynamic	Charlie
Summerlost	Ben	Deceased boy, ASD	Supporting	Realistic	Mixed	Static	Cedar (Sister)
Superstar	Lester	10-year old boy, ASD	Main	Realistic	Mixed	Dynamic	Lester
Tournament of Champions: Rookie of the Year	Red	11-year old boy, ASD	Supporting	Realistic	Positive	Slightly Dynamic	Rip (friend)
un/Fair	Ryan	11-year old boy, ASD	Main	Realistic	Mixed	Dynamic	Narrator
Welcome to the Show	Mickey	Young adult male, ASD	Main	Realistic	Mixed	Slightly Dynamic	Narrator
West Meadow Detectives: The Case of Maker Mischief	Myron	8-year old boy, ASD	Main	Realistic	Positive	Slightly Dynamic	Myron
West Meadow Detectives: The Case of the Snack Snatcher	Myron	8-year old boy, ASD	Main	Realistic	Positive	Slightly Dynamic	Myron
The World From Up Here	Russell	8-year old boy, ASD	Supporting	Realistic	Mixed	Slightly Dynamic	Wren (sister)

Note. ASD = autism spectrum disorder; ID = intellectual disability. * indicates 2018 Dolly Gray Award winner.

picture book category (Mosca, 2017), changed the cattle industry as well as the public's perception of autism forever.

Characters' visions of themselves are portrayed as well. The picture book *Isaac and His Amazing Asperger Superpowers!* (Walsh, 2016) portrays Isaac's accomplishments in a highly self-confident first-person voice. In Isaac's understanding, Asperger syndrome represents ability, not disability. *A Boy Called Bat* (Arnold, 2017) is an optimistic loveable boy with autistic characteristics who loves and takes good care of his pet skunk; he plans to be a veterinarian like his mother. Pearla, in *Pearla and her Unpredictably Perfect Day* (Lieberman, 2016), accidentally makes triangle cookies and flat cupcakes at her father's bakery, but in her optimistic self-confidence she sells them regardless of their "imperfections."

The fantasies also portray strong positive characters with developmental disabilities; self-determination is an important theme for some of them. In *On the Edge of Gone* (Duyvis, 2016), Denise, a 16-year-old with ASD, recounts her struggle to find her missing sister, Iris, and get Iris and their drug-addicted mother into their assigned shelter before the earth is struck by a comet. The advanced decision-making skills characteristic of her autism are clearly apparent. The picture book *Prince Noah and the School Pirates* (Schnee, 2016) portrays young "Prince Noah" who goes to a school that takes place on ships, different ships for those with different needs (including Noah's Down syndrome). When pirates attack, the ships cannot escape unless all students do their best; everyone must contribute.

Themes for Portrayals
We analyzed portrayals of the 38 individuals with DD categorized across three themes: (a) personal portrayal, (b) social interactions, including relationships with siblings, and (c) exemplary practices. Each theme is explained with examples from the books.

Personal portrayal. Portrayals of individuals with DD were analyzed in relation to (a) disabilities (b) personal characteristics, and (c) realistic character development.

Disabilities. Various disabilities are depicted among characters in the books. Of the 38 characters with developmental disabilities, 30 (80%) have ASD, 3 (8%) have Down syndrome, 2 (5%) have intellectual disabilities excluding Down syndrome, 2 (5%) have multiple disabilities, and 1 (3%) has an unspecified developmental disability. These statistics do not realistically represent the ratios of children with developmental disabilities enrolled in U.S. schools; books analyzed in the three past studies were also disproportionate, but in different directions.

According to the most recent data, of the 13% of school children who have been classified as having a disability, 9% have autism compared to 6% having intellectual disabilities including Down syndrome (McFarland et al., 2017). The drastic increase in proportion of books including a character with autism compared to those having a character with another DD may be due to the increase in prevalence of ASD. According to the Centers for Disease Control and Prevention (2016), 1 in 68 children has now been diagnosed on the autism spectrum. The tendency to include

characters with ASD is obviously meeting readership needs for these children; however, the disproportion could imply misleading comparisons.

Age/time of life. Ages of characters in the books with DD range from infant to adult. In three books the characters with DD are depicted as infants or toddlers as well as in later stages of life: *A Girl Like Tilly, Pablo Piñeda,* and *The Girl Who Thought in Pictures*. In the more closely focused books, 12 characters are elementary-aged children, 12 are upper elementary, and 5 are teenagers; 2 books have a deceased character with DD; and *Gap Life* (Coy, 2016) has 4 supporting characters of various ages with DD.

Gender. In the past studies of Dolly Gray Award books, the majority of characters with ASD were male, with a decreasing trend. All of the characters with autism were male in 2001 (Dyches et al.), 84% were male in 2005 (Dyches & Prater), 64% were male in 2009 (Dyches et al.). In this year's study the percentage of characters with autism who are male increased to 72%. Because the male to female ratio for autism is 4.5:1, males are only slightly under-represented in the books currently analyzed (Centers for Disease Control and Prevention, 2016). This could be an overcorrection of the earlier trends.

Because females demonstrate some of the characteristics associated with autism differently than males, many girls suffer undiagnosed. A book like *A Girl Like Tilly* (Bates, 2016) can be especially useful in recognizing the problem. Tilly puzzles her family: an obviously bright girl who struggles at school, a child at an age when peers seem all-important who doesn't want to make friends—at times

she doesn't even know if she is a girl or a boy. Since she cannot communicate how she really feels, she withdraws. Finally a psychologist realizes that Tilly has autism; the puzzling characteristics are explained; her family is able to help her move forward.

Overall 65% (*n* = 24) of this year's characters with DD are male; the picture book category has slightly more female (*n* = 6) than male (*n* = 5) characters. In one of the chapter books, *Gap Life* (Coy, 2016), minor male and female characters with DD were analyzed as composite.

Ethnicity. Previous studies of characters with DD show that individuals of diverse ethnicities were not represented at all in 2001 (Dyches et al.) and accounted for only 14% in 2005 (Dyches & Prater). In this study 26% of the books included characters of diverse ethnic backgrounds who have DD, representing more accurately how DD is actually distributed among ethnicities. In 2016 the U.S. Census Bureau reported the U.S. population as 76.9% White alone (not mixed), 17.8% Hispanic, 13.3% Black alone, and 5.7% Asian. Despite improvement over books studied in the past, the eight books that depict an ethnically/culturally diverse main or supporting character with DD do not represent actual proportions. Hispanics are underrepresented by 12.5%, Blacks by 2.8%, and Asians by .4%. In several instances the ethnicity of the character is unclear; thus these data should be interpreted with caution.

Character development. Most of the books portray characters who are at least partially realistic as they show both their strengths and weaknesses in various aspects of their lives.

Realistic. Characters with DD who are realistically depicted are not superhuman or subhuman, are not cured miraculously, and are not depicted in ways not congruent with current knowledge and practice related to their disability. Most of the books analyzed portray a character with DD who is realistic ($n = 29$, 76%); in some this character with DD is only partially realistic ($n = 8$, 21%). One book was found with an unrealistic character with DD. *Jon's Bouncing Ball* (Bicknell, 2015) portrays a child with Down syndrome seeking adventure in Yellowstone National Park, and reviewers consider it unrealistic (and unwise) for young Jon to be in the national park by himself encountering and interacting with strangers.

In contrast, in *Janine and the Field Day Finish* (Cocca-Leffler, 2016), Janine, a realistic young child with intellectual disabilities and delayed physical development, can't run all the way around the field, but she enthusiastically enjoys field day as she cheers on her more athletically talented classmates and comforts a friend who falls. She doesn't overcome her physical weakness; she enjoys doing what she can within her limitations.

The title character in *MyaGrace Wants to Get Ready* (Meserve Mach & Stroup-Rentier, 2016) is a teenage girl with autism, intellectual disabilities, and cerebral palsy who is generally portrayed realistically. She is excited about going to a school dance. Her family supports her in getting ready: her brother practices dancing with her, and others help her choose a dress, fix her hair, and get her nails professionally painted—the interests, needs, and concerns of most girls her age. MyaGrace is portrayed as being more like than different from other teens, though the extent of her disabilities is not emphasized.

Dynamic. Of the books analyzed, only 12 (32%) feature characters classified as dynamic; characters in the remaining books are portrayed as static, showing little to no growth. The brevity of picture books makes it challenging to portray strong character growth; however, some do show significant change. For example, Theresa in *Scribbles* (Mackiewics, 2017) lacks self-confidence in her academic work. But when she takes initiative to ask her teachers for help during class, she gains confidence and skills. *The Girl Who Thought in Pictures* (Mosca, 2017) shows dramatic changes in the development and progression of autism hero Temple Grandin, from a toddler who would "never be normal" to a world-acclaimed scientist, inventor, researcher, lecturer, and inspiration to the entire autism community. Chapter books have the space and sophistication to begin bringing characters with disabilities, particularly autism, out of social isolation.

Social interactions. We analyzed several aspects of social interactions involving the characters with DD, including their types of relationships and specific relationships with others, particularly friends, parents, siblings, and peers. Typically developing characters are sometimes changed by interacting with the character with DD.

Overall social relationships. Rating the characters' overall social relationships, we found that 34 (92%) of the books portray what we consider positive social relationships, with only four (8%) showing relationships we noted as

negative. In the chapter book *No One Needed to Know* (Driver, 2017), the individual with DD, George, is bullied throughout the entire novel, both by boys his age and by friends of his sister, Heidi, who narrates the story. Few instances enable George to experience positive social interactions. In contrast, *West Meadows Detectives: The Case of the Snack Snatcher* (O'Donnell, 2016) portrays positive social relationships throughout the story as Myron and his friends work together to solve mysterious events at their elementary school.

Primary relationships. In the study sample, the most prevalent primary relationship is with a friend without a disability ($n = 18$, 47%). For example, In *Everyday Hero* (Cherry, 2016) Alice, who has ASD, is struggling to fit in at her new school. Megan befriends Alice and helps her navigate the various social norms of teenage life. Later Megan becomes the one in need of help, and Alice becomes her *hero*. In *Superstar* (Davis, 2017) Lester is frequently rescued, comforted, and reassured by the friendship of Abby, who sits next to him in class. Other characters with DD were found to have a primary relationship with a sibling ($n = 10$, 26%), parents ($n = 4$, 11%), a friend with a disability ($n = 3$, 7%), paid personnel ($n = 2$, 5%), or others ($n = 1$, 3%).

Of the books in the study, 24 (63%) were analyzed for sibling interactions, as they portray a family in which a child with a developmental disability has at least one sibling. All were judged to show positive though realistic sibling relationships. The teenage twins who wrote *Same but Different* (Peete et al., 2016) share a realistic positive relationship. Subtitled *Teen Life on the Autism Express,* the

alternating chapters written by Callie, who is typically developing, and Charlie, who has ASD, describe what teen life is like for them, and the phrase *autism express* reflects their tone and approach. Positive support is dominant, but conflicted feelings occur when Callie resents looking after Charlie, and Charlie resents being looked after. Charlie and Callie are pen names for R.J. and Ryan Elizabeth Peete, who wrote this book with support and guidance from their mother, noted autism advocate Holly Robinson Peete. (Callie and Charlie made their first appearance in the 2012 Dolly Gray winner *My Brother Charlie*, in which the voice of Callie—co-written by then 10-year-old Ryan—tells about the characteristics of and the love she shares with her twin.)

An influential primary relationship with parents is portrayed in the picture book biography *Pablo Pineda*, which is subtitled *Being Different Is a Value* (Sala & Bosch, 2017). Pablo has Down syndrome, and the school near Pablo's home in Spain does not accept children with disabilities. However, Pablo's parents refuse to accept that restriction or be intimidated by the school. They get their son a tutor to help him reach the top of his class. After graduating first among his schoolmates, Pablo attends and graduates from college, after which he becomes an actor and an advocate/public speaker for rights of individuals with Down syndrome. His parents believe in and support him every step of his journey.

The Someday Birds (Pla, 2017) conveys complex relationships of an individual with developmental disabilities interacting with both siblings and an unusual "other." Charlie, who has both high functioning autism and obsessive-

compulsive disorder, is taking a road trip cross country with his older sister, younger twin brothers, and a "strange" individual named Ludmilla, who is looking after them and driving an ancient camper named "Old Bessie." Ludmilla's bizarre appearance is topped only by her bizarre behavior. Charlie's sister manages him and tries to get him to behave as "normal" as possible; the twins constantly mock and tease him; and Ludmilla manages the unruly crew with insight, sensitivity, intelligence, and strength that Charlie eventually learns to respect.

Relationship with characters without developmental disabilities. In addition to memorable friendships, characters with DD are otherwise influenced by neurotypical individuals and in turn influence their typical associates. The percentage of characters with DD who are represented as victimized by others (e.g., through bullying, teasing, ridiculing, shunning) has decreased since the earliest studies. From 83% represented as victims in 2001 (Dyches et al.), the percentage was down to 39% in 2005 (Dyches & Prater), though up slightly to 43% in 2009 (Dyches et al.). In the current study, the victimization total is down to 34%. The teasing (name-calling) and bullying suffered by Donald, the teenager with autism who embarrasses his sister in *No One Needed to Know*, has been mentioned. Bat, the boy with ASD in *A Boy Called BAT* (Arnold, 2017), is frequently called names by his older sister. R. J. Peete (alias Charlie) in *Same but Different* is manipulated cruelly by classmates. Some characters were considered victimized by reviewers because they victimized themselves with self-pity.

Changes in characters interacting with the individual with DD were categorized as positive, neutral, or negative. The majority of the books portray these typically developing characters as experiencing positive change with this association ($n = 30$, 79%). Some books portray characters who interact with the character with DD as neutral, suggesting that they did not change positively or negatively as a result of their interaction ($n = 8$, 21%). No books showed negative impact by a character with DD. Data on this theme were not analyzed in earlier studies.

This study found an increase in characters with DD assuming important social roles. Over 42% of these characters taught others rather than merely learning from others—a notable increase from the 2009 study that found only 24% could be considered informal teachers. This study also found five books featuring characters who went on to influence their society by having meaningful careers: for example, scientist, baseball player, actor, chef. None of the previous studies found books portraying characters with DD who had meaningful careers.

Exemplary Practices
This study evaluated some exemplary (and some not so exemplary) practices related to individuals with developmental disabilities found in the books examined in this study.

Past practices. All but three of the books are set in contemporary times. Those that depict earlier periods are relatively consistent with the attitudes and practices toward individuals with DD during those eras. *The Silver Gate* (Bailey, 2017) portrays Wynn, a girl with DD during medieval times. According to the "rules"

of her community, Wynn was supposed to be abandoned at birth because of her disability, but she is saved and hidden by her mother for 11 years. She is called a *half-wit* and *changeling*—terms not acceptable today. The family must live in hiding and in fear; eventually her brother must help her run away to avoid being sold by their father into slavery. These practices occurred in most areas of the world during the last century.

Other unfortunate practices have been slower to disappear. In *Welcome to the Show* (Nappi, 2016)*, set in 1950, Mickey Tussler, a prodigious young major league pitcher, who happened to have ASD, was characterized as having "slowness of mind" and referred to as a *retard*. In the early 1960s, Temple Grandin was expelled from school when she threw a book at a girl who was taunting her (Mosca, 2017); at that time children could be expelled with no legal process.

Schooling/education. We analyzed the books for two topics relevant to current practices affecting the quality of life for characters with DD: the characters' schooling/education and their residence. Educational environments for students with DD have become more inclusionary throughout the years. Of the books depicting school settings in the 2005 (Dyches & Prater) study, 46% of children with DD were in general education classes, increasing to 54% in the 2009 (Dyches et al.) study. In the current study 68% of the books depict schooling: In these, 58% of students with DD are attending only general education classes (e.g., Lester, Charlie, Temple Grandin), and 31% are attending both general and special education classes. Some students receive extra one-on-one assistance in their general education class (e.g.,

paraeducator, counselor). These data show lower rates than the national data, which indicate that over 60% of students with disabilities spend over 80% of their time in general education classes (McFarland et al., 2017). Few characters with DD receive sole instruction in special education classrooms as portrayed in *On Cue* (Watson, 2016) and *Afterward* (Mathieu, 2017).

Residence. The most common residence for the characters with DD portrayed in the books is the family home (*n* = 31, 82%). Some of the books do not depict a specific place of residence (*n* = 4, 11%). *Gap Life* (Coy, 2016) is the only book to depict a group home. In *Earth Force Rising* (Tesler, 2016) the main character with DD lives in an institution for most of the story. Charlie and his siblings in *The Someday Birds* (Pla, 2017) leave and eventually return to a fairly typical family home in California, but most of the book takes place in scattered places during their trip to Virginia. The remainder of the books did not include enough information to accurately judge the home location.

Limitations and Future Research
The results from this descriptive study are not intended to be generalized; they apply only to the 38 books evaluated. A limited number of reviewers analyzed and rated these books, so data for positive/negative valence should be interpreted with caution. Future research should increase the number of reviewers to at least 30, include standardized training, and conduct reliability checks with all reviewers, to strengthen the analyses. In addition, analysis of the Dolly Gray Award books published between 2009 and 2015 should be considered along with quantitative data.

Implications for Practitioners and Publishers

Literature that includes characters with disabilities can enrich student learning by exposing students to an array of characters who are like them in some ways and different in others. Lenses of books allow readers both to look beyond their own experience and to closely and critically examine themselves as they learn to accept people who may seem different and difficult to understand (Prater & Dyches, 2008).

Acceptance requires more than brief exposure. Students need explanations, discussion, and opportunities to ask questions; thus many books include information and discussion suggestions to broaden knowledge and perspective for educators and students (Crisp et al., 2016).

Authors, illustrators, and publishers are to be commended for their contributions to the rapid increase in the number of books commercially published that include characters with DD. Furthermore, the depictions of these characters are increasingly inclusive and positive. However, other developmental disabilities besides ASD are receiving less attention than expected. Portrayals of a wider variety of developmental disabilities are warranted.

Conclusion

From the 38 books analyzed in this study, two were chosen for the 2018 Dolly Gray Children's Literature Award, as they authentically portray individuals with developmental disabilities in an engaging story for children or youth. Most of the books considered for the 2018 award depict authentic characters who enjoy reciprocal relationships with family and friends and receive at least some of their education with typically developing classmates. But the two award-winning books are exemplary in all criteria. In the chapter book awardee, *The Someday Birds* by Sally J. Pla (2018), Charlie, an 11-year-old boy with ASD and OCD, learns to cope with fears and obsessions and to more fully engage in reciprocal relationships with family members and others who care about him. The picture book winner, *The Girl Who Thought in Pictures* by Julia Mosca (2017), shares highlights from the life of Temple Grandin, showing her self-determination and character strength in coping with challenges and contributing to the world in many ways. Such books can help children recognize similarities as well as differences, strengths as well as challenges, in individuals with developmental disabilities.

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Autism Program Improvement: Identified Themes for Areas of Growth within Public School Self-Contained Classrooms for Students with Autism

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With a growing number of students with autism spectrum disorder (ASD) being served in the public schools, ways in which schools are meeting student needs has risen to the forefront of discussion. Within the current study, information pertaining to autism program quality was collected from 35 self-contained classrooms serving students with ASD. Findings indicate programmatic areas of improvement within 9 of the 10 identified Autism Program Environment Rating Scale (APERS) domains including positive learning climate, learning environment, teaming, curriculum and instruction, functional behavior, communication, assessment and IEP development, social competence, and personal independence and competence. Addressing program needs, and training, within public schools is also discussed.

Recent reports have indicated the prevalence rate for autism spectrum disorder (ASD) to be approximately 1 in 68 (Christensen et al., 2016). This number is also reflected in the growing percentage of students in the public school eligible for special education services under this category, from 3.29% in 2005 to 7.02% in 2011 (United States Department of Education, 2011). With the continual increase of students with ASD receiving special education services, school programs throughout the country are working to comply with the federal mandate put forth by the Individuals with Disabilities Education Act (IDEA, 2004) that requires the identification and implementation of research-based practices to meet student needs (Yell, Drasgow, & Lowrey, 2005; Yell, Katsiyannis, Drasgow, & Herbst, 2003). The complexity of needs associated with autism requires highly specific instructional practices as well as a broad range of services to address social skills, communication, behavior, functional and/or academic-related proficiencies (Wong et al., 2015). With this breadth of programming required for each individual, there is a growing concern over the quality of educational services for the ASD population (Brock, Huber, Carter, Juarez, & Warren, 2014). When considering autism quality in schools, the classroom is one of the most important settings for student growth to take place (Keonig, Bleiweiss, Brennan, Cohen, & Siegel, 2009), however, there are other important factors that must be considered. These factors, which include administrative support as well as collaboration between teachers and treatment providers, serve as the foundation for effective instruction and high-quality programming. In order to address this area of concern, the current study sought to determine public school autism program quality with respect to self-contained settings for students with ASD and discuss specific classroom, and school, areas of program improvement to assist in meeting students' educational needs.

The impact of autism program quality is reflected in the current literature which points to sustained issues in programming and uncertain long-term prospects for students with autism. Parents, teachers, and

administrators suggest that services for students with ASD are most effective when they are highly individualized, delivered by a competent multidisciplinary team of professionals who regularly collaborate, and when decisions are made using data (Callahan, Henson, & Cowan, 2008). Although these areas have been identified as being essential for current and long-term success, Keen, Webster, and Ridley (2016) reported that many programs for students with ASD showed little to no emphasis on individualized assessment to drive programming, which corresponded to high variability of individual academic achievement. This is also consistent with previous findings that have specifically identified public school deficits in the areas of individualized supports and instruction (Yell et al., 2005). Concurrent with these findings, there was little use of systematic instruction, function-based approaches for problem behavior, curriculum specific to autism, and limited comprehensive learning environments and supports in the classroom (Yell et al., 2005). Unfortunately, these findings are affirmed by the substantial court cases wherein parents have successfully litigated the lack of appropriate implementation of effective education and autism related services in public schools (Hill & Hill, 2012).

Educational programming is an important issue facing public schools because substandard programming, and instructional shortfalls, can lead to poor outcomes in the areas of academic performance, social relationships, communication, challenging behavior, and self-determination (Carter, Lane, Cooney, Weir, Moss, & Machalicek, 2013). Skill deficits in these areas have the potential to influence long term prospects for individuals with ASD that are relevant to the areas of independent living, employment, and college attendance (Shattuck et al., 2012),

thus having a lifelong impact on student success and independence.

The individuals primarily responsible for educational programming are special education teachers. Teacher responsibilities in a self-contained classroom include identifying individual student needs, selecting appropriate interventions, and providing specific explicit instruction aligned to those needs (Brownell, Sindelar, Kiely, & Danielson, 2010). This process involves multiple skills, including both diagnostic and intervention knowledge (Brownell et at., 2010), which allow practitioners to assess students in relation to selecting appropriate instructional goals and subsequently implementing effective interventions.

Interventions educators should use to address the deficit areas associated with autism are evidence-based practices (EBPs). Wong et al. (2015) identified 27 EBPs to use in combination or isolation to address the educational and behavioral needs of students with ASD. Each of these practices differ widely in application as well as complexity, making it challenging for teachers to readily learn and apply in classrooms. Many teachers have limited knowledge and training in EBPs (Dillenburger, McKerr, & Jordan, 2014) and less than 5% of special education teachers report using EBPs for students with autism in their classrooms (Morrier, Hess, & Heflin, 2011). Moreover, as Wong et al. (2015) reported, multiple EBPs should be used to address student needs, however, this 'multi-layered' approach requires extensive resources, training and support for teachers (Dingfelder & Mandell, 2011). These factors related to teacher use of, and training in, EBPs have the potential to impact the successful implementation and, as a result, overall program quality, for students with ASD.

In order to increase the probability of the success of autism programs in schools, organizational leadership and support are key factors that relate to the provision of adequate resources and training (Odom, Collet-Klingenberg, Rogers, & Hatton, 2010). The literature suggests strong correlations between lack of support, resources and training related to autism in public schools, and teachers' ability to implement complex practices and competently meet the needs of students in schools (Locke et al., 2016). Administrators, through effective leadership practices, can affect the provision of autism services within schools (Locke et al., 2016). Effective leadership includes developing a culture within the building that both motivates staff and inspires optimal performance as well as then executing decisions to enact effective plans. These leadership qualities are vital in sustaining autism programs in schools. Positive climate and culture also help create an atmosphere where teachers and staff are supported (Michaelis, Stegmaier, & Sonntag, 2010), and this enables them to fulfill their roles effectively.

