# FACTORS RELATED TO STUDENTS' ON-TASK BEHAVIORS IN AUTISM SUPPORT CLASSROOMS

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ABSTRACT

The number of publications examining autism spectrum disorders (ASD) has increased dramatically over the past 30 years, and research on treatments and interventions for individuals with ASD is a growing and popular topic. It is essential to identify effective and efficient strategies for educating students with ASD due to the number of recommended interventions, the increasing number of students with ASD, and the limited resources available in public schools. However, there is a lack of research examining the application of these strategies in classrooms for students with ASD, as well as their associations with student outcomes. The purpose of this study is to examine the use of commonly recommended and applied strategies (i.e., praise-to-behavior correction ratios, individual or small group instructional format, and paraprofessional support), and to investigate the association between these factors and on-task behaviors of students with ASD. Data from 257 observations across 76 kindergarten-to-second grade autism support teachers in a large, urban school district were analyzed. Teachers were observed using positive praise-to-behavior correction ratios, and more than half of the observations were collected during whole group instruction. The use of fewer behavior correction statements and small group instruction had significant associations with students' on-task behaviors, but the number of staff was not associated with higher rates of on-task behaviors. Directions for future research include investigating additional characteristics related to teachers' use of praise and behavior correction statements in autism support classrooms, as well as providing teacher and paraprofessional training in the use of praise-to-behavior correction ratios and providing instruction in small group formats.

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# CHAPTER 1

## INTRODUCTION

Autism spectrum disorder (ASD) is a developmental disability characterized by repetitive and restricted behaviors and impairments in social communication and interaction (American Psychiatric Association, 2013). The prevalence of autism has been rising steadily over the past few decades, with recent estimates suggesting that 1 in 59 children are diagnosed with autism (Centers for Disease Control and Prevention, 2018). Autism is the fastest growing category served in special education (Ludlow, Keramidas, & Landers, 2007). Recent estimates from the United States Department of Education (2017) reported that the number of students ages 6 to 21 served under the category of autism has increased between 106, 189, and 209 percent for each age group (ages 6 to 11, 12 to 17, and 18 to 21, respectively) from 2006 to 2015. In contrast, there were decreases in other categories, with the exception of Other Health Impairment, which had increases ranging from 44 to 80 percent across age groups. Due to the growing number of students with autism in schools, it is important to identify and implement practices that are research-based and effective for teaching students with autism. This study will examine three factors that are commonly recommended, as well as their relationships with the on-task behaviors of students with autism: praise-to-behavior correction ratios, small group instructional formats, and paraprofessional supports and services.

On-task behavior is a basic foundation to learning, in that students who are on-task are available for learning (Iovannone, Dunlap, Huber, & Kincaid, 2003). It has been defined in the literature as the amount of time a student is attending to the teacher or a

task and is engaged in an assigned task (Ferguson & Houghton, 1992). It is a critical first step in engaging students academically so they can benefit from instruction (Landrum, Tankersley, & Kauffman, 2003). On-task behavior is considered to be an indicator of how beneficial and effective a student's educational program is (Kurth & Mastergeorge, 2012), and it has been found to be a predictor of positive long-term student outcomes and academic achievement (Iovannone et al., 2003; Matheson & Shriver, 2005). Unless teachers are effective in preparing students to be ready for learning, their teaching skills are likely to be unsuccessful (Madsen, Becker, & Thomas, 1968); therefore, if students are off-task, they may not benefit from instruction.

Educators might find it challenging to engage students with autism in instruction due to unique characteristics related to autism that can make maintaining on-task behavior in a school environment difficult (Hume & Reynolds, 2010; Lindsay, Proula, Thomson, & Scott, 2013). Students with autism may engage in stereotypic or repetitive behaviors that interfere with their learning (Greenberg, Tang, & Tsoi, 2010), or they may not be motivated to stay on-task due to highly specialized and restricted interests (Marks et al., 2003). Another barrier to on-task behavior is that students with autism may become fixated on a cue that is not relevant for learning, while not attending to the cues that are important (Lovaas, Schreibman, Koegel, & Rehm, 1971; Schreibman, 1975). These barriers to staying on-task can interfere with the acquisition of critical social and academic skills that can prepare a student for success (Goodman & Williams, 2007).

The use of a high praise-to-behavior correction ratio is a frequently recommended strategy for increasing on-task behaviors in general education and special education

classrooms. Praise statements are positive statements that communicate approval of desired behaviors, while behavior correction statements are intended to redirect or correct inappropriate behaviors (O'Handley, 2014). Although a standard praise-to-behavior correction ratio has not been established, teachers are advised to provide anywhere from three praise statements for every one behavior correction statement, to eight praise statements for every one behavior correction statement (Shores, Gunter, & Jack, 1993; Wong & Wong, 1998). Unfortunately, reviews of studies conducted over the past four decades have found that teachers generally provide more behavior correction than praise statements, especially for social behaviors, such as following rules or sitting quietly (Beaman & Wheldall, 2000; Gable, Hendrickson, & Young, 2009; Sutherland, 2000).

Studies examining praise-to-behavior correction ratios have focused on students in general education classrooms (e.g., Andrews & Kozma, 1990; Beaman & Wheldall, 2000; Merrett & Wheldall, 1987; Pisacreta, Tincani, Connell, & Axelrod, 2011; Reinke, Herman, & Stormont, 2013; Utley & Obiakor, 2015; Wheldall, Houghton, & Merrett, 1989) or students with or at-risk for emotional and behavioral disorders (e.g., Allday et al., 1988; Conroy, Sutherland, Vo, Carr, & Ogston, 2014; Hawkins & Heflin, 2011; Maggin, Wehby, Partin, Robertson, & Oliver, 2011; Martens, Hiralall, & Bradley, 1997; Rathel, Drasgow, & Christle, 2008; Rosén, O'Leary, Joyce, Conway, & Pfiffner, 1974; Sutherland, 2000; Wehby, Symons, & Shores, 1995). However, praise may have different effects on students with autism due to impairments in social interaction and communication that are considered to be an essential feature of autism (Shattuck et al., 2007). Due to these social impairments, it has been suggested that individuals with

autism may respond differently to the use of praise, which is a social consequence (Koegel, Robinson, & Koegel, 2009; Machalicek, O'Reilly, Beretvas, Sigafoos, & Lancioni, 2007; Rivera, Mason, Jabeen, & Johnson, 2015).

Some individuals with ASD may engage in behaviors to gain access to social consequences, such as attention and praise, while others may engage in behaviors to escape from social consequences (Kelly, Axe, Allen, & Maguire, 2015; Love, Carr, & LeBlanc, 2009). For others, social consequences may not function as reinforcers. However, praise can be conditioned as a reinforcer to increase desired behaviors by pairing it with other reinforcers, such as food or toys (Lovaas et al., 1966). Studies examining the effects of praise on individuals with autism have focused on preference assessments, that is, the individual's preference for praise versus another class of reinforcer, such as edible or tangible reinforcers (e.g., Gutierrez, Fischer, Durocher, & Alessandri, 2013; Leaf et al., 2014; Smaby, MacDonald, Ahearn, & Dube, 2007), or the effects of praise on the acquisition of new skills (e.g., Paden & Kodak, 2015; Tsiouri & Greer, 2007).

Unfortunately, few studies have examined the effects of praise on the on-task behaviors of students with autism. Greenberg and colleagues (2010) examined the use of a treatment package that included written reminders to stay on task (e.g., "listen to teacher") and verbal and nonverbal praise for correct responding on the on-task behaviors of a 6-year-old student with autism. They reported that the treatment package was effective in increasing the student's on-task behavior across three settings: one-to-one instruction, group instruction, and physical education. Rivera and colleagues (2015) used

a mobile device to prompt teachers' delivery of praise to students with autism. While teachers' rates of praise increased and there was a corresponding increase in students' on-task behaviors, a functional relationship could not be established, as students' on-task behaviors did not return to baseline levels when teachers withdrew the use of praise.

Rathel, Drasgow, Brown, and Marshall (2014) examined the effects of increased praise-to-behavior correction ratios in four students with diagnoses of emotional and behavioral disorders, learning disabilities, or autism. During the baseline phase, none of the teachers met the researchers' goals of a praise-to-behavior correction ratio of 5:1. While two teachers' praise-to-behavior correction ratios were closely related (e.g., they delivered similar amounts of praise and behavior correction), the other two teachers delivered more behavior correction than praise. The teachers were instructed to increase their ratios, which resulted in immediate increases in students' on-task behaviors.

Other factors believed to impact on-task behaviors in students with autism are structural and environmental factors in the classroom, such as instructional format and increased adult support and proximity (Carter, Sisco, Brown, Brickham, & Al-Khabbaz, 2008). One-to-one or small group instruction is often recommended to meet students' individualized goals (National Research Council, 2001). Students with autism have been found to be most on-task during one-to-one instruction and small group instruction, with more difficulty maintaining on-task behaviors during large group or whole group instruction (Carter et al., 2008; Koegel & Rincover, 1974; Whorton, Delquadri, & Hall, 1986, Young, Simpson, Myles, & Kamps, 1997). Despite these recommendations, studies report that students with autism in self-contained classrooms have been observed to spend

varying amounts of time in one-to-one instruction, small group instruction, whole group instruction, independent work, or taking a break (Dymond & Russell, 2004; Kurth & Mastergeorge, 2012; Ledford & Wehby, 2015; Maggin et al., 2011; Ruble & Robson, 2007; Young et al., 1997).

In addition, considerable resources have been devoted to provide paraprofessional supports and services to students with disabilities. Paraprofessional services are one of the most commonly used supports for children with autism (Koegel et al., 2009). Paraprofessionals may provide academic or behavioral supports by facilitating social interactions with peers, assisting with challenging behaviors, prompting students to stay on-task, or by providing supplemental instruction to students with disabilities (Carter, O'Rourke, Sisco, & Pelsue, 2009).

It has been suggested that paraprofessionals are either over-involved or under-involved with students in classrooms (Koegel et al., 2009). On one hand, students may spend the majority of their time with their paraprofessional, who assumes the majority of the responsibility for the student's academic and behavioral support needs (Koegel et al., 2009; Scheuermann, Webber, Boutot, & Goodwin, 2003). On the other hand, paraprofessionals may spend minimal amounts of time interacting with their students with autism. Young and colleagues (1997) reported that paraprofessionals did not initiate interactions with their students for 57% of the intervals observed. Azad, Locke, Downey, Xie, and Mandell (2015) reported that paraprofessionals spent less time engaged with students compared to classroom assistants and special education teachers.

Limited research suggests that the presence of paraprofessionals appears to have inconsistent effects on students' on-task behaviors. Werts, Zigmond, and Leeper (2001) found that students with autism were more on-task when their paraprofessional was close in proximity, while Young and colleagues (1997) found different effects for each of the three students with autism observed in their study.

Although federal educational legislation has resulted in an increased focus and commitment to delivering strategies and practices with a strong evidence base (IDEA, 2004), educators of students with autism have reported that they use evidence-based or emerging practices, such as discrete trial teaching or structured teaching, while also continuing to use some practices that are unsupported with similar frequency to evidence-based practices, such as facilitated communication or sensory integration training (Ferreri, Witmer, & Shivers, 2016; Paynter et al., 2016). While it has been hypothesized that practices implemented with accuracy and fidelity will result in improved outcomes for students with ASD, Pellecchia and colleagues (2015) found that evidence-based practices were implemented with low fidelity in public education and community settings. Barriers to implementation include inadequate training, a lack of ongoing support, and time constraints (Koegel et al., 2009). It is likely that urban schools face additional barriers in implementing these factors, such as limited resources (Partin, Robertson, Maggin, Oliver, & Wehby, 2010). Given the importance placed on delivering high quality instruction, it is important to identify critical ingredients that maintain students' on-task behaviors.

The current study will investigate the use of three factors that are believed to have an effect on students' on-task behaviors in autism support classrooms by using data from an existing research project. A glossary of terms used in the current study is included in Table 1. The study will address three primary research questions:

Question 1:

a. What are the praise-to-behavior correction ratios used by special education teachers in autism support classrooms?
b. What is the relationship between teachers' praise-to-behavior correction ratios and students' on-task behaviors?

Question 2:

What instructional formats (i.e., small group, whole group) are associated with improved on-task behaviors in students with autism?

Question 3:

a. What is the relationship between the number of staff members and students' on-task behaviors? Are students more or less on-task in classrooms with more paraprofessional services?
b. Is there a relationship between the number of staff members present in the classroom and the instructional formats being used?

