USING VIDEO MODELING TO TEACH TYPICAL ADOLESCENTS TO INTERACT
SOCIALLY WITH PEERS WITH ASD

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ABSTRACT

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Researchers have found that video modeling can be an effective procedure for training teachers, behavioral technicians, and paraeducators to administer evidence-based practices to children with autism spectrum disorder (Brock & Carter, 2013; Catania et al., 2009; Digennaro-Reed, Codding, Catania, & Maguire, 2010; Lipschultz, Vladescu, Reeve, Reeve, & Dipsey, 2015; Moore & Fisher, 2007; Rosales et al., 2015; Vladescu, Carroll, Paden, & Kodak, 2012; Weldy, Rapp, & Capocasa, 2014). Video modeling has not yet been evaluated to teach typical adolescents to deliver evidence-based practices. The purpose of the present study was to extend previous research on the use of video modeling as a training tool by teaching typical adolescents to administer naturalistic evidence-based practices to adolescents and young adults with autism spectrum disorder (ASD). This was accomplished by: (a) examining the effects of video modeling training on typical adolescents' performance of peer mediated social interaction (PMSI), a 10-step procedure comprised of simplified behavioral practices, during roleplay with an adult actor , (b) examining the effects of video modeling training on the generalization of PMSI from an actor to adolescents with ASD, and (c) determining the social meaningfulness of video modeling training via pre- and post-intervention measures of social interaction for youth with ASD.

A multiple probe design across participants was used to evaluate the effects of training via video modeling on delivery of PMSI by five typical adolescents. The dependent variable was the percentage of steps performed correctly by the typical adolescent for each step of

PMSI. All participants demonstrated an immediate increase in PMSI as video modeling was systematically applied. Typical adolescents also generalized delivery to adolescents with ASD. These findings demonstrate a clear functional relation between video modeling training (VMT) and improved performance of PMSI. In addition, the present data extend the results of previous VMT research conducted with adult service providers (Catania et al., 2009; Lipschultz et al., 2015; Vladescu et al., 2012) by demonstrating similar outcomes with typical adolescents.

An analysis of social interaction was conducted to ensure that teaching PMSI was likely to be of benefit to individuals with ASD. Social interaction consisted of: (a) being within 3 ft of and physically orienting toward peers, (b) interacting verbally or with gestures with one or more peers, and (c) engaging in an activity consistent with the peer hangout group. Social interaction between two youths with ASD and typical adolescent participants was evaluated within a peer mediated setting before and after VMT. Pre-intervention measures were compared to post-intervention measures. Social interaction for both youths with ASD improved following VMT.

Dedicated to my Yayo Vicente Valentin Gonzalez Nächer, who did not have the opportunity to apply his intellect toward formal academic study.

ACKNOWLEDGEMENTS

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CHAPTER 1

INTRODUCTION

The following dissertation examines the use of video modeling to teach typical

adolescents to deliver behavioral practices within a peer mediated intervention. Peer mediated

intervention (PMI) is an evidence-based practice that involves training typical peers to interact

with and support students with autism spectrum disorder (ASD) as they work to acquire new

behaviors, communication, and social skills (Carter, Cushing, Kennedy, et al., 2005; Hughes et

al., 2012). It has been shown to increase the quality and amount of social interaction for youth

with ASD (Carter et al., 2014). Despite demonstrated effectiveness, training and

implementation of a peer mediated intervention involves comprehensive instruction and a

substantial time investment (Carter, Cushing & Kennedy, 2008; Carter & Kennedy, 2006;

Hughes & Carter, 2008; Plavnick & MacFarland, 2014). Using video modeling to train typical

adolescents may help mitigate the process of implementing peer mediated intervention.

The current chapter introduces this dissertation and provides a brief overview of topics

to be covered in greater detail within the remaining chapters. This includes an introduction to

(a) characteristics and prevalence of ASD, (b) social skills deficits among individuals with ASD

(c) social skills intervention research for adolescents with ASD, (d) evidence-based practices

and applied behavior analysis, (e) mediating social interaction for adolescents with ASD, (f)

benefits of participation in peer mediated intervention for adolescents with ASD, (g) benefits of

participation in peer mediated intervention for typical adolescents, (h) barriers to

implementation of peer mediated intervention, and (i) video modeling as an effective training

method for typical adolescents. The introduction concludes with a statement of purpose for the

dissertation.