Although effective leadership practices can lead to an increase in overall autism program quality, there are also factors that negatively impact success. One detriment to successful leadership is lack of administrative knowledge of EBPs for students with autism (Odom et al., 2010). Lack of knowledge negatively impacts effective decision-making and can hinder access to training and resources as well as delivery of educational services (Forman, Olin, Hoagwood, Crowe, & Saka, 2009). While most administrators are acutely aware of their legal and educational responsibilities in educating children with autism (Whitmer, 2013), few have the foundational knowledge to execute decisions that support this population (Odom et al., 2010). Decision-making is also

hindered by financial constraints, which subsequently limits resources and capacity-building (Kucharczyk et al., 2015; Whitmer, 2013). Lastly, administrators often rely upon child study team members to help guide decisions; however, key members of the child study team that serve in that capacity, such as school psychologists, have limited ability to appropriately identify EBPs in relation to child needs (Sansosti & Sansosti, 2013). This places the burden of carrying out evidence-based interventions largely upon the teaching staff, which results in unequal distribution of responsibilities associated with servicing students with autism in schools, as well as, limited support from administrators and other educational leaders.

Given the immense growth of this population, and vast complexity across individuals, the current study fulfills a mandate to actively address gap areas affecting quality of education in applied settings (Kopetz & Endowed, 2012). The purpose of this study is to identify specific areas of growth for autism programs that can be used to further define complexities of delivering high quality instruction in public schools. Furthermore, the present article can be used to elucidate current limitations identified in the literature regarding effective delivery of special education supports and services as an impetus to developing a comprehensive framework for enhancing public school programming.

Method
Participants
Participants were 35 kindergarten – 12th grade teachers working in self-contained classrooms for students eligible under the category of autism spectrum disorder within five north eastern suburban school districts. The majority of the participating teachers were female (86.5%), white (94.6%), and had been teaching for an average of 8 years (see

Table 1). Participating school districts were involved in a larger autism program improvement project. Throughout the district, teachers were required to participate in training, and complete associated measures, as part of their yearly contractual professional development. They were not required, however, to allow their data to be used for research purposes. Of the 38 classroom teachers participating in the autism program improvement project, data in the current study reports only on the 35 teachers (92%) who consented to participate.

Procedure/Measures
All research procedures were reviewed and approved by the Monmouth University Institutional Review Board. Packets of measures were provided to teachers and completed during an introductory presentation describing involvement in the autism program improvement project. Classroom observations and interviews, in order to complete the Autism Program Environment Rating Scale (APERS), were then schedule by administration. For the purposes of this study information from a demographic survey and results from the APERS were utilized. Descriptions of the measures are as follows:

Demographic Survey. A brief questionnaire was administered to teachers in order to collect demographic information including teacher race, number of years teaching, level of education, grade level taught, and number of professional development hours in the last year.

Autism Program Environment Rating Scale (APERS; Odom et al., 2018). This instrument was used to measure autism program quality and includes a form for preschool/elementary and middle/high school. Both forms focus on 10 domains including; learning environment (safety, organization, materials, visual schedules, transitions), positive classroom climate (staff-student interactions, staff behaviors, promoting diversity), assessment and IEP development (assessing student progress, assessment procedures, IEP goals, transition planning), curriculum and instruction (classroom instruction, focus on IEP goals, opportunity to generalize, prompting, accommodations), communication (planning for communication, communication rich environment, individualize communication instruction, responsiveness to student, communication systems), social competence (arranging opportunities, teaching and modeling, personal hygiene and relationships, social skills training, peer social networks), personal independence (self-advocate for accommodations, self-management, choices available), functional behavior (proactive strategies, behavioral assessment, data collection, teaming), family involvement (teaming, communication, parent teacher meetings), and teaming (team training, team membership, team meetings, decision making). The preschool/elementary form comprises 59 items across the 10 domains; while the middle/high school form contains 66 items across 10 domains (with

Table 1. *Participant Demographics*

Demographics	*n* = 35
Gender (% female)	86.5%
Ethnicity (% white)	94.6%
Education (% Master's Degree)	43.2%
Number of Years Taught	7.97
Professional Development Hours (1-year)	40.50
Grade Level Taught (% preschool/elementary)	54.1%

transition planning addressed within assessment and IEP development). Item scoring is organized in a 5-point Likert scale, with one being the fewest amount of quality indicators checked and five meeting all quality indicators. Researchers collected information through observation, interviews with team members (teacher, related service provider, and parent), and record reviews. Classroom observations lasted approximately 3-4 hours and interviews between 30 and 50 minutes with each individual. Upon completion, an overall rating of quality, and profile scores within each domain, were provided and summarized through scores and graphs. Alphas for the pre-school/elementary and middle/high school forms range from .94-.96 and all subscale scores were above .70 (Odom et al., 2018).

Results

Upon analysis of descriptive statistics for each of the 10 APERS domain areas, mean scores were calculated and domains were organized from highest to lowest score (see Table 2). Mean scores for the 10 domain areas ranged from 1.72 – 3.48 and APERS total scores had a mean of 2.64. The means from the subdomains from highest to lowest score were as follows; family involvement, positive learning climate, learning environment, teaming, and curriculum and

instruction, functional behavior, communication, assessment and IEP development, social competence, and personal independence and competence.

Upon examining individual topics within each of the 10 domain areas, more specific needs were able to be determined (see Table 3). Scores below 3.00, which are recorded when less than 50% of the quality indicators are reached, in each domain area were identified in order to get a more focused view of areas of need within overarching domain areas. Upon examining the domain of family involvement, all areas scored above 3.0, which included teaming, communication, and parent teacher meetings. Positive learning climate had the areas of staff-student interactions and staff behavior above 3.00, however, promoting diversity scored below this threshold. The learning environment domain had 3 of 5 domain area scores above 3.00 (safety, organization, materials), with areas identified as having a score below 3.00 being use of visual schedules and transitions. Looking at the scores within the teaming domain, implementation and team training were the areas scoring below 3.00 and both domains within curriculum and instruction (classroom instruction and planning for transition) scored below 3.00 as well. Within the subdomain of functional behavior; each of the individual topic scores were below

Table 2. *Mean APERS Scores by Subdomain*

Domain	Mean	SD
Family Involvement	3.48	1.10
Positive Learning Climate	3.33	.76
Learning Environment	3.07	.60
Teaming	2.81	.78
Curriculum and Instruction	2.53	.60
Functional Behavior	2.48	.92
Communication	2.43	.58
Assessment and IEP Development	2.23	.51
Social Competence	2.03	.51
Personal Independence and Competence	1.72	.48
Total	2.64	.49

Table 3. *Areas of Growth – Subdomain Topic Mean Scores*

Domain	Mean	SD
Family Involvement		
Teaming	3.38	1.16
Communication	3.36	1.25
Parent-teacher meetings	3.88	1.56
Positive Learning Climate		
Staff-student interactions	4.02	1.02
Staff behaviors	3.28	1.12
Promoting Diversity	2.11	.86
Learning Environment		
Safety	3.33	.82
Organization of Learning Environment	3.32	.94
Materials	3.64	.77
Visual Schedules	1.97	.90
Transitions	1.75	.72
Teaming		
Team Training	3.38	.94
Team Membership	2.56	.92
Team Meetings	2.70	.89
Implementation	3.08	1.27
Curriculum and Instruction		
Classroom Instruction	2.61	.58
Planning for Transition	1.24	.37
Functional Behavior		
Proactive Strategies	2.06	.88
Behavioral Assessment	2.67	1.01
Behavior Management	2.41	.98
Data Collection	2.63	1.50
Communication		
Planning for Communication	1.27	.47
Communication Rich Environment	1.91	.53
Individualized Communication Instruction	2.34	.83
Responsiveness to Communication	2.69	.93
Communication Systems	3.00	.84
Assessment and IEP Development		
Assessing Student Progress	2.94	1.16
Assessment Process	1.13	.34
IEP Goals	2.74	.70
Transition Planning	1.38	.49
Social Competence		
Arranging Opportunities	1.97	.72
Teaching and Modeling	2.94	.95
Personal Hygiene and Relationships	1.50	.52
Social Skills Instruction	1.36	.67
Peer Social Networks	1.69	1.09
Personal Independence and Competence		
Personal Independence	1.94	.58
Self-Management	1.27	.42

3.00 including proactive strategies, behavioral assessment, behavior management, and data collection. Planning for communication, having a communication rich environment, individualized communication instruction, and staff

responsiveness to communication all scored below 3.0; while communication systems scored at 3.00 within the communication subdomain. When reviewing the subdomain of assessment and IEP development; assessing student progress, assessment process, IEP goals, and transition planning received mean scores below 3.00. Examining social competence; arranging opportunities for social interaction, teaching and modeling social skills/competence, providing instruction related to personal hygiene and relationships, social skill instruction, and peer social networks are all identified as being below 3.0. Finally, upon examining personal independence, both of the content scores were below 3.0 and should be addressed; which include personal independence and self-management.

Discussion

This study further elaborates upon existing literature that reports challenges and limitations in public school autism programs. While these issues associated with programming are often viewed through a narrow lens, such as focusing solely on teacher training or use of evidence-based practices, the results of this study provide a broader perspective of factors that both directly and indirectly affect program quality.

Of the 10 domains within the APERS, there was only one, family involvement, in which all domains were scored at 3.0 or above, making it highly evident that autism programming needs to be improved in many areas. Given that each domain directly impacts student skill acquisition and goal attainment, it is clear that special education supports and services are not adequately meeting the needs of students with ASD in public school self-contained settings. As such, these results were interpreted in relation to illustrating the complexities associated with each of the quality domains identified

within the APERS as well as the intent to establish a clear framework of improvement for schools.

Each aspect of the APERS delineates specific components related to overall quality, however, each are intrinsically tied to multiple factors. Many, if not all, of the domains are dependent upon implementation by multiple personnel across multiple settings. Consider the domain of communication; communication is primarily associated with the speech therapist, however it is a shared domain with the teacher, as well as all individuals who interact with the student. Communication must be taught consistently using a variety of supports, such as individualized adaptive communication systems (Goldstein, 2002). Additionally, effective instruction in communication involves highly specific strategies, such as verbal behavior or sign language (Goldstein, 2002). However, within the APERS, scores indicated lacked of time for planned collaboration, shared decision making, as well as, a shortage of trained support staff. Therefore, systematic instruction in communication was not identified within many of the APERS conducted, which cannot be regarded as a singular issue related to speech services, but as a systemic issue within the program.

This type of issue also holds true for the domain of functional behavior assessment. Many students with autism demonstrate maladaptive behaviors and functional behavior assessment (FBA) is an evidence-based practice used to analyze both functions of the behavior as well as develop behavior intervention plans (BIPs; Wong et al., 2015). These plans are critical to the success of students across learning environments, however, they must be implemented consistently and with fidelity to the procedures outlined (Detrich, 1999). As such,

all staff who interact and support the student must be fully trained with clear channels of communication to support effective evaluation of the plan. However, per the domain area scores, time constraints were consistently reported, which affected both staff training as well as collaboration between teachers, specialists and parents. While each district that participated in this study employed a behavior analyst, many teachers reported limited access to these specialists, which directly impacted their ability to effectively address behavioral issues and impacted their score within this domain. Similar to communication, it would be easy to associate any limitations within this domain to a behavior analyst, however, it is clear that there are multiple factors affecting quality in this area.

Another area that impacted quality of programming in schools was the significant burden of responsibility on teachers. Research cited within this study reported inherent issues with expectations for teachers regarding the complexity of skills needed, lack of training coming into the field, lack of access to high quality training and lack of defined competencies (Barnhill, Polloway & Sumutka, 2011). These issues are then compounded when teachers are tasked with the oversight of paraprofessionals, who also have limited training. Consider the domain of curriculum and instruction: Critical facets of curriculum and instruction include the use of data to drive daily instruction as well as implementation of programs that formally target IEP goals. While many teachers employed individualized educational strategies to support students, implementation of these strategies was highly variable across classrooms and between districts. Additionally, data were collected in effective ways in some classrooms, however, there were highly divergent data collection practices and little agreement, even within

districts, of how to use data to inform instructional decisions. This presents issues for teachers in providing effective oversight and guidance to paraprofessionals who are also carrying out instruction. Furthermore, many teachers and staff demonstrated little use of prompting hierarchies, contingent reinforcement, generalization within programming and embedded use of strategies to address maintenance. These skills, while complex, are critical to effective educational programming for students with autism, however, they pose a challenge for teachers who are already overextended with little support from specialists (Locke et al., 2016).

The domain of social competence also exemplifies issues with responsibility. In order to address social skills needs within school-based settings, it is necessary to embed social opportunities within programs in different ways (White, Keonig, & Scahill, 2007). This requires collaboration with teachers as well as training for both staff and peers. Due to the fact that these opportunities are created for the students with autism, the responsibility of planning the activities as well as training peers and staff, falls to the special education teacher. While opportunities to interact with peers were present in many programs, neither peers nor staff were trained and carefully planned activities were not implemented. This was largely due to limited availability of special education teachers to conduct these activities as well as issues with accessing peers and staff to conduct training. Lack of structured social skills instruction was also noted in the classrooms as well. While these skills are essential to developing social independence as well as increasing self-efficacy across settings, teachers allocated little, if any instructional time to social skills instruction. Moreover, very little, if any materials were present in most classrooms to support this type of instruction. While it was clear that

this was not a prioritized domain in many schools, most teachers were aware of their limitations in this area and articulated the need for additional training, support and materials.

Lastly, and perhaps most importantly, these findings demonstrate general lack of knowledge that negatively impacts both decision-making and support for autism programs in schools. Administrative decisions for autism programs directly impact training, personnel, resources and planning time for staff. The domain of teaming clearly demonstrates the issues with informed decision-making in this area. Teaming, which pertains to the allocation of personnel as well as scheduling of time, directly impacts teachers' abilities to plan with one another as well as with related service providers. Limited collaboration was demonstrated across schools, which directly impacts instructional decisions and delivery of services across settings and personnel. While many team members were invited to contribute to important decisions, staff were very limited by time and resources. Teaming was also limited by lack of regularly scheduled meetings both across grade levels as well as with case managers and service providers. Without planning and communication within the schools, there are persistent issues with understanding program needs, assessing quality of instruction and providing appropriate supports and services to classrooms.

These findings articulate the need for a defined framework for decision making in schools. Defined expectations for both the classroom and school are needed to support leadership and appropriate organization of staff and instructional time (Locke et al., 2016).

Limited knowledge of teachers and case managers impacted instructional decisions and development of appropriate IEPs. Without a full understanding of student needs or appropriate assessments, instructional goals were frequently determined arbitrarily (e.g., using goals already in the IEP). Additionally, instructional strategies and supports practices were implemented without an understanding of fidelity and consideration of quality. Therefore, there was little understanding of *what* practices should look like, nor *how* to improve them. These components are critical factors to educational success, directly impact student progress, and influenced program quality scores within each APERS domain.

Although this study provides insight into how public schools are meeting the needs of students with ASD through the 10 identified domains, limitations in the diversity and number of the participants in this study need to be taken into consideration. In addition, future research is needed to explore and define expectations for teachers of students with autism with particular respect to uniqueness of their role within special education as well as the level of support needed from other team members. In addition, viable training modalities to increase knowledge within public school environments, specifically in respect to paraprofessionals and administrators, should be explored. This is emphasized by findings that indicate many of the current methods of professional development, including one day workshops, are ineffective in teaching educators how to meet student needs (Morrier et al., 2010). Finally, resources need to be developed to inform decision making in schools regarding autism programming and resources necessary to increase skill acquisition and reduce problem behavior.

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Applied Use of Video Modeling: A Survey of Autism Professionals

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While there are many evidence-based practices (EBPs) for teaching individuals with an autism spectrum disorder (e.g., video modeling), the adoption of these EBPs by practitioners does not occur automatically. Existing research suggests practitioners have a generally favorable opinion of video modeling (a noted EBP) as a teaching technique. However, limited research has examined the applied use of video modeling by practitioners. Using a survey instrument (the Video Modeling Perceptions Scale [VMPS]), data were collected from 510 autism professionals across various disciplines (e.g., special educators, speech-language pathologists [SLPs], and behavior analysts [BCBAs]). Data showed that many respondents were familiar with video modeling, were interested in the strategy, and utilized it with their students or clients with autism spectrum disorder (ASD). Factor analysis was used to examine the underlying structure of the survey instrument, revealing two predominant factors: (1) interest in video modeling and (2) perceived accessibility of video modeling. Multiple regression was used to examine which demographic characteristics (e.g., age and years of experience) associated with each factor. Results indicated that BCBAs and SLPs perceived video modeling as more accessible compared to special education teachers. Additionally, professionals who worked with preschool-age students, worked in a suburban location, and who had an extended family member with autism showed higher levels of interest in video modeling. Implications for the field of special education, its practice and future research are discussed.

The nature of social-communication and behavioral characteristics of individuals with autism necessitate that professionals use evidence-based practices (EBPs) for skills-instruction to achieve positive outcomes (Wong et al., 2014). Technological advancements have contributed to the development of computer- and video-based EBPs for skills-instruction. These technology-based interventions may be uniquely beneficial for individuals with autism spectrum disorder (ASD), who appear to show a particular affinity for technology (Balderez & Mehta, 2016; Matsuda & Yamamoto, 2014). Cardon, Guimond, and Smith-Treadwell (2015) suggest that video modeling in particular has become more popular, relevant, and practical for practitioners working with people with ASD.

Video modeling (VM), the demonstration of specific behaviors on a video clip, is now considered an established intervention for teaching social, play, and self-help skills to children with ASD (Shukla-Mehta, Miller, & Callahan, 2010). VM generally consists of an individual watching a video demonstration and then imitating the behavior shown in the video in a natural setting. Viewing the performance of a behavior is believed to assist the viewer to internalize and, at a future time, reproduce the behaviors observed in the video in a real-world setting.

Given that VM involves visual learning, it may capitalize on a preferred learning style for individuals with ASD. A survey of families of children with ASD reported that during leisure time, children with ASD tended to engage in high levels of interaction with electronic screen media (Shane & Albert, 2008). Also, watching videos seems to represent an activity that may be naturally reinforcing to individuals with ASD given that they tend to selectively direct their attention toward visual media (Cihak, Smith, Cornett, & Coleman, 2012).

Another perspective is that it may be easier for individuals with ASD to cognitively process information delivered through video. When compared to in-vivo instruction, videos tend to have fewer demands for social interaction and greater visual prompts (Cihak et al., 2012). VM has also been shown to be effective for acquisition and generalization of various skills such as social, communication, behavior, joint attention, play, school-readiness, academic, motor, and vocational skills for individuals with ASD (Wong et al., 2014). A common element in these studies is the potential for videos to be inherently reinforcing to individuals with ASD.

Despite research support for effectiveness of VM, it cannot be assumed that this intervention has been disseminated extensively to promote widespread use in applied settings. The potential of VM may be limited if those who work with individuals with ASD do not utilize it consistently (Cardon et al., 2015). There is little empirical attention devoted to the extent to which practitioners use VM to promote skill acquisition of people with ASD. A possible explanation is the assumption that practitioners readily adopt EBPs because they are identified and widely disseminated. However, adoption of EBPs does not occur automatically, leading to a research-to-practice gap, which could be explained through the diffusion of innovations theory.

Diffusion of Innovations Theory
The diffusion of innovations theory helps explain the process by which novel interventions (i.e., *innovations*) are disseminated into social systems (Rogers, 2002). If, when, and how an innovation is adopted depends on various factors including relative advantage (i.e., the extent to which the innovation is perceived as superior to what it is replacing) and complexity (i.e., the extent to which people perceive the innovation as less or more challenging to use). This theory provides a context for researchers to conceptualize how EBPs may be effectively disseminated. Researchers have made significant contributions to the body of knowledge on effective interventions for ASD but this knowledge has not yet fully impacted educational and clinical settings (Dingfelder & Mandell, 2011). Recognizing how dissemination occurs can aid researchers in promoting applied use of empirical results and connect EBPs with potential users (Rogers, 2002). If diffusion of innovations is recognized as a research priority, it increases the likelihood that effective interventions will be adopted by practitioners. As per this theory, the perspectives of professionals have a substantial influence on adoption of EBPs (Borders, Bock, & Szymanski, 2015; Callahan et al., 2015). Thus, it is critical for researchers to have a comprehensive understanding of practitioner perspectives on the applied use of VM to close the research-to-practice gap (Alexander, Ayres, & Smith, 2015).

Applied Use of Video Modeling
Currently, there is little research that directly measures the use of VM by practitioners. Articles in practitioner journals provide a proxy for examining applied use of VM for skills-instruction. However, the extent to

which professionals use VM remains unknown and the impact of such articles on bridging the research-to-practice gap is unclear. Another proxy measure for applied VM use is social validity. Published research on VM that included measures of social validity indicated that educators (1) enjoyed participating in VM (Bellini, Akullian, & Hopf, 2007); (2) believed that VM was worthwhile for students (e.g., Burckley, Tincani, & Guld Fisher, 2015); (3) stated the likelihood to continue using VM (e.g., Burckley et al., 2015; Smith, Ayres, Mechling, & Smith, 2013; Spriggs, Gast, & Knight, 2016; Taber-Doughty, Miller, Shurr, & Wiles, 2013); and (4) would recommend VM to others (e.g., Cihak et al., 2012). In one study (Cihak, Fahrenkrog, Ayres, & Smith, 2010), educators specifically expressed their appreciation of the portability of VM which permitted students to use it during transitions around the school.

Professionals have also reported that VM: (1) was not disruptive to classroom routines (Bellini et al., 2007); (2) was easy to implement (Murdock, Ganz, & Crittendon, 2013; Yakubova, Hughes, & Hornberger, 2015); (3) was socially acceptable (Cihak et al., 2012); (4) would be acceptable to other educators (e.g., Cihak et al., 2010); and (5) was not time consuming [to implement] (e.g., Spriggs et al., 2016; Yakubova et al., 2015). Professionals have also noted some potential barriers in the use of VM. For example, lack of access to relevant technology, lack of time to create videos (Taber-Doughty et al., 2013), and additional time needed for filming and editing self-modeling videos (Cihak & Schrader, 2008).

The social validity measures of these studies indicate that overall, professionals have favorable opinions about the use of VM. However, these social validity measures were based on a small number of participants in each study and do not necessarily reflect the opinions of the larger population of professionals. Also, these measures reflect how VM was perceived when it was part of a research study. Opinions regarding ease of use of VM could be different if the practitioners were responsible for creation of videos and implementation of intervention without support from researchers. It is possible that willingness to use VM may be influenced by these factors, but this aspect was not measured in previous research, making it difficult to evaluate the applied value of this intervention.

Individuals with ASD cannot benefit from VM if educators fail to use it. To facilitate the integration of research and practice on VM, it is beneficial to examine perspectives of and applied use by professionals, which is the purpose of this study. Specific research questions are:
1. To what extent are ASD professionals aware of and interested in VM?
2. To what extent do ASD professionals use VM for skills-instruction (e.g., frequency of use)?
3. What types of VM procedures do ASD professionals use? What specific types of skills do they teach their students/clients using video modeling?
4. What are perceived barriers to using VM among ASD professionals?
5. To what extent do educational and professional background factors predict levels of interest in and perceived accessibility of VM for skills-instruction?

Method
Research Design
A survey research design was used to examine the perspectives of professionals who work with individuals with ASD. Participant responses were gathered via a web-based questionnaire.

Participant Recruitment

Professionals were eligible to participate if they worked with individuals with ASD, were familiar with VM, and had certification in at least one of the following: special education teacher, speech-language pathologist (SLP), occupational therapist (OT), school psychologist or behavior analyst (BCBA®). Professionals were recruited from across the United States via distribution of flyers that linked to the online questionnaire. Participants were primarily recruited from public schools in the United States. The first author created a list of school districts in each U.S. state by through online searches. Using a random number generator, 25% of the public school districts on this list in each state were selected (approximately 1,950 districts). If these districts provided online contact information, the special education directors or other administrators were e-mailed to inquire if they would distribute the study flyer to their special education professionals. Additionally, printed copies of the flyers were sent via postal mail to eight ASD organizations for dissemination to members (see Table 1). The data collection period lasted about eight weeks after which four participants who elected to provide their e-mail address were randomly selected to receive a $25 gift card to an online bookstore.

Sample. A total of 674 participants initiated the online questionnaire. To be eligible, participants were required to provide an affirmative answer to the first item, that is, their familiarity with VM. Approximately 75% of the initial participants ($n = 510$) were eligible to participate and complete the remainder of the questionnaire.