Table 1

*Glossary of Terms*

| Term | Definition |
|---|---|
| ASD | Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by impairments in social communication and the presence of repetitive, restricted behaviors. |
| Autism support classroom | An autism support classroom is a type of self-contained classroom in a public school that is designed to serve the needs of students with an educational classification of autism. |
| Classroom assistant | In the current study, a classroom assistant is a paraprofessional who is employed by the school district to provide academic or behavioral support for students in the classroom, and assist the teacher in clerical or administrative duties. |
| One-to-one assistant | In the current study, a one-to-one assistant is a paraprofessional who is employed by the school district to provide academic or behavioral support to an individual student. Because one-to-one assistants are employed by the school district, they can also provide assistance to other students. |
| Paraprofessional | A paraprofessional is a staff member who provides various support roles within a school or classroom. The terms used to refer to these school personnel can vary widely and are often used interchangeably. This study will use the term "paraprofessional" to describe the various support staff, including classroom assistants, one-to-one assistants, and therapeutic support staff, in the classroom. |
| Self-contained classroom | A self-contained classroom is a special education classroom in a public school designed to serve students with special needs. They typically have a special education teacher and a paraprofessional, and have fewer students, who can be grouped by their disability or learning needs, or can be a mixed group of students. |
| Therapeutic support staff (TSS) | In the current study, therapeutic support staff workers are paraprofessionals who are employed by outside agencies, such as behavioral health agencies, to provide behavioral support to an individual student. Because they are not employed by the school district, they are limited in the type of assistance they can provide, as well as to whom they provide assistance. |

# CHAPTER 2

# LITERATURE REVIEW

## Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a complex developmental disorder that is characterized by impairments in social communication and interaction, and restricted, repetitive patterns of behavior (American Psychiatric Association, 2013). It comprises previous diagnoses of autistic disorder, Asperger's disorder, and pervasive developmental disorder – not otherwise specified. Autism is diagnosed about 4 times more in boys than girls, and is diagnosed across all ethnic, racial, and socioeconomic groups (Centers for Disease Control and Prevention [CDC], 2018).

There has been a dramatic increase in the prevalence of autism over the past 30 years (Crosland & Dunlap, 2012). Recent prevalence estimates suggest that 1 in 59 children are diagnosed with autism, representing a significant increase from estimates of 1 in 150 children in 2000 (CDC, 2018). Autism is considered to be the fastest growing developmental disorder and is second in frequency to intellectual disability as the most common developmental disorder in the United States (Loiacono & Allen, 2008; Newschaffer et al., 2007).

In 1990, autism was added as an educational disability category under the Individuals with Disabilities Education Act (Individuals with Disabilities Education Act [IDEA], 2004). Since its inclusion, the number of individuals with autism receiving special education services under IDEA has been increasing, with autism being the fastest growing group of students served through special education (Ludlow, Keramidas, &

Landers, 2007). In 2015, 9.1% of students ages 6 to 21 receiving special education services had a primary classification of autism (U.S. Department of Education, 2017). These figures may be an underestimate, since not all children with autism receive special education services under the primary category of autism (Goodman & Williams, 2007). Christensen and colleagues (2016) found that 61% of boys and 57% of girls with autism had a primary special education eligibility classification of autism. Children with autism may also be served under other categories, such as Language/Communication Impairment, Emotional Disturbance, Specific Learning Disability, Multiple Disabilities, or Other Health Impairment (Sansosti & Sansosti, 2013).

IDEA (2004) states that children with disabilities are entitled to a free, appropriate public education. Furthermore, IDEA requires that special education and related services are provided in the least restrictive environment, or included with nondisabled peers to the maximum extent appropriate. IDEA recommends the use of strategies that have strong, research-based support to reach the goal of inclusion. Since education is the one comprehensive, free service that all children with autism are entitled to, and schools are where many of these students receive the majority of their treatment, it is important to identify and implement high quality, effective school-based practices and interventions (e.g., Machalicek, O'Reilly, Beretvas, Sigafoos, & Lancioni, 2007; Pellecchia, Connell, Beidas, Xie, Marcus, & Mandell, 2015; Strain, Schwartz, & Barton, 2011).

Due to federal regulations and the increasing prevalence of autism, educators are more likely to encounter students with autism in their classrooms, regardless of their training. There are several unique challenges to educating students with autism. First, the

presentation of symptoms and behaviors can vary across and within individuals over time (National Research Council [NRC], 2001). Some individuals with autism may have significant cognitive and language impairments, while others have average to above average cognitive and language abilities (Simpson, McKee, Teeter, & Beytien, 2007). Some individuals may have splinter skills, or advanced skills in an isolated area (Simpson et al., 2007). Comorbid diagnoses such as intellectual disability, anxiety disorders, and depression can also contribute to the heterogeneity of autism presentation (Klinger, Dawson, & Renner, 2003).

Other characteristics related to autism may pose challenges by impacting a student's ability to learn. Students with autism may have difficulty generalizing the skills they learn in one setting to other settings (Koegel, Koegel, & Carter, 1999) or maintaining the skills they learn over time (NRC, 2001). They may engage in self-stimulatory or challenging behaviors such as self-injury, meltdowns, and property destruction (Koegel, Matos-Freden, Lang, & Koegel, 2012). Some students may have narrow or restricted interests that may interfere with their motivation to attend to instruction (Williams, 1995).

Due to these challenges, it is important for educators to have sufficient knowledge and training to identify and deliver effective practices for students with autism. Students with autism need consistency and a highly structured environment to learn important skills (Serna et al., 2015). Applied behavior analysis (ABA) is among the most known and recommended evidence-based practices for teaching students with autism. Behavioral strategies based on the principles of ABA have the strongest evidence base for teaching

new skills and addressing the needs of students with autism (Manning-Courtney et al., 2013; Odom, Collet-Klingenberg, Rogers, & Hatton, 2010). Praise is an ABA-based strategy that has extensive research supporting its use to increase appropriate behaviors and reduce inappropriate behaviors since the 1960s (e.g., Becker, Madsen, Arnold, & Thomas, 1967; Madsen, Becker, & Thomas, 1968).

Other recommendations for teaching students with autism include modifying the structure and environment to maximize instruction. The educational environment in which students with autism learn can have a considerable impact on their academic and social development (Lauderdale-Littin, Howell, & Blacher, 2013). A self-contained classroom may be able to provide the intensive academic and behavioral support that these students need, which may not be available in general education classrooms (Lane, Wehby, Little, & Cooley, 2005). Self-contained classrooms are special education classrooms in schools that provide intensive supports, such as lower staff-to-student ratios, paraprofessional assistance, and modified curricula, to meet the educational needs of students with disabilities (Maggin, Wehby, Partin, Robertson, & Oliver, 2011).

Individualized, one-to-one instruction is often recommended as a modification for teaching students with autism. Although one-to-one instruction is empirically supported, its utility in public schools has been questioned because it requires intensive staffing and training (Lerman, Vorndran, Addison, & Kuhn, 2004). Small group instruction offers a suitable alternative to one-to-one instruction within public school settings because it addresses the limitations of one-to-one instruction (Kamps, Walker, Locke, Delquadri, & Hall, 1990).

The use of paraprofessional services to support students with disabilities has also been identified as an essential component in providing free and appropriate public education (Etscheidt, 2005). Paraprofessional support is one of the most commonly used supports for students with autism in public schools (Koegel, Robinson, & Koegel, 2009). Paraprofessionals can help students attain their educational goals by providing academic or behavioral support, such as helping students stay on-task and supporting the implementation of effective instruction (Dymond, Gilson, & Myran, 2007); therefore, it is expected that students would be more engaged and on-task in classrooms staffed with more paraprofessional staff.

Despite these widely proposed and accepted recommendations, the literature suggests that there is a research-to-practice gap that is prevalent in special and general education research, resulting in poor implementation and delivery of research-based practices in schools (Duchnowski, Kutash, Sheffield, & Vaughn, 2006). While research-to-practice gaps are common across all disciplines, education research is faced with multiple barriers, such as the separateness of the research and practice communities, limited opportunities for continuing professional development, and the perception that educational research has limited relevance in the classroom (Greenwood & Abbott, 2001). While the implementation of evidence-based practices is becoming more widespread in schools due to federal regulations (IDEA, 2004), teachers of students with autism tend to use a variety of strategies, many of which lack research support (Hess, Morrier, Heflin, & Ivey, 2008). The purpose of this study was to examine the use of these

practices in autism support classrooms in an urban public school district, and to examine the relationship of these factors with students' on-task behaviors.

## On-Task Behaviors

The amount of time that a student is on-task, or attending to and interacting with his or her social and nonsocial environments, has been cited as one of the best predictors of positive student outcomes (Iovannone, Dunlap, Huber, & Kincaid, 2003). On-task behavior, or academic engagement, is considered to be a necessary precondition to learning (Andrews & Kozma, 1990) and is highly correlated with improved academic achievement (e.g., Carter, Sisco, Brown, Brickham, & Al-Khabbaz, 2008; Harbour, Evanovich, Sweigart, & Hughes, 2015; Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008; Sutherland, Wehby, & Copeland, 2000). On-task behaviors can be active or passive. Active on-task behaviors include actively participating in instruction by responding to a question or working on an assigned task, while passive on-task behaviors include looking at the teacher or shifting attention to look at a peer who is responding to the teacher (Kemp & Carter, 2006).

On the other hand, off-task behaviors are behaviors that are disruptive to, or interfere with, learning, such as calling out, daydreaming, being out of seat without the teacher's permission, looking away from the teacher or task, or completing an unrelated activity (Acker & O'Leary, 1987; Kemp & Carter 2006). Off-task behaviors, especially those that are actively disruptive, can result in lost instructional time and compromised learning for students and their peers (Lassen, Steele, & Sailor, 2006).

On-task and off-task behaviors are incompatible; by definition, if a student is on-task, then it is difficult to engage in off-task behaviors (Reinke, Herman, & Stormont, 2013). As a result, when students display higher levels of on-task behavior, levels of off-task behaviors decrease, as students have less time to engage in disruptive or off-task behaviors (Ferguson & Houghton, 1992; Massey & Wheeler, 2000).

Students with autism may display off-task behaviors that interfere with their learning, such as repetitive or stereotypic behaviors, or challenging behaviors (Greenberg, Tang, & Tsoi, 2010; Neitzel, 2010). While challenging behaviors such as aggression, self-injury, and meltdowns are not included in the diagnostic criteria for autism, children with autism are at-risk for developing at least one challenging behavior that interferes with their learning (Neitzel, 2010). When repetitive behaviors are included under the umbrella of challenging behaviors, they are among the most common types of challenging behaviors endorsed by parents (Jang, Dixon, Tarbox, & Granpeesheh, 2011). These behaviors can interfere with the ability to meaningfully engage in learning activities and stay on-task during instruction, and have considerable impact on an individual's educational and social opportunities (Horner, Carr, Strain, Todd, & Reed, 2002; Neitzel, 2010).

Another barrier to maintaining on-task behaviors is called stimulus overselectivity, which suggests that students with autism selectively attend to one component of a stimulus and have difficulties attending to multiple cues simultaneously (Lovaas, Schreibman, Koegel, & Rehm, 1971). In the classroom, students may become fixated on the movement of objects in the classroom or other inappropriate stimuli, such

as a flickering light bulb (Goodman & Williams, 2007); as a result, they may be distracted during instruction or not attending to the appropriate cues necessary for learning to occur (Keen & Pennell, 2015).

Difficulty motivating students with autism to engage with their environment due to restricted interests has also been cited as a barrier to on-task behaviors (Iovannone et al., 2003). Students with autism may find it difficult to stay on-task when the content is not related to their topic of interest (Marks et al., 2003; Williams, 1995). Other characteristics related to symptoms of autism include deficits in joint attention that make it difficult for students to attend to teachers, and executive functioning impairments, such as emotion regulation or organizing materials (Hume & Reynolds, 2010).

In classrooms, on-task behavior is typically measured by examining the percentage of time a target student or a class spends displaying on-task behaviors during an observation (Chalk & Bizo, 2004). The average levels of on-task behaviors observed in general education classrooms have ranged from 70 to 85% (Merrett & Wheldall, 1987; Sutherland et al., 2000; Wheldall, Houghton, & Merrett, 1989), with 85% considered as the benchmark for expected on-task behaviors (Utley & Obiakor, 2015).

Levels of on-task behaviors for students with disabilities are reported to be highly variable, depending on factors such as developmental age, disruptive behaviors, and educational placement (Logan, Bakeman, & Keefe, 1997; Sam, 2012). Several studies have attempted to increase on-task behaviors in students with autism and reported low levels of on-task behavior. These studies reported mean levels of on-task behavior during baseline ranging from 19 to 47% (Courtade, Lingo, & Whitney, 2013; Finn, Ramasamy,

Dukes, & Scott, 2015; Keen & Pennell, 2015; McCurdy & Cole, 2014). However, because these students were targeted for interventions aimed at increasing on-task behavior, their behaviors may not reflect natural rates of on-task behaviors of students with autism.

Few studies have examined the rates of on-task behaviors in students with autism. They suggest that students with autism may have lower levels of on-task behaviors, especially as students get older and are expected to work more independently with less adult supervision. Sam (2012) reported that 190 preschool children with autism were actively engaged for 70% of the time during center-based activities. Dymond and Russell (2004) reported that 12 students with disabilities in grades 1 through 5 were actively on-task for 68% of their day, with minimal disruptive behaviors. Disability categories included behavior disorders, learning disabilities, intellectual disabilities, developmental delay, and orthopedic disabilities. Carter and colleagues (2008) examined the on-task behaviors of 23 middle and high school students with developmental disabilities in general education classes and reported that they were on-task an average of 62.7% of the time on activities assigned to the class or to the student individually. Kurth and Mastergeorge (2012) reported that students with autism in self-contained classrooms spent nearly one-third of their instructional time taking a break. While they did not directly measure the amount of time students were on-task, this finding demonstrates the need to develop strategies to help students with autism maintain on-task behaviors.

## Praise and Behavior Correction

### *Praise*

One strategy that is frequently recommended to increase students' on-task behaviors is verbal praise. Praise is a strategy based on reinforcement, a fundamental ABA practice, in which teachers apply a consequence (i.e., praise) after a student engages in a desired behavior (i.e., on-task behavior), in order to increase the future occurrence of the desired behavior (Odom & Wong, 2015; Wong et al., 2014).