Autism

The number of children diagnosed with ASD each year has increased to 1 out of 68 children in the United States (Centers for Disease Control and Prevention's Autism and Developmental Disabilities Monitoring Network, 2012). ASD involves persistent deficits in social and interactive communication, in addition to restricted and repetitive behavioral patterns (American Psychological Association, 2013). Examples of social communication deficits may include difficulty engaging in reciprocal conversation and misinterpreting non-verbal cues. In addition to challenges in building friendships, individuals with ASD may demonstrate an intense focus on highly specific items, excessive adherence to routines, and high levels of sensitivity to environmental changes (American Psychological Association, 2013). The preceding characteristics fall on a continuum from mild to severe, depending on the individual.

Social deficits are one of the most common symptoms for individuals with ASD, regardless of severity (American Psychological Association, 2013). The degree to which individuals successfully demonstrate social behaviors, establish and maintain interpersonal relationships, gain peer acceptance and discontinue harmful relationships is termed social competence (Gersten, Carnine, & Woodward, 1987; Gresham, 1983). Deficits in social competence can cause serious problems in the everyday life of adolescents and young adults with ASD. Individuals with ASD may experience challenges with turn taking and sharing, showing or talking about their emotions, and perspective-taking (Baron-Cohen, 1992; Dennis, Lazenby, & Lockyear, 2001). Some people with ASD are very sensitive to being touched and may not wish to shake hands or hug others (American Psychological Association, 2013). Some individuals with ASD demonstrate self-stimulatory behaviors (e.g., moving fingers in front of eyes) and difficulty with voice modulation (e.g., intonation, volume; Happe, 1993; Shriberg et

al., 2001) which may interfere with social interaction. People with ASD may also experience anxiety and depression (Bellini, 2006). All of these symptoms can compromise social competence, potentially leading to negative social interactions with others. This may cause youth with ASD to withdraw socially (Bellini, 2006). Although social withdrawal provides temporary relief from the stress and discomfort of negative peer interactions, it simultaneously impedes further social development by limiting subsequent social interactions with peers (Bellini, 2006). Provision of evidence-based services is essential to mitigating the effects of social deficits and improving outcomes for youth with ASD (Boyd et al., 2010). Numerous social skills interventions target individuals with ASD, but only those shown to be effective through scientific analysis are considered evidenced-based (Horner et al., 2005).

Applied Behavior Analysis: The Basis for Evidence-Based Practices

The evaluation and dissemination of resources related to evidence-based social skills interventions for youth with ASD has been a central focus for researchers in recent years (Otero et al., 2015). Scientific evidence currently provides numerous empirically-based social skills interventions from which practitioners and other professionals may choose (Collet-Klingenberg, 2009; National Autism Center, 2009; Odom et al., 2010; Wong et al., 2015). Such interventions are often based on the principles of applied behavior analysis (National Research Council [NRC], 2001; National Autism Center Standards Report [NSR], 2009; Wong et al., 2015).

Applied behavior analysis (ABA) is a science that systematically applies tactics derived from behavioral principles toward the improvement of socially significant behavior (Cooper, Heron, & Heward, 2007). ABA operates under the philosophy that examination and refinement of current behavioral applications will lead to their eventual replacement by improved applications (Baer, Wolf, and Risely, 1968). It emerged from the practices of researchers

interested in using operant conditioning to improve the lives of consumers. Single-case experimental designs are the primary methodology used to evaluate the effects of independent variables on changes in dependent variables in ABA (Kazdin, 2011). Single case experimental designs, and therefore ABA, have been instrumental in the identification of evidence-based practices in educational settings for individuals with ASD (Horner et al., 2005; Kratochwill et al., 2010; Wong et al., 2015).