Dependent Variables

The dependent variables were the composite scores on interest in and perceived accessibility of VM as measured by the questionnaires completed by participants.

Instrument. The 47-item questionnaire (Video Modeling Perceptions Scale; VMPS) initially developed by Cardon et al. (2015) to assess perspectives of caregivers of children with ASD, was modified for use by professionals in the current study. Changes included replacement of terms related to the role (teacher, service provider) and context (school, clinic) of the study.

Section I. The initial section (items 1-17) sought information about the applied use of VM. This section included items regarding skills that were taught using VM, number of individuals taught, types of VM procedures used (i.e., peer, self, or point-of-view), devices used to record and show videos, sources and frequency of use.

Table 1. *Organizations Contacted for Participant Recruitment*

Organizations	Number of Chapters Contacted
ASD-Specific Organizations	
Autism Society of America	95
Autism Speaks	17
Families for Effective Autism Treatment	15
Professional Organizations	
Association for Behavior Analysis International	42
American Occupational Therapy Association	50
American Speech–Language–Hearing Association	49
Council for Exceptional Children	47
National Association of School Psychologists	46

Section II. This section (items 18-22) contained items regarding interest in VM (e.g., "I would be interested in learning how to make my own videos to use with individuals with autism"). Participants responded to items with a Likert-type scale with five points, ranging from *agree completely* to *disagree completely* to indicate preference.

Section III. This section (items 23-29) included Likert-type items reflecting perceived accessibility of and barriers to use of VM (e.g., "I believe that the equipment required to implement video modeling with an individual with autism is too expensive").

Section IV. The background characteristics (items 30-47) included age, professional role, training received, age/grade levels of students or clients, years of experience, certification areas, employment, geographical employment area, number of people with ASD with whom they worked, highest degree received, and whether participants had a family member with ASD.

After an initial draft of the modified instrument was created, a preliminary item review was conducted by sending it to five doctoral students specializing in educational research, measurement, and statistics. They were asked to provide feedback on the items in terms of accuracy, wording, ambiguity, relevance, technical item construction, level of readability, inadvertent appearance of bias, and any other area of concern. Based on their feedback, minor changes were made to the wording of several items for purpose of clarity.

Subsequently, a preliminary test was conducted to pilot-test the instrument with paraprofessionals who were not eligible to participate in the study. A total of 33 paraprofessionals participated. No changes

were deemed necessary based on the analysis of responses to open-ended pilot test items. For two items, additional answer choice options were added based on responses to items that contained fields marked *Other, please specify*, followed by a text box for participants to type in a response. After these minor adjustments, the survey was uploaded on the Qualtrics online survey platform for dissemination.

Data Analysis
Descriptive statistics. Descriptive statistics (i.e., frequencies and percentages) were used to address the first four research questions on awareness, use, and perceived accessibility of VM. For the Likert-type items reflecting participant interest in and perceived accessibility of VM, frequencies and percentages of participant-reported agreements and disagreements were noted.

Factor analysis. An exploratory factor analysis was conducted to examine the underlying structure of the instrument for ASD professionals. In the original instrument for caregivers of children with ASD, Cardon et al. (2015) had conducted an exploratory factor analysis. Their analysis revealed two predominant factors, (1) interest in and (2) perceived accessibility of VM. Since the instrument was modified for a different population for the current study, an exploratory (rather than a confirmatory) factor analysis was conducted.

Multiple regression. Multiple regression was conducted to determine the extent to which background characteristics predicted both levels of interest and perceived accessibility of VM.

Results
Participant Personal, Educational, and Professional Background Characteristics
Of the 510 participants, the highest

percentages of professionals identified themselves as special education teachers (44.12%) or SLPs (21.57%). Smaller percentages included BCBAs (9.22%), school psychologists/counselors (8.24%), or OTs (6.27%). Participants in categories collectively termed *other* made up 10.59% of the sample. The *other* group generally included professionals from multiple categories (e.g., a participant with both special education and BCBA certifications), special education directors and administrators, and ASD consultants.

Participants had been working with individuals with ASD for a mean of 12.55 years ($SD = 8.42$), with a range of one to 40 years. Approximately half (57.45%) reported that they primarily worked with elementary-aged students (kindergarten–fifth grade); 15.69% with high school students (ninth–12th grade, including students receiving special education services through the age of 21); 13.73% with middle school students (sixth–eighth grade); 11.37% with preschool students (ages 3–4 years); 0.98% with infants or toddlers (birth–2 years of age), and 0.78% with adults over the age of 21. The majority of participants worked in either rural (46.08%) or suburban areas (37.45%), while 16.47% worked in urban areas. Participant ages ranged from 23 to 74 years, with a mean of 43.31 and a standard deviation of 11.58. In terms of EBP training, 88.24% of participants indicated that they had received formal training in EBP.

Awareness of Video Modeling
On the initial item in the questionnaire, respondents were asked if they were familiar with VM for teaching skills to individuals with ASD. A total of 674 participants responded to this item, with 510 (75.67%) responding affirmatively. Of these 510 participants, 172 (33.73%) reported they had received training on VM. Sources for training included workshops or conferences (73.84%; $n = 127$), independent study of books or journal articles (37.79%; $n = 65$), university classes (30.23%; $n = 52$), in-service training from employers (30.23%; $n = 52$), non-university online training (19.19%; $n = 33$), and other sources (6.98%; $n = 12$).

Interest in Video Modeling
Nearly all participants (90.2%) agreed or strongly agreed they were interested in using VM for skills-instruction. Most participants (86.27%) agreed or strongly agreed they were interested in learning more about VM and 75.88% agreed or strongly agreed they were interested in learning to create videos. An overwhelming majority (93.92%) of participants agreed or strongly agreed that VM would enhance services received by individuals with ASD.

Use of Video Modeling by ASD Professionals
The percentage of participants who reported using VM with at least one individual with ASD was 73.92% ($n = 377$). On average, participants reported using VM with approximately six individuals with ASD (mean = 6.03). In terms of frequency of video modeling use, 13.26% of participants ($n = 50$) reported using it daily, 34.22% ($n = 129$) used it weekly, 34.48% ($n = 130$) used it monthly, and 18.04% ($n = 68$) used it annually.

Participants reported using VM to teach social skills ($n = 330$; 87.53%), daily living skills ($n = 200$; 53.05%), language and communication ($n = 180$; 47.75%), replacement responses for problem behavior ($n = 179$; 47.48%), play skills ($n = 141$; 37.40%), gestures ($n = 74$; 19.63%), academic skills ($n = 66$; 17.51%), and other skills ($n = 24$; 6.37%). When asked to identify the one skill area they taught most often using VM, participants reported social skills ($n = 212$; 56.23%), daily living skills (n

= 52; 13.79%), replacement responses for problem behavior (n = 42; 11.14%), play skills (n = 25; 6.63%), language and communication (n = 24; 6.37%;), (n = 10; 2.65%;) academic skills, (n = 1; 0.27%;) gestures, and other skills (n = 11; 2.92%).

Participants were also asked to select all types of VM procedures they used for skills instruction. Data showed that participants used peer modeling (n = 313; 83.02%), self-modeling (n = 212; 56.23%) and point-of-view modeling (n = 103; 27.32%). When asked about the type of VM they used most frequently, participants reported using peer modeling (n = 246; 65.25%), self-modeling (n = 97; 25.73%), and point-of-view modeling (n = 34; 9.02%).

Subsequent items requested information on how participants obtained and showed videos. Participants noted they made their own videos (n = 276; 73.21%), found videos online (n = 203; 53.85%), used videos created by colleagues (n = 100; 26.53%), and/or purchased commercial videos (n = 98; 25.99%). Sixteen participants (4.24%) reported they used videos from other sources. Participants who created their own videos used various devices to record them including tablets (n = 218; 78.99%), cell

phones (n = 131; 47.46%), camcorders (n = 67; 24.28%), computers (n = 36; 13.04%), and other devices (n = 10; 3.62%). Devices used to show videos included tablets (n = 291, 77.19%), computers (n = 244, 64.72%), cell phones (n = 74, 19.63%), other devices (n = 61, 16.18%), and camcorders (n = 9, 2.39%).

Perceived Accessibility of Video Modeling among ASD Professionals
Almost 70% of participants (68.43%) agreed or strongly agreed they already owned the equipment to implement VM. Very few agreed or strongly agreed that this equipment would be cost prohibitive (11.38%). Participants reported confidence in their technological abilities, with only 10.19% agreeing or strongly agreeing that they lacked the technological skills to implement VM. However, many participants (47.45%) agreed or strongly agreed they would need additional training to implement VM effectively. In terms of efficiency of VM, 26.47% of participants agreed or strongly agreed that it would place extensive demands on their time.

Psychometric Properties of Instrument
An exploratory factor analysis used to examine the underlying structure of the

Table 2. *Total Variance Explained*

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.990	24.917	24.917
2	2.521	21.005	45.922
3	1.065	8.876	54.798
4	.968	8.063	62.861
5	.814	6.785	69.646
6	.751	6.262	75.908
7	.702	5.847	81.755
8	.531	4.424	86.180
9	.501	4.175	90.355
10	.485	4.038	94.393
11	.392	3.266	97.659
12	.281	2.341	100.000

Figure 1. *Scree plot*
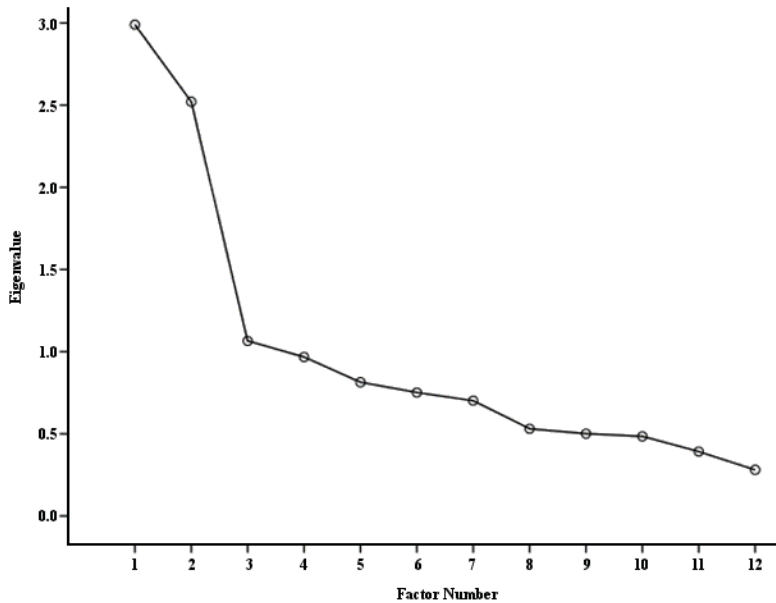
instrument revealed two factors: (1) interest in and (2) perceived accessibility of VM. Obtaining composite scores on these factors permitted examination (i.e., via multiple regression) of how participants view VM. The total variance explained by each of the extracted factors is shown in Table 2. Tinsley and Tinsley (1987) described the frequently used Kaiser's criterion in determining the number of factors extracted based on eigenvalues. Per this criterion, factors with an eigenvalue of 1.0 or greater should be retained in the analysis.

The extraction revealed three factors with an eigenvalue of 1.0 or greater. Based on examining the scree plot (shown in Figure 1) for a point in which the curve suddenly descends (Cattell, 1966) and comparing the relative variance accounted for by the extracted factors, only the first two factors were retained for the final analyses. Factors one and two accounted for 24.92% and 21.00% of the variance, respectively. Factor

three accounted for 8.88% of the variance, and had an eigenvalue of 1.065, barely above the cut-off point for Kaiser's criterion.

Based on the individual items correlating with each factor, the two retained factors were conceptualized as perceived accessibility of VM (factor one) and interest in VM (factor two). These interpretations are consistent with factors extracted by Cardon et al. (2015). The pattern matrix containing correlations of items to factors is displayed in Table 3. Using .30 or higher as a general guideline (Tinsley & Tinsley, 1987), six items correlated with factor one (28, 29, 30, 31, 32, and 34), four items correlated with factor two (22, 23, 24, and 25), and two items did not correlate with either of these factors (26 and 33).

Predicted Interest In and Perceived Accessibility of Video Modeling
Once a composite score on each factor was

Table 3. *Pattern Matrix Correlations for Individual Survey Items*

Item	Factors	
	1	2
Item 22: Would like to learn more about VM	−.140	.815
Item 23: Interested in using VM	.190	.717
Item 24: Interested in learning to make own videos	−.168	.760
Item 25: VM would enhance services individuals with ASD receive	.251	.556
Item 26: VM would replace services individuals with ASD receive	−.121	.089
Item 28: Already own equipment	.634	.044
Item 29: Equipment is too expensive	.484	.072
Item 30: Technological skills beyond my technical abilities	.642	.035
Item 31: Will place extensive demands on time	.467	−.011
Item 32: Would require additional training	.722	−.259
Item 33: Feel comfortable using pre-made videos	.000	.099
Item 34: VM lacks a personal component; individuals with autism would learn more effectively from one-on-one instruction	.472	.068

Summaries of survey items used and modified with permission from Cardon et al. (2012).

calculated (by summing the individual item scores) for each participant, multiple regression was used to examine how well demographic variables predicted the composite scores. The variables entered as predictors in each regression model were (a) years of paid experience working with individuals with disabilities; (b) years of paid experience working with individuals with ASD; (c) age; (d) professional role; (e) whether the participants had formal training on EBPs; (f) age/grade level of students or clients; (g) whether the participant worked in urban, suburban, or rural settings; (h) class type; (i) highest degree obtained; and (j) whether the participant had a family member with ASD.

Results indicated that the overall model predicting the composite score for perceived accessibility was statistically significant, F (23, 486) = 1.648, p = .030, accounting for 7.2% of the variance. Professional role of BCBA (p = .034), professional role of SLP (p = .016), professional role of *other* (p = .007), and formal training on EBPs (p = .008) were significant predictors of perceived accessibility. On this measure, a lower score indicates that a participant perceives VM as

more accessible. Compared to special education teachers, BCBAs scored 1.484 points lower, SLPs scored 1.225 points lower, and participants who identified as *other* scored 1.752 points lower. Occupational Therapists and school psychologists did not have significantly different scores compared to special education teachers. The final variable identified as a significant predictor for perceived accessibility scores was whether the participants had formal training on EBPs. Participants with this training on EBPs scored 1.481 points lower compared to participants with no formal EBP training, indicating that participants with EBP training perceived VM as more accessible. All other predictor variables (e.g., age, years of experience, age of students/clients, highest degree obtained) were not found to be statistically significant.

The overall regression model predicting the composite scores of interest in using VM was statistically significant, F (23, 486) = 1.867, p = .009, accounting for 8.1% of the variance. When analyzing predictor variables individually, having a student/client in the age range of three to four years (p = .045),

working in a suburban location ($p = .028$), having a doctoral degree ($p = .036$), and having an extended family member with ASD ($p = .044$) were significant predictors of the interest in VM composite scores. On this measure too, lower scores reflect a higher level of interest in VM. Participants who worked with children ages three to four years scored .667 points lower compared to participants who worked with elementary school-aged children (kindergarten through fifth grade). Participants working with other age groups did not have significantly different scores. Participants who worked in suburban areas scored .492 points lower than those working in rural areas, and those who had an extended family member with ASD scored .513 points lower compared to participants who did not have a family member with ASD. The only independent variable associated with a lower level of interest in VM was having a doctoral degree. Interestingly enough, when compared to

participants who had a master's degree, participants with a doctoral degree scored .936 points higher. All other predictor variables were not found to be statistically significant.

While statistical significance was obtained for several explanatory variables for each factor, additional information is needed to evaluate the practical significance of these findings. A statistically significant result indicates that the differences between the groups were unlikely to be the result of chance alone. Calculating a measure of effect size may provide an estimate of the magnitude of these differences (Ferguson, 2009). The effect size measure used in this study was Cohen's *d*, an estimate of the magnitude of difference between groups (Ferguson, 2009). Using this method, the following effect size estimates (displayed in Tables 4 and 5) were calculated for the statistically significant explanatory variables.

Table 4. *Effect Sizes for Factor One (Accessibility of Video Modeling)*

Statistically Significant Explanatory Variable	Composite Score Comparison	Compared To	Cohen's *d*	General Interpretation
Had EBP Training	Perceived as more accessible	No EBP Training	0.45	Medium
Professional Role (BCBA)	Perceived as more accessible	Professional Role (Special Education)	0.36	Medium
Professional Role (SLP)	Perceived as more accessible	Professional Role (Special Education)	0.30	Medium
Professional Role (Other)	Perceived as more accessible	Professional Role (Special Education)	0.47	Medium

Table 5. *Effect Sizes for Factor Two (Interest in Video Modeling)*

Statistically Significant Explanatory Variable	Composite Score Comparison	Compared To	Cohen's *d*	General Interpretation
Preschool-Age Students/Clients	Higher interest	Elementary-Age Students/Clients	0.22	Medium
Working in Suburban Area	Higher interest	Working in a Rural Area	0.21	Medium
Having a Doctoral Degree	Lower interest	Having a Master's Degree	0.49	Medium
Extended Family Member with ASD	Higher interest	No Family Members with ASD	0.19	Small

Discussion

The purpose of this study was to examine opinions of professionals on their use of VM for skills instruction for individuals with ASD, including awareness, applied use, interest in, and perceived accessibility of VM. Data revealed that most respondents were familiar with VM (75.67%). Similarly, Borders et al. (2015) found that 61% of teachers of students with a hearing impairment were familiar with VM. Nearly all participants in the present study (90.2%) strongly agreed or agreed that they were interested in using VM.

In an extensive review of numerous EBPs for teaching individuals with ASD, Callahan et al. (2016) found that 39.4% of 66 published studies specifically on modeling (including VM), reported collecting data on social validity measures. In other words, not all researchers collect data on social validity measures, an important consideration in attempting to bridge the research-to-practice gap. Similar to the opinions expressed by participants in the current study, social validity measures included in published VM research have indicated professional interest in video modeling as an instructional strategy (e.g., Burckley et al., 2015).

Various factors may account for these high levels of awareness of and interest in VM. In light of VM being listed as an EBP for individuals with ASD in recent years National Professional Development Center on ASD (2014; NPDC), additional VM resources for professionals have become available (e.g., implementation guides and scripts available from the NPDC). These resources are designed to facilitate the implementation of EBPs among practitioners, an important step in bridging the research-to-practice gap. Per the diffusion of innovations theory, the publication of research alone is not sufficient to promote

applied use of EBPs (Rogers, 2002). Availability of resources (e.g., implementation guides and scripts) can assist practitioners with how to use EBPs. Individuals may be less likely to adopt a new EBP if they perceive it to be difficult to understand and use (Dingfelder & Mandell, 2011; Rogers, 2002). Therefore, EBP dissemination efforts that facilitate ease of use of VM for practitioners in the field may account, at least in part, for the levels of interest in using VM.

Another possible reason that professionals may have high levels of interest in VM is that they may have been trained on EBP as part of their professional preparation programs or in-service training. In the present study, 88.24% of professionals stated they had formal training on EBPs for individuals with ASD. Individuals who have such training may also influence EBP use among their colleagues. The diffusion of innovations theory suggests that individuals form viewpoints on innovations based on the opinions of members of their peer groups who already use the innovation (Rogers, 2002). Thus, professionals with training are in a unique position to facilitate EBP use with other professionals. Additionally, it is possible that professional interest in VM may be related to the increased availability of various portable devices including cell phones, tablets and laptops to create videos. Domingo and Garganté (2016) found that teachers had been using tablets in classrooms for a mean of 3.74 years.

Participant characteristics associated with greater perceived accessibility of VM included a professional role of either a BCBA or SLP and training on EBPs. These results may further indicate the importance of training. BCBAs, by nature of their field, have training in data-based decision-making and EBPs. This may account for their

perception of an EBP (in this case, VM) as more accessible. Among all professions surveyed, having training on EBPs seems to influence the perception of VM as more accessible for obvious reasons.

Implications for Practice

Given that training in EBP was associated with greater perceived accessibility, additional opportunities for such training in both pre-service and in-service training programs may be beneficial. In addition to general training on the concept of EBP and training on specific EBPs, professionals could also be provided training on ways to locate and evaluate studies as well as how to implement prescribed intervention procedures (Alexander et al., 2015). This would give professionals the skills to locate, understand, and use interventions based on empirical evidence.

Since only 68% of professionals in this study indicated they already own the necessary equipment, another potential training topic might be ways that professionals can use equipment they already own to implement VM, including iPods (e.g., Cihak et al., 2010), computers (e.g., Mechling, Ayres, Purrazzella, & Purrazzella, 2014), or mobile devices (e.g., Smith, Shepley, Alexander, Davis, & Ayres, 2015). Almost one-half of participants (47.45%) indicated they would need additional training to effectively implement VM, so providing these opportunities may help professionals feel more comfortable with using VM.

Collaboration among professionals may also provide an opportunity to increase the knowledge and accessibility of effective instructional practices (e.g., VM). In this study, BCBAs and SLPs were more likely to view VM as accessible, and these professionals were also identified by participants as potential sources of

information about VM. "When asked how they could learn more about VM, the individuals most frequently selected by participants were BCBAs (69.22%), special education teachers (63.14%), and SLPs (61.96%)." Opportunities for collaboration with these professionals can facilitate the dissemination and applied use of EBPs due to the social components of the diffusion of innovations theory (Dingfelder & Mandell, 2011). When some members of a social group (e.g., practitioners at a school or clinic) adopt an innovation, it may increase the likelihood that others will also adopt the innovation (Alexander et al., 2015; Jones, 2009). Professionals working on multidisciplinary teams can share knowledge and resources on VM and EBPs and support each other in using them effectively.

Limitations and Directions for Future Research

One limitation of this study that should be considered is the non-random sample. While it is not uncommon for such sampling methods in online survey research, they do present some limitations. Results cannot necessarily be assumed to represent the larger population of ASD professionals. There is also the potential for bias based on individuals who self-selected to participate in the study compared to those who elected not to participate.

Caution should also be exercised when looking at multiple regression results for several survey items. For items 41 and 42 (i.e., years of experience working with individuals with disabilities and ASD, respectively), the potential for multicollinearity exists (relating to their correlation of .807) and should be further examined. Multicollinearity (i.e., explanatory variables that have high correlations with each other), makes it difficult to examine the independent effects

of each variable. Future research may remove one of these items.

In general, more research is needed on the use of EBPs in applied settings by ASD professionals. Few studies have examined these specifically for video modeling (e.g., Borders et al., 2015; Cardon et al., 2015). One specific area for future research relates to the evaluation of the revised VMPS instrument itself. Since the instrument was significantly revised from the original version for caregivers, additional research on its psychometric properties should be conducted before the revised instrument could potentially move into more widespread use. Ideally, an exploratory and confirmatory factor analyses should be conducted with two different samples with additional statistical procedures (e.g., multiple regression) with a third sample.

When feasible, researchers might also explore the applied use of EBPs with direct observation of teaching in the classroom or clinic (Jones, 2009). Given the inherent limitations associated with the indirect measurement methods of interviews and surveys (i.e., self-reports may lack detail, cannot be verified for accuracy, and may be inaccurate or false), future research could examine the fidelity of implementation (FOI) of VM in applied settings, with and without implementation guides. FOI, the extent to which an intervention is delivered according to the protocol or model, is critical to ensure that EBPs are used in an effective manner.

Examination of the manner in which professionals use VM in applied settings relative to the implementation presented in published research would be useful in planning future studies that are meaningful to practitioners. The diffusion of innovations theory suggests that individuals may place more trust into the opinions of their close acquaintances and colleagues, rather than published research (Rogers, 2002). More research into the nature and extent of this disconnect may be useful in reducing the research-to-practice gap.

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Use of Social Narratives as a Standalone Strategy to Decrease Shouting Out Behaviors of a Child with Autism in a General Education Setting

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The purpose of this study was to evaluate the use of the social narrative as a standalone strategy to decrease shouting out behaviors in the school setting for a third-grade boy diagnosed with autism. A social narrative, addressing shouting out was used throughout the school day and then again after each incidence of shouting out as an intervention to decrease the problem behavior of shouting out. An A-B-A-B reversal design was used in order to determine if the behavior was under experimental control. Data were collected using frequency recording continuously throughout the school day, in the general education setting, beginning at the start of the school day through the end of the school day. Results indicated that the social narrative method was an effective means of decreasing problem behaviors for the student in this study. Further research is needed to study the effects of the social narrative intervention as an evidence based practice.