Generally, verbal praise refers to positive statements that indicate approval. Praise is typically delivered with the intent to provide positive feedback, encourage, and support appropriate behaviors (Hester, Hendrickson, & Gable, 2009). Researchers have differentiated between general praise and behavior specific, or descriptive, praise. Behavior specific praise is typically defined as a positive statement that describes or identifies the desired behavior, such as "Great job putting your books away," while general praise does not specify the behavior being praised, such as "Good" (Allday et al., 2012). Praise is believed to be most effective when it is specific, contingent on the desired behavior (i.e., delivered after the desired behavior occurs), and sincere (Brophy, 1981).

Teachers have reported that they prefer interventions that require little preparation and implementation time due to limited time, resources, support, and implementation skills (Elliott, Witt, Galvin, & Peterson, 1984). Praise is an ideal strategy for teachers because it is free, quick, requires no preparation, and easy to administer (Landrum & Sweigart, 2014). Furthermore, delivering praise is a naturalistic consequence that is not

intrusive to instruction (Hawkins & Heflin, 2011; Reinke, Lewis-Palmer, & Martin, 2007) and is socially acceptable in inclusive settings.

There has been extensive research dating back to the 1960s supporting the effectiveness of praise as an intervention to increase appropriate behaviors. Zimmerman and Zimmerman (1962) found that smiling, providing verbal praise, and moving closer to students immediately after desired classroom behaviors occurred, while ignoring undesired behaviors, resulted in students working more efficiently with fewer undesired behaviors.

Becker and colleagues (1967) reported remarkable improvements in disruptive behaviors, such as running, tapping pencils, disturbing peers, and ignoring the teacher, when teachers were instructed to praise behaviors that facilitated learning. The mean rate of disruptive behavior across 10 students in five classrooms was 62.13% during baseline and decreased to 29.19% when the teachers made explicit rules describing expected behaviors, ignored disruptive behaviors, and delivered verbal praise following desired behaviors.

Madsen and colleagues (1968) compared the effects of classroom rules, teacher praise, and planned ignoring on the appropriate classroom behaviors of three students. While rules alone had limited impact on the students' behaviors and planned ignoring produced inconsistent results, increases in students' appropriate behaviors were observed in conditions where praise was introduced. The authors suggested that the key to effective classroom management was the delivery of praise for appropriate behaviors. When students are engaged in appropriate behaviors, there are fewer opportunities to engage in

disruptive behaviors. Recent reviews of studies continue to support findings that praise has a positive impact on decreasing inappropriate or disruptive classroom behaviors (e.g., Beaman & Wheldall, 2000; Gable, Hester, Rock, & Hughes, 2009), and these findings have been replicated in more recent studies as well (e.g., Allday et al., 2012; Conroy et al. 2014; Hemmeter, Snyder, Kinder, & Artman, 2011; Moffat, 2014; Pisacreta, Tincani, Connell, & Axelrod, 2011).

Many teachers recognize the importance of acknowledging appropriate behaviors and report that they use praise as a behavior management strategy (Merrett & Wheldall, 1987; Van Acker, Grant, & Henry, 1996). However, despite the strong empirical support and the ease of implementation, numerous reviews have suggested that praise is an infrequently used strategy (Brophy, 1981; Gable et al., 2009; Strain, Lambert, Kerr, Stagg, & Lenker, 1983; White, 1975). White (1975) found that, while initially high during earlier grades, teacher rates of praise decline sharply after second grade and continue to decline at a rate of one praise statement every five to ten minutes. Teacher praise was more frequently directed at academic behaviors, such as responding correctly, and rarely directed at social behaviors, such as sitting quietly or arriving on time.

Although comprehensive studies reviewing rates of praise across grade levels have not been published since White (1975); recent individual studies generally support the finding that teachers' rates of praise decrease as grade level increases (Jenkins, Floress, & Reinke, 2015). Heller and White (1975) reported that out of 1,105 total praise and behavior correction statements delivered to students, only one praise statement was directed at approving social behavior. Recently, rates of teacher praise have been

estimated to range greatly from less than 1 to 34.8 statements per hour (e.g., Floress, Jenkins, Reinke, & McKown, 2017; Rathel, Drasgow, & Christle, 2008), with behavior specific praise statements accounting for only about 5% of praise statements delivered to students (Alber, Heward, & Hippler, 1999).

Even when students are displaying appropriate and expected behaviors, rates of teacher praise appear to be low. Lannie and McCurdy (2007) reported that teacher praise remained at 0 for 14 consecutive sessions, despite increases in student on-task behavior and decreases in disruptive behavior. Strain and colleagues (1983) reported that the probability of teacher praise following student compliance was 10%, with 82% of students who were rated by teachers to have poor social adjustment never receiving praise for compliance. These rates are believed to be too low to function effectively and have the effects they are intended to have (Chalk & Bizo, 2004).

Studies have suggested that students in special education classrooms may receive praise less frequently than students in general education classrooms. Rates of praise ranging from 0.2 to 4.4 praise statements per hour have been reported in classrooms for students with emotional and behavioral disorders (EBD) or learning disabilities (Gable, Hendrickson, Young, Shores, & Stowitscek, 1983; Shores, Gunter, & Jack, 1993; Wehby, Symons, & Shores, 1995). However, Maggin and colleagues (2011) reported comparable rates of praise for students with EBD in self-contained and general education classrooms, with teachers in self-contained classrooms delivering slightly more than two praise statements per 15 minutes, while teachers in general education classrooms delivered slightly under two praise statements per 15 minutes. Martens, Hiralall, and Bradley

(1997) reported that teachers of students with emotional disturbance delivered approximately three praise statements per 30-minute session, which is comparable or slightly higher than the 1 to 4.5 praise statements per 30-minute session reported in general education classrooms by Rathel and colleagues (2008). Berlinghof (2016) compared six general, at-risk, and special education preschool teachers' rates of praise. While there were no statistically significant differences among groups in the rates of praise delivered by teachers, large effect sizes were found when comparing special education teachers' rates of praise to general education and at-risk teachers' rates of praise, suggesting that special education teachers used higher rates of praise compared to at-risk and general education teachers. These findings, however, may not generalize to elementary classrooms, as higher rates of praise across all three types of preschool classrooms were observed overall compared to rates reported in kindergarten and older grades.

### *Behavior Correction*

On the other hand, behavior correction is more commonly used. Behavior correction can include positive or negative behavior correction statements, reprimands, or disapproval statements. A behavior correction statement is defined as any statement that is intended to redirect or correct inappropriate behaviors (O'Handley, 2014). Research suggests that teachers are more likely to respond to inappropriate social behaviors by delivering behavior correction statements than by praising appropriate behaviors (Shores et al., 1993). Gorman-Smith (2003) found that praise was observed only about once every 20 observation sessions, while behavior correction was observed an average of once per

session. Heller and White (1975) reported that teachers delivered one behavior correction statement every two minutes, or 30 behavior correction statements per hour. Merrett and Wheldall (1987) reported that 63% of 138 teachers were observed delivering twice as many praise statements for every behavior correction statement for academic responses; for social behavior, only 6% of teachers delivered twice as many praise statements as they did behavior correction.

Teachers may use behavior correction statements more frequently because it may be a natural reaction to inappropriate behaviors in the absence of planned preventative strategies, especially when they are new to teaching or lack sufficient training in classroom management strategies (Lannie & McCurdy, 2007). In response to reading some scenarios involving problem behaviors, teachers frequently reported that they would use mildly aversive or punitive strategies such as saying the student's name as a warning, sending students to the principal's office, or using verbal redirection, more frequently than preventive strategies, such as praise (Reupert & Woodcock, 2010).

Behavior correction may be perceived as a more culturally acceptable strategy, with schools reverting to using increasingly aversive consequences with each rule violation (Sugai, Sprague, Horner, & Walker, 2000). Although there has been a recent shift emphasizing the use of positive strategies to prevent and respond to challenging behaviors, schools have historically relied on reactive "get tough" tactics such as zero-tolerance policies to manage behaviors (Lassen et al., 2006; Skiba & Peterson, 2000; Sugai & Horner, 2008). As a result, teachers may find it acceptable to explicitly correct a student's behavior while taking good behavior for granted (Madsen et al., 1968).

Furthermore, teachers may not feel comfortable acknowledging positive student behaviors, especially if they hold the belief that students are expected to behave well without additional feedback from the teacher (Gable et al., 2009; Merrett & Wheldall, 1987; Wheldall et al., 1989).

Behavior correction has been found to have more immediate and drastic effects on reducing inappropriate behaviors or increasing on-task behaviors when compared to the use of praise. Acker and O'Leary (1987) found that the use of behavior correction resulted in immediate and significant increases in students' on-task behaviors. Similarly, Martin and his colleagues (Martin, 1977; Redd, Morris, & Martin, 1975) found that children exhibited higher rates of responding when working with an adult who reprimanded off-task behaviors, compared to when working with adults who praised on-task behaviors or were neutral in their interactions. Redd and colleagues (1975) also found that children responded more quickly in the presence of the adult who provided behavior correction. Because behavior correction can terminate inappropriate behaviors immediately, teachers may feel rewarded and be more likely to use behavior correction in the future (White, 1975).

However, the continued use of behavior correction can result in negative long-term effects on students and on teachers. The long-term effects of using reprimands can have the opposite effect of what the teacher wishes to achieve, with studies showing that behavior correction increased inappropriate behaviors and non-compliance (Beaman & Wheldall, 2000; Shores et al., 1993; Van Acker, Grant, & Henry, 1996). For some students, the attention they receive for misbehaving may be the only attention they

receive from the teacher, particularly if the teacher uses low rates of praise, and they may continue to engage in inappropriate behavior to get the teacher's attention (Partin, Robertson, Maggin, Oliver, & Wehby, 2010). While students rated by teachers as having poor social adjustment rarely received praise for complying with teacher requests, they were more likely to receive feedback for noncompliance and repeated commands following compliance, suggesting that the majority of teacher behaviors inadvertently reinforced noncompliance rather than compliance (Strain et al., 1983).

The use of disproportionate behavior correction statements may lead to teacher-student relationships that are characterized by conflict, which can hinder efforts to promote positive school climates and exacerbate an already difficult situation (Gable et al., 2009; Hamre & Pianta 2001). Carr, Taylor, and Robinson (1991) reported that teachers were less likely to interact with students with severe behavior problems than other students in the same group, and they presented tasks that were less difficult, suggesting that teachers may have been reducing their interactions with these students to avoid triggering disruptive behaviors (Partin et al., 2010). Teachers and students may also fall into a cycle of negative reinforcement, in which students' disruptive behaviors are reinforced by the removal of teacher demands, and teachers' use of behavior correction is reinforced by the removal of students' disruptive behaviors, and so on (Sutherland, Wehby, & Yoder, 2002). As the effectiveness of behavior correction decreases, teachers may resort to increasingly punitive measures (Maag, 2001; Tillery, Varjas, Meyers, & Collins, 2010). Furthermore, the use of behavior correction does little to teach and

encourage students to engage in appropriate replacement behaviors (Maag, 2001), making it difficult to break the cycle of negative reinforcement.

While behavior correction was the most effective strategy in producing the desired behavior, children tended to avoid the adult and task associated with behavior correction, choosing instead to interact with the adult associated with praise or an adult who did not say anything to the child (Redd et al., 1975). The use of behavior correction can also affect the teachers. Teachers who were observed to use higher rates of harsh reprimands, which were defined as reprimands that were prolonged, used excessive force, or used a loud, critical, or sarcastic tone, and teachers who had more negative than positive interactions with students reported feeling higher levels of emotional exhaustion (Reinke et al., 2013).

Behavior correction has been found to be an effective and useful tool with typically developing students and students with EBD, if used correctly. Behavior correction statements that are short (i.e., two or three words) were found to be more effective than longer behavior correction statements for managing off-task behavior, possibly because longer statements elicited "back talk" from students (Abramowitz, O'Leary, & Futtersak, 1988). Behavior correction statements delivered privately and in close proximity to individual students, rather than loudly, were also more effective in increasing on-task behaviors (Houghton, Wheldall, Jukes, & Sharpe, 1990; O'Leary, Kaufman, Kass, & Drabman, 1970; Van Houten, Nau, MacKenzie-Keating, Sameoto, & Colavecchia, 1982). Like praise, behavior correction should be specific, explicitly telling the student what they should be doing (e.g., "Walk quietly" instead of "No"), and can be

delivered as a reminder of appropriate behaviors before the problem behavior occurs (Simonsen et al., 2008; Smith, Lewis, & Stormont, 2011; Stormont, Lewis, & Beckner, 2005). This type of behavior correction provides corrective feedback that helps students discriminate between appropriate and inappropriate behaviors (Harbour et al., 2015).

### *Praise-to-Behavior Correction Ratio*

Researchers suggest that using a combination of praise and behavior correction is more advantageous than relying solely on praise or behavior correction. When used together, their effects on desired behaviors can be enhanced. While removing praise had little effect on students' on-task behaviors, the removal of behavior correction was associated with a significant decrease of on-task behaviors, leading Rosén, O'Leary, Joyce, Conway, and Pfiffner (1984) to conclude that the prudent use of behavior correction was essential to maintaining classroom order. Pfiffner, Rosén, and O'Leary (1985) also reported that a combination of praise and behavior correction resulted in higher levels of on-task behavior than praise alone. Houghton and colleagues (1990) observed increases in students' on-task behaviors when only praise or behavior correction was delivered, with further increases in on-task behaviors when a combination of praise and behavior correction was used.