Positive reinforcement is an essential component of many ABA interventions (Cooper et al., 2007). Positive reinforcement is the contingent presentation of a stimulus immediately following a behavior that increases the probability of that behavior happening again under similar circumstances. For example, a student named Jess rarely interacts socially with other students. When Jess greets a peer who enters the classroom, the peer smiles and responds with a request for Jess to join her group activity saying, "Hi Jess! Want to be in my group? We're making a cool poster." Jess accepts the peer invitation since she enjoys creative activities and likes to be included. Social attention from a peer is likely to function as a positive reinforcer for Jess' peer-directed social behavior. Subsequent increases in social interactions with her peers, such as Jess walking up to the group and asking if she can join them, confirm social attention as a positive reinforcer.

In order to effectively administer reinforcers during interventions for individuals with ASD, interventionists must be able to identify stimuli that are likely to function as reinforcers. The most common procedure for identifying likely reinforcers for children with ASD is a preference assessment. Researchers and practitioners may conduct preference assessments by: (a) observing the student in natural settings and recording activities, objects, food, and social interactions evoking a positive response (e.g., smile, laugh), (b) asking the student what he or she

likes, (c) asking the student's parents and/or other teachers and service providers what activities and items they have observed the student to select or gravitate toward, and (d) repeatedly presenting the student with either a single, pair, or group of potential reinforcers and observing and recording the items he or she chooses (Fisher et al., 1992; Hagopian, Wilson, & Wilder, 2001; DeLeon & Iwata, 1996).

Conducting preference assessments to determine actual reinforcers is more efficient than using presumed reinforcers. This is because presumed reinforcers such as verbal praise that are effective for most children, may not be effective for those with ASD. Implementing an otherwise effective intervention using presumed reinforcers such as verbal praise as the only arranged consequence for students with ASD, may increase the likelihood of treatment failures (Pitts & Dymond, 2012; Zuluaga & Normand, 2008). Conducting preference assessments prior to implementing an intervention allows for programming of highly preferred stimuli, thereby strengthening an intervention's potential.

Another common intervention in ABA is the use of prompts and prompt fading to increase accurate responding, which connects the behavior to reinforcing stimuli. Frequently evaluated as a component of a treatment package or focused intervention (Otero, Schatz, Merrill, & Bellini, 2015), prompts are antecedent stimuli used to occasion a specific behavior so that it may contact reinforcement and be strengthened (Krantz & McClannahan, 1998). For instance, if a student with ASD passes a friend from her swim team in the hallway, but does not greet her, a teacher could mouth the word "hi" and smile or wave. The teacher's "hints" or cues are referred to as prompts and may increase the chances that the student with ASD will greet her friend before she walks away, providing an opportunity for contact with the naturally occurring reinforcer of talking to a friend (Newman, Reeve, Reeve, & Ryan, 2003). If the prompt is

successful and contacting a social response from a peer is reinforcing for the student, the likelihood of independent future instances of social interaction will be increased. Based on the student's behavior and program goals, the extra stimuli (i.e., prompts) introduced by the practitioner or researcher must be gradually and systematically reduced so the student learns to perform the behavior independently (Cooper et al., 2007; Newman et al., 2003). This is referred to as prompt fading and has been shown to accelerate the learning process (Libby, Weiss, Bancroft, & Ahearn, 2008). A prompt fading protocol may be used in combination with positive reinforcement to occasion a correct response in the presence of a discriminative stimulus that eventually controls the targeted behaviors.

Mediating Social Interaction

Environment plays an important role in promoting social interaction for adolescents with ASD. Adaptations to the learning environment can be made by teachers and other service providers to encourage social interaction. Selecting collaborative activities and providing access to socially competent peers are ways to increase the chances that social interactions will occur (Odom et al., 1997). Years of research on the impact of interactions between typical adolescents and youth with ASD has resulted in the evidence-based practice known as peer mediated intervention (PMI; Wong et al., 2015). PMI has the potential to benefit all parties involved in its implementation (Carter et al., 2008).

Peer Mediated Intervention for Adolescents with ASD

In PMI typical peers are taught to interact as friends to their peers with ASD (DiSalvo & Oswald, 2002). Opportunities for interaction between typical peers and youth with ASD have been shown to expand social networks and promote self-confidence. Youth with ASD participating in PMI have also shown gains in their awareness of and sensitivity to others (Carter,

Cushing, & Kennedy, 2008). Frequent and explicit social skills instruction is often required for students with ASD. Training typical peers to promote social interaction via PMI allows for the provision of explicit instruction in social interaction embedded throughout the school day, simultaneously preserving the integrity of academic instruction for students with and without ASD (Plavnick & MacFarland, 2014). Participation in PMI has been shown to increase social competence for youth with ASD via opportunities to interact with typical peers across a variety of environments (Sperry, Neitzel, & Engelhardt-Wells, 2010). Additionally, these features of PMI have been shown to promote generalization of social interaction for youth with ASD, an outcome that is not always demonstrated within the extant literature (Bellini, Peters, Benner, & Hopf, 2007; Hughes et al., 2012).