Inclusion of children with autism in the general education setting with the provisions of accommodations is an important and established activity (Chandler-Olcott & Kluth, 2009; Laurence & Orsak, 2006; McCauley & Fey, 2006). The social narrative approach, in particular, is a widely accepted ongoing practice used as a means to accommodate the social and communication skills often identified with the condition of autism (Green et al., 2006; Hess, Morrier, Heflin, & Ivey, 2008). A social narrative is designed to provide individuals with language or other communication issues with an understanding of academic and behavioral expectations through a series of images or words which visually represent information a student needs in order to participate in any social setting (Gray, 2004). The use of the social narrative strategy has been touted as being particularly helpful in inclusion settings, as the approach is simple and can be used with all members of the class in a non-intrusive manner (Chan & O'Reilly, 2008).

Provision of the social narrative as an accommodation is rarely delivered in isolation. The social narrative strategy is typically a part of a simultaneously delivered complementary set of accommodations, e.g., social narrative, token economy, and verbal praise. The exact impact of a social narrative strategy is difficult to separate from multiple interventions which usually accompany delivery of this technique. The social narrative approach is widely used as an intervention for children with autism spectrum disorders (ASD) but how this approach is applied is typically confounded with the pairing of other accommodations, such as such as prompting and operant reinforcement (Ali & Frederickson, 2006;

Reynhout & Carter, 2006; Sansoti, Powell-Smith, & Kincaid, 2004). Until the effect of the social narrative is separated from other forms of accommodations, teachers and interventionists will not be able to identify the impact of the strategy on individual children.

Presently little systematic study of the efficacy of a social narrative as an intervention detached from other forms of accommodation or modifications exists (Reynhout & Carter, 2006). The need for evidence based practices (EBPs) is important for teachers when making decisions related to educational programming (Farley, Torres, Wailehua, & Cook, 2012). As mandated by the Individuals with Disabilities Education Act (IDEA, 2004), teachers are expected to use interventions supported by research. Practices popularly used in the classroom for children with autism often are not supported by sufficient research, that is, approximately two thirds of strategies used in public schools are not sufficiently supported by research (Hess et al., 2008). Sani Bozkurt and Vuran (2014) conducted a meta-analysis of single-subject studies where social narratives were used to teach social skills to students with ASD. Results indicated the need for more research to further support the effectiveness of social narratives as an evidence-based practice.

The social narrative has been used to increase desired behavior as well as decrease dysfunctional behaviors (Jaime & Knowlton, 2007; Schneider, & Goldstein, 2010). Although research is limited, some promising results are beginning to emerge. Scattone, Tingstrom, and Wilczynski (2006) used a social narratives intervention targeting appropriate social interactions. The intervention was successful for two of the three participants. In another study, Chan

and O'Rielly (2008) studied the effects of reading social narratives, asking comprehension questions and then role playing as a whole treatment package to decrease behaviors in an inclusive environment. The results showed a dramatic decrease in unwanted behavior and were maintained for at least 10 months, but not beyond. Another study revealed that social narratives can decrease frustration behavior while completing homework and can be generalized across settings (Adams, Gouvousis, VanLue, & Waldron, 2004). Research suggests it is easy to write and deliver this intervention with high treatment integrity and acceptability (Olcay-Gul & Tekin-Iftar 2016).

Although a modicum of research supporting the use of social narratives to improve problem behavior has surfaced, results may be confounded in that the social narrative is typically not an intervention delivered in isolation. A review of the literature has revealed only 15 studies examined the use of social narratives as the sole intervention (Chan, 2009). Because much of the research on the effectiveness of social narratives has also included interventions used in conjunction with social narratives, the results have masked the effect of the social narrative as a contributor in changing behavior. A study conducted by Agosta, Graetz, Mastropieri, and Scruggs (2004), for example, supported a decrease of problem behaviors with the use of social narratives, however the authors could not rule out the effects of tangible reinforcers that were used simultaneously.

The effect of the social narrative, as standalone intervention has important implications for ongoing instructional practice in inclusion settings (Kokina & Kem, 2010; Qi, Barton, Collier, Lin, & Montoya 2015). In addition to a need to

collect additional empirical research on the effectiveness of this practice, long term studies need to be conducted to validate the generalization and maintenance of skills taught through the social narrative (Scattone, Wilczynsko, Edwards, & Rabian, 2002). Using the social narrative as an effective way to increase appropriate behaviors and decrease problem behaviors may not modify behavior for all students. Results of the few studies which used social narratives as a solitary intervention and not as part of treatment package have found mixed results (Toplis & Hadwin, 2006). In an attempt to increase independence at lunch time, for example, Toplis and Hadwin conducted a study with five children using the social narrative approach. Although three of the five children's independent behaviors increased, the other two children demonstrated no change. Mixed results have been found when pre-service teachers attempted to implement a social narrative intervention to three students with autism in the general education classroom. Data were collected on student behavior under immediate and delayed (several hours) exposure to the social narrative. Results indicated some improvement in classroom behavior following social narratives but no differences between the immediate and delayed conditions. The results of this study suggest that social narratives may not work in isolation as a powerful strategy in terms of behavior change, but may present an uncomplicated classroom intervention (Chan et al., 2011).

Sansosti et al. (2004) concluded the need for further research is necessary, not just because of the promise of the social narrative as an intervention (Ali & Frederickson, 2006), but because the social narrative strategy or variations would continue to be used regardless of the current lack of research supporting the social narrative as a standalone intervention. The purpose of this study was to evaluate the effectiveness of using social narratives as an isolated intervention in the general education setting with a child diagnosed with autism.

Method

Participant

The participant in this study was a third-grade boy named Tom. Tom was 8 years 10 months old at the initiation of this study. Tom had an educational diagnosis and medical diagnosis of autism. He performed at or above grade level across all academic standards and benchmarks. He participated in the general education setting with the support of a paraprofessional throughout the school day. Tom's fine motor, gross motor and speech were age appropriate. Tom was verbal and was able to use grade level vocabulary. He enjoyed talking and sharing information that he knows. Tom struggled with when he should and should not share information. Tom also struggled with waiting to share information or the appropriate way to share information in the school setting. Tom's shouting out impeded the learning of others, as well as his own learning. Tom's shouting out made participation in the general education setting difficult for him and his classmates. Shouting out was defined as Tom using his voice during the school day, without permission, to answer, ask or comment on what someone has said or done in the school setting, using a tone louder than those around him. Shouting out was not when the teacher asked a question directly to the participants or if they raised their hand and waited until the teacher calls on them to answer. The behavioral objective for Tom was: When using a social narrative, Tom would decrease the daily number of incidences of shouting out behavior when

participating in the general education setting to five or fewer for three consecutive days.

Setting
The general education setting was at the second-grade level. This class provided service for 21 students with four being given special education assistance. One of the four students was classified as autistic. The class was staffed by a full time general educator and paraprofessional with part time assistance by a special education teacher. The special education teacher team taught a 60-minute math class and a 20-minute social skills lesson daily. The special education teacher would also make between 3-5 randomly scheduled visits lasting from 2 to 10 minutes during each day.

When not in large or small group instruction, the children completed their work in pods with between 4-6 learners to a pod. The children sat at small group table for more individualized instruction and for large group instruction at a carpet space. While students were at learning stations, the special education teacher would randomly pull children for about 20 minutes for instruction in social skills. During this time, classroom peers served as models and provided interaction under teacher supervision. No special training was given to the peer models. Small group instruction was rotated as was one-on-one as needed. Regardless of instructional event, any time Tom shouted out he received the intervention in the classroom.

Intervention
In order to change the behavior of shouting out, an alternative response needed to be taught (Cooper, Heron, & Heward, 2007). A socially appropriate alternative response to shouting out is teaching Tom to raise his hand and wait to be called on by the teacher when he wants to answer a question or share

information. In order for the alternative behavior to take the place of the problem behavior, a reinforcer needed to be put into place. A possible reinforcer could be the use of a positive punisher (Cooper et al., 2007). Every time Tom shouted out, he read a social narrative about raising his hand and waiting his turn to be called on. The objective was to decrease the number of incidences of shouting out in the general education setting and improve the learning environment for Tom and his peers.

The social narrative provided to the student consisted of six sentences which provided descriptions of expected behaviors and consequences. No images accompanied the social narrative. The six lines were as follows:

1. When I have information to share, I need to remember to raise my hand.
2. When I raise my hand, my teacher knows I have something to say.
3. When I shout out, my friends can't share.
4. When I raise my hands and my friends raise their hands, my teacher knows that we have something to say.
5. When I raise my hand and my teacher calls on me, I feel good.
6. I like to share information at school and when I raise my hand, it makes me and my teacher feel happy.

The learner had the mechanical and comprehension skills to read the material, but he also practiced reading the sentences out loud immediately following the five days of baseline and prior to starting the intervention. This additional practice was to ensure that the learner was able to use the social narrative independently and was familiar with the process.

Once the intervention was initiated, the student read the information sub vocally and independently. The instructional team,

consisting of the special education teacher, the general education teacher and the paraprofessional, set up the intervention so that the learner read at the beginning of the day, immediately before math and then again before and after lunch, i.e., the independent reading of the social narrative occurred approximately every hour and a half every day. In addition, if the student shouted out, he was directed to read his story. When he did raise his hand, he was provided with typical verbal reinforcement, e.g., good job, thanks for raising your hand.

Social validity of intervention. At the beginning of the school year, the general education teacher reported that she had a difficult time with the student. He did not wait to be called upon, but rather shared information without permission regardless of subject or time of the lesson. He was disruptive to his peers and taking away chances for others to participate.

The general education teacher, the special education teacher, and the paraprofessional considered shouting out a high priority target behavior. Because the student was academically bright, the team wanted to keep him in the classroom so that he would not miss any learning opportunities. He needed to be in the classroom to practice the appropriate behavior and did not need to be pulled out of the classroom so they considered social narrative as a viable and nonintrusive intervention for the student.

Implementation
An ABAB reversal design was implemented. During the baseline phase, the natural occurrence of shouting out behavior was observed without the intervention of social narrative and data were collected for five days. During the intervention phase of the study, Tom read a social narrative about shouting out at the beginning of the school

day, before lunch, right after lunch and after math class (approximately every 1.5 hours while in school). He read the social narrative as a consequence to any incidents of shouting out throughout the school day. Each time Tom shouted out during the day, an adult working with him (general education teacher, special education teacher or paraprofessional) said, "Remember, we raise our hand when we have something to say" and then the adult prompted Tom to go and read the social narrative. When Tom raised his hand instead of shouting out, the staff member leading the discussion provided him with verbal praise for not shouting out and for raising his hand when he had something to say. Prior to the start of the intervention phase, but after the baseline phase, Tom was introduced to the social narrative. Once data were stable, the baseline phase was reinstated. After five days of baseline data, the intervention was put into place. Each time Tom shouted out in the general education setting, he would be directed to read his social narrative with the paraprofessional, special education teacher or general education teacher. He would also read the social narrative at scheduled times each day with the paraprofessional.

Implementation went well. Tom attended school each day as did the paraprofessional, general education teacher and special education teacher. Data were continuously collected throughout the school day. Tom responded well to the prompt to read the social narrative after shouting out. No other negative behaviors developed as a response to the adult prompt to read the social narrative.

Intervention fidelity. The instructional team met once a week to formally review anecdotal records, field notes, implementation procedures, and data sheets. In addition, the special education teacher

observed the implementation of the social narrative at least once a day to double check that the implementation procedures were followed with integrity.

Data Collection

Data were collected using frequency recording continuously throughout the school day in the general education setting, beginning at the start of the school day through the end of the school day. The total number of shouting out incidences were recorded and totaled at the end of each day. Every time an incident of shouting out occurred, the event was recorded on a data sheet (see Figure 1). Data were collected by the special education teacher as well as the paraprofessional that worked with Tom throughout the day.

Interrater reliability. The team defined the target behavior and reviewed data collection procedures at least once a week to check for observer bias. The special education teacher served as an additional observer with the paraprofessional and maintained 100 % reliability across the observations of the target behavior.

Results

During the initial baseline phase, Tom averaged 24 incidences of shouting out over the course of five consecutive school days (Monday through Friday). When the intervention was in place, the average incidences of shouting out decreased from 24 in baseline to 6.2 during the first 5-day implementation of the intervention and from 22.6 in the second baseline phase to 5 instances on average during the second intervention phase (see Figure 2). Thus, it appeared that Tom's behavior was under the control of the intervention.

Discussion

The intervention was effective in decreasing shouting out behaviors in the general education setting for Tom. During the second baseline phase of the reversal design, the frequency of shouting out incidences increased to numbers similar to the first baseline phase indicating that the behavior was under control of the intervention (Cooper et al., 2007). Tom was able to meet his goal of decreasing shouting out behaviors to five or fewer for

Figure 1. *Data Recording Sheet*

		Monday	Tuesday	Wednesday	Thursday	Friday	TOTAL
8:00-8:30	Reading						
8:30-9:00	Reading						
9:00-9:30	Writing						
9:30-10:00	Math						
10:00-10:30	Math						
10:30-11:00	Math						
11:00-11:30	Lunch						
11:30-12:00	Recess						
12:00-12:30	Social Studies						
12:30-1:00	Science						
1:00-1:30	Centers						
1:30-2:00	Centers						
	TOTAL						

Figure 2. *Tom's Frequencies of Shout Outs*
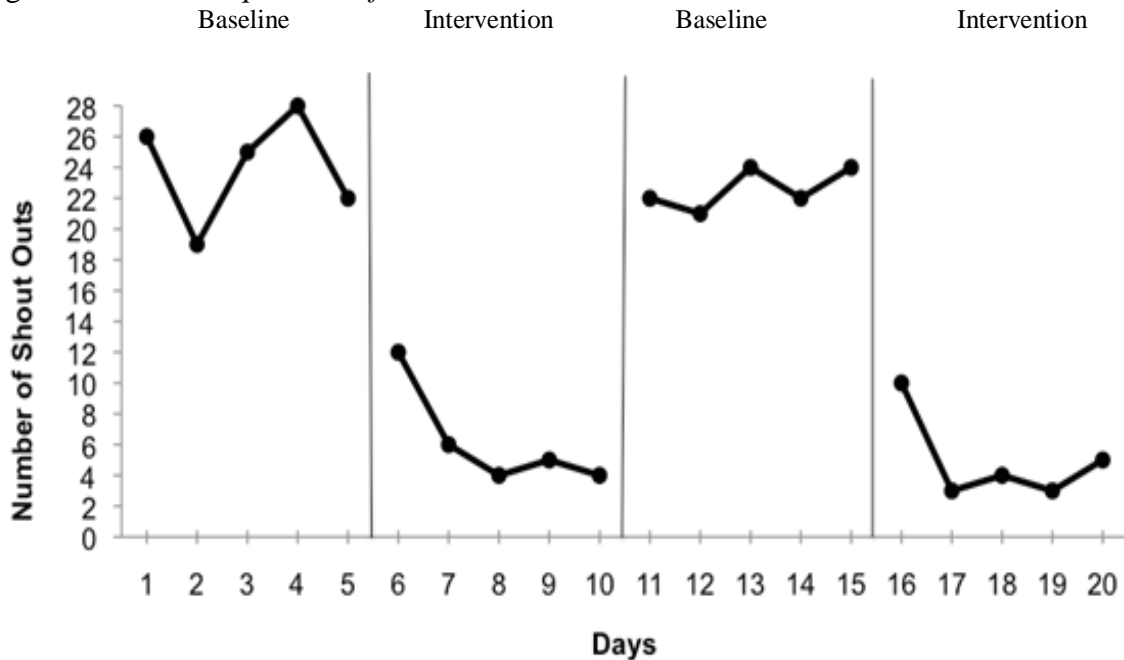
three consecutive days. Since data reflects that the behavior is under the control of the intervention, the recommendation would be to continue the intervention.

This study adds to the research that social narratives may be used as a standalone intervention to decrease problem behaviors (Qi et al., 2015). As a singular intervention, without being part of a treatment package, social narratives may work as an effective intervention for some participants (Toplis & Hadwin, 2006). This is practical in the school setting because it can be implemented within the general education classroom without interrupting the natural environment (Chan & O'Reilly, 2008) and provides a real-world example of how to address a problem behavior, teach a replacement behavior, and collect data. It is important to add to the research on the effectiveness of social narratives because it is a very common intervention (Sani-Bozkurt & Vuran, 2014; Sansosti et al., 2004).

A limitation of the study is the amount of time and thought that needs to be put into the intervention may hinder its use in the school setting. From a teacher's stand point, it may difficult to implement this intervention and collect data if there is not additional staff to help support the intervention in the various areas of concern.

In addition, an adjustment that could be made to this current study is to schedule check back times in the future to test for maintenance of the skill learned through the social narrative intervention. Studies to support the long-term effects of social narrative as an effective intervention (Chan & O'Rielly, 2008) have not yet been documented.

Also, in this study, the team approach was very successful, but in an inclusion setting with one teacher ease of implementation is still to be investigated. The use of the reversal design attests to the durability and internal validity of this intervention with this particular child, however, generalizability to

other settings and children is not warranted. Despite this, information gleaned from this study provides data based on an individual success, and suggests evidence of procedural effectiveness when used to intervene on inappropriate social behaviors.

The use of social narratives as a standalone intervention in a general education setting was relatively easy to implement, was not intrusive, and did not take away a lot of teaching time. The ease of use and simplicity are important characteristics of strategies that are implemented in large classes typically found in a general education setting. The strategy is realistic in that the use of the social narrative doesn't require the student to leave the classroom or to draw unnecessary attention to the intervention. The social narrative was very successful with the student in this study by promoting appropriate social interaction and very helpful to the teacher who was able to maintain better instructional flow once the interruptions were diminished. The teacher

and the student both gained instructional time. Additionally, the intervention is easy to reinstate as well as discontinue. An anecdotal account of the student's behavior suggested a positive and long-term effect of the social narrative as an intervention. The student did not use the social narrative all summer or at the beginning of the third grade because his behavior was appropriate. For reasons unknown, by Thanksgiving he needed a reminder about controlling his shout outs and the social narrative was reinstated and used until Christmas. For the remainder of the school year, the student's behavior remained appropriate and the intervention was no longer needed to control shout outs. The results of this study as well as future research will extend the empirical evidence in the literature regarding the effects of social narrative and provide teachers with a scientific basis for making instructional decisions about the use of the social narrative as an intervention for decreasing disruptive behavior.

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Training Caregivers to Establish Joint Attention in Children with Autism through Storybooks

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This study evaluated the effectiveness of a caregiver intervention called Meaningful Interactions Through Storybooks (MITS). The MITS intervention was created to teach caregivers of children with autism four interactive reading strategies in an attempt to increase children's joint attention skills using storybooks. A multiple probe across dyads was used to examine the effectiveness of the MITS intervention. Results indicated that caregivers were able to effectively implement the MITS intervention. In addition, increases in the children's joint attention skills and expressive language were observed. As a result, these findings support that the MITS intervention produced changes in caregivers' storybook reading strategies.

Bruner's (1978) research has demonstrated that young children comprehend the world around them through joint interactions. Described as two persons sharing attention on the same external object through the use of gaze or gestures, joint attention (JA) is considered a fundamental milestone in part because it contributes to a child's learning of a variety of object labels, thus enabling a child to make sense of language around them (Jones & Carr, 2004; Murray et al., 2008; Vismara & Lyons, 2007). For children with autism spectrum disorder (ASD), the lack of JA results in the difficulty of the acquisition of language and social skills (Schertz & Odom, 2007; Vismara & Lyons, 2007). Through the use of JA interventions, positive results have been shown for children with autism in the areas of responding to JA bids and initiating JA with others (e.g., Ingersoll & Schreibman, 2006; Isaken & Per Holth, 2009; Jones & Feely, 2007; Martin & Harris, 2006; Taylor & Hoch, 2008; Whalen & Schreibman, 2003).

Joint Attention and Development of Language Skills

The relationship between JA and language development has been long acknowledged (Farrant, Murray, & Fletcher, 2011; Tomasello & Todd, 1983). For example, Tomasello and Todd's (1983) seminal study examined the effects that JA had on language development during mother-child play. The typically developing children were between the ages of 12 to 18 months and were observed during natural play interaction with their mothers. Tomasello and Todd reported that the amount of time the dyads spent in joint focus of an object or event positively correlated with the child's overall vocabulary. The study was replicated comparing singletons to twins (Tomasello, Mannle, & Todd, 1986) and results were similar, showing positive correlation between the amount of time a child was engaged in JA at 15 months to vocabulary size at 20 months.

Joint Attention Impairment in Individuals with ASD

Children with ASD have significantly more difficulty following head turns, eye gaze, and pointing than their typically-developing peers (Ingersoll & Schreibman, 2006; Jones & Carr, 2004; Jones & Feeley, 2007; Murray et al., 2008; Vismara & Lyons, 2007). Due to the impairment of JA that children with ASD display, the syntax and semantics of language that are usually acquired during this pertinent stage of development are repressed. Therefore, the strategies and techniques that are acquired to use the pragmatics of language effectively need to be explicitly taught.

Effective Early Interventions for the Population of ASD

Typical children naturally learn from the environment around them; unfortunately, for the majority of children with ASD, this is not always the case. Researchers have conducted numerous studies to identify the most effective ways to teach new skills to children with autism and discrete trial and naturalistic intervention model techniques have been particularly effective strategies used in early intervention (Kasari et al., 2010; Schertz & Odom, 2007; Vismara & Lyons, 2007). A naturalistic intervention method uses objects of the child's interest and common turn-taking play activities to increase a child's motivation to acquire new skills (Ingersoll & Schreibman, 2006; Koegel & Koegel, 2006). The naturalistic intervention approach emphasizes the importance of parents as the primary agent (Koegel & Koegel, 2006). Koegel and Koegel (2006) state the goals of naturalistic intervention methods "are to move individuals with autism towards a typical developmental trajectory by targeting a broad number of behaviors and providing children with autism the opportunity to lead meaningful live in natural, inclusive settings" (p. 4). There are numerous studies (i.e.,

Kasari et al., 2010; Schertz & Odom, 2007; Vismara & Lyons, 2007) that show positive JA gains in children when a naturalistic intervention was provided by a caregiver. Interventions involving naturalistic intervention methods provide embedded opportunities for instruction within everyday activities, thus making it easier to integrate the interventions components into a family's everyday routine.

Shared Storybook Reading Interventions with Children with ASD

JA is situated early on in the caregiver-child relationship (Bakeman & Adamson, 1984). Typically, these interactions happen during familiar routines and daily interactions. Shared storybook reading is a natural activity in which a caregiver and child partake in joint interactions that utilize JA skills (Fletcher, Perez, Hooper, & Claussen, 2005; Fleury; 2015; Fleury & Schwartz, 2017; Whalon, Hanline, & Davis, 2016; Whalon, Martinez, Shannon, Butcher, & Hanline, 2015). In addition, shared storybook reading is an evidence-based literacy intervention that has demonstrated effectiveness in increasing emergent literacy skills for the majority of children (Beauchat, Blamey, & Walpole, 2009; Fielding-Barnsley & Pudie, 2003; Justice & Ezell, 2002; Justice, Kaderavek, Fan, Sofka, & Hunt, 2009; Lane & Wright, 2007). This interactive intervention advocates the growth of language and social participation, two core deficits for children with ASD (American Psychiatric Association, 2013). This technique not only increases a variety of developmental skills for many children, but also allows caregivers to tailor the intervention to suit their child's specific interests.

Although the literature is limited, shared storybook reading is showing positive effects in increasing JA (Fleury; 2015; Fleury & Schwartz, 2017; Whalon et al., 2015;

Whalon, Hanline, & Davis, 2016). Shared storybook enables a caregiver and child to partake in communication, shared JA, and advocates the growth of language and social participation. Results from Fleury and Schwartz (2017) study taught five paraeducators a modified version of a dialogic reading approach. Specifically, paraeducators learned five types of questions (i.e., completion, recall, open-ended, *wh*-questions, and distancing) and specialized prompts in case the child with ASD was unable to answer. Results showed an increase in the number of questions the paraprofessional asked during each reading session and improvements in each child's engagement and response rate. Similar results were seen in the Whalon et al. (2015) study on the impact of a modified dialogic reading intervention called RECALL (Reading to Engage Children with Autism in Language and Learning) on four children with ASD. Two doctoral students served as the interventionists and provided the interventions to the participants. Positive impacts were seen in all participants' communication skills and a decrease in incorrect or no responses were seen immediately after implementation of intervention.