Due to these findings, researchers have recommended that using a praise-to-behavior correction ratio may be more critical than the frequency of either praise or behavior correction alone (Shores et al., 1993). Although a standard has not been established for the optimal praise-to-behavior correction ratio, experts generally agree that the number of praise statements should outnumber behavior correction statements.

Some researchers have suggested using a praise-to-behavior correction ratio of 3:1 (e.g., Pfiffner et al., 1985; Shores et al., 1993; Wong & Wong, 1998), while others have recommended ratios as high as 8:1 (Latham, 1992). Furthermore, some researchers suggest that while a lower ratio of 3:1 may be effective for students in general education, a higher ratio of 5:1 may be needed for students with disabilities such as autism, learning disorders, intellectual disability, or EBD (Rathel, Drasgow, Brown, & Marshall, 2014).

The praise-to-behavior correction ratios found in general education classrooms can vary widely. Some studies have reported that teachers are using more praise than behavior correction, or equal amounts of praise and behavior correction, especially at younger grade levels. Utley and Obiakor (2015) reported that the average praise-to-behavior correction in an urban elementary school was 3.2:1. Maggin and colleagues (2011) found that teachers used a praise-to-behavior correction ratio of 1:1 in a sample of elementary school teachers in self-contained or general education classrooms. White (1975) reported that while teachers delivered more praise than behavior correction in grades 1 and 2, the rate declined sharply after second grade, with behavior correction occurring more frequently than praise in later grades.

Unfortunately, many studies report that teachers use a negative praise-to-behavior correction ratio, with few teachers approaching higher ratios of praise-to-behavior correction, especially when responding to social behaviors (Beaman & Wheldall, 2000; Landrum & Sweigart, 2014). Thomas, Presland, Grant, and Glynn (1978) reported that 7 out of 10 teachers had negative praise-to-behavior correction ratios of 1:3. Merrett and Wheldall (1987) reported that 31% of the 128 general education primary and middle

school teachers they observed used a positive praise-to-behavior correction ratio of 2:1. However, when they differentiated between statements delivered to academic responses versus social behaviors, 63% of teachers used a 2:1 ratio for academic responses alone, while only 6% of teachers used a ratio of 2:1 for social behaviors alone. For academic responses, teachers used a mean ratio of 6:0; for social behaviors, the mean ratio was in the opposite direction, with one praise statement for every seven behavior correction statements delivered. Wheldall and colleagues (1989) reported similar findings in a sample of 130 secondary school teachers, with generally higher rates of praise than behavior correction, but differences when differentiating between comments made toward academic and social behaviors. They reported an average ratio of 3:1 for academic behaviors, but the opposite ratio, 1:3, for social behaviors. Again, 76% of teachers used a 2:1 for academic behaviors, while only 8% used a 2:1 ratio for social behaviors.

In more recent studies, Reinke and colleagues (2013) reported that only one out of 33 elementary school teachers in their study had a ratio above 4:1 and two other teachers had a ratio of 2:1; overall, teachers in their sample provided more behavior correction than praise to students. White (2010) reported 1:1 or negative praise-to-behavior correction ratios in five general education elementary school teachers. Pisacreta and colleagues (2011) also reported low ratios of praise-to-behavior correction in three general education middle school teachers, with zero to one praise statement for every 10 behavior correction statements.

*Effects of Praise on Students with Autism Spectrum Disorders*

Many of these studies examining the use of praise and behavior correction have been conducted in general education classrooms (e.g., Andrews & Kozma, 1990; Merrett & Wheldall, 1987; Utley & Obiakor, 2015; Wheldall et al., 1989) or students with or at-risk for EBD (e.g., Allday et al., 2012; Conroy, Sutherland, Vo, Carr, & Ogston, 2014; Fullerton, Conroy, & Correa, 2009; Hawkins & Heflin, 2011; Maggin et al., 2011; Martens et al., 1997; Sutherland et al., 2000). Sam (2012) suggested that the research on the effects of praise on students with EBD may be applicable to students with autism due to similar characteristics, such as challenging behaviors, behavioral deficits, and the risk for developing less than optimal relationships with teachers. Rathel and colleagues (2014) compared praise-to-behavior correction ratios in classrooms for students with EBD, learning disabilities, and mild intellectual disabilities or developmental disabilities, and reported that there were no observable differences in the teachers' behaviors across the different disability categories. They suggested that this finding supported the generalizability of research on the use of praise with students with EBD to students with other diagnoses.

However, praise might have different effects on students with autism due to impairments in social interactions and communication that are a hallmark feature of the disorder (Volkmar & Klin, 2005). Because impaired social reciprocity is more persistent than the other core symptoms of autism and is believed to be an essential feature of autism (NRC, 2001; Shattuck et al., 2007), researchers have suggested that social consequences, such as praise and behavior correction, may not be as effective with

children with autism (Koegel et al., 2009; Machalicek et al., 2007; Rivera, Mason, Jabeen, & Johnson, 2015).

The literature seems to suggest that individuals with autism do respond to praise and other social reinforcers. Taylor and Carr (1992) described two types of children with developmental disabilities: attention seeking children, who initiated frequent social interactions and exhibited high problem behaviors when adult attention was low, and socially avoidant children, who rarely initiated social interactions and exhibited higher problem behaviors when adult attention was high. Other studies have confirmed that there are individuals with autism who engage in behaviors in order to gain attention (positive reinforcement), while others may engage in behaviors to escape from social attention (negative reinforcement). Love, Carr, and LeBlanc (2009) reported that the problem behaviors of children with autism were largely maintained by social reinforcement (88%), with some children engaging in problem behaviors to escape attention from others, and others engaging in problem behaviors to gain attention. Kelly, Axe, Allen, and Maguire (2015) conducted brief functional behavior analyses with three children with autism and reported that two of the children engaged in challenging behavior most frequently in the attention or escape conditions. Similarly, Hagopian, Wilson, and Wilder (2001) reported that the problem behavior of a 6-year-old with autism and mild intellectual disability functioned to escape from social attention.

Social consequences may not initially function as a positive or negative reinforcer for other individuals. It has been found that when praise is paired with other reinforcers, such as food or toys, it may gain reinforcing properties. For example, Lovaas et al. (1966)

reported that two children characterized as autistic, who did not initially respond to social stimuli, increased their performance on a bar pressing task after the word "good" was paired with food delivery.

Several studies have examined children's preference for various types of social reinforcers. Smaby, MacDonald, Ahearn, and Dube (2007) reported that children with autism requested various social consequences, such as head rubs, tickles, and praise, though their preferences varied. Gutierrez, Fischer, Hale, Durocher, and Alessandri (2013) found that when given a choice between no interaction and a social act, such as high fives, praise, and tickles, the three children with autism selected a social act.

Other studies have compared the effectiveness of praise as a reinforcer to other types of reinforcers. Leaf and colleagues (2014) compared the effectiveness of food, praise, toys, and feedback on the number of trials to reach mastery on an expressive labeling task. Participants were able to reach mastery criteria when praise was used, suggesting that praise had some effect on their behavior. However, praise resulted in the most trials and sessions needed before the mastery criterion was met. The authors argued that although praise was not the most effective reinforcer, clinicians should work to teach the value of praise to children with autism, as praise is a more naturally occurring reinforcer.

Paden and Kodak (2015) examined the effects of reinforcement magnitude, or the intensity of the reinforcer, on responding during discrete trial teaching (DTT) in four boys with autism. They examined the effects of a small-magnitude edible reinforcer, large-magnitude edible reinforcer, and praise only on skill acquisition during DTT.

Although the large-magnitude reinforcer was the most preferred, the small-magnitude reinforcer and praise-only conditions produced faster skill acquisition, which contradicted the findings of Leaf and colleagues (2014).

Tsiouri and Greer (2007) compared the effects of contingent praise versus praise delivered on a fixed-interval schedule with two students with autism. Data were collected on the number of correct echoic tacts (i.e., repeating a word labeled by the teacher) and the students' performance on rapid motor imitation tasks (e.g., clap hands, touch head, tap knees). Performance on rapid motor imitation tasks remained high regardless of the schedule of reinforcement used. This may have been because these tasks were mastered and already in the students' behavioral repertoires. Echoic tacts were not previously acquired or mastered. The number of correct echoic tacts, however, increased when praise was delivered contingent on correct responding, and decreased when it was delivered on a fixed schedule. This supports research recommending that praise should be contingent on students' behaviors (e.g., Brophy, 1981; Hester et al., 2009). It also suggests that there are distinct effects of schedules of reinforcement on skill acquisition versus skill maintenance.

Greenberg and colleagues (2010) examined the effects of a treatment package that included a sentence strip prompting a 6-year-old student with autism reminding him to be on-task (e.g., look at teacher) and verbal and nonverbal praise. They reported greater increases in on-task behaviors during group instruction and physical education, and a minimal increase in on-task behaviors during one-to-one instruction. This could have been due to a ceiling effect, as the child's baseline levels of on-task behavior during one-

to-one instruction was higher than his post-treatment levels of on-task behaviors in the other two settings.

Fewer studies to date have examined the relationship between praise and on-task behaviors in students with autism. Rivera and colleagues (2015) used a mobile device to prompt four teachers to provide praise to students with autism. This intervention was effective in increasing the rates of praise provided to students. However, there were high levels of variability across and within students' on-task behaviors. Generally, students' on-task behaviors corresponded with the teachers' initial increased rates of praise, but did not return to baseline levels when the intervention was withdrawn. As promising as these findings appear, these results do not demonstrate a strong functional relationship between the teachers' use of praise and students' on-task behaviors due to the high levels of variability.

Rathel and colleagues (2014) instructed four teachers to increase their praise-to-behavior correction ratios, and investigated the effects of improved praise-to-behavior correction ratios on the on-task behaviors of four target students with disabilities, including one student with autism. Following increased rates of praise and decreased rates of behavior correction statements, students' on-task behaviors increased and became stable above 80%.

Kranak, Alber-Morgan, and Sawyer (2017) examined the effects of different rates of praise on on-task behaviors in five students with ASD, ages 7 to 10. At baseline, the teacher provided an average of 1.31 praise statements per minute. While two students demonstrated nearly 100% on-task behavior during all three conditions, increases in the

other three students' on-task behaviors were observed when the teacher provided four or eight praise statements per minute. The authors suggested a rate of four or more praise statements per minute is needed in order to be an effective strategy.

These findings suggest that praise may be a promising strategy for increasing appropriate behaviors in students with autism; however, more research in this area is clearly needed. The use of praise, a naturally occurring and simple to use strategy with sufficient evidence support, may be a promising intervention for teachers to use with students with autism in an era where legislation places pressure on educators to use empirically supported practices to increase educational outcomes for students with disabilities. However, there is a lack of research demonstrating the use of praise as an intervention for students with autism, specifically to target on-task behaviors. Furthermore, the generalization of the existing research is limited due to use of single subject methodology and small sample sizes.

## Instructional Format

Individualized supports and services are among the essential programming elements for students with autism (Iovannone et al., 2003); this is especially important to consider given the variability in student levels within each classroom. One-to-one instruction, such as discrete trial teaching, is heavily supported by research (Stahmer, Collings, & Palinkas, 2005) and its use has been recommended for teaching academic and social skills to students with autism (Kamps et al., 1990). One-to-one instruction allows teachers to focus on an individual student's needs, while minimizing distractions and maximizing the student's opportunities for learning (Leaf et al., 2013; Russ, Chiang,

Rylance, & Bongers, 2001). Because students have more opportunities to respond in one-to-one instruction, it has been suggested that it can facilitate higher rates of on-task behavior (Greenberg et al., 2010).

However, one-to-one instruction requires intensive staffing and time. It requires intensive time for a teacher to provide one-to-one instruction for each student, while other students may be assigned to do work independently, work with another staff member if another staff member is present and available, or is not given any instruction on what to do (Russ et al., 2001; Whorton, Delquadri, & Hall, 1986). Given that many schools have too few teachers and resources available, the feasibility of one-to-one instruction is questionable in schools (Kamps et al., 1990). Additionally, one-to-one teaching methods, such as discrete trial teaching, require specialized training. Smith (2001) suggested that teachers need 25 to 60 hours of supervised experience to implement discrete trial procedures correctly, and at least a year of full-time supervised practicum training in order to develop discrete trial curricula or troubleshoot problems that occur during teaching.

The benefits of one-to-one instruction may also be limiting if the overall goal is to prepare students for inclusion in general education classrooms. Students may become dependent upon teacher prompts to respond (Whorton et al., 1986). It has also been reported that peer interaction and generalization of skills learned in one-to-one settings to other environments is limited (Kamps et al., 1990; Koegel, Koegel, & Carter, 1999). One-to-one instruction may not teach students the prerequisite skills for functioning in

whole group instruction, as is typically used in general education classrooms (Whorton et al., 1986).

Center-based, or small group, instruction is an alternative instructional format that can be easier to implement in schools and addresses the limitations of one-to-one instruction. Small group instruction allows teachers to work with several students at the same time, it more closely resembles the type of instruction found in general education classrooms, and it provides students opportunities to interact with and observationally learn correct responses from their peers (Carter et al., 2008; Leaf et al., 2013). It also reduces the amount of non-instructional time for the class as a whole, as groupings allow teachers to interact with more students simultaneously and students can receive longer instructional sessions when in a group (Kamps et al., 1990; Whorton et al., 1986). Whorton and colleagues (1986) found that one-to-one instructional time could be reduced from 60 minutes to 30 minutes, allowing more time for teachers to provide group instruction, by reallocating the amount of individual instruction and independent work.