Peer Mediated Intervention for Typical Adolescents

For typical adolescents, participation in a PMI has been associated with greater acceptance of peers with disabilities, enhanced self-esteem, and an increased appreciation of diversity. Improved academic performance and consideration of future careers in special education have also resulted from typical adolescent participation in a PMI (Carter et al., 2014; Copeland et al., 2004; Hughes et al., 2001). Serving as a peer within a PMI may provide typical adolescents with an increased schedule of behavior-specific praise and feedback from adults, potentially contributing to increased engagement and learning (Carter & Kennedy, 2006). Typical adolescent engagement and learning may also be impacted by the responsibility of facilitating participation, conveying accurate information, and promoting social interaction for their peers with ASD. For example, it is possible that the act of explaining academic content or a new activity to a peer with ASD, may also support the typical adolescent's learning. Further, youth without disabilities participating in a PMI have reported socio-emotional growth including

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increased appreciation and expectations of their peers with disabilities, the formation of new friendships, and an enhanced sense of accomplishment (Copeland et al., 2004; Hughes et al., 2001).

Barriers to Implementation of PMI

Despite the benefits, some barriers to implementation of PMI exist. Most notably, the amount of time that a teacher has available for social skill instruction is typically low when compared to the amount of time required for academic instruction. The provision of PMI requires careful training, often including a combination of didactic instruction (i.e., PowerPoint and lecture), question and answer, in-vivo modeling and role-playing (Hughes & Carter, 2008). Preparing peers for participation in a PMI at the secondary level requires additional consideration, as social interactions become more complex and difficult to navigate (Carter & Kennedy, 2006). In addition to increased complexity of social interactions in secondary settings, there is also increased autonomy. Peers may take on greater responsibility for facilitating social interaction, resulting in additional training considerations. For example, peers may require basic emergency training, in the event that an adult is not readily available (Carter et al., 2008). Confidentiality and sensitive scenarios relating to the transition to puberty for adolescents with ASD are additional areas of consideration (Dubie, 2005). As such, the time and preparation required to teach typical adolescents to effectively participate in a PMI may hinder its implementation (Plavnick & MacFarland, 2014).

Video Modeling Training

Video modeling involves the display of a video depicting a target behavior and the opportunity for the learner to perform the targeted behavior following the video (Charlop-Christy, Le & Freeman, 2000). Video modeling has been used to train service providers to

implement several different types of interventions for children with ASD including preference assessments (Bishop & Kenzer, 2012; Lavie & Sturmey, 2002; Lipschultz, Vladescu, Reeve, Reeve, & Dipsey, 2015), functional analysis (Moore and Fisher, 2007), problem-solving interventions (Collins et al., 2009), and discrete-trial instruction (Catania, Almeida, Liu-Constant, & Reed, 2009; DiGennaro-Reed, Codding, Catania, & Maguire, 2010; DiGennaro, Martens, & Kleinmann, 2007; DiGennaro, Martens, & McIntyre, 2005; Vladescu, Carroll, Paden, & Kodak, 2012). Table 1.1 provides a representation of the extant literature on video modeling training.

Table 1.1

A Representation of the Extant Literature on Video Modeling Training (VMT).

	Adult Service Providers	Generalization (Empirical Measurement)	Behavioral Practices	Typical Adolescents	Social Validity (Subjective Measurement)	Social Validity (Objective Measurement)
Brock & Carter (2013)	✓	✓	✓		✓	
Catania et al. (2009)	✓	✓	✓			
Digennaro-Reed et al. (2010)	✓		✓		✓	
Lipschultz et al. (2015)	✓	✓	✓		✓	
Moore & Fisher (2007)	✓	✓	✓			
Vladescu et al. (2012)	✓	✓	✓			✓
Weldy, Rapp & Capocasa (2014)	✓		✓			
Present study		✓	✓	✓	✓	✓

Although not previously applied to adolescents as part of a PMI for individuals with ASD, video modeling could lead to improved implementation while also reducing demands on educators to prepare peers to deliver the interventions. Considering the limited resources potentially available within public school districts and centers for individuals with ASD, it may be advantageous to utilize training strategies that require reduced teacher or therapist presence, with additional potential reductions in overall training time.