Based on the research reviewed, it appears that caregiver and child can establish joint interaction through storybook reading as it creates an environment in which both parties are focused on the same external object (Dale, Notari-Syverson, & Cole 1996; Fleury; 2015; Fleury & Schwartz, 2017; Lovelace & Stewart; 2007; Whalon et al., 2016; Whalon et al., 2015). Yet additional research is needed, particularly when caregivers are involved. Some caregivers may have lower literacy expectations of children, simply due to the presence of a disability (the lack of the transactional communication). Others caregivers, may lack

the motivation or understanding of the importance of emergent literacy activities (Basil & Reyes, 2003; Goin, Nordquist, & Twardosz; 2004; Koppenhaver, Hendrix, & Williams 2007; van der Schuit, Peeters, Segers, Van Balkom, & Verhoeven, 2009). In addition, the majority of the child's early interventions are speech, physical ability, and self-care focused, placing opportunities for literacy development on the backburner (Basil & Reyes, 2003).

Focus of the present study
The aim of this study was to examine the effectiveness of a caregiver-implemented intervention. Storybook reading enables both caregiver and child to interact with one set object. This activity allows the caregiver to ask questions and converse, thus providing opportunities for the child to engage in JA behaviors. This intervention was designed to increase JA in young children who have ASD through the use of shared storybook reading. Research questions included:

1. Will training caregivers to use Meaningful Interaction through Storybooks (MITS) intervention increase their use of the four reading strategies?
2. Does caregiver utilization of the four reading strategies during storybook reading facilitate joint attention skills in their child?
3. Does the MITS intervention result in an increase in verbal expressive language in children?

Method
Participants and Settings
Prior to beginning the study, IRB approval was obtained through the researchers' university. Consent forms were completed by all caregivers in order to participate in this study. Participants were four children with a diagnosis of ASD based on the *Diagnostic and Statistical Manual of Mental Disorders-*

Fourth Edition Text Revision (DSM-IV-TR; Association American Psychiatric, 2013) or another autism diagnostic instrument (e.g., *ADOS*, *ADI-R*, *CARS-2*, or *SCQ*) and their primary caregivers. The children were between the ages of 24 and 39 months and came from English-speaking homes. The children were nominated by the Orlando Center for Autism and Related Disabilities Center (CARD) regarding their initial eligibility. All four children received speech therapy and Applied Behavioral Analysis (ABA) therapy at least once a week. Three of the children received occupational therapy weekly. One child attended a general education preschool and one attended a varying exceptionalities pre-k 3days a week. The criterion for participation also included a diagnosis of ASD and an evaluation of the child's JA level as determined by the Unstructured Joint Attention Assessment adaptive from Loveland and Landry (1986).

The criterion for caregiver participation included: a completed informed caregiver consent form, completion of a Child's Interest Inventory survey, and permission to evaluate the child's JA skills using *Unstructured Joint Attention Assessment* (adaptive from Loveland & Landry, 1986). Caregivers were all female, ranging in age from 31-35 years old. Educational background of the caregivers ranged from no college experience (*n*=1), holds a bachelor's degree but not currently employed (*n*=1), currently enrolled at local college for an undergraduate degree (*n*=1), and currently enrolled at a local university in a Ph.D. program (*n*=1).

Book Selection
In this study, some of the books used were matched to the child's interest. For example, if the child's interest inventory indicated a fascination with trains, the child's book selections would contain some books on trains (e.g., *The Good Night Train* or *Inside Freight Trains).* Additional books not based on the child's interest were also selected. The selection criterion for the books were as follows: (a) had colorful illustrations, (b) were at or below a second-grade readability level, (c) were of typical length, (d) were age-appropriate, and (e) some books were based on the particular interests of each child. Information about the child's interest was gathered from the caregiver through the Child's Interest Inventory Survey, given at baseline.

Study Design
A multiple probe across dyads design was used in this study to determine: (a) if the MITS instruction was functionally related to the caregiver's use of MITS strategies; (b) if the caregivers' use of the MITS strategies resulted in changes in their child's use of JA behaviors; and (c) if the caregiver's use of the MITS strategies resulted in changes in their child's use of expressive utterances (Horner & Baer, 1978). This design was chosen as it staggers the introduction of the intervention across participants; allowing the investigator to evaluate threats to internal validity as well as demonstrating experimental control (Gast & Ledford, 2014). Furthermore, the multiple baselines controlled for developmental maturation and exposure to the treatment setting. This design was useful in evaluating immediate effects of the intervention. In addition, participants were not denied intervention (Gast & Ledford, 2014; Horner & Baer, 1978). During the baseline, intervention, maintenance and generalization phases of this study, data were collected on three dependent measures: the frequency of the four MITS reading strategies implemented by the caregiver during storybook reading per minute; frequency of the child's JA (initiated and response) per minute; and frequency of the child's

expressive utterances produced during the shared storybook reading per minute.

Setting

The baseline, intervention, maintenance, and generalization phases were conducted in the home of each dyad. The rooms had adequate lighting and were arranged in such a way that the caregiver and child could sit next to each other, so they were able to see and interact with each other and the book during each session.

Measurement Procedures

Dependent measures. This interactive reading intervention was composed of four strategies produced by the caregiver: (a) Attention Directing: noted as any verbal or nonverbal initiation (e.g., point) to establish joint focus (e.g., attention to the book), such as the pictures, events, attributes, or text; (b) Query: any communicative act to volunteer or request information to be shared and to solicit a child's verbal or nonverbal response; (c) Model Response: any semantically contingent response to the Query, if the child did not respond to the Query in verbal or nonverbal way within 5 seconds; and (d) Feedback: any comment serving to acknowledge, extend, restate, or clarify the response of the child or provides an opportunity for the caregiver and child to discuss material presented in the storybook (Crowe, Norris & Hoffman, 2004). Operational definitions and an example of each MITS strategy are presented in Table 1.

Each child's JA behaviors were represented in four subcategories based on Vismara & Lyons (2007): (a) Vocal Response to joint attention; (b) Nonverbal Response to joint attention; (c) Vocal Initiation of joint attention; and (d) Nonverbal Initiation of joint attention. Expressive language was represented in three subcategories: Canonical Vocalizations were defined as a rhythmic production of one or more consonant-vowel sounds. A single Word was defined as any single word utterance, and Word Combination was defined as multiple word combinations in a single utterance (e.g., play ball). Table 2 lists specific types of JA behaviors that were used to code the analysis. Each behavior is operationally defined and further clarified with an example.

Baseline. During the baseline home visits, the researcher instructed each caregiver to read to their child like they normally would, using books that they already had in their home. The researcher observed and videotaped the reading sessions and used the MITS Collection Checklist and coding sheet to analyze videotapes to determine the number of MITS strategies used by the caregivers as well as responses to bids and initiation of JA by the child participants.

Intervention phase. The investigator conducted the trainings. Each training session was broken up into three segments and lasted approximately 30 minutes. Three segments were used in the training.

MITS instruction/review. At the first training session, the caregiver received a MITS manual. This session began with an introduction of the importance of JA, shared storybook reading, and the MITS strategies. As the MITS strategies were explained, the researcher modeled the interactive skills and the caregiver was given opportunities to practice those skills using a storybook that was not used with the child. Subsequent training sessions with the caregiver continued with a review of the MITS reading strategies. The researcher would ask the caregiver to explain each strategy. If the caregiver were having trouble with a specific strategy, then the researcher would provide corrective feedback and would ask the caregiver to

Table 1. *Definitions of MITS strategies to be implemented by caregiver*

MITS Strategy	Definition	Example
Attention Directing	Any verbal or nonverbal initiation (e.g., point) to establish joint focus (e.g., attention to the book), such as the pictures, events, attributes, or text. The caregiver's attention directing can include a word or combination of words (e.g., "look", "see"), which serve to establish the topic or picture for discussion.	Caregiver points to a picture of a dog and says, "Look! A big dog".
Query	Any communicative act to volunteer or request information to be shared and to solicit a child's verbal or nonverbal response. Queries include requests for labels (e.g., "What's that?") or actions (e.g., "What's he doing?", "What's happening here?"). Cloze procedure (e.g., "He's eating ____.") and binary choice (e.g., "Should he walk or run?") also can be used as a query. Queries can be open-ended questions (e.g., "What will happen now?") or introduced with an attention directive plus query combination, (e.g., "Let's see what he did.", "Let's find out what happened next.", "Let's do it again".). Caregivers are taught to wait 5 seconds, to allow the child time to respond.	Caregiver give the child a binary choice, "Is that dog eating a bone or a hamburger?"
Model Response	Any semantically contingent response to the Query, if the child did not respond to the Query in verbal or nonverbal way within 5 seconds. Model Response includes answering the Query requests for labels (e.g., "What's that?" wait 5 seconds, then model "That is a _____.") or actions (e.g., "What's he doing?", "What's happening here?" wait 5 seconds, then model answer). Waiting 5 seconds, then modeling the cloze procedure (e.g., "He's eating ____.") and binary choice (e.g., "Should he walk or run?", "He should _____").	After waiting 5 second for the child to respond, the caregiver them models the appropriate response: "That dog it eating a bone".
Feedback	Any comment serving to acknowledge, extend, restate, or clarify the response of the child. Or provides an opportunity for the caregiver and child to discuss material presented in the storybook. The caregiver can clarify the accuracy of the child's previous utterance or response.	While reading a book about a dog, the child says, "big". The caregiver acknowledges the child by saying, "You're right, that is a big black dog".

explain the missed strategy later on in the training session. Once the MITS strategies were reviewed, the caregiver was able to practice the MITS strategies with the

researcher using storybooks that were not used in the study. During this time, the researcher continued to model, provide corrective feedback, and praise. Once the

Table 2. *Definitions of Child's Joint Attention*

Type of Joint Attention	Definition	Example
Vocal Response to Joint Attention (VR)	After caregiver ask a query, child vocalization a canonical vocalization, word, or words answering query in conjunction with gaze alternation and positive affect to the caregiver	Caregiver & child are reading a book about a bear, Caregiver ask child, "What is the bear eating" and child responds, "apple".
Nonverbal Response to Joint Attention (NVR)	Eye Gaze: Child looks between object & caregiver with gaze alternation & positive affect to the caregiver (e.g., smiling, laughing) OR Point: child extends finger towards object in conjunction with gaze alternation & positive affect to the caregiver	Child & caregiver are reading a book about a bear. Child points to the bear & alternates eye contact to the caregiver
Vocal Initiation of Joint Attention (VI)	Child vocalizes a canonical vocalization word, or words about the book to their caregiver with gaze alternation and position affect to the caregiver	Child & caregiver are reading a book about bears. Child says to caregiver, "brown bear"
Non Vocal Initiation of Joint Attention (NI)	Child initiates joint attention with eye contact or point & positive affect	Child & caregiver are reading a book about a bear, as caregiver turns page, child see that the bear on the page & alternates eye contact between bear & caregiver

training session was over, the caregiver would then read a book to their child. The MITS training sessions continued during the intervention phase until the caregiver was able to produce seven or more spontaneous MITS strategies per minute consecutively for three sessions during reading probes with their child. If the caregiver produced below seven MITS strategies, additional training was given.

Dyad Reading Probe. Following the MITS instructional review session, the caregivers had the opportunity to practice what they had learned. Eight books were given to the caregiver. Four books were based on the child's interest and the researcher selected the other four books. The caregiver was instructed to give their child a choice of which book to read from a selection of three books. Once a book was read, the caregiver was not to read that book again during that phase. Video recording began when the caregiver started the storybook session with the child.

Investigator/Caregiver Coaching. After the reading probe, the investigator and caregiver watched the videotape, discussed strengths, set goals, and discussed the session. As the caregiver and researcher watched the reading session video, the researcher frequently paused to address the positive exchanges between the caregiver and the child, the caregiver's responses to the child's interaction, and/or techniques to increase communication between the dyad. Caregivers were permitted to stop the video to ask questions, point out any positive exchanges, and/or explain where they could have used additional MITS strategies.

Maintenance. The caregiver was asked to use the MITS intervention with their child for a minimum of two times per week for 2 weeks. The caregivers chose the best time of day to read aloud and was asked to remain consistent for the duration of the study. The caregiver was allowed to use any of the eight books given to them during intervention, continuing to allow the child to choose from a selection of three books.

Generalization. Generalization was assessed through the use of four novel books. The caregiver was asked to video record themselves reading unfamiliar books for at least three reading sessions. The sessions were coded for the MITS strategies and child responses.

Interobserver Agreement
The researcher and a trained graduate assistant (GA) coded approximately 33% of the sessions (i.e., 23 sessions) to assess interobserver agreement (IOA) on the MITS strategies, child's JA skills, and child's expressive language behaviors. The GA became familiar with the coding definitions as she had practiced coding from sample videos from a previous pilot study. They had to meet a training criterion (i.e., 80% IOA on 4 consecutive pilot study videos) before coding was started on the current study. The researcher and the GA independently coded for occurrence and nonoccurrence of each behavior, compared codes, and developed decision rules for each behavior. The decision rules were added to the MITS Collection Checklist and Coding Sheet.

IOA was also calculated for each child's *Unstructured Joint Attention Assessment* to establish the reliability of the scores. The IOA for this assessment was 85% across all four children (range 80-90%). In addition, IOA was calculated for 33% of each dyad's sessions, across conditions. IOA across all four children's expressive language was 82.5% (range 80-85). IOA of all four children's JA was a mean agreement 87.7% (range 83.6-90.8). In addition, IOA of caregiver's MITS strategies was a mean agreement of 89.6% (range 85.4-95.2).

Treatment Integrity
The investigator used the MITS Treatment Fidelity Checklist to assess caregiver training. The MITS Treatment Fidelity

Checklist outlined components that the investigator needed to teach during training to ensure treatment fidelity between caregivers. The investigator self-evaluated her implementation of the training through the use of this checklist. This evaluation was completed to ensure that the caregiver instruction was implemented consistently across caregivers.

Results
For each phase, the researcher calculated rate of MITS strategies the caregiver used and rate of the child's response to and initiation of JA (Figure 1). The MITS strategy rate was determined by dividing total number of strategies the caregiver used (i.e., attention directing, query, model response, or feedback) by total number of minutes in the session. Rate of the child's JA behaviors was calculated by dividing total number of behaviors the child produced (i.e., verbal response to JA, nonverbal response to JA, verbal initiation of JA, and nonverbal initiation of JA) by total number of minutes in the session (Gast & Ledford, 2014). Caregiver's use of MITS strategies and child's use of JA behaviors are presented on the same graph (Figure 2) to determine if caregiver utilization of the four reading strategies during shared storybook reading facilitated JA skills in the child.

Caregivers
During baseline, caregiver rates of MITS averaged 2.07 per minute (.45, 3.14, 3.66, 1.08 respectively). During intervention, caregiver rates of MITS strategies averaged 8.65 per minute (7.86, 8.13, 7.67, 10.94, respectively). During maintenance caregiver rates of MITS strategies averaged 7.88 per minute (8.5, 7.38, 9.17, 6.5, respectively). During generalization caregiver rates of MITS strategies averaged 6.67 per minute (5.77, 8.04, 6.40, 6.50 respectively).

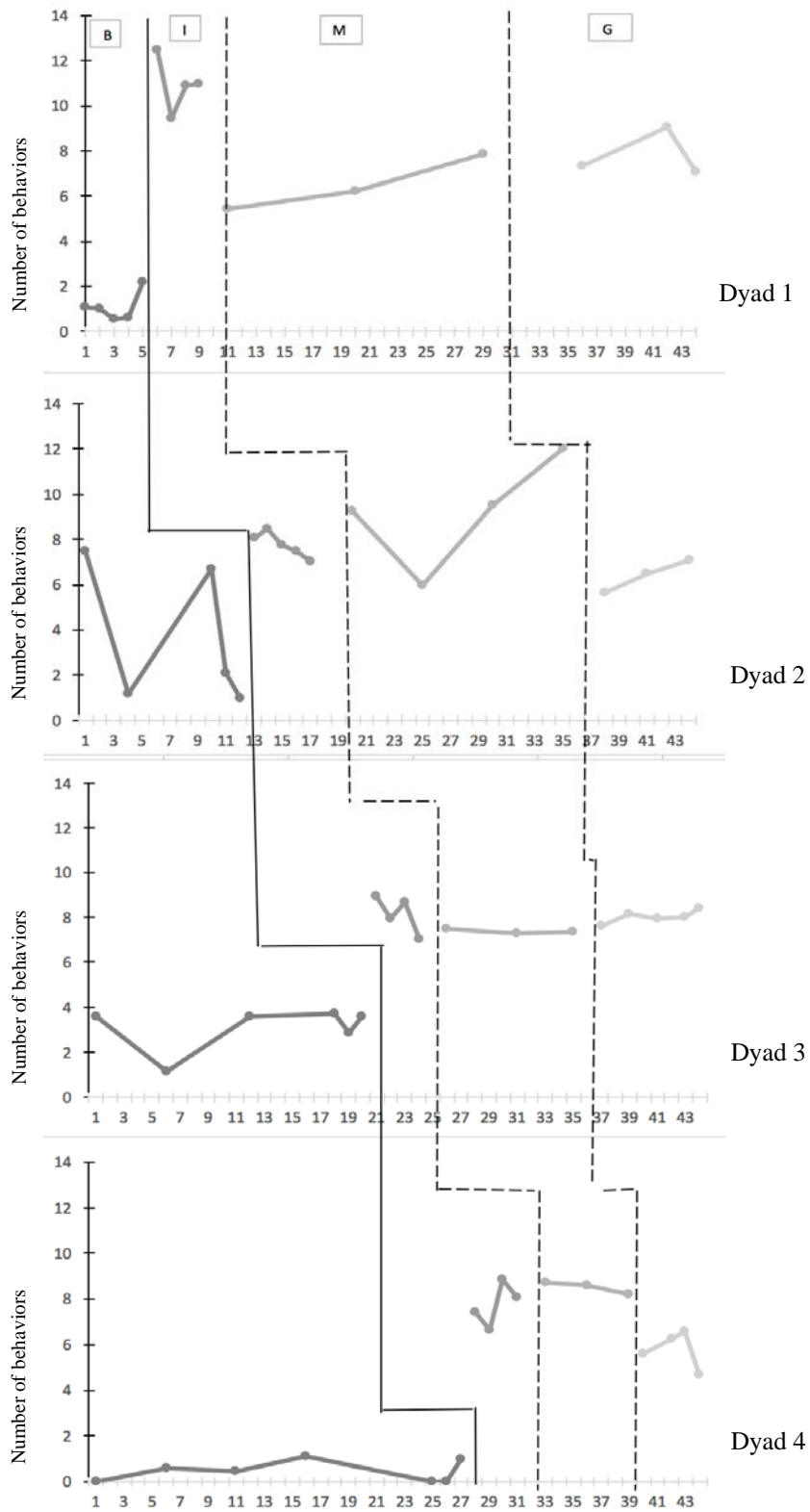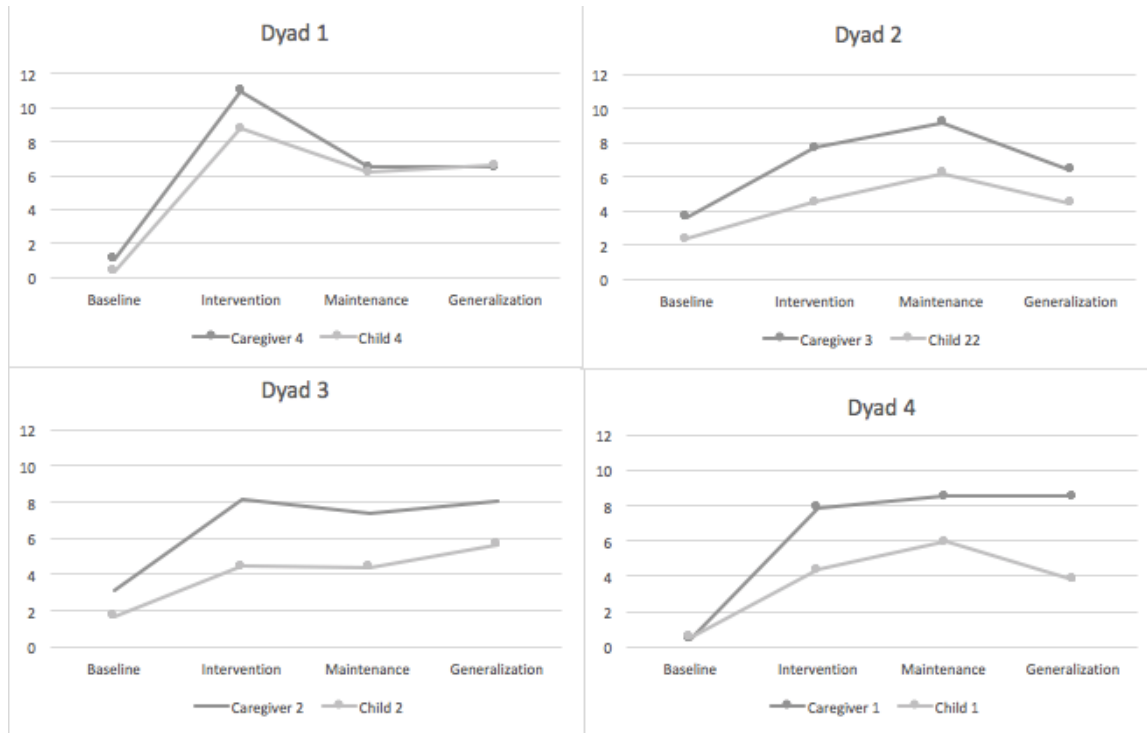Figure 1. *Caregivers MITs behaviors per minute*

Figure 2: *Average of Caregiver and Child Behaviors by Phases*

Overall the most frequently used strategy was Query. During intervention caregivers used the Query strategy at 4.34 per minute, 3.59 per minute during maintenance, and 3.54 per minute during generalization phase. The next strategy that was used most often was Feedback. During intervention, caregivers used the Feedback strategy at 3.42 per minute, 3.41 per minute during maintenance, and 3.16 per minute during generalization phase. The least used strategies were Attention Directing and Model Response.

Children
During baseline, average JA behaviors observed across participants was 1.46 per minute with individual child averages of .58, 1.71, 2.36, and 0.37, respectively. Across participants, verbal responses averaged 0.84 per minute (range 0-1.56) while nonverbal response rates averaged .26 per minute (range 0.08-0.36). Throughout intervention phase, average JA behaviors observed across

participants was 5.48 per minute (Range 4.39-8.77) with individual child averages of 4.39, 4.47, 4.52, and 8.77 respectively. More specifically, children averaged 4.09 verbal responses per minute (2.19, 3.57, 3.85, and 6.80 respectively), while nonverbal responses averaged .85 per minute (1.19, .22, .49, and 1.58 respectively). Results of the children's' JA and expressive communication behaviors showed an accelerating trend across participants, as well as a positive change in level between baseline and intervention phases across all participants. Throughout maintenance phase, average JA behaviors observed across participants was 5.67 per minute (Range .83-6.23) with individual child averages of 5.96, 4.40, 6.23, and .6.20 respectively. More specifically, children averaged 4.15 verbal responses per minute (4.01, 3.68, 4.89, and 3.79 respectively), while nonverbal responses averaged .47 per minute (0.97, 0.02, 0.17, and 0.83, respectively).

Throughout generalization phase, the average JA behaviors observed across participants was 4.08 per minute (Range 3.84-6.58) with individual child averages of 3.84, 5.67, 4.47, 6.58 respectively. More specifically, children averaged 2.94 verbal responses per minute (3.1, 4.76, 3.18, and 3.84 respectively), while nonverbal responses averaged 0.57 per minute (0.23, 0.08, 1.29, and 1.37 respectively).

Social Validity

Each caregiver was asked to complete the social validity questionnaire comprised of eight, 5-point Likert-type scale items and one free response question (i.e., Please feel free to share any additional comments or concerns about the MITS intervention.) to obtain their opinion regarding the investigation. All caregivers either agreed (4) or strongly agreed (5) that MITS training provided by the researcher was useful (range 4-5); the MITS intervention helped them to interact with their child during storybook reading; felt their child's JA skills had improved due to the MITS intervention; they would continue to use the MITS readings strategies in the future; they felt more confident when they read to their child; and they believed they had more interaction with their child during storybook reading. For the free response question, when asked to share any additional comments/concerns, two caregivers indicated that they have incorporated some of the MITS strategies into their everyday routine.