Research suggests that small group instruction can be just as effective as one-to-one instruction. Rincover and Koegel (1977) trained students to learn in a small group setting and work individually without continuous one-to-one supervision while the teacher moved on to instructing other students in the group. Kamps and colleagues (Kamps et al., 1990; Kamps, Walker, Maher, & Rotholz, 1992) compared the effectiveness of one-to-one and small group instruction. They found comparable gains on scores on criterion referenced tests and increases in on-task behaviors for students in both groups (Kamps et al., 1992). They reported that the one-to-one format and the small

group format were the most effective, especially when instructed by a more experienced staff person (Kamps et al., 1990). Leaf and colleagues (2013) evaluated the delivery of discrete trial teaching in a group format with three students per group. They reported that both one-to-one and small group teaching were effective in teaching skills. Similarly, Ledford and Wehby (2015) showed that students were able to learn all academic target behaviors when instructed in groups with one or two other students. Furthermore, Leaf and colleagues (2013) and Ledford, Gast, Luscre, and Ayres (2008) reported that students were able to identify targets taught to their peers during small group instruction, suggesting that the students were able to gain skills even when they were not the target of instruction.

There is limited research examining the types of instructional formats that are being used and are most effective for students with autism in public schools. The results of these studies suggest variable use of instructional formats across classrooms, although whole group instruction is widely used in general education settings. This variability in the type of instruction used with students, especially in general education classrooms, may reflect the heterogeneity of strengths and needs found in students with autism.

Kurth and Mastergeorge (2012) compared the instructional formats used for adolescents with autism in general education classrooms and in self-contained classrooms. Students in general education classrooms spent most of their time participating in teacher-directed whole group instruction, followed by individual seatwork, while students in self-contained classrooms spent most of their time on independent seatwork, followed by a break.

Dymond and Russell (2004) found that teacher-directed instruction and seatwork were the most frequently observed activities for students with disabilities in general education classrooms and special education classrooms. Despite the setting, all students spent a considerable amount of time in whole group instruction, although students who received special education services for more than 50% of their day in grades 1 and 2 spent more time in individual instruction (33%) than students who spent less than 50% of their day receiving special education services (2%). The authors raised questions about the extent to which students' individualized needs were being met in general education settings, as individualized adaptations were rarely observed.

Maggin and colleagues (2011) reported that students in general education classrooms spent more time in whole group instruction and down time, while students in self-contained classrooms were provided similar amounts of small group and whole group instruction. Ruble and Robson (2007) reported that large group instruction was the most frequently used instructional format for students with autism and Down syndrome, followed by one-to-one instruction, small group instruction, and independent work.

On the other hand, Ledford and Wehby (2015) found that all five students with autism in their sample received much of their academic instruction in a one-to-one format, despite being placed in inclusive settings. Young, Simpson, Myles, and Kamps (1997) examined the instructional format observed for three students with autism in general education classrooms. They reported that two of the students were primarily observed in independent work activities, while the other student worked one-on-one with a paraprofessional.

In addition to identifying the use of instructional formats in classrooms, it is also important to examine the effects of these instructional formats on students' on-task behaviors. On-task behaviors may vary depending on the instructional format. For example, students are expected to be more on-task during one-to-one instruction or small group instruction, where there are multiple opportunities for the student to respond. On the other hand, students may be more off-task during whole group or independent seatwork, as opportunities to respond are distributed across more students and the teacher's attention may not be as focused on individual students. Students may also be off-task during small group instruction if the teacher has difficulty maintaining the on-task behaviors of a group of students simultaneously (Whorton et al., 1986).

Research comparing on-task behaviors during various instructional formats suggests that students generally have lower on-task behaviors as the group size increases. Carter and colleagues (2008) reported that the highest levels of on-task behaviors in general education classrooms were found during one-to-one instruction (81.10%), small group instruction (75.65%), large group instruction (67.31%) and independent seatwork (66.67%). Kemp and Carter (2006) examined the on-task behaviors of students with intellectual disabilities in general education classrooms during whole group instruction and independent work. They reported that the students had more difficulty staying on-task during whole group instruction (57.58%) than independent work (63.1%).

For students with autism, Young and colleagues (1997) reported that students had the most difficulty maintaining on-task behaviors during group activities in general education classrooms. Koegel and Rincover (1974) found that as the number of students

in a group increased from one-to-one instruction to a group of two students and a group of eight students, appropriate responding decreased. However, by gradually increasing the number of students in the group while thinning the reinforcement schedule, children were able to produce large increases in appropriate behaviors. In a series of 11 studies comparing the use of one-to-one, small group, and peer tutoring in teaching students with autism, Whorton and colleagues (1986) concluded that small group instructional formats were superior to one-to-one formats in producing higher levels of correct responding, higher levels of teacher-student and student-student interaction, and comparable levels of on-task behaviors to one-to-one formats.

More recently, Steinbrenner and Watson (2015) reported significant effects of group size on coordinated joint engagement in 25 students with autism. Coordinated joint attention was defined as the student being engaged in the same activity with another person while alternating his or her attention between objects and other people in the activity. In large group instruction, students spent an average of 8% of their time in coordinated joint attention. In small group instruction and one-to-one instruction, students were in coordinated joint attention an average of 23 and 42% of the time, respectively.

Given that it appears that teachers rely on various instructional formats in autism support classrooms, further investigation is needed to determine the effects of various instructional formats on students' on-task behaviors.

## Paraprofessionals

The provision of paraprofessional services to students with disabilities has been identified as an essential component in ensuring that students have access to a free and

appropriate public education, and is one of the most commonly used supports for children with autism (Etscheidt, 2005; Koegel et al., 2009). Paraprofessionals work under the supervision of licensed professionals to deliver direct services to students with special education needs (Azad, Locke, Downey, Xie, & Mandell, 2015) or they may provide clerical or organization support to the teacher in the classroom (Symes & Humphrey, 2011).

Paraprofessionals are the fastest growing personnel segment in special education (Young et al., 1997). In the 1997-1998 academic year, more than 230,000 paraprofessionals were employed to help educate students with disabilities (Werts, Zigmond, & Leeper, 2001). In 2014, there were over 339,000 full-time equivalent paraprofessionals who were employed to provide special education and related services for children with disabilities under IDEA (U.S. Department of Education, 2017). This increase in the number of paraprofessionals is partly in response to teacher shortages, parent requests for paraprofessionals, teachers' increasing caseloads, and the belief that paraprofessionals are cost-effective (Azad et al., 2015; Giangreco & Broer, 2007; Koegel et al., 2009). Furthermore, this increase is likely a response to the growing number of students with autism in schools (Young et al., 1997).

Paraprofessionals have multiple roles in the classroom. They may assist teachers by preparing materials for lessons or by performing other clerical duties (Azad et al., 2015). Paraprofessionals may provide behavioral assistance to students by facilitating interactions with peers and implementing behavior management plans (Carter, O'Rourke, Sisco, & Pelsue, 2009). Paraprofessionals can also provide academic support by

delivering group or one-to-one instruction and helping students stay on-task (Carter et al., 2009).

One benefit of having paraprofessional support is that teachers may be more likely to provide small group instruction rather than whole group instruction due to the availability of another staff member to monitor students or deliver instruction (Maggin et al., 2011). However, concerns have been raised about the reliance on the least trained staff to deliver services to students with the greatest support needs (Carter et al., 2009). Giangreco and Broer (2007) surveyed 27 schools about their use of paraprofessionals. Most of the schools (89%) reported concerns that paraprofessionals were assigned to provide academic support in subjects where they were underprepared.

Despite these concerns, paraprofessionals frequently assume the majority of the responsibility for a student's instructional and behavioral needs (Koegel et al., 2012) and students with disabilities may spend more time with their paraprofessional than they do with their teachers (Scheuermann, Webber, Boutot, & Goodwin, 2003). Carter and colleagues (2009) surveyed 313 paraprofessionals in elementary, middle, and high schools about their positions. Some paraprofessionals reported delivering either group instruction (19.2%) or one-to-one instruction (38.4%), while 42.3% reported delivering both formats. Dymond and Russell (2004) also found that paraprofessionals were commonly asked to provide one-to-one instruction to students with severe disabilities, especially in older grades. Paraprofessionals were more commonly observed providing one-to-one instruction for students in grades 3 to 5 (85%), than students in grades 1 to 2 (45%).

There were also concerns that students were highly dependent on their paraprofessionals (Giangreco & Broer, 2007). Unfortunately, due to lack of training, paraprofessionals may hinder rather than facilitate peer relationships by blocking interactions between children with autism and their peers (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011). Paraprofessional support can be stigmatizing, especially for students in general education classrooms, and increase students' risk of being bullied (Giangreco & Broer, 2007; Lindsay et al., 2013). Increased paraprofessional support has been associated with elevated levels of challenging behavior (Conroy, Asmus, Ladwig, Sellers, & Valcante, 2004).

When paraprofessionals are not overinvolved, they may be underinvolved (Koegel et al., 2012). Werts and colleagues (2001) reported that paraprofessionals were observed to be close to their students between 47.6% and 76.4% of the intervals observed. Although close proximity does not necessarily ensure that paraprofessionals are interacting with their students, the authors reported that the paraprofessionals did not interact with the students at all when instructed to move to a distant position. Young and colleagues (1997) reported significant variability in the proximity of paraprofessionals to the students they were assigned to provide services to. Paraprofessionals were in close proximity to their students between 2 to 73% of the time and did not initiate interactions with their students for over half (57%) of the intervals observed. Azad and colleagues (2015) differentiated between two types of paraprofessionals: classroom assistants, who assisted the lead teacher, and one-to-one assistants, who were assigned to support students. They reported that while classroom assistants spent the majority of their time

engaged with students (74%), one-to-one assistants spent slightly over half of their time engaged with students (58%).

Despite the widespread use of paraprofessional support, few studies have examined the impact of paraprofessional support on student outcomes. Howes (2003) suggested that paraprofessional support seemed to have little and inconsistent impact on overall attainment scores. Werts and colleagues (2001) found that students were more on-task when their paraprofessional was nearby and less on-task when their paraprofessional moved away. They suggested that their paraprofessionals may have served as reminders for the students to be on-task. Young and colleagues (1997) found that students were generally on-task between 62 and 79% of the intervals observed; however, the role of the paraprofessional in maintaining on-task behavior was unclear, as one student exhibited higher levels of on-task behavior when his paraprofessional was in close proximity, another student displayed similar levels of on-task behavior regardless of how close his paraprofessional was, and the third student exhibited higher levels of on-task behavior when his paraprofessional was farther away.

Since school districts invest considerable funds and resources to provide paraprofessional supports for students with disabilities, it seems essential to determine the impact of paraprofessionals on student outcomes, especially as the number of paraprofessionals continues to increase.

## The Current Study

The current study will attempt to extend the literature by determining the use of praise-to-behavior correction ratios, small group instructional formats, and

paraprofessional services in autism support classrooms. In addition, the study will investigate the relationship between the presence and use of these factors and student on-task behavior.

The first goal of this study is to determine the rates of praise-to-behavior correction ratios being used in autism support classrooms, and to examine the relationship between teachers' praise-to-correction ratios and students' on-task behaviors. If teachers are using low praise-to-correction ratios, it may indicate a need for more explicit pre-service and in-service training in this area. Determining the effects of praise-to-behavior correction ratios on behaviors of students with autism can provide guidance for improving personnel training. If students display high rates of on-task behaviors in classrooms with high praise-to-behavior correction ratios, researchers should continue to focus their efforts on interventions developed to increase praise-to-behavior correction ratios in teachers. If students are displaying low rates of on-task behaviors in classrooms with high praise-to-behavior correction ratios, it may indicate a need to focus teacher classroom management training efforts in other areas, or perhaps that students with autism may need a higher praise-to-behavior correction ratio than typically developing students to maintain on-task behaviors.

The second goal of this study is to determine rates of teachers' use of various instructional formats in autism support classrooms, and to investigate the relationship between the various instructional formats and students' on-task behaviors. Although research recommends that instruction for students with autism should be delivered in one-to-one or small group formats, teachers may find it difficult to deliver these formats due

to limited resources or time. Identifying instructional formats associated with higher on-task behaviors can assist teachers in allocating their instructional time and resources.

The final goal is to examine the number of paraprofessionals in autism support classrooms and their association with student behaviors. In the current study, paraprofessionals included classroom assistants, one-to-one assistants, and therapeutic support staff. Classroom assistants were employed by the school district to work under the supervision of the lead teacher and fulfilled a number of roles, including providing support to various students, instructing students, and preparing lesson materials. One-to-one assistants were also employed by the school district, usually to provide academic or behavioral support to an individual student. Therapeutic support staff were employed by an outside agency to provide behavioral support to an individual student. It is hypothesized that students will display higher levels of on-task behaviors in classrooms with an increased number of staff members in the classroom. It is also hypothesized that teachers will use more one-to-one and small group formats in classrooms with more staff members, due to the additional support paraprofessionals are intended to provide.