Discussion

The purpose of this study was to determine if training caregivers to use MITS increased their use of the four reading strategies, if those four reading strategies facilitated JA skills in their child, and if MITS resulted in an increase in verbal expressive language in each child. Data demonstrated caregivers could be trained to use the four reading strategies, as no caregiver needed additional coaching after intervention. In addition, caregivers could generalize the MITS strategies to unfamiliar books and continued to use the MITS strategies at higher rates than baseline. Also, results showed when each caregiver used the four reading strategies an increase was observed in each child's JA skills. Furthermore, the data demonstrated there was an increase in verbal expressive language for each child.

Research Question #1

To address the first question of caregiver's use of MITS strategies, the researcher looked at the level of the data between baseline and intervention. Data displays that each caregiver showed an immediate increase in the use the of MITS strategies after the first MITS training (Figure 1). All caregivers were able to consistently produce seven or more MITS strategies per minute during the intervention phase.

Research Question #2

To answer the second research question "*Does caregiver utilization of the four reading strategies during storybook reading facilitate joint attention skills in their child?*" data were collected on the child's response to and initiation of JA during the reading sessions. Results indicated (Figure 2) when the caregivers used the reading strategies during the reading session, each child increased their overall rate of JA behaviors. When examining the children's use of JA behaviors, the data indicated that the verbal and nonverbal response behaviors (i.e., response to JA bids by the caregiver) were used more often than the verbal and nonverbal initiation behaviors (i.e., the child getting the caregiver to attend with her). All four children displayed the greatest gains in their verbal responses to JA bids. Three children produced minimal gains in their nonverbal response behavior. Child

participants did not show significant gains in these initiations of JA behaviors.

Research Question #3

Research question 3 explored the impact of the MITS intervention on verbal expressive language. Results indicated that after caregivers received MITS training and used strategies during reading sessions, each child increased their rate of verbal expressive language (Figure 3 Appendix E). Three of the four children increased the number and variety of expressive language they used to communicate with their caregiver. The only child who did not demonstrate an increase in the variety of verbal expression was Jess (Dyad 2). Jess had speech production difficulties, which may have accounted for his lack of improvement.

Limitations

A number of factors may limit findings of this study and should be considered when interpreting results. First, the frequency in which caregivers participated in shared storybook reading sessions outside the study's allotted time is unknown. Second, although the investigator followed the MITS Treatment Fidelity Checklist, the investigator's behavior may have varied. These differences may have influenced caregivers' behaviors or ability to learn the MITS intervention (Rocha, Schreibman, & Stahmer, 2007). Third, presence of the investigator and use of video camera may have caused caregivers to utilize MITS strategies at higher rates. Fourth, despite positive benefits of using a multiple probe across participants' design, baseline data should have been longer for Dyads 3 and 4, but due to scheduling restrictions such data was not possible to collect. Fifth, there was no treatment integrity on the coaching during the intervention phase. Keeping these limitations in mind, results should be interpreted with caution.

Figure 3. *Child's Joint Attention Behaviors Per Minute Per Phase*
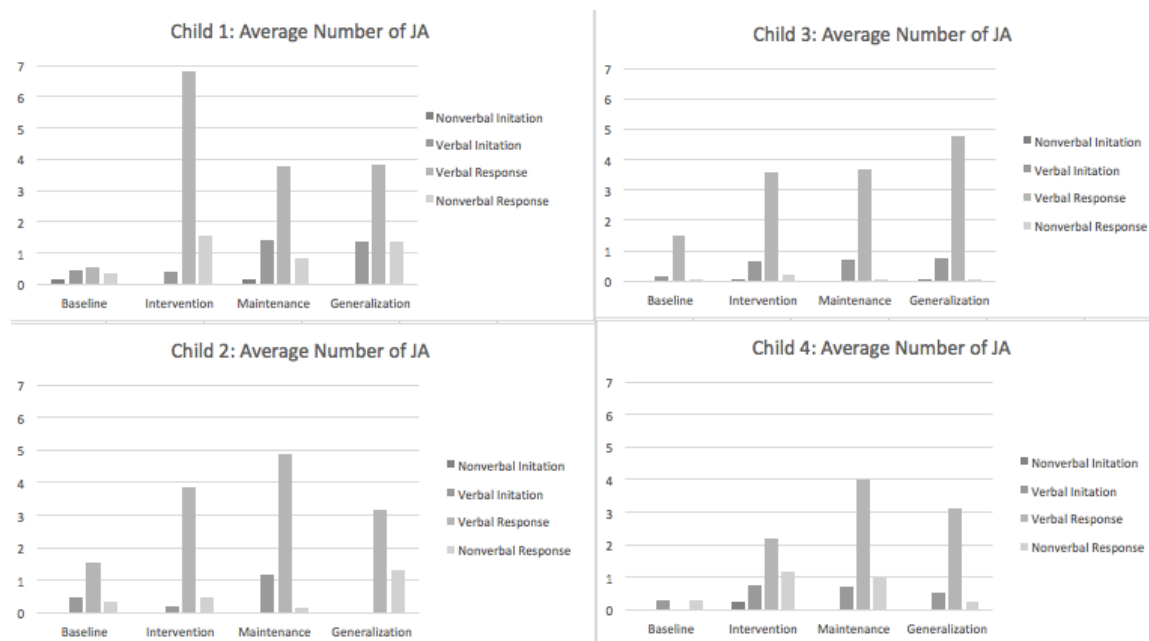
Implications for Practice and Research

Results of this study provide evidence that caregivers were able to effectively learn and implement the MITS intervention. Furthermore, an increase in caregivers' use of MITS strategies provided numerous JA bids, or opportunities, for their child to become an active participant in the storybook session. Results hold several implications for researchers and practitioners.

When examining use of caregiver's four MITS strategies more closely, two strategies, Query and Feedback, were used more often than Attention Directing and Model Response strategies. All four caregivers showed greatest gain in Query strategy; indicating caregivers were able to go beyond just reading the text and incorporate relevant questions about story into reading sessions. One possible explanation for caregiver's frequent use of this strategy may be they found it easiest to implement. Additionally, asking questions resulted in an increased interaction between caregiver and child. Natural back and forth conversation created by asking questions may have prompted caregiver to use this strategy in order to continue conversation. Another possibility for increase may be that children were quicker to respond to bids for JA, as some selected books were based on their interest. Using storybooks with the interest of the child may have potentially motivated the child to engage in JA. Although further research is needed in this area, previous investigations found that children are more likely to respond to bids for JA when interventions create opportunities that specifically played to their interest (e.g., Isaksen & Holth, 2009; Jones & Feeley, 2007; Rocha et al., 2007; Vismara & Lyons, 2007).

MITS strategies are interactive strategies that could potentially be beneficial for educators working with children with ASD. Exposing children to important literacy experiences becomes complex for practitioners when their preschool students with ASD have deficits in JA. This is due to the fact that JA is a prerequisite skill for acquiring emergent literacy skills. Therefore, it is vital for early educators to work on increasing JA with children with ASD throughout the school day. Illustrated by limited research, there is a need for further research in the area of shared storybook reading and acquisition of JA and early literacy skills with young children with ASD. Current ASD research has focused on hyperlexia, sight word instruction, and limits caregiver involvement (Koppenhaver & Erickson, 2003; Watson, Lanter, McComish, & Poston Roy, 2004). This study touches on the idea that using materials and objects of interest to the child could potentially motivate the child and naturally boost engagement. Practitioners can use this knowledge when setting up their classroom to support more natural JA exchanges.

Additionally, future research should examine specific types of Query questions caregivers used (i.e., request for label, request for action, cloze procedure, binary choice, or open-ended question) is warranted. Looking at particular types of questions used most often, least, or not at all could provide researchers with valuable information when working with children with ASD. Finally, although the researcher conducted a coaching component during intervention phase of the study, it was not done using a systematic method across participants. Further research is needed to create and use a more methodical manner of coaching when viewing the reading sessions with the caregivers.

Conclusion

Teaching children with ASD to acquire JA skills comes with a unique set of challenges. To state a single intervention would alleviate

the deficit in JA that young children with ASD have would be over simplistic, but research strongly supports the impact that early JA interventions can have. Children with a deficit in JA have difficulties with shared experiences. The lack of shared interactions makes it significantly difficult to acquire language, as the emergence of JA skills are a critical developmental milestone (Wood & Wetherby, 2003). Results of this study suggest caregivers can effectively implement MITS strategies during shared storybook reading. These interactive strategies, paired with a storybook that has the child's interest in mind, encourages caregiver and child to become actively involved, thus increasing JA and language opportunities.

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Effects of an In-Home Intensive Toileting Protocol for a Young Child with Autism

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Designing and implementing effective toileting protocols for young children with autism spectrum disorders (ASD) is challenging for parents and even the most seasoned practitioners. Using a simple A-B design with gradual component withdrawal, the results of an intensive toileting protocol implemented with a four-year-old male with ASD is presented. The toileting protocol used is a modification of previously examined protocols and includes: (a) a leveled sit schedule, (b) programmed consequences for successful eliminations, (c) fluid-loading, (d) communication training, and (e) positive practice for accidents. Parents were directly and heavily involved in intervention implementation. The participant was successfully taught how to eliminate in the toilet and accidents discontinued.

Toilet training young children can be an incredibly challenging feat for any parent or teacher. When teaching young children with autism spectrum disorders (ASD) to eliminate in the toilet, even the most savvy parent and experienced teacher may find the task overwhelming. The purpose of this paper is to present an applied study of an in-home intensive toileting protocol used to teach a young child with ASD how to eliminate in the toilet.

There is no established evidence-base to guide pediatricians in specific protocols or procedures for a family to follow when they begin to toilet train their child (Kiddoo, 2012). Moreover, no empirical consensus exists to inform a family's decision to begin toilet training their child. Toileting, like many other self-care skills, is a culturally-laden skill set (e.g., deVries & deVries, 1977; Koc, Camurdan, Beyazova, Illhan, & Sahin, 2008). Age at the time of initiation, the manner in which a child is to request access to a culturally accepted urinary receptacle,

the expected self-cleaning procedure, and the level of comfort discussing toileting practices vary between cultural backgrounds. Pediatricians who subscribe to Westernized norms typically recommend one of two leading approaches in determining toilet training readiness (Brazelton et al., 1999): (a) the child-oriented approach (Brazelton, 1962) or (b) the structural-behavioral approach (Azrin & Foxx, 1971). The *child-oriented approach* is when the decision to toilet train a child rests in whether the child is demonstrating signs of (culturally accepted) toileting readiness behaviors (e.g., remaining dry for extended periods of time, withdrawing to an isolated physical space to eliminate in his/her diaper, exhibiting behaviors indicating the desire for increased autonomy, etc.). The *structured-behavioral approach* is grounded in applied behavior analysis and teaches a series of chained behaviors (i.e., sequence of discrete skills that are interdependent on one another to complete a full task or behavior) that ultimately result in the complex behavior that

is "toileting." Some refer to the structured-behavioral approach as a parent-oriented intervention because the parent makes the determination that the child is ready to toilet train (Brazelton et al., 1999; Kidoo, 2012). Despite the popularity of the structured-behavioral approach, the child-oriented approach is the most widely accepted approach in most Western cultures (American Academy of Pediatrics, 1999; Brazelton et al., 1999; Kiddoo, 2012). However, typical signs of toileting readiness that are necessary for the child-oriented approach often present differently or are completely lacking in children with ASD.

Training Young Children with ASD
With little applicable direction from pediatric recommendations, parents of children with ASD are often at a loss as to how and when to toilet train their child with ASD. Behavior analysts and special education teachers serving young children with ASD are often working with the child and family when the issue of toilet training is broached. Literature about how to toilet train children with ASD almost always employs some version of Azrin and Foxx's (1971) structured-behavioral approach. Distinct features of Azrin and Foxx's protocol include: (a) fluid loading to increase frequency of urination, (b) reinforcements as an immediate consequence for successful eliminations, (c) sensory apparatus worn within the undergarment to alert the child when s/he is wet from urinating while in underwear, and (d) self-care procedures for cleaning after eliminations.

LeBlanc, Carr, Crosesett, Bennett, & Detweiler (2005) adapted Azrin and Foxx's (1971) intensive toileting protocol to toilet train three children with ASD who had previously been unsuccessful in less intensive toileting protocols. In their adapted protocol, LeBlanc et al. (2005) added (a)

positive practice as a consequence when participants had accidents, (b) parental implementation of the protocol in the clinical setting before generalizing to the home, (c) communication training to teach verbal behavior of independent initiations, and (d) prescriptive fluid loading and a sit schedule that was systematically reduced throughout the intervention timeline. All of the participants were successfully toilet trained by the conclusion of the study and all of the prescriptive components of the protocol were gradually and systematically removed. In a follow-up study, Hanney, Jostad, LeBlanc, Carr, & Castile (2012) implemented LeBlanc et al.'s (2005) protocol with 30 children with ASD and/or developmental disabilities in an outpatient training clinic. All participants were successfully toilet trained and the majority of them reached success within two weeks of intervention.

Greer, Neidert, & Dozier (2016) conducted a component analysis to examine the essential elements of leading structured-behavioral approaches to toilet training, including the LeBlanc et al.'s (2005) protocol. Preschool teachers of 20 developmentally-typical children in preschool classrooms implemented the different toilet training interventions. Training packages consisted of combinations and sequential effects of the following components: (a) type of undergarment (i.e., diaper/pull-up or cotton underwear), (b) sit schedule, and (c) type of programmed consequences for accidents (i.e., differential reinforcement). Children were more successfully toilet trained when all of the training packages were combined. Implementing only one training package and neglecting the other components did not result in successful toilet training.

Most of the previous research on the various toileting protocols were conducted within school and clinical settings with

professionals serving as the initial implementers. Moreover, Greer et al. (2016) indicates that no one component of LeBlanc et al.'s (2005) protocol emerged as particularly salient, but that a combination of multiple components were necessary for successful toilet training. What are the necessary components to toilet train a young child with ASD at his home?

The Present Study

The present study examined a modified version of LeBlanc et al.'s (2005) intensive toileting protocol. First, the entire intervention was implemented in the child's home. Second, the child's parents were directly involved in the implementation of the protocol during intervention hours. Third, although the child was in cloth underwear, we did not use a urine sensor and alarm to alert the child at the onset of urination. Finally, we did not go all the way through LeBlanc et al.'s (2005) prescribed leveled system—Levels 1-12—but stopped at a level reflecting the desired schedule of the parents and gradually faded the other components of the protocol (e.g., fluid loading, prompting communication training, sit schedule). Social validity data were collected from the parents prior to the intervention and generalization training was completed after the child demonstrated mastery.

Method

As an applied study, the intention was to train the participant how to complete steps within the basic toileting sequence (i.e., go to toilet, pull down pants, pull down underwear, sit on toilet, wipe, flush, pull up pants, and begin handwashing sequence) and to provide ample opportunities to successfully eliminate in the toilet and decrease instances of eliminating in his underwear. Therefore, an A-B design with a gradual withdrawal was used (Graham, Karmarker, & Ottenbacher, 2012). Baseline data were collected for five days to track the number of eliminations in the toilet without the use of any intervention components.

Participants

The participant—Adnan (this is a pseudonym)—was a 4 year-old Pakistani male diagnosed with ASD by a pediatric neurologist when he was 3-years-old. He lives with his father, mother, and baby sister. Adnan's father works outside of the home and his mother stays at home to care for both children. Both parents have earned degrees from American universities and they reside in an upper-class, suburban area in the southwest. Adnan received 24 hours of in-home behavioral therapy per week. His therapy team was led by a Board Certified Behavior Analyst (BCBA) and included his mother, father, and four behavioral technicians (Adnan's father elected to take two weeks off of work to stay home and assist with the intervention). All members of the therapy were equally involved in implementing the intervention and intervention sessions typically had two members of the implementation team present (i.e., one of Adnan's parents and a therapist). Adnan scored 13 on the *Verbal Behavior-Milestones Assessment and Placement Program* (VB-MAPP; Sundberg, 2008), indicating his functioning level was analogous to a typically-developing infant between the ages of 0-18 months. In the subtest that assessed behaviors related to toileting-readiness—*VB-MAPP Transitions Assessment Category III: Self-help, Spontaneity, & Self-Direction*—Adnan scored 9 out of 30, indicating a need for frequent and intensive treatment to develop skills.

Setting and Materials

The intervention was conducted on the second floor of Adnan's home where he had a designated room where most of his

behavioral therapy sessions were conducted (i.e., the therapy room). The intervention protocol was implemented in his therapy room and continued in the bathroom located just outside of the therapy room. In his therapy room, there was a large trampoline, two large plastic containers each with three drawers full of materials for therapy programs, a small crib mattress, and some cause-and-effect toys. The bathroom was a full-sized bathroom with a tub, toilet, sink and mirror. A child-sized toilet seat that fit on top of the adult toilet seat was used to stabilize Adnan while he was sitting on the toilet. A small stool that was about 1-foot tall was in the bathroom for Adnan to put his feet on when he was sitting on the toilet and also to stand on when he was using the sink.

Preferred, non-caffeinated, nondairy drinks were used for fluid loading. During the sit schedule, Adnan was given access to preferred items and/or activities, including: singing highly preferred songs with the therapy team, watching preferred videos on mobile devices (either his parents' phones or a therapist's phone), eating chips, or looking at books featuring the alphabet. Upon completion of a successful elimination, Adnan was granted limited access to his highest preferred item—a popular cartoon application on a tablet. Small cotton underwear with preferred characters were used during intervention. Additional underwear, diaper wipes, small terrycloth towels, paper towels, and disinfectant cleaning solution were available for when Adan had an accident.

Response Definitions and Data Collection
Data were collected using paper-and-pencil method and tracked (a) the time Adan was placed on the toilet according to the sit schedule (the target level(s) was indicated on the daily datasheet), (b) if he eliminated in the toilet (i.e., indicate "yes" or "no"), and (c) if

he had an accident before the next trial. To be considered a *successful elimination,* Adnan's underwear had to be completely dry upon entering the bathroom and doffing his underwear *and* he had to urinate or defecate in the toilet. If Adnan began urinating or defecating after doffing his underwear but before completely sitting down on the toilet seat, the elimination was counted successful if he was sitting before completing the urination or defecation stream. *Accidents* were defined as the presence of urine or feces on the underwear or on the surface around him any time and any place before he climbed on the stool in the bathroom to begin doffing his underwear.

Prior to implementing the intervention, Adnan's parents were asked to report the typical duration of time he was remaining dry (i.e., controlling his sphincter). After the proposed toileting protocol was explained to them, Adnan's parents completed a 7-question social validity questionnaire to rate their level of agreement with statements about the social validity of the intervention (e.g., I believe that toilet training my son is an important skill; I understand the components and steps of the training protocol). Both parents reported agreement with all of the statements.

Procedures
The modified intensive toileting protocol consisted of multiple components that varied within and across days. Specific components of the protocol included: (a) cotton underwear worn during training sessions (i.e., training sessions were six hours a day); (b) leveled sit schedule; (c) programmed consequences for eliminations; (d) fluid loading; (e) communication training; and (d) positive practice for accidents.

Leveled sit schedule. The sit schedule prescribed the duration of time Adnan was to

remain sitting on the toilet and the intersit interval duration (i.e., the length of time between scheduled sittings on the toilet). The leveled sit schedule followed the same sit duration and intersit interval time presented in LeBlanc et al. (2005); however, Adnan only went as high as Level 8 during the time of the study (see Table 1). Additionally, Adnan was moved through the levels using the same criteria as the LeBlanc et al. (2005) protocol—participants were moved through the levels according to the prescribed schedule contingent on 80% or more success within a level before moving to the next level. The first day, Adnan started at Level One and moved up to the next level after each hour of the training session. On the second day, Adnan started at Level One and moved one level every two hours. The third day of intervention, Adnan started on Level Two and stayed there for the entire day. On day four of intervention, Adnan started on Level Two and moved to Level Three after half of the training session (i.e., three hours at Level Two and three hours at Level Three). After the fourth day, Adnan moved up one level every two days.

Communication training. Before each scheduled sit time, the therapist paired the American Sign Language (ASL) sign for "bathroom" with the command to verbally imitate the word "potty". Adnan was required

to verbally imitate the word "potty" before the therapist would continue walking toward the bathroom, however, he was not required to imitate the ASL sign for "bathroom." Although Adnan was not likely to initiate a request for access to the "potty", this was the process used to teach Adnan how to communicate a request to go to the toilet for an elimination.

Positive practice after accidents. After accidents occurred, a positive practice procedure was implemented. Positive practice was only implemented if Adnan had an accident and had not eliminated during the previous sitting schedule. If Adnan had an accident, he remained in his urine-saturated underwear and escorted to the toilet after being told "no wet pants" in a firm voice tone. The participant then removed his wet clothes and sat briefly on the toilet. After sitting, the participant stood and changed his clothes. The participant was then brought back to where the accident occurred and the positive practice procedure was repeated four times. The intersit interval is not reset, and the intersit interval after the positive practice procedure.

Results
Data were analyzed in two ways: visual analysis and Tau-U scores. Visual analysis

Table 1. *Leveled Sit Schedule*

Level	Duration on Toilet (minutes)	Intersit Interval (minutes)
1	10	5
2	5	10
3	5	15
4	5	25
5	5	35
6	5	45
7	5	60
8	5	90

(Figure 1) of level change, immediacy of change, trend, and variability in performance (Horner et al., 2005) were used to analyze the functional relationship between (a) the intensive toileting protocol and (b) successful eliminations and accidents. Effect size was also calculated using Tau-U scores (Parker, Vannest, & Davis, 2011). Results show a functional relation between intensive toilet training and successful elimination in the toilet when the treatment was implemented.

During baseline, the participant did not engage in successful elimination or initiations. The intensive toilet training procedure lasted 43 days, 48 including baseline. During the first three days of training the participant's accidents decreased to a mean of 1.67 (SD= 0.58) and eliminations increased to an average of 2.67 (SD= 1.15). On day four the participant began at Level Two, at this level he had 2 accidents and 3 eliminations when he moved to Level Three on day five. During Level Three, the participant stayed there for two days and averaged 1.5 accidents (SD= 2.12) and 7 eliminations (SD= 3.70). On day seven, he moved to Level Four had zero accidents and eliminated seven time, resulting in moving to Level Five the next day. On day eight the participant stayed at Level Five for six days and averaged 0.5 accidents (SD= 1.22) and 5.67 eliminations (SD= 1.97). Throughout days eight through 13, the participant did move up and down levels dependent on success during the day, however, he mostly stayed at Level Five. Once moved to Level Six on day 14, he stayed there for two days and averaged zero accidents and 7 eliminations (SD= 1.41). On day 16 the participant moved to Level Seven where he stayed for three days and averaged 0.33 accidents (SD= 0.58) and 12.67 eliminations (SD= 1.15). Day 19 the participant moved to Level Eight and stayed there for six days averaging 0.83 accidents (SD= 1.33) and

14.33 eliminations (SD=2.50). The last two days at Level Eight is when the participant began having accidents therefore the decision was made to move back down to Level Seven, where the participant remained for the duration of the study. This was also decided because the parents would prompt the child to attempt to eliminate about every hour, similar to parents prompting a typically developing child at that age. The participant averaged 0.58 accidents (SD= 0.77) and 10.79 eliminations (SD= 2.76).

Effect size calculation. Using the free online single-case research website (Vannest, Parker, Gonen, & Adiguzel, 2016) researchers calculated Tau-U effect size. Tau-U determines the effects by comparing baseline and intervention phases of each dependent variable (Parker et al., 2011; Vannest et al., 2016). Ranging from -1.0 to 1.0 Tau scores above 0 indicate an increase of behavior between phases and a score below 0 means a decrease in behavior between phases (Parker et al., 2011). Scores ranging from 0.0 and 0.62 demonstrate a small effect, scores between 0.63 and 0.92 establish a moderate effect, and scores between 0.93 and 1.00 confirm large effect. Parker et al., 2011). We calculated the effect sizes for number of eliminations in the toilet and percentage of successful eliminations. Computing the effect size for the dependent variables of the toilet training protocol, resulted in an omnibus effect size for both number of eliminations and percentage of success (see Table 2). Large effects were demonstrated for number of successful eliminations and percentage of success on the toilet.

Discussion

The modified version of LeBlanc et al.'s (2005) intensive toileting protocol produced the desired effects and Adnan is a successfully toilet trained child with ASD.

Figure 1. *Daily performance data showing (a) number of accidents, (b) number of successful eliminations, and (c) percentage of success.*

In-Home Toilet Training

Baseline   Intervention
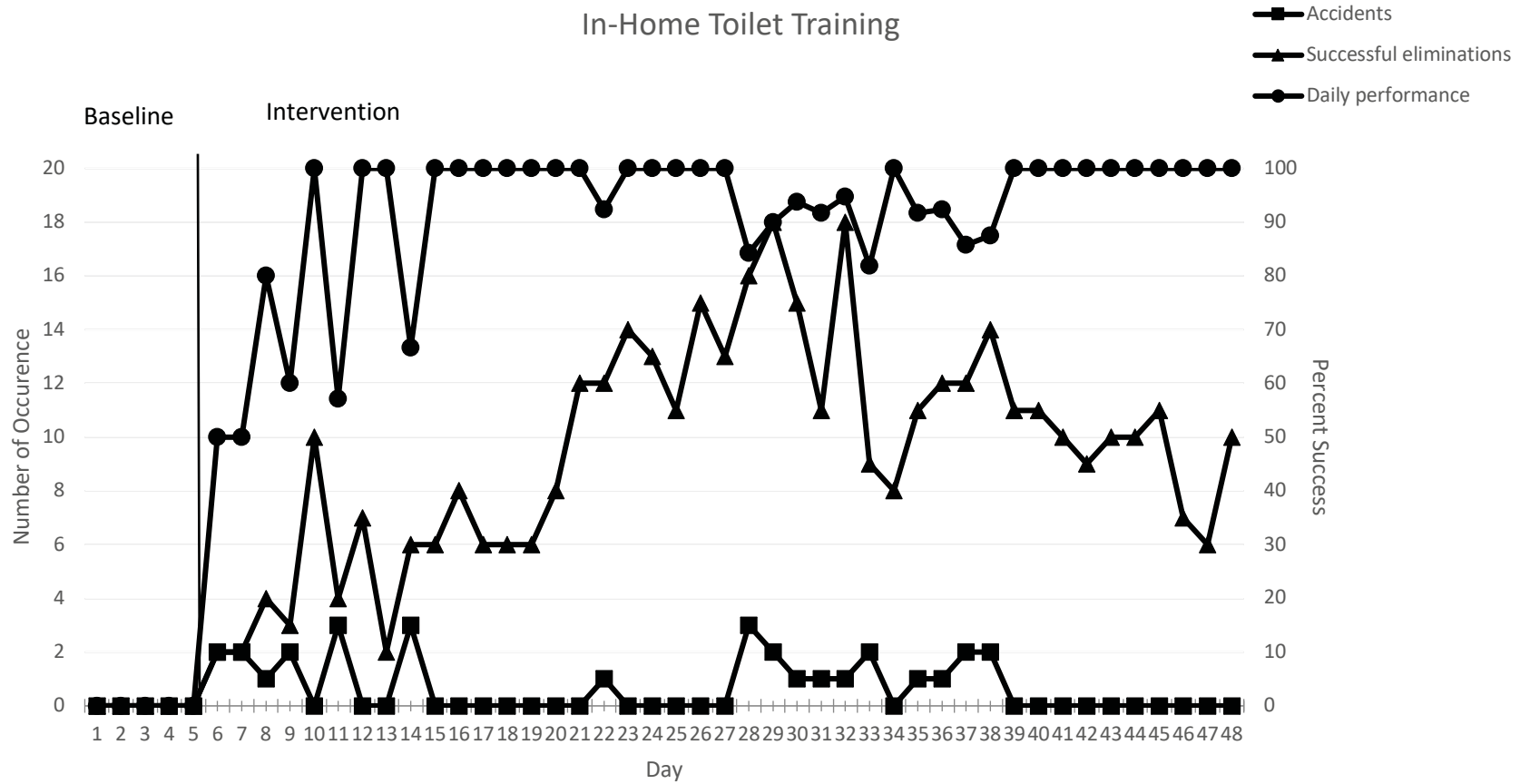
All of the components within the modified toileting protocol were gradually removed after Adnan demonstrated consistent success. Adnan's parents wanted him to be given the opportunity to eliminate in the toilet every hour, so the therapy team continued to initiate the toileting routine every hour for about 45 days post-intervention. Data were not being tracked during this time; however, he was never reported as having an accident and his parents began to keep him in underwear overnight. It is important to note that Adnan did not frequently make requests to communicative partners and had very few instances of initiation behaviors; therefore, it seemed unlikely to his parents and therapy team that he would independently initiate the toileting sequence. Unlike many other young children, Adnan had no difficulty defecating in the toilet during the intervention.

Generalization training was systematically introduced by Adnan's parents outside of therapy sessions. The BCBA recommended they choose one toilet in the home that he was frequently in close proximity to while he was not in therapy and train him there. Parents reported that he had no difficulty generalizing to each of the toilets in the home. Shortly after generalizing to the other toilets in the home, Adnan's parents provided opportunities for Adnan to toilet while they were in public restrooms and when they were visiting the homes of neighbors and friends. Adnan had no difficulty generalizing to other toilets. Adnan's parents reported that the success of this intervention gave them "hope" for their son and it showed them "how he learns." Their high ratings of agreement with

the statements on the social validity questionnaire and their level of involvement in the implementation of the toilet training protocol likely contributed to Adnan's initial and continued toileting success (Barton & Fettig, 2013; Schwartz & Baer, 1991).

Limitations
Although this paper adds to the literature for implementing a successful toilet training protocol in the home with parent involvement a couple of limitations need to be noted. First, the protocol conducted by LeBlanc et al. (2005), was not replicated exactly. However, the protocol was tailored to the child and his family to fit his age and the needs of the parents, strengthening the social validity of the protocol, but limiting the conclusions that can be made. For example, Adnan was successful with one hour intervals but did not initiate. Whereas in the LeBlanc et al. (2005) study, participants were successful at higher levels and could initiate independently. Additionally, LeBlanc et al. (2005) systematically eliminated components of the protocol after 80% success was achieved at Level 12—after 80% success was achieved at Level 12 for two consecutive days, the sitting schedule was removed and participants were expected to initiate. Adnan's therapy team was more interested in Adnan being able to successfully complete the steps within the toileting sequence with minimal assistance when prompted to "potty" and having more successful eliminations than training sphincter control and toileting initiation. Adnan's age also played a role in his success, he was 4-years old when the protocol began, although data was not collected for typically

Table 2. *Effect Size Calculations*

	Tau-U	*SD* **tau**	**p-value**	**90% Confidence Interval**
Eliminations	1.00	0.28	0.0003	[0.55, 1.00]
Percentage of Success	1.00	0.28	0.0003	[0.55, 1.00]
Omnibus Effect	1.00	0.19	0	[0.68, 1.00]

developing children, at this age many parents prompt their child to go to the restroom to circumvent accidents, making the decision to stop data collection and intervention at Level 7 a natural and reasonable schedule.

Another limitation to this study is the choice of design. This was an applied study investigating a behavior that cannot be reversed (in most cases); therefore, an A-B design was chosen. This design does not allow for replication with a single participant again limiting the conclusions that can be made with the results. Future research should employ a different design such as changing criterion or multiple baseline to strengthen the evidence for the practice.

Implications for Future Research and Practice
Most research in toilet training is conducted in a clinical or school setting, resulting in the participants being successful at school, but not home. This paper adds to the research base because it demonstrates parents acting as equal intervention agents to successfully implement a toilet training protocol in their home. More research should be conducted across students of varying abilities and with families of various backgrounds.

Other toileting protocols should also be compared allowing families to choose the method they feel is most effective. This will allow researchers to better understand which

protocol is more socially valid among parents and increase the buy-in when practitioners are beginning a toileting protocol with an individual. Although this protocol was socially valid for the parents in this study, it is important to tailor procedures for each individual to increase the likelihood of fidelity and success. Having multiple participants or a series of studies with different participants could also help in determining for whom and under what conditions this protocol works for students with ASD, since individuals with ASD are a heterogeneous group and toileting is a culturally-laden behavior (Carrero, Collins, & Lusk, 2017; West et al., 2016).

Conclusion
The common issue of designing and implementing effective protocols for toilet training children with ASD can be a daunting task for parents, teachers, and service providers. The available literature of toilet training components allow practitioners to make informed programming decisions when designing and implementing training protocols. Although pediatricians do not have clear guidance to offer families of young children with ASD how to determine whether a child is ready to toilet train or how to best approach training, triangulating accessible research may provide practitioners with information and inspiration for efficacious protocols.

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Contextual and Structural Modifications in Cognitive Behavioral Therapy for Youth with Autism Spectrum Disorder and Comorbid Obsessive-Compulsive Disorder: A Review and Analysis of the Research

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This review evaluated studies that employed cognitive behavioral therapy (CBT) to alleviate symptoms of obsessive-compulsive disorder (OCD) in young people with autism spectrum disorder (ASD). It compiled and analyzed the modifications that are largely focused on the content and structure of CBT to address social, emotional, and cognitive needs of this clinical population. Systematic searches of electronic databases, reference lists, and journals identified nine studies meeting predetermined inclusion criteria. Results indicate that modified CBT yielded reductions in obsessive-compulsive behaviors (OCBs) in young people with ASD. These results warrant further research into the effects of CBT in relation to the required modifications to address disorder-specific symptoms and maximize treatment outcomes. Implications for future research and practice are discussed.

Autism spectrum disorder (ASD) is typically characterized by impairments in reciprocal social interaction and communication, restrictive and repetitive patterns of behavior and interests that are ego-syntonic, meaning pleasurable and not distressing to the person (American Psychiatric Association [APA], 2013). According to the latest estimates, ASD continues to be rapidly increasing with a prevalence rate of one in 59 children in the United States (US) (Autism and Developmental Disabilities Monitoring Network [ADDM], 2014). Researchers find that individuals with ASD are at an elevated risk of presenting with comorbid psychopathology since 72% - 80% of children with ASD meet criteria for a comorbid psychiatric disorder (Joshi et al., 2013; Matson & Nebel-Schwalm, 2007; Tsakanikos et al., 2006). Amongst these, obsessive-compulsive disorder (OCD) was reported to coexist as the second most often - after anxiety- with prevalence rate of 37%

(Joshi et al., 2010; White, Ollendick, Scahill, Oswald & Albano, 2009). Obsessive-compulsive disorder (OCD) is a chronic condition characterized by repeated intrusive thoughts and compulsive acts that are ego-dystonic, meaning not pleasurable and distressing to the person (APA, 2013). According to DSM-5, OCD is no longer a part of the anxiety disorders but is a separate entity that includes Trichotillomania (hair pulling disorder), body dysmorphic disorder and Tourette syndrome (APA, 2013). The current estimates indicate that the lifetime prevalence of OCD in the US is approximately one in 40 adults (2.3% of the population) and one in 100 children (National Institute of Mental Health [NIMH], 2017).

Researchers find that these two disorders are highly comorbid. One recent study reported that approximately 17% of children with ASD also met criteria for OCD (Van Steensel, Bogels, & Perrin, 2011). Meier et

al. (2015) found that a personal history of ASD doubled the risk of receiving a diagnosis of OCD later in life while a personal history of OCD quadrupled the risk of being diagnosed with ASD later in life. In addition, Joshi et al. (2010) analyzed the prevalence of anxiety disorders in psychiatrically referred youth stratified by the status of ASD and found that OCD is more prevalent in youth with ASD than in typically developing youth; 25% of the youth with ASD had comorbid OCD while only 15% of non-ASD had OCD.

The comorbid condition of OCD in individuals with ASD precipitates an urgent need to identify evidence-based practices that would address this comorbidity exclusively. Cognitive-behavioral therapy (CBT) with exposure and response prevention (ERP) is the best-established psychological treatment for typically developing individuals with OCD (Ponniah, Magiati, & Hollon, 2013). Since OCD affects individuals with ASD in the same way it affects the general population, CBT has been shown to also help this specific population in reducing their obsessive-compulsive behaviors (OCBs). However, due to the unique challenges and multifaceted needs of individuals on the autism spectrum, standard CBT programs require individualized modifications (Scattone & Mong, 2013). There is an established research base demonstrating that a personalized variant of CBT can result in successful outcomes when treating anxiety symptoms within the ASD population (Reaven et al., 2009; Reaven & Hepburn, 2003; Sofronoff, Attwood, & Hinton, 2005; Storch et al., 2013; Storch et al., 2015; White et al., 2009; Wood et al., 2009; Wood et al., 2015). These studies involved modifications made in the content and structure of standard CBT to address social and communication difficulties, cognitive rigidity, alexithymia (i.e., difficulties with describing and labeling

emotions), and difficulties in generalization faced by individuals with ASD (Bird & Cook, 2013; Dahlgren, Sandberg, & Hjelmquist, 2003; Happé & Frith, 2006).

Existing literature evidences the effectiveness of employing a specific blend of techniques and strategies as the most effective approach to modify CBT for use with children with ASD and comorbid OCD. Although there appears to be general consensus that with certain modifications, CBT can be used effectively to lessen OCBs in children with ASD, no prior research has come up with a taxonomy of these modifications to shed light upon which techniques and strategies to employ for this specific set of patients. This review stratified and analyzed these modifications at two levels: (1) content and (2) structure, with an attempt to (i) provide clear and succinct guidelines for the stakeholders, (ii) lessen the ambiguity and instability around the application of the practices, and (iii) maximize treatment outcomes for children with ASD and comorbid OCD.

Method
Information Sources and Search Terms
Systematic searches of five electronic databases were included: ERIC, ProQuest, PsychINFO, PsycARTICLES, and Google Scholar. Publication year was selected as after 1/1/2000 to keep track of the most recent and updated evidence-based practices. Reference lists of most cited articles and recent review papers were searched by hand. The following terms were screened in the title and/or full text of the article: 'ASD' (e.g., autism, autistic, Asperger syndrome, pervasive developmental disorder not otherwise specified (PDD-NOS), 'OCD' (e.g., obsessions and compulsions, obsessive-compulsive disorder, obsessive-compulsive behaviors), 'young people' (i.e., children and adolescents separately), and 'CBT' (e.g.,

modified CBT, exposure response prevention). Searches were initially expanded to include CBT for young people with specific mental health disorders and then narrowed down including just 'Autism' and 'OCD', yielding in the compilation of relevant studies only.

Eligibility Criteria
Inclusion criteria. Studies that were eligible for review included: (1) children and/or adolescents with a diagnosis of ASD (or autistic disorder, Asperger disorder, or pervasive developmental disorder falling under the ASD criteria according to the publication of DSM-5) and comorbidity of OCD, (2) any treatment modality of CBT (e.g., individual, group-based, family-centered therapy, and function-based CBT), (3) indicators of the effectiveness of CBT components (both cognitive and/or behavioral), and (4) the results reported on at least one validated and standardized outcome measure of core features of OCD. No limits were applied to the severity of the diagnosis (i.e., both low- and high-functioning autism and mild to severe OCD were included). All quantitative research manuscripts were eligible to be included, regardless of research design (i.e., single subject, case study, or group).

Exclusion criteria. Studies that were not eligible for review included: (1) the primary intervention other than CBT (e.g., psychopharmacological treatment, anger-management etc.), (2) methods that were qualitative or meta-analysis, (3) CBT interventions delivered to individuals with ASD and other comorbid issues (e.g., anxiety disorder, attention deficit hyperactivity disorder (ADHD), (4) CBT interventions conducted only for individuals with ASD or only for individuals with OCD, and (5) CBT interventions addressing adults with ASD

and comorbid OCD since the focus of the review was on the youth population.

Study Selection and Data Extraction Process
The first author completed the searches and reviewed the title and abstract of all the given results to confirm whether studies met the eligibility criteria. The initial search of the electronic databases yielded 908 potentially eligible articles that met the search terms; 284 duplicates were removed at this stage. Of those studies that met the eligibility criteria, the first author completed data extraction on all data items of interest including participants, intervention characteristics, study design and measures, efficacy of intervention at reducing OCBs, and modifications to interventions. Based on the data extraction criteria, 518 papers were removed due to not meeting any of the inclusion criteria. To enhance rigor, the second author screened 10% (52 papers) of all titles and abstracts for eligibility and reviewed the data extraction table to confirm study inclusion.

Out of the remaining 106 studies, 55 papers were excluded because CBT was not employed for ASD and OCD comorbidity exclusively — it was employed either for typically developing people with OCD, or for people with ASD or anxiety, or for people with OCD and other disorders (e.g., social phobia, depression, sleep problems etc.). From the rest, 30 papers were excluded because CBT was not employed as the primary intervention and the effects of CBT could not be isolated, and 12 papers were removed because the methodology employed did not fit for the inclusion criteria. Thus, a total of nine studies were included in the review. It should be noted that the analysis of these studies was conducted on a subset of articles that were included in the published paper by Kose, Fox, & Storch (2018) on the

effectiveness of CBT for individuals with ASD and comorbid OCD. This review adds to the published study in the sense that it took one step further and analyzed the effectiveness of CBT treatment in relation to the modifications incorporated at the levels of context and structure. The subset of the articles that met the inclusion criteria included one randomized control trial (RCT; Vause, Neil, Jaksic, Jackiewicz, & Feldman, 2015), one case-controlled study (Murray, Jassi, Mataix-Cols, Barrow, & Krebs, 2015), two single subject experimental designs (Neil, Vuase, Yates, & Feldman, 2017; Vause, Hoekstra, & Feldman, 2014), and five case studies (Elliott & Fitzsimons, 2014; Farrell, James, Maddox, Griffiths, & White, 2016; Lehmkuhl, Storch, Bodfish, & Geffken, 2008; Nadeau, Arnold, Storch, & Lewin, 2013; Reaven & Hepburn, 2003). Overall search results are reported in the PRISMA flow diagram (see Figure 1).

Outcome of Interventions
The current study reviewed nine studies, which met the eligibility criteria to analyze CBT efficacy with regard to the stratified modifications for youth with ASD and comorbid OCD (please see Table 1).

Participants
A total of 66 participants received CBT treatment across the nine studies. The case study reports included 1-2 children who ranged in ages from 7 to 16 (Elliott & Fitzsimons, 2014; Farrell et al., 2016; Reaven & Hepburn, 2003). Out of the 44 participants in the case-controlled study by Murray et al. (2015), 22 were described as youth with ASD with a mean age of 15 years. In the randomized trial conducted by Vause et al. (2015), the participants included 14 children, ranging from 8 to 12 years of age. Of the 66 participants, 41 participants were male (62%)

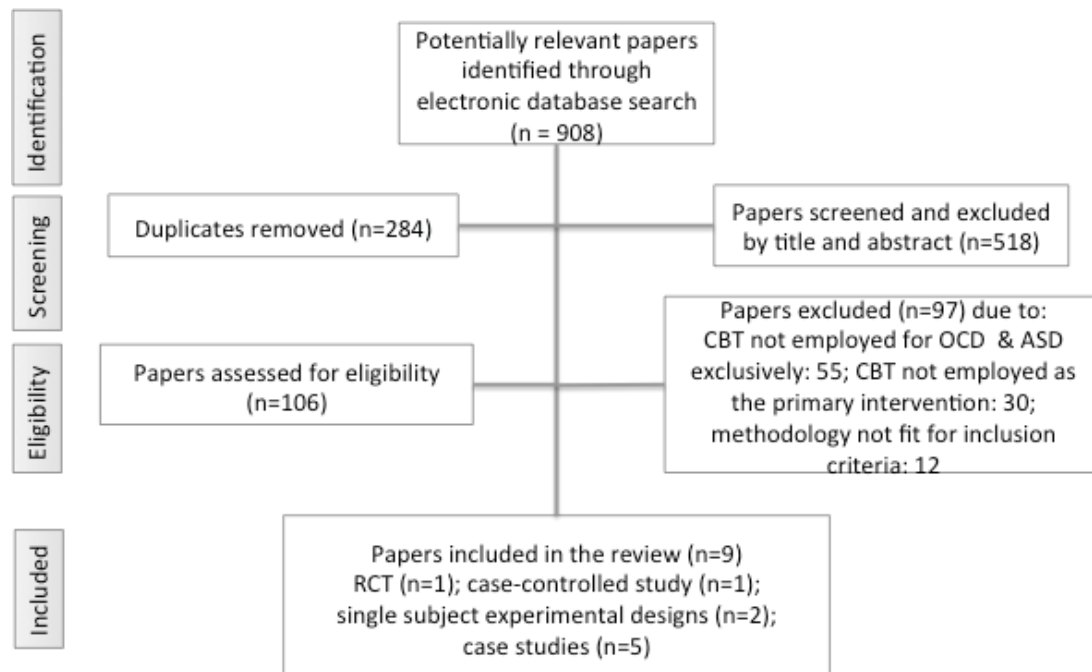Figure 1. *PRISMA Flow Diagram of Study Inclusion. From Moher et al. (2009).*

Fig. 1 PRISMA flow diagram of study inclusion. From Moher et al. (2009)

Table 1.*Table of study characteristics*

Study details	Participants	Intervention characteristics	CBT components	Modifications	Treatment outcomes
Randomized control trial (RCT)					
Vause et al. (2015) Canada	14 children (8-12 years) Fb-CBT mean age: 9.32 TAU mean age: 10.17 Diagnosed with high-functioning ASD & OCD	Number of sessions: Fb-CBT: 9 TAU: 0 Session duration: 2 hours	Psychoeducation/Mapping, Cognitive restructuring, Exposure & response prevention (ERP) with homework assignments	**Contextual:** Increased use of visuals, personalized treatment metaphors & coping statements, explicit directions & repetitiveness, non-verbal & concrete examples, and social skills exercises **Structural:** Functional behavior assessment and intervention (FBAI), Positive reinforcement, Focused concentration on behavioral strategies, Parent training	All between-group and within-group comparisons revealed medium to large effect sizes, significantly greater reduction between pre- and post-treatment in OCD symptoms in Fb-CBT vs TAU *No significant changes in gains at 5 month follow-up
Case-controlled study					
Murray et al. (2015) U.K.	44 individuals (ages not specified) OCD+ASD mean age: 15 OCD+NoASD mean age: 15 Diagnosed with ASD & OCD	Number of sessions: 14 (no significant change between the two groups, OCD+ASD and OCD+NoASD) Session duration: 1 hour	Psychoeducation, Graded ERP, Relapse prevention with homework assignments	**Contextual:** Increased use of visuals **Structural:** Parental involvement	Smaller decrease in symptoms in OCD+ASD than in OCD+NoASD (38.31% vs 48.20%) and lower remission rates at post-treatment (9% vs 46%)
Single-subject experimental designs					
Neil et al. (2017) Canada	1 male: 11 years old Diagnosed with ASD & OCBs Multiple baseline across behaviors	Number of sessions: 9 Session duration: 2 hr.	Psychoeducation, ERP	**Contextual:** Increased use of visuals, personalized treatment metaphors & coping statements, incorporation of child interests, self-monitoring, explicit directions & repetitiveness, non-verbal & concrete examples, and social skills exercises **Structural:** Parental involvement, Positive reinforcement, FBAI, Cognitive & behavioral skills training	Decreases of OCBs to zero levels in all checklists and high consumer satisfaction *Treatment gains maintained at 6, 12, and 20 months follow-up
Vause et al. (2014) Canada	1 male: 10 years old 1 female: 8 years old Diagnosed with ASD & OCD Multiple baseline across behaviors and participants	Number of sessions: 15 for male, 11 for female Session duration: 90 min. for male, 60-90 min. for female	Psychoeducation/Mapping, Cognitive restructuring, ERP, Relapse prevention with homework assignments	**Contextual:** Increased use of visuals, personalized treatment metaphors & coping statements, incorporation of child interests, self-monitoring, and non-verbal & concrete examples **Structural:** Parental involvement, Positive reinforcement, FBAI	Reductions in OCD symptoms in both cases, CY-BOCS score decreased from 25 (severe) to 14.5 (mild) for male and from 29 (severe) to 9.5 (subclinical) for female Reduction in target behavior to near zero levels after FBAI, CT, ERP plus Positive Reinforcement was implemented in addition to psychoeducation and mapping
Case studies					
Elliott and Fitzsimons (2014) U.K.	1 male: 7 years old Diagnosed with ASD & OCD	Number of sessions: 10	Psychoeducation/Mapping, Cognitive restructuring,	**Contextual:** Increased use of visuals, personalized treatment metaphors & coping statements, incorporation of child interests,	Authors describe reduction in symptoms

		Session duration: not specified	Graded ERP with homework assignments	self-monitoring, explicit directions & repetitiveness, and non-verbal & concrete examples **Structural:** Parental involvement	
Farrell et al. (2016) Australia	1 male: 16 years old, Caucasian Australian Diagnosed with ASD & OCD & ADHD	Number of sessions: 6 (3 intensive CBT and 3 maintenance sessions) Session duration: not specified	Psychoeducation (Family-based), Intensive ERP with homework assignments	**Contextual:** Increased use of visuals, personalized treatment metaphors & coping statements, incorporation of child interests, self-monitoring, explicit directions & repetitiveness, and social skills exercises **Structural:** Parental involvement	Reductions in severity scores of all checklists *Not diagnosed with OCD at 3 month follow-up
Lehmkuhl et al. (2008) U.S.	1 male: 12 years old Diagnosed with ASD & OCD	Number of sessions: 10 Session duration: 50 min.	Traditional components of CBT including Psychoeducation/Mapping, Cognitive restructuring, Fear hierarchy development, ERP, Relapse prevention with homework assignments	**Contextual:** Personalized treatment metaphors & coping statements, and self-monitoring **Structural:** Parental involvement	Reductions in OCD symptoms, CY-BOCS score decreased from 18 (moderately severe) to 3 (within normal limits) and CYIS score from 40 to 3 at pre/post treatments *Parent report of treatment effect maintenance at 3 months post-treatment
Nadeau et al. (2013) **U.S.**	1 male: 9 years old, Caucasian Diagnosed with ASD & OCD & social phobia and specific phobia	Number of sessions: 16 Session duration: 35-70 min.	Affective education, Fear hierarchy development, ERP with homework assignments	**Contextual:** Increased use of visuals, incorporation of child interests, explicit directions & repetitiveness, and non-verbal & concrete examples **Structural:** Parental involvement, Coping skills development, Identification and generation of rewards (Positive reinforcement)	Reductions in OCD symptoms & decreases in all checklist scores from clinical significance to within normal limits, CY-BOCS score decreased from 27 (severe) to 0 *Treatment gains sustained at 4 month follow-up
Reaven and Hepburn (2003) U.S.	1 female: 7 years old Diagnosed with Asperger syndrome & OCD	Number of sessions: 14 Session duration: not specified	Traditional components of CBT including Psychoeducation/Mapping, Cognitive restructuring, Fear hierarchy development, ERP, Relapse prevention	**Contextual:** Increased use of visuals, personalized treatment metaphors & coping statements, incorporation of child interests, self-monitoring, explicit directions & repetitiveness, and social skills exercises **Structural:** Parental involvement	65% decrease in OCD symptoms

and 25 were female (38%). Out of the five case studies, only Reaven and Hepburn (2003) included a female participant and out of the two single-subject experimental designs, one of them (Vause et al., 2014) included both a male and a female participant.