# CHAPTER 3

# METHODS

## Setting

Data for the present study were collected within autism support classrooms in the School District of Philadelphia, a large, urban school district. During the 2015-2016 academic year, there were over 130,000 enrolled students and 18,400 students with an educational disability in the school district. Half (51.1%) of the students were African American, 19.5% Hispanic/Latino, 13.8% Caucasian, 8.0% Asian, and 7.3% multiracial/other. Approximately 68.8% of students received free lunches.

## Participants

Participants were those participating in another research project, the TeachTown study. The TeachTown study is a randomized control trial in one large school district, funded by the National Institute of Mental Health, that examines the effects of a software program, TeachTown, on outcomes for children with autism and on their teacher's use of other evidence-based practices. The principal investigator is David Mandell, ScD, who allowed the researcher to use data collected as part of the TeachTown study for this dissertation research. The TeachTown study has been approved by the Institutional Review Board at the University of Pennsylvania.

Subjects for the present study were recruited from teachers working in kindergarten-through-second grade autism support classrooms in the School District of Philadelphia during the 2015-2016 academic year. Inclusion criteria for teachers were being assigned to a full-time teaching position in a kindergarten-through-second grade

autism support classroom in the school district. The present study included 76 kindergarten-through-second grade autism support teachers. Most teachers were female (98.7%) and white (81.1%) and ranged in age from 22 to 62 years ($M$ = 37 years). Of the 92% of the teachers who had taught special education before the study year, the mean years of experience teaching special education was 8.8 (range = 0.5 to 37). As part of the study, teachers received in-classroom consultation at least once a month focusing on a number of evidence-based practices, such as positive reinforcement, visual schedules, one-to-one instruction (e.g., discrete trial teaching, pivotal response training), and data collection. Professional development workshops were also provided.

Students included students enrolled in kindergarten-through-second grade autism support classrooms who had a teacher who consented to participate in the study. Individual student data were not collected, as student behavior data (i.e., on-task behaviors) were aggregated to the classroom level. By district regulation, it was expected that students were between the ages of 5 to 8, and had an educational classification of autism.

Although demographic information was not collected for all of the paraprofessionals, data collected from a sample of school district classroom assistants ($N$ = 59) as part of the larger TeachTown study were included, since this study examined the effects of paraprofessional presence on student behaviors. The majority of the classroom assistants were female (92.6%) and African American (58.9%). Classroom assistants ranged in age from 20 to 64 ($M$ = 44 years). More than half of the classroom assistants (60.1%) reported that they had previous experience working in a special education

setting; their mean years of experience in special education was 7.2 years (range = 1 to 28).

## Measures

To estimate associations between classroom characteristics and teachers' and students' behaviors, a class observation tool was developed. The class observation tool is a 20-minute paper-and-pencil time sampling recording system. The class observation tool was used to collect data on student behaviors, teacher behaviors, the number of students and staff in the classroom during the observation, and the instructional format used during the observation. The observation is divided into four 5-minute observations and alternates between recording data for student behavior and teacher behavior every 5 minutes. Observations were collected during various times of day, as previously arranged by teachers and observers. Teachers provided times when they were providing instruction for the observer to visit. All observations were collected in vivo during academic or instructional activities. As part of the TeachTown study, the class observation was conducted four times in each classroom during the 2015-2016 school year.

### *Student Behaviors*

The dependent variable was an aggregate measure of students' on-task behaviors in the classroom. On-task behaviors were measured over two 5-minute intervals using a classroom observation tool that was developed for the TeachTown study. Whole-interval recording was used for on-task behaviors. On-task behaviors were defined as the student orienting toward and being engaged in the lesson or expected activity for the entire 10-second interval. Examples of on-task behavior included orienting toward the teacher

during large group instruction, working with a paraprofessional during centers, or completing assigned tasks during independent work. Developmentally appropriate expectations were considered when scoring a student as being on-task. For example, if a student was fidgeting in his chair but otherwise doing what he was supposed to be doing, he was considered on-task.

Partial-interval recording was used for collecting off-task behaviors. A student was coded as being off-task if he or she was actively disengaged from the expected lesson or activity at any time during the 10-second interval. Off-task behaviors included not being oriented toward an activity, engaging in self-stimulatory behaviors that prevented or interrupted participation in an activity (e.g., flapping hands when the target activity is a worksheet), leaving the activity or room without permission, or engaging in disruptive behavior.

Each 5-minute observation was divided into 10-second intervals, for a total of 30 intervals. The number of intervals coded "on-task" was divided by the total number of intervals observed, and multiplied by 100 to calculate the percentage of intervals students were on-task. All students in the classroom were observed. The observer marked the data sheet to indicate the order in which students would be observed (e.g., Student A during interval 1, Student B during interval 2) and repeated the rotation for the duration of the observation. If a student was not in the room with the teacher's permission during his or her designated interval, the interval was counted as missing. Prior to the observation, observers asked the teacher if any students were expected to leave the room for any reason (e.g., to go to speech therapy) to minimize missing intervals. If a student was

expected to leave the room during the observation, data on that student were not collected.

### *Teacher Behaviors*

The primary independent variable was the frequency of teachers' use of praise and behavior correction statements. Teachers' use of praise and behavior correction statements were measured over two 5-minute intervals using the classroom observation tool. Praise was defined as any positive statement from the teacher to a student or the entire class about their behavior or academic performance. Praise could be specific or general. A specific praise statement was any statement that told the child specifically what he or she did to earn that positive response, such as, "Awesome job sitting" and "Great job reading." A general praise statement was defined as any positive statement that did not specify what the student did correctly, such as, "good job," "awesome," and "great." Even though the literature recommends the use of behavior specific praise over general praise, studies examining the use of behavior specific praise and general praise suggest that these recommendations are not supported in autism treatment, as they have comparable effects on correct responding in students with autism (Polick, Carr, & Hanney, 2012; Stevens, Sidener, Reeve, & Sidener, 2011). As such, observers did not differentiate between specific or general praise statements when collecting data on the frequency of praise statements.

Behavior correction was any statement provided by the teacher with the intent to correct a student's behavior. Behavior correction could be directed to a group or a specific student, and could be positively or negatively phrased. Positive behavior

correction statements were defined as statements that told the student what to do, such as, "Eyes on me," or "Walk." Negative behavior correction statements were defined as statements that told the child what not to do or statements that sounded punitive, such as "Stop that," or "No, don't do that." Similar to praise statements, positive and negative behavior correction statements were not coded separately.

The frequency of teacher praise and behavior correction statements was collected during two 5-minute observations. A tally mark was recorded each time the teacher provided a praise or behavior correction statement to any student or group of students. Two or more praise or behavior correction statements said consecutively were recorded as separate statements. For example, "I like how Johnny is sitting. Good work, Billy!" was counted as two separate praise statements.

### *Classroom Characteristics*

Secondary independent variables included the number of students, the number of staff members, and the instructional format (e.g., partners, group, independent seatwork, centers) being used during the observation. These variables were collected using the class observation measure at the beginning of the observation.

The *number of students* included the number of students present in the classroom when the observation was collected. The *number of staff members* included the lead special education teacher, various paraprofessionals, and on rare occasions, additional school staff members, such as speech and language pathologists or special education liaisons, who were in the classroom during the observation. Paraprofessionals included classroom assistants, one-to-one assistants, and therapeutic support staff. Classroom

assistants were defined as individuals who were employed by the school district to work under the supervision of the lead teacher to fulfill a number of responsibilities, including providing instructional or behavioral support to various students, or more clerical duties, such as making photocopies and preparing lesson materials. One-to-one assistants were also employed by the school district to provide instructional or behavior support to an individual student. Therapeutic support staff were employed by an outside agency, such as a behavioral health agency, to provide behavioral support for an individual student. Observers did not formally collect data on the breakdown of staff members in the classrooms (e.g., whether a paraprofessional was a district one-to-one assistant or a therapeutic support staff worker).

The *instructional format* used during the observation was coded as partners, group, independent seatwork, or centers. Students assigned to work on an activity together with a peer or group of peers by the teacher were coded as being engaged in *partners. Group* was defined as whole class instruction. Students were coded as being engaged in *independent seatwork* if they were given assignments or tasks to complete independently. *Centers* (i.e., small group instruction) were coded if the students were divided into small groups with various activities per group (e.g., the teacher provided instruction to a group of three students, while two students worked with a classroom assistant, and two students completed independent work). Teachers were also asked to report the amount of time they spent providing one-to-one or small group instruction in a typical school day as part of a larger fidelity questionnaire.

### *Training and Reliability*

Classroom observations were collected by research coordinators and masters-level behavioral consultants who were trained and reliable in the measure. Training for research coordinators and behavioral consultants consisted of watching and coding five videos for students' on-task and off-task behaviors and teachers' use of praise and behavior correction. They were required to reach an inter-observer agreement (IOA) of at least 80% for each video with the primary observer, a postdoctoral fellow, who developed the class observation tool. IOA was calculated by dividing the number of agreements by the sum of agreements and disagreements, and multiplying by 100. Inter-rater reliability checks were collected at least once by the primary observer, during each of the four observation periods with each observer. IOA data were collected for 17 observations out of 258 total observations (6.6% of observation sessions). The mean IOA for on-task and off-task behaviors was 86.4% (range = 72 to 95%), and 88.7% (range = 80 to 100%) for teacher praise and behavior correction.

## Data Analysis

**Question 1a:** What are the praise-to-behavior correction ratios used by special education teachers in autism support classrooms?

A scatter plot was used to display the praise-to-behavior correction ratios used by teachers during the 10-minute observational period. Due to the range in praise and behavior correction statements observed, the teachers were grouped into four categories using a median split: a) high praise and high behavior correction (High P/High BC), b) high praise and low behavior correction (High P/Low BC), c) low praise and low

behavior correction (Low P/Low BC), and d) low praise and high behavior correction (Low P/High BC).

**Question 1b:** What is the relationship between teachers' praise-to-behavior correction ratios and students' on-task behaviors?

A one-way analysis of variance (ANOVA) was conducted to examine the differences in on-task behaviors among the four groups. The categories (i.e., High P/High BC, High P/Low BC, Low P/Low BC, Low P/High BC) were entered as the predictor variables.

**Question 2:** What instructional formats (i.e., small group, whole group) are associated with improved on-task behaviors in students with autism?

A one-way ANOVA was conducted to examine the association between instructional formats and students' on-task behaviors.

**Question 3a:** What is the association between the number of staff and students' on-task behaviors? Are students more or less on-task in classrooms with more paraprofessional services?

A one-way ANOVA was conducted to examine the association between the number of staff and students' on-task behaviors.

**Question 3b:** Is there an association between the number of staff present in the classroom and the instructional format used?

A one-way ANOVA was conducted to examine the association between the number of paraprofessionals and instructional formats.

# CHAPTER 4

# RESULTS

This study combined data across four observations for each teacher and classroom for the 2015-2016 academic year. There were 270 observations across the four time points for the 76 teachers. Some observations were not collected due to teachers withdrawing from the study or scheduling conflicts. Observations were excluded if they were missing any of the class observation variables, for a total of 258 observations across the four time points. One outlier was excluded from the analyses because it was collected when the teacher was supervising students from another classroom in addition to her own. The final sample included 257 class observations. Descriptive statistics for classroom observation variables are reported in Table 2.

Table 2.

*Descriptive Statistics for Classroom Observation Variables*

| Variable | *M (SD)* | Range |
|---|---|---|
| Number of students | 6.8 (1.8) | 1 – 11 |
| Number of staff | 3.4 (1.3) | 1 – 8 |
| Percentage of on-task behaviors[a] | 80.5% (12.6) | 43.33 – 100% |
| Number of praise statements[a] | 10.7 (8.1) | 0 – 49 |
| Number of behavior correction statements[a] | 8.6 (9.3) | 0 – 56 |

[a]Per 10-minute observation.

**Question 1a:** What are the praise-to-behavior correction ratios used by special education teachers in autism support classrooms?

The mean praise-to-behavior correction ratio in the sample was 2.6:1 ($SD$ = 4.6). Teachers used a positive praise-to-behavior correction ratio ($M$ = 4:1, $SD$ = 5.6) for more than half of the observations (59.9%). A negative praise-to-behavior correction ratio (0.45:1) was observed for 35.0% of the observations. A one-to-one ratio (e.g., equal number of praise and behavior correction statements) was observed for only 5.0% of the observations.

The teachers were grouped into four categories using median splits: a) high praise/high behavior correction (High P/High BC), b) high praise/low behavior correction (High P/Low BC), c) low praise/low behavior correction (Low P/Low BC), and d) low praise/high behavior correction (Low P/High BC). The median number of praise statements was 9, while the median number of behavior correction statements was 5. The scatter plot summarizing teachers' use of praise and behavior correction statements during a 10-minute observation is presented in Figure 1. Low praise/low behavior correction was most frequently observed (28.2%, $n$ = 75), followed by high praise/high behavior correction (26.9%, $n$ = 69).

**Question 1b.** What is the relationship between teachers' praise-to-behavior correction ratios and students' on-task behaviors?