In the case-controlled study (Murray et al., 2015), 22 participants with OCD+ASD were matched with 22 OCD+NoASD to compare CBT outcomes, outnumbering the OCD diagnosis in the overall studies. Of the 66 participants, 52 (78%) were diagnosed with OCD and 44 (67%) were diagnosed with ASD. Those who did not get OCD diagnosis were participants in the RCT study by Vause et al. (2015), since all of 14 participants had OCD-like behaviors (referred to as OCBs). Out of 44 participants with ASD, 35 (53%) were diagnosed with high-functioning autism, 7 (10.7%) with Asperger syndrome, and 2 (3%) with PDD-NOS. In addition to ASD and comorbid OCD, one participant in a case study (Farrell et al., 2016) had ADHD and one participant in another case study (Nadeau et al., 2013) had social and specific phobia. Although these two case studies did not exclusively involve ASD and OCD, the treatment measures and procedure primarily focused on this dual psychopathology, warranting inclusion in the review. In studies reporting participant IQ, the IQ ranged from borderline to gifted (Lehmkuhl et al., 2008; Nadeau et al., 2013; Neil et al., 2017; Reaven & Hepburn, 2003; Vause et al., 2014; Vause et al., 2015). Other studies described intellectual functioning as "having at least average cognitive abilities" (Farrell et al., 2016), "above average intelligence" (Elliott & Fitzsimons, 2014) and one study failed to report (Murray et al., 2015).

Intervention Characteristics
The sessions of CBT treatment ranged from 6 (Farrell et al., 2016) to 17.4 (mean CBT

sessions in Vause et al., 2014) over a period of 9 (Neil et al., 2017) to 21 weeks (Nadeau et al., 2013) while the duration of sessions ranged from 35 minutes (Nadeau et al., 2013) to 2 hours (Neil et al., 2017). With all studies, CBT treatment was implemented mainly in a clinic or a therapist's office. With the purpose of generalization, ERP sessions, the most active ingredients in CBT treatment, were also implemented in home (e.g., Farrell et al., 2016; Lehmkuhl et al., 2008; Reaven & Hepburn, 2003) and school (e.g., Lehmkuhl et al., 2008; Reaven & Hepburn, 2003). In the case study by Farrell et al. (2016), in addition to clinic and home, CBT was implemented on a beach and in a park to maximize opportunities for ERP. Clinical psychologists or therapists, who were trained postdoctoral fellow or masters-level students and supervised by licensed providers, implemented the treatment sessions.

Studies employed a variety of designs including five clinical case reports (Elliott & Fitzsimons, 2014; Farrell et al., 2016; Lehmkuhl et al., 2008; Nadeau et al., 2013; Reaven & Hepburn, 2003), two studies using a time series experimental design (Neil et al., 2017; Vause et al., 2014), and two group studies that ranged in experimental rigor from a design described as case-controlled (Murray et al., 2015) to the Randomized Controlled Trial (RCT; Vause et al., 2015). The clinical case studies (Elliott & Fitzsimons, 2014; Farrell et al., 2016; Lehmkuhl et al., 2008; Nadeau et al., 2013; Reaven & Hepburn, 2003) offered data on the promising applications of an intervention and allowed for an examination of the details of the intervention approach; however, they did not include design elements for external and internal validity or a determination of treatment efficacy.

In contrast, both single subject experimental designs (Neil et al., 2017; Vause et al., 2014)

had high treatment fidelity since trained naïve observers completed treatment implementation checks with video recordings and reached 100% inter-observer agreement. Out of the two group studies, Vause et al. (2015) included measures for ensuring treatment fidelity while Murray et al. (2015) did not. In the RCT by Vause et al. (2015), therapists collected observational probe data to check reliability on parent ratings of targeted behaviors and reached 86% agreement with parents' Likert-type scale ratings. Of the two group studies, Murray et al. (2015) had a control group while Vause et al. (2015) had a treatment as usual (TAU).

CBT Components

In all studies, a multi-component CBT treatment was implemented. The components of CBT typically involve psychoeducation/ mapping, cognitive restructuring, fear hierarchy development, ERP, and relapse prevention, accompanied with homework assignments. One study also included affective education or emotional literacy (Nadeau et al., 2013), which addressed identification of emotions based on facial and contextual clues. A few of the studies (Elliott & Fitzsimons, 2014; Farrell et al., 2016; Lehmkuhl et al., 2008; Reaven & Hepburn, 2003) had a reduced focus on cognitive restructuring and an earlier introduction of ERP due to the participant(s)' difficulty in identifying and reflecting on specific obsessions. Relaxation activities core to ERP were delivered in a more directive way than would be expected for CBT with a typically developing population. Cognitive restructuring was typically delivered in a creative way through personalized treatment metaphors such as "Buzz off OC" (Vause et al., 2014) and "Beat OCD and not let him be the boss" (Lehmkuhl et al., 2008) or through the use of acronyms such as KICK— Knowing I'm nervous, Icky thoughts, Calming thoughts, Keep practicing (Nadeau

et al. 2013).

Similarly, problem solving was introduced through coping strategies such as social stories (Elliott & Fitzsimons, 2014; Reaven & Hepburn, 2003; Vause et al., 2015) and self-monitoring (e.g. reviewing, positive self-talk; Reaven & Hepburn, 2003; Vause et al., 2014). Also, except two studies (Neil et al., 2017; Reaven & Hepburn, 2003), all studies incorporated homework for generalization; most exposure was completed as homework assignments. Except two of the studies (Elliott & Fitzsimons, 2014; Farrell et al., 2016), relapse prevention plans were reported and booster sessions were implemented. Two of the studies that involved relapse prevention and generalization delivered these components as part of a parent training (Murray et al., 2015; Vause et al., 2015). It is of interest to note that all studies employed almost all phases of traditional CBT and found significant reductions in child and parent reports of OCD symptoms as well as in clinician-administered measures. In terms of relative treatment effects of these phases, Vause et al. (2014; 2015) studies found that psychoeducation/mapping alone did not show a treatment effect; changes were observed only after ERP, functional behavioral assessment and intervention (FBAI), and positive reinforcement were introduced.

Modifications

Although traditional elements of CBT treatment (e.g., March & Mulle, 1998) were employed across studies, there were several modifications or enhancements to the standard treatment to address the social, emotional, and cognitive needs of youth with ASD. All studies reviewed reported that with certain modifications, CBT can be used effectively to lessen OCBs in children with ASD; however, the wide range of

modifications employed inconsistently across studies rendered the review process challenging and necessitated the classification of clear and succinct guidelines that would facilitate the intervention delivery for all stakeholders. To ease the analysis of modifications incorporated across studies, this review evaluated them with regard to content and structure, respectively. Table 2 summarizes the modifications that were used across studies at these two levels.

Contextual modifications. These modifications are directly linked to the content of the CBT treatment, which aim at increasing the engagement of the children with ASD and comorbid OCD. Due to the idiosyncratic needs of children on the autism spectrum, traditional CBT requires disorder-specific modifications to the content. These modifications were "supplementary" in the sense that they supplemented the existing features of CBT treatment by addressing the core deficits of children on the autism spectrum. Common contextual modifications incorporated across studies included visual aids to accommodate the non-verbal and concrete learning styles (e.g., weekly written schedule in Nadeau et al., 2013; Neil et al., 2017), incorporation of child interests, personalized treatment metaphors and coping statements to overcome difficulties in social engagement, attention, and motivation (e.g., "Buzz off OC" in Vause et al., 2014; "Beat OCD and not let him be the boss" in Lehmkuhl et al., 2008, and "Allies Xtreme Race Team vs. OCD Mean Team" in Farrell et al., 2016), self-monitoring (e.g., behavior monitoring chart in Lehmkulh et al., 2008; tracking logs in Reaven & Hepburn, 2003), use of clear language and instructions with repetitiveness, non-verbal and concrete examples, and social skills exercises (e.g., social stories Vause et al., 2015) to increase social understanding. The common element that brought these modifications under one

category was that they directly addressed the social, emotional, and cognitive needs of the participants and encouraged them to actively engage in the process. These modifications not only compensated for the social and communication difficulties experienced by children with ASD but also helped alleviate the challenges of cognitive rigidity, alexithymia, and difficulties in generalization, resulting in more optimal treatment outcomes for this specific population.

Structural modifications. These modifications are directly linked to the structure of the CBT treatment, which aim at facilitating the intervention delivery for the children with ASD and comorbid OCD. These modifications were "complementary" in the sense that they complemented the overall process of the intervention by enhancing the mode of delivery. Common structural modifications incorporated across studies included parental involvement, positive reinforcement, functional behavioral assessment (FBA), and cognitive & behavioral skills training with more focus on behavioral strategies than on cognitive component. Parents were involved in all studies; some of the studies involved them in all phases of CBT (Farrell et al., 2016; Reaven & Hepburn, 2003; Vause et al., 2014) while one of them involved them in a few phases only (e.g., psychoeducation, relapse prevention phases in Murray et al., 2015). Parent training and parent psychoeducation were also components of CBT treatment in two of the studies (Farrell et al., 2016; Vause. et al., 2015). Parental involvement was not only clinic-based; parents were also responsible for doing homework in the home setting. These homework assignments were a component of CBT treatment to aid generalization of treatment gains, limit family accommodation (Lehmkuhl et al., 2008), and promote awareness of OCB

Table 2. *Overview of contextual & structural modifications from the most common to the least*

	Contextual Modifications (Supplementary)							Structural Modifications (Complementary)				
	Increased use of visuals	Personalized treatment metaphors & coping statements	Incorporation of child interests	Self-monitoring	Explicit directions & repetitiveness	Non-verbal & concrete examples	Social skills exercises (e.g. social stories)	Parental involvement	Parent training	Positive reinforcement	Functional behavioral assessment & intervention (FBAI)	Cognitive & behavioral skills training
Elliott & Fitzsimons (2014)	✓	✓	✓	✓	✓	✓		✓				
Farrell el at. (2016)	✓	✓	✓	✓	✓		✓	✓	✓			
Lehmkuhl et al. (2008)		✓		✓				✓				
Murray et al. (2015)	✓							✓	✓			
Nadeau et al. (2013)	✓		✓		✓	✓		✓	✓	✓		✓
Neil et al. (2017)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Reaven & Hepburn (2003)	✓	✓	✓	✓	✓		✓	✓				
Vause et al. (2014)	✓	✓	✓	✓		✓		✓	✓	✓	✓	
Vause et al. (2015)	✓	✓			✓	✓	✓	✓	✓	✓	✓	

(Vause et al., 2015). Homework was an element of CBT treatment across all studies, except in a case study by Reaven & Hepburn (2003) and in the single subject experiment by Neil et al. (2017).

Structural modifications in CBT also included a reduced concentration on the cognitive component and a greater employment of behavioral strategies such as exposure and relaxation. One of the studies (Lehmkuhl et al., 2008) started ERP sessions early (in the second or third session) due to the protracted cognitive component that diminished the participant(s)' ability to reflect on specific obsessions. Three studies included the use of functional behavioral assessment to identify the perceived functions of the compulsions and included assessment-based behavior intervention techniques (e.g., applied behavior analysis) and called this new treatment approach function-based CBT (Fb-CBT; Neil et al., 2017; Vause et al., 2014; Vause et al., 2015). Fb-CBT included identification of potential functions of behaviors (i.e., social attention, escape from task, tangible, sensory/non-social) and appropriate techniques such as differential reinforcement of alternative behavior (DRA), planned ignoring, redirection (Vause et al., 2014), and positive reinforcement (i.e., verbal praise and tangibles such as tokens, stickers; Neil et al., 2017; Vause et al., 2015).

Treatment Outcomes

Various measures were utilized to evaluate treatment effects across studies. The most common measures included the Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS; Scahill et al., 1997), the Autism Diagnostic Interview-Revised (ADI-R; Lord, Rutter, & Le Couteur, 1994), self-generated ratings, parent OCB rating scale, and treatment satisfaction report. Some other measures included the Child Behavior Checklist (CBCL; Achenbach, 2001), the Children's Global Assessment Scale (CGAS; Shaffer et al., 1983), the Repetitive Behavior Scale-Revised (RBS-R; Bodfish, Symons, & Lewis, 1999), and the Anxiety Disorder Interview Schedule for DSM-IV – Child and Parent Version (ADIS-C/P; Silverman & Albano, 1996). Except in a case study by Elliott and Fitzsimons (2014), pre- and post-treatment assessments were conducted in all studies. Overall, there were significant reductions in OCD symptoms in scores of all checklists and in some, even decreases of OCBs to zero levels (Farrell et al., 2016; Nadeau et al., 2013; Neil et al., 2017), and high treatment satisfaction. In the case-controlled study, however, Murray et al. (2015) found that as compared to OCD+NoASD group, OCD+ASD group had a significantly smaller decrease in symptoms over treatment (38.31% vs. 48.20%) and lower remission rates at post treatment (9% vs. 46%).

Except for the Murray et al. (2015) study, all studies administered follow-up measures to identify if treatment gains were sustained. Follow-up measures were conducted in a varying period of time, ranging from two sessions (Elliott & Fitzsimons, 2014) to 20 months (Neil et al., 2017). Across all studies, treatment gains were maintained with little to no changes except the single subject experimental design by Vause et al. (2014), where the OCD symptoms were reduced but resurfaced for the female participant due to some triggers. In Fb-CBT studies (Neil et al., 2017; Vause et al., 2014; Vause et al., 2015), functional behavioral assessment and parent training were the pivotal accompaniments of CBT, which resulted in near to zero level OCBs, high treatment satisfaction, and maintained treatment gains in as far as 20 month follow-up. Parental involvement was one of the major modifications incorporated across all studies; however, only five of the

studies (Farrell et al., 2016; Nadeau et al., 2013; Neil et al., 2017; Vause et al., 2014; Vause et al., 2015) also included parent training within therapy or as a separate session, during which they learned about treatment protocols and had training on how to manage OCD demands. In the studies that did not include parent training, parental involvement was in the form of a full time aide, who encouraged the child to continue with the process of intervention delivery and assisted with homework assignments.

Discussion

This review identified nine studies that evaluated the efficacy of CBT treatment with regard to the stratified modifications for youth with ASD and comorbid OCD. All studies reported promising results since there was a significant reduction in OCD symptoms when CBT treatment was modified to meet the unique needs of the children on the autism spectrum. However, except the RCT by Vause et al. (2015), the other studies fell short of demonstrating experimental control and providing rigorous evidence to make conclusions about the overall efficacy of CBT for OCD in this population.

The modifications employed varied across the studies. To shed light upon what modifications were commonly incorporated and proved effective, this review analyzed them at the contextual and structural levels. The most common contextual modifications included visual cues, incorporation of child interests, personalized metaphors and coping statements, and self-monitoring while the most common structural modifications included parental involvement and parent training. This is a preliminary research compiling the most common modifications in CBT treatment according to their function and effect. Given the high comorbidity of OCD in children with ASD, there is a

pressing need to provide stakeholders treating this clinical population with a more comprehensive set of guidelines that would illustrate all evidence-based strategies and techniques in a clear and succinct way. There is also a need for additional rigorous research that can contribute to the development of a disorder-specific CBT protocol for children with ASD and comorbid OCD to meet their social, emotional, and cognitive needs. This might not only eliminate the ambiguity and instability around what modifications to employ in the intervention package and also facilitate the intervention delivery both for the therapist and the participants, resulting in more optimal treatment outcomes.

In the studies reviewed, positive outcomes were evident for all participants. It is important to note that all of the participants in the studies had high-functioning autism and IQ > 69. In the Vause et al. (2015) study, the researchers stated that individuals with ASD and intellectual disabilities were not included because it was more likely that anxiety disorders, including OCD, are more frequent among individuals with ASD who are verbally fluent (Gadow, Devincent, Pomeroy, & Azizian, 2005; Gilliot, Furniss, & Walter, 2001). However, Farrell et al. (2016) concluded that their preliminary findings suggest that modified CBT may also be effective in reducing repetitive behaviors (RBs) in the context of ASD and co-occurring intellectual disability (Boyd, Woodard, & Bodfish, 2013). Thus, youth with fewer verbal and cognitive skills should also be addressed in the pursuit of maximizing the effectiveness of CBT treatment.

Limitations

The findings of this review need to be tempered by reference to a number of limitations. First, there is a dearth of studies on CBT treatment for children with ASD and

comorbid OCD since it is a relatively nascent field of inquiry. This led to the inclusion of studies that did not have methodological rigor. Five of the studies included in the review offered descriptive data (e.g., case studies) while the rest had more rigorous designs with experimental control (e.g., single subject experimental designs, case-controlled study, and RCT). Only one of the group studies (Murray et al., 2015) had comparison to an active treatment condition, while the other incorporated a TAU (Vause et al., 2015). Second, there was a wide variation of techniques (i.e., behavioral, skills-based, cognitive) employed in CBT treatment across studies, which rendered the analysis of intervention delivery difficult. The heterogeneity across components of CBT and their delivery had a threat to internal validity, which made it difficult to come to a conclusive finding with regard to what treatment modality was the most effective. This review aimed to attract attention to the so-far neglected problem of heterogeneity in the content and structure of CBT treatment and alert researchers to conduct research with this mindset. Third, despite the exclusion of studies that included pharmacological treatment, in two of the studies (Murray et al., 2015; Reaven & Hepburn, 2003) medication was started during CBT treatment, not allowing to make a conclusion that observed improvements were the result of CBT alone. Finally, the pre/post-tests conducted as the outcome measures included self-report and parent-report data. In terms of treatment fidelity, behavior scales or checklists rated by the participants or parents did not have as much methodological rigor as those rated by the therapists since self –report data had relatively poor reliability while parent-report data were susceptible to observer drift.

Future Research and Practice
This review yielded nine studies that examined the modifications of CBT with regard to their function and effect on children with ASD and comorbid OCD. Due to the high prevalence of children with ASD and comorbid OCD, there is a need for more rigorous research that may result in a disorder-specific CBT protocol with clear and succinct guidelines. Although there are many evidence-based techniques and strategies incorporated into CBT treatment for children on the autism spectrum, there is no agreed upon set of guidelines, which renders the process of intervention delivery challenging for the stakeholders. To maximize treatment outcomes, there is a need for a disorder-specific CBT protocol that will build upon the social, emotional, and cognitive needs of the clinical population and will include contextual and structural modifications to select from and use depending on the unique case of the participant.

While the content and structure of CBT are significant to determine the treatment efficacy, some other factors might also moderate or mediate treatment outcomes. Future studies might also examine the predictors of remission and relapse. Almost all studies reviewed included follow-up data to illustrate whether treatment gains were maintained over a period of time. All concluded that treatment gains were sustained; however, none of the studies described the factors that possibly led to remission. Lack of parental accommodation, continued affective education, homework compliance, and positive reinforcement might be a few of the factors that helped remission and prevented relapse. Future research is warranted to examine the validity of these factors and increase the maintenance of treatment gains.

Even though ERP has been acknowledged as the most active ingredient in reducing OCBs (Lehmkuhl et al., 2008; March & Mulle,

1998), it has not yet been tested whether ERP alone would yield in the same results. Three of the studies (Neil et al., 2017; Vause et al., 2014; Vause et al., 2015) found that some of the treatment components (e.g., ERP, Cognitive Training (CT), FBAI) resulted in more optimal treatment outcomes for the participants than the others (e.g., psychoeducation and mapping). It is of critical importance to conduct component analysis studies to examine the relative efficacy of these treatment components since it would be ideal to focus on the more effective components only. Similarly, the contextual and structural modifications analyzed in this review might be tested for efficacy in randomized control trials and assessed whether one set of modifications overrides the other one. Additionally, future research should further test the efficacy of the component of FBAI in the CBT treatment since there is a growing support for the use of function-based components (Kuhn, Hardesty, & Sweeney, 2009; Rodriguez, Thompson, Schlichenmeyer, & Stocco, 2012). Fb-CBT, the revolutionized form of CBT, may help not only identify some possible functions of OCBs (e.g., social attention, access to a tangible item, escape from task, and automatic reinforcement) (Feldman, Condillac, Tough, Hunt, & Griffiths, 2002; Hanley, Iwata, & McCord, 2003) but also lead to a more comprehensive treatment protocol that will provide more optimal treatment outcomes and higher remission rates.

As well as modifications, the modes of intervention delivery (e.g., group CBT, family CBT, and individual CBT) also varied across studies. However, there was no indication of the superiority of one mode over the others. Only Neil et al. (2017) referred to the efficacy of individual CBT over group CBT. Future research should further examine the relationship between the mode of delivery and treatment outcomes. Additionally, parental involvement was a core aspect of CBT treatment across the studies. Five of the studies reviewed also had parent training as a component of CBT treatment but not all studies explained the parents' role or examined it as a predictor of treatment success. Future research is warranted to clarify parents' role and its impact on the treatment success.

Although the review was focused on the youth, there is a clear need for concentration of future research on the adult population as well. Only one study (Russell et al., 2013) was positioned in the literature to include adults in examining the effectiveness of CBT treatment for ASD and comorbid OCD. It is of vital importance to address the adult population as well since this comorbidity tends to persist for the lifetime if left untreated. The last but not the least, the outcome measures in the studies were concentrated on the measures of symptom severity. Although changes in symptom severity are clearly the most important proximal outcomes for treatment, there are other outcomes related to lifestyle that may also merit close examination such as social and communication skills, access to community activities, friendship development, and family quality of life.

Conclusion
This is the first review to examine the modifications in CBT treatment for youth with ASD and comorbid OCD in relation to (1) content and (2) structure with an attempt to (i) provide clear and succinct guidelines for the stakeholders, (ii) lessen the ambiguity and instability around the application of the practices, and (iii) maximize treatment outcomes. The contextual modifications were "supplementary" whereas the structural modifications were "complementary", creating a holistic way of intervention

delivery. The results suggest that youth on the autism spectrum clinically benefited from the modified interventions as indicated by reduced symptom severity scores on both self- and parent-report questionnaires and clinician-administered measures of OCBs. However, in order to serve this clinical population in the most optimal way, a disorder-specific CBT protocol needs to be created with guidelines for the selection and use of modifications that are evidence-based and effective. Given the high prevalence of OCD in individuals with ASD, there is an urgent need to continue rigorous research on this promising approach for treatment.

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