A one-way analysis of variance was used to analyze the differences in on-task behaviors based on teachers' praise-to-behavior correction ratios. Results of the ANOVA indicate that there was a significant main effect of teachers' praise-to-behavior correction ratios on students' on-task behaviors ($F$ (3, 253) = 8.18, $p$ < .0001), with an $R^2$ of .088. The effect of behavior correction was statistically significant ($F$ (1, 253) = 22.87, $p$ <

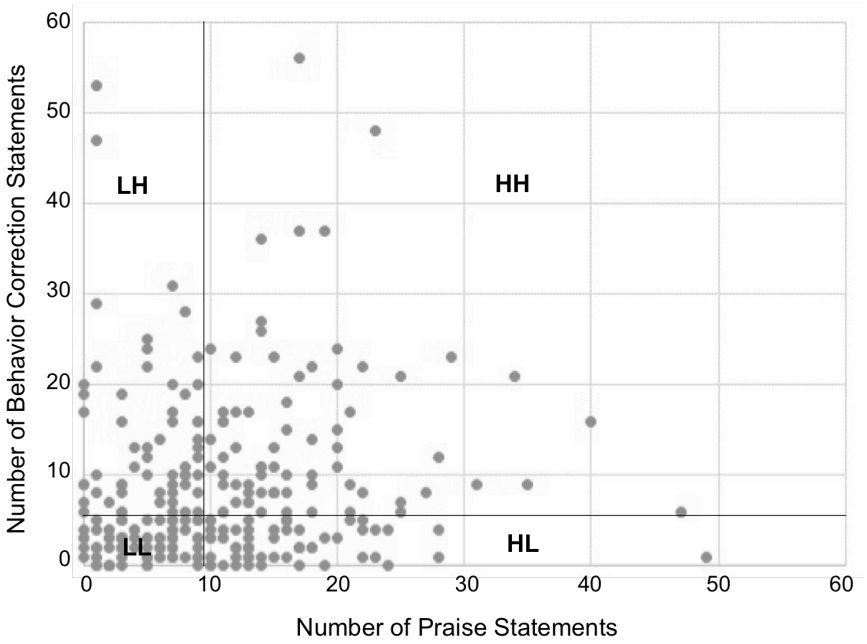


*Figure 1.* Scatterplot summarizing teachers' use of praise and behavior correction statements. HL = high praise/low behavior correction; LL = low praise/low behavior correction; LH = low praise/high behavior correction; HH = high praise/high behavior correction. Observations were categorized as "low praise" if ≤9 praise statements were coded during the 10-minute observation, and as "low behavior correction" if ≤ 5 behavior correction statements were observed.

.0001), while the effect of praise ($F$ (1, 253) = 0.45, $p$ = 0.50) and the effect of the interaction between praise and behavior correction, ($F$ (1, 253) = 0.02, $p$ = 0.89), were not significant. Post hoc analyses using the Least Significant Difference (LSD) criterion for significance indicated that higher mean on-task behaviors were associated with Low P/Low BC classrooms ($M$ = 84.7%) and High P/Low BC classrooms ($M$ = 83.5%) compared to Low P/High BC classrooms ($M$ = 77.2%) and High P/High BC classrooms ($M$ = 76.4%). The mean percentages of on-task behaviors observed across the four categories are summarized in Figure 2. These analyses suggest that there is a significant difference in student on-task behavior when the number of behavior correction statements

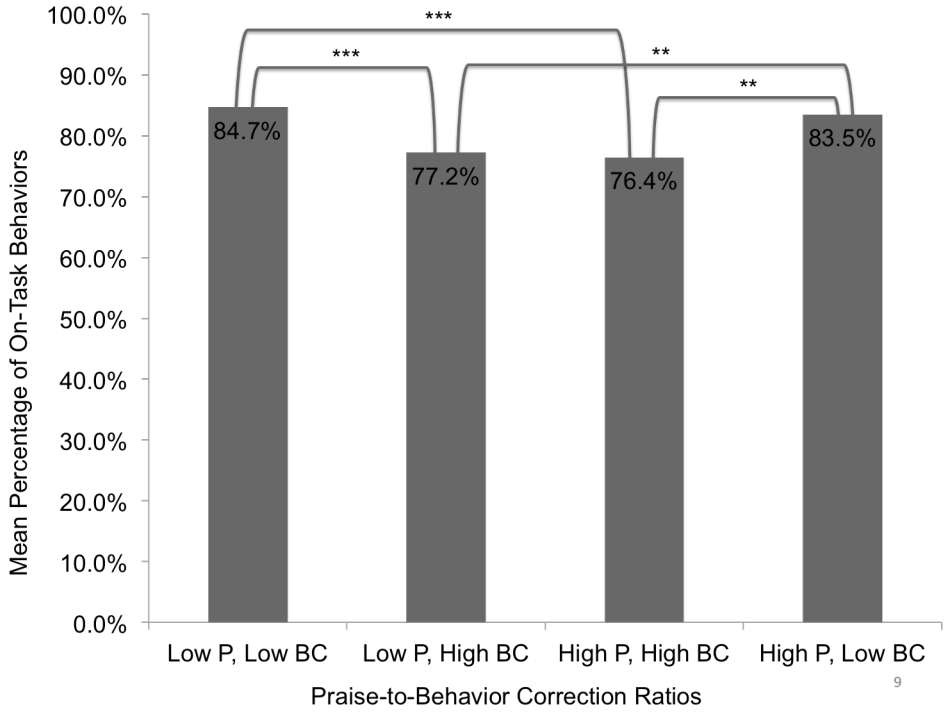


*Figure 2.* Mean percentage of on-task behaviors observed across praise-to-behavior correction ratio categories. ** $p < .01$. *** $p < .001$.

was low compared to when a greater number of behavior correction statements were used.

Additional analyses were conducted to examine the associations between praise-to-behavior correction ratios and additional classroom factors, such as instructional format, the number of students, and the number of staff. Chi-Square tests suggested no significant evidence of associations between praise-to-behavior correction ratios and additional classroom factors (see Table 3).

Table 3.

*Summary of chi-square tests examining the association between praise-to-behavior correction ratios and additional classroom factors.*

| Classroom factor | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Instructional format | 3.52 | 6 | 0.7409 |
| Number of students | 0.16 | 1 | 0.6932 |
| Number of staff | 0.65 | 1 | 0.4214 |

In summary, the results of the analyses conducted to examine Question 1 found that special education teachers in autism support classrooms generally used positive praise-to-behavior correction ratios, and that higher levels of on-task behaviors were observed for teachers in low behavior correction groups. Additionally, teachers' use of praise-to-behavior correction ratios was not significantly associated with instructional format, the number of students, or the number of staff in the classroom.

**Question 2:** What instructional formats (i.e., small group, whole group) are associated with improved on-task behaviors in students with autism?

The majority of the observations were collected during whole group instruction (58.1%). Observations were less frequently collected during centers/small group instruction (26.0%) and independent seatwork (15.9%). No observations were collected during partners-based instruction. The teachers were also interviewed asking about their use of one-to-one or small group instruction. Less than half of the teachers (40.4%, *n* = 23) reported that they spent 3 to 4 hours in one-to-one or small group/center-based instruction, while 31.6% (*n* = 18) reported that they spent most of the school day (5 to 6 hours) providing one-to-one or small group instruction. A quarter (24.6%, *n* = 14) of the

sample reported teaching in one-to-one instruction or small groups/centers for 1 to 2 hours, while 3.5% of the teachers reported spending less than one hour teaching in one-to-one or small group formats.

A one-way ANOVA was conducted to evaluate the effect of instructional format on students' on-task behaviors. There was a significant effect of instructional format on on-task behaviors ($F$ (2, 254) = 6.94, $p$ = 0.001), with an $R^2$ of .052. Post hoc analyses using the LSD criterion suggested that the higher mean on-task behaviors were associated with center-based/small group instruction ($M$ = 85.3%) than for whole group instruction ($M$ = 78.6%) or independent seatwork ($M$ = 79.7%). The mean percentage of on-task behaviors across instructional formats is presented in Figure 3.

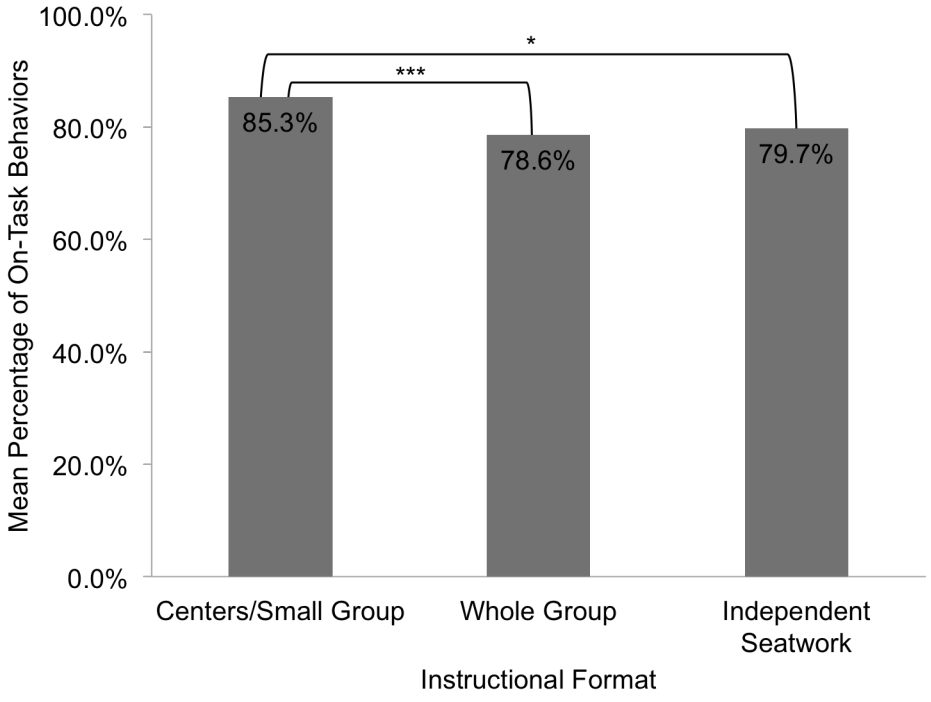


*Figure 3.* Mean percentage of on-task behaviors observed across instructional formats over a 10-minute observation. *$p$ < 0.5. *** $p$ < .001.

**Question 3a:** What is the relationship between the number of staff and students' on-task behaviors? Are students more or less on-task in classrooms with more paraprofessional services?

A one-way ANOVA was used to examine the relationship between the number of staff and students' on-task behaviors. The relationship between the number of staff and students' on-task behaviors was non-significant ($F$ (1, 255) = 0.09, $p$ = 0.76), indicating that the number of staff was not associated with students' on-task behaviors.

**Question 3b.** Is there a relationship between the number of staff present in the classroom and the instructional format used?

To examine the relationship between the number of staff present in the classroom and the instructional format used by the teacher, a one-way ANOVA was conducted. There was a significant effect of the number of staff on the instructional format used by teachers ($F$ (2, 254) = 3.54, $p$ = .03), with an $R^2$ of .027. Post hoc analyses using the LSD procedure suggested that the mean number of staff was higher in classrooms with center-based instruction ($M$ = 3.7) compared to classrooms using whole group instruction ($M$ = 3.2).

# CHAPTER 5

# DISCUSSION

A number of strategies have been proposed as effective techniques for educating students with autism. Some of the most commonly recommended strategies include principles of applied behavior analysis (e.g., praise as reinforcement), individualized instruction, and the use of paraprofessionals to support students. This study examined the use of these practices in autism support classrooms, and the associations among praise-to-behavior correction ratios, classroom characteristics (i.e., instructional format, number of staff), and students' on-task behaviors.

## Praise-to-Behavior Correction Ratios

The current study found that teachers' use of praise-to-behavior correction ratios was generally positive, with teachers delivering more praise statements than behavior correction statements. This is in contrast to Maggin and colleagues' (2011) report of a 1:1 ratio in general education and self-contained classrooms for students with EBD. However, this sample comprised special education classrooms for students in kindergarten through second grade, and is consistent with White's (1975) findings that teachers generally used higher praise-to-behavior correction ratios until after second grade.

It was hypothesized that classrooms with teachers who used high praise/low behavior correction would be associated with higher percentages of on-task behaviors. While this hypothesis was supported, there was also a significant association between low praise/low behavior correction and higher on-task behaviors, suggesting that limiting

the use of behavior correction statements may have a stronger effect than the overall use of praise, or the use of a praise-to-behavior correction ratio. The lack of an association between rates of praise and students' on-task behaviors warrants future investigation. It is possible that praise did not function as a positive reinforcer for the majority of the students in autism support classrooms. It is also possible that a 1:1 ratio is an effective strategy for maintaining on-task behaviors in students with ASD, or that the praise-to-behavior correction ratios reported in this study were not representative of all staff members' delivery of these statements, as data were focused on the teachers' behaviors. Furthermore, the quality of praise statements may be a more critical factor than the quantity of praise statements, as discussed below.

This study did not conduct functional behavior analyses on individual students to determine the effectiveness of praise as a reinforcer. The lack of a significant effect of praise provides evidence to support the view that praise may not function as a reinforcer for students with autism. However, previous studies have suggested that praise can be conditioned as a reinforcer in children with autism (Lovaas et al., 1966), and that some children with autism preferred receiving a social act (e.g., high fives, praise) over no interaction (Gutierrez et al., 2013). Further research should examine special education teachers' knowledge and application of conditioning praise as a reinforcer in students with autism.

It is also possible that a 1:1 praise-to-behavior correction ratio can be sufficient in managing students' behaviors, as Pisacreta and colleagues (2011) suggested. While identifying a standard praise-to-behavior correction ratio may continue to be an elusive

task due to students' individual differences (Hawkins & Heflin, 2011), it may be worthwhile to examine the differential effects of neutral (i.e., 1:1) and positive praise-to-behavior correction ratios for students with ASD.

Paraprofessionals were occasionally observed to deliver praise and behavior correction statements to students during the observation. Actual praise-to-behavior correction ratios observed in the classrooms during the observations may not be represented in these data because the observations only coded teachers' behaviors. It would be worthwhile to study paraprofessionals' knowledge and use of basic behavior management strategies, such as praise-to-behavior correction ratios. While paraprofessionals may not have the background or training to provide supplemental instruction to students, they can be trained to implement these practices, which do not require intensive training.

It is promising that low rates of behavior correction statements, rather than high rates of behavior correction statements, were significantly associated with on-task behaviors. This is contrary to the findings of Rosén and colleagues (1984), who reported that the removal of behavior correction statements were associated with decreases in on-task behaviors, while the removal of praise statements had no effect on students' behaviors. The findings in the current study may be related to the types of praise and behavior correction statements delivered by teachers. Effective praise statements are characterized as specific, contingent on appropriate student behaviors, and sincere (O'Leary & O'Leary, 1977). It is possible that infrequent praise statements that comprise these qualities may be more reinforcing and effective than frequent, general praise

statements that are not delivered contingently on appropriate behaviors (Brophy, 1981). Behavior correction statements that are specific, provide corrective feedback, and are used before the problem behavior occurs are suggested to be more effective than behavior correction statements that are general, harsh, and do not tell the child what to do (Harbour et al., 2015; Simonsen et al., 2009; Smith et al., 2011; Stormont et al., 2005). As the current study did not code whether teachers used general or specific praise and behavior correction statements, the variability of statements used (e.g., frequent use of "Good job" versus varied statements, such as "Nice work," "That was amazing," or "Great listening"), or whether these statements were delivered contingently on students' behaviors, further research should examine the quality of praise and behavior correction statements (e.g., general or specific, academic or behavioral), and their relationship with on-task behaviors in students with ASD.

Teachers did not vary their use of praise-to-behavior correction statements based on the instructional format they used, or the number of students and staff in the classroom. This suggests that teachers' practices may be related to individual differences in teacher characteristics, rather than in classroom factors (Coffee & Kratochwill, 2013), and further investigation examining the effects of teacher characteristics (e.g., training, years teaching special education) on their use of practices, such as praise-to-behavior correction ratios, should be conducted.

### Instructional Format

Teachers' use of small group, or center-based, instruction was associated with higher on-task behaviors, which is consistent with previous findings that on-task behavior

increases as group size decreases (Koegel & Rincover, 1974; Steinbrenner & Watson, 2015; Whorton et al., 1986; Young et al., 1997). Despite these findings and recommendations for individualized instruction, teachers were observed to provide instruction to the whole classroom in over half (58.1%) of the observations conducted, even though the majority of the teachers (71.9%) reported spending at least half of the school day providing instruction in small groups. Although this study did not directly observe teachers' use of various instructional formats throughout the day, this is an area that would benefit from further research, as previous studies have found discrepancies between teachers' reported and observed behaviors (Azad, Kim, Marcus, Sheridan, & Mandell, 2016; Barnyak & McNelly, 2009).

## Paraprofessionals

Paraprofessionals are staffed in classrooms due to perceived benefits that they will help students access free and appropriate public education, and support students in meeting their educational goals. This study evaluated the relationship between the number of staff and students' on-task behaviors. Results indicated that the number of staff in the classroom did not have a significant relationship with on-task behaviors. Previous research has suggested an inconsistent relationship between paraprofessional support and proximity, and students' on-task behaviors. Werts and colleagues (2001) reported that on-task behaviors were higher when a student's paraprofessional was nearby, while Young and colleagues (1997) found varying effects of paraprofessional proximity on students' on-task behaviors. This study did not examine paraprofessionals' engagement or proximity to students; however, the presence of more paraprofessional

staff in classrooms was not significantly related to higher levels of students' on-task behaviors. Given the significant resources allotted to staffing paraprofessionals, further research is needed to clarify the relationship between paraprofessional behaviors and student outcomes.

This study also examined the relationship between teachers' use of instructional formats and the number of staff members in the classroom. Previous research suggested that teachers might be more likely to provide small group instruction when paraprofessional support was available, as teachers may rely on paraprofessionals to monitor students or deliver instruction (Maggin et al., 2011). Paraprofessionals have reported delivering group and individual instruction to students (Carter et al., 2009; Dymond & Russell, 2004). The current study found that the number of staff members was associated with instructional format, such that teachers were more likely to deliver instruction in small groups as the number of staff members increased. The current study did not examine paraprofessional's roles (i.e., whether they were monitoring students in smaller groups or providing instruction); however, it is possible that paraprofessionals are used to support teachers and to help delegate teachers' workloads. It will be important to conduct further examination into paraprofessional roles and their relationships to student outcomes.

## Limitations

Several limitations are present in the current study. As previously noted, functional behavior analyses were not conducted on individual students to determine whether students engaged in appropriate behaviors to get access to social attention.

Furthermore, because student behaviors and teacher behaviors were collected during different intervals rather than concurrently, a contingent relationship between teachers' use of praise and behavior correction statements and students' on-task behaviors cannot be deduced. It is possible that teachers delivered fewer behavior correction statements because students were more on-task. On the other hand, on-task behaviors may have been higher because teachers were delivering fewer behavior correction statements. While there was no significant relationship between the rates of praise and students' on-task behaviors, it may still be worthwhile to condition praise as a reinforcer in students with autism due to the increasing focus on the inclusion of students with autism in general education classrooms, where tangible reinforcers are less likely to be used. Furthermore, praise may be a more socially acceptable strategy since it is naturally occurring and can be delivered quietly and privately.

Second, the classroom observation measure was limited in the specificity of the behaviors observed. As previously mentioned, behavior correction statements that are short, specific, and explicit (i.e., provide corrective feedback) are more effective than longer, general behavior correction statements. Praise statements should also be specific, as well as contingent on appropriate behaviors, and sincere (O'Leary & O'Leary, 1977). The current study did not code descriptions on teachers' quality of praise and behavior correction statements. While some teachers were observed delivering high rates of praise statements, the praise statements may not have had their intended effect if they were general, or delivered as part of an instructional curriculum script. Excessive and repetitive use of praise statements, especially general statements such as, "Nice work" or "Good,"

can decrease the effectiveness of praise as a reinforcer (Alberto & Troutman, 2009). Data were not collected on the frequency of distinct versus repeated praise statements. While numerous studies have examined the effects of specific versus general praise statements in students in general education classrooms, there is a paucity of research in relation to students with ASD. Stevens and colleagues (2011) found that the effects of behavior specific praise and general praise were too similar to produce differential effects in skill acquisition in two children with ASD. Polick (2011; Polick et al., 2012) also found minimal benefits of using behavior specific praise over general praise. However, since teachers naturally deliver higher rates of general praise compared to behavior specific praise (e.g., Floress et al., 2017), supporting teachers to increase their overall rates of praise may be a promising direction for teachers of students with ASD. Further investigation into the characteristics of praise and behavior correction statements in relation to outcomes for students with ASD is needed.

A third limitation is that data were not collected on the breakdown of staff members or paraprofessionals (i.e., paraprofessionals who were employed by the school district versus outside agencies, or speech language pathologists) in the classroom or their behaviors (e.g., delivery of praise and behavior correction statements, engagement with students, proximity to students). It is possible that paraprofessionals also delivered praise and behavior correction statements to students during instruction, which may have helped to maintain the high rates of on-task behavior observed. On the other hand, the current study did not find a significant relationship between the number of staff and students' on-task behaviors. Paraprofessionals from outside agencies were generally assigned to work

with a specific student and they were limited in the types of support they provided to students (i.e., they provided behavior support after challenging behaviors occurred rather than academic support). Therefore, if classrooms were staffed by more paraprofessionals from outside agencies, rather than by paraprofessionals who were employed by the school district, it is plausible that more staff would not predict higher on-task behaviors. Research examining paraprofessional roles, as well as their relationships with students' behaviors, is needed.

Lastly, given the high rates of on-task behaviors observed in the current study ($M$ = 80.5%, $SD$ = 12.6), it is unclear whether there was a ceiling effect that contributed to the non-significant findings on the effect of praise. The current study found higher rates of on-task behavior compared to other studies examining on-task behaviors in students with autism (Carter et al., 2008; Dymond & Russell, 2004; Kurth & Mastergeorge, 2012; Sam, 2012). While it was slightly lower than the 85% benchmark proposed by Utley and Obiakor (2015), the mean on-task behaviors in the current study was consistent with figures reported in general education classrooms (Merrett & Wheldall, 1987; Sutherland et al., 2000; Wheldall et al., 1989). These observations were conducted in classrooms where teachers received at least monthly coaching visits from consultants on a number of evidence-based practices, including positive reinforcement, visual schedules, discrete trial teaching, and pivotal response training. The effects of coaching visits on teachers' use of these strategies were not examined for this current study. Although previous research has found low treatment fidelity for evidence based practices in autism support classrooms despite intensive workshops and follow-up coaching, clinically meaningful

student outcomes have been observed in classrooms that received coaching (Mandell, et al., 2013; Stahmer et al., 2015). Furthermore, teachers who received multiple ongoing coaching sessions demonstrated higher levels of implementation compared to teachers who received less coaching (Reinke, Stormont, Herman, & Newcomer, 2014), suggesting higher levels of implementation despite low fidelity. It is unclear whether the findings from the current study would generalize across other settings where teachers do not receive regular consultation and support.

## Future Directions

While research continues to study and identify EBPs for educating students with autism, EBPs will not have their intended effects if they are not consistently applied in schools (Alexander, Ayres, & Smith, 2015). This study provides preliminary insight into the use of teachers' praise-to-behavior correction ratios, individualized instruction, and effects of paraprofessionals; however, future research is needed to gain a more comprehensive picture of the relationships among these factors. Future studies should expand on the current study by collecting data on additional variables, such as the quality of praise and behavior correction statements, and the effects of paraprofessional behaviors. Additionally, future studies should investigate whether there is a contingent relationship between praise-to-behavior correction ratios and students' behaviors in autism support classrooms.

The results from the current study also provide ideas for special education teacher and paraprofessional preparation and training. For special education teachers, it may be worthwhile to provide training around the use of small group instruction and using EBPs,

such as discrete trial teaching, which is typically delivered individually, in small group formats. Leaf and colleagues (2013) reported that discrete trial teaching in both one-to-one and small group formats was effective in teaching skills. Therefore, teachers may benefit from strategies to adapt individual instructional techniques, such as discrete trial teaching and pivotal response training, to small group instruction. Teacher training should also focus on the use of effective praise and behavior correction statements, as well as training on how to condition praise as a reinforcer in students with autism. Given that many special education teachers reported feeling ill-prepared to supervise other adults working in their classrooms (Lauderdale-Littin et al., 2013), teacher training should also provide guidance on supervising paraprofessionals.

Lastly, there is a need to clarify the role of paraprofessionals. While there was a significant relationship between the number of staff and teachers' use of different instructional formats, the association between the number of staff and students' on-task behaviors was non-significant. While it should not be expected that paraprofessionals should provide supplemental instruction to students, paraprofessionals should be trained in basic behavioral strategies that can help them monitor and maintain students' on-task behaviors during center-based or small group instruction, such as providing praise when students are on-task. Politte (2015) provided training to four paraprofessionals on the use of general and behavior specific praise and increasing students' opportunities to respond (OTR). Paraprofessionals increased their rates of praise and OTR following training, and five out of six students with ASD increased their on-task behaviors by a minimum of 10 percentage points. This promising finding suggests that consultants and coaches should

regularly include paraprofessionals in consultation sessions and their training on basic behavioral strategies. Additionally, communicating these practices to the classroom staff as a whole, rather than to the teacher separately, may help foster a climate where use of these practices is encouraged.

## Summary

Research on autism spectrum disorders has increased dramatically since 1980, surpassing the growth rate of publications in other related health topics (Office of Autism Research Coordination [OARC], 2012), and a number of strategies for educating students with autism have been suggested in the literature. In 2010, publications on treatment and interventions accounted for the second largest number of publications within autism research, second only to research examining the biology of autism (OARC, 2012). With the increasing number of students receiving special education services for autism and federal regulations mandating strategies with strong, research-based support, it is important to identify high quality practices, and ensure that these practices are being applied effectively.

While some practices, such as praise-to-behavior correction ratios, have extensive research support for use with students without ASD, their application to students with ASD is lesser known. Additionally, there is a lack of research examining the use and effects of additional practices, such as classroom instructional format or paraprofessional support, which are commonly recommended for students with autism. The present study is a preliminary investigation into the use of these practices, as well as the associations among these practices and on-task behaviors of students with ASD.

The results of this study revealed that teachers generally used positive praise-to-behavior correction ratios, and that rates of praise and the number of staff did not have a significant relationship with students' on-task behaviors. However, higher percentages of on-task behaviors were associated with classrooms where teachers used fewer behavior correction statements. Furthermore, while small group instruction may be an effective and efficient alternative to providing more intensive, individualized instruction such as discrete trial teaching, teachers may benefit from receiving training on how to implement these practices in small group formats in order to implement them more effectively, with paraprofessionals monitoring other centers and small groups. Additionally, consultation should be expanded to include paraprofessionals. The current study provides promising insight into teachers' use of various practices, and provides a foundation for further research examining additional variables that may contribute to the engagement of students with autism.

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