Purpose of the Study

The following investigation examined the use of video modeling to train typical adolescents to use simplified behavioral practices with adolescents and young adults with ASD. The specific purpose of the current investigation was to evaluate the use of video modeling on typical adolescents' implementation of peer mediated social interaction (PMSI), a 10-step procedure comprised of three simplified behavioral practices. PMSI was initially performed with an adult actor. This allowed participants to roleplay and practice in a low-pressure environment. It also helped to expose participants to a range of responses that they might encounter when performing PMSI with an adolescent with ASD. PMSI consisted of three simplified behavioral practices based on preference assessment, prompting, and reinforcement. For use in the present investigation the simplified behavioral practices were termed: (a) choice, (b) redirection, and (c) promoting social interaction. An additional purpose was to evaluate generalization of procedures to interactions with an adolescent with ASD. Finally, the present investigation examined social interaction between typical adolescents and two youths with ASD prior to and following administration of video modeling training.

CHAPTER 2

LITERATURE

REVIEW

Pronounced deficits in social interaction are a central feature of ASD (Carter et al., 2005). Beginning with Kanner's (1943) original description of individuals with ASD as unable to form close attachments to others, struggling with typical changes in routine or environment, and possessing characteristics such as repetitive behaviors and perseveration, social deficits have been a core characteristic of the disorder (Rutter, 1974, 1978, 1979). Recent researchers have more carefully described specific social deficits including difficulties responding to multiple environmental cues, taking another person's perspective, social initiations and responses (Cervantes, 2013; Charlop-Christy and Daneshvar, 2003; Whalen, Schreibman, & Ingersoll, 2006; Weiss, 2001).

Although there are many treatments for individuals with ASD, those with the strongest empirical base are associated with ABA principles (Rosenwasser and Axelrod, 2001; Smith, 1999). In a recent extension of an earlier evidence-based practice review (Odom et al., 2010), 27 evidence-based practices were identified for youth with ASD (Wong et al., 2015). Wong and colleagues (2015) found all 27 evidence-based practices to consist of:

> fundamental applied behavior analysis techniques (e.g., reinforcement, extinction, prompting), assessment and analytic techniques that are the basis for intervention (e.g., functional behavior assessment, task analysis), and combinations of primarily behavioral practices used in a routine and systematic way that fit together as a replicable procedure (p. 1957).

Evidence suggesting that ABA is beneficial to the intellectual, verbal and social functioning of individuals with ASD has been increasing steadily over the past four decades (Cooper et al., 2007; Fenske, Zalenski, Krantz, and McClannahan, 1985; Foxx, 2008; Lovaas, 1987; Odom et al., 2010; Remington et al., 2007; Wong et al., 2015). ABA has been shown to be extremely effective in building skills such as social initiations and responses, which are essential for successful social interaction (National Research Council [NRC], 2001; NSR; New York State Department of Health, 1999).

Applied Behavior Analysis Practices for Individuals with ASD

Behaviors are not learned when they are followed by non-motivating reinforcers (Michael, 2004). Due to potentially weak connectivity in brain systems relating to human voice perception, the sounds of parent's and primary caregiver's voices may not become a reinforcing stimulus for individuals with ASD as they do for typical infants (Abrams et al., 2013, Chevallier et al., 2012). In typical development, the repeated pairing of a caregiver's singing and talking with feeding and comforting may serve to condition the sounds of the caregiver's voice as a reinforcer for the infant (Cooper et al., 2007). Children with ASD may not attend to parent voices during these early caregiving experiences (Cooper et al., 2007), potentially preventing vocal sounds of parents and caretakers from becoming conditioned reinforcers. This may result in reduced exploratory vocal behavior for the infant with ASD, which can have pervasive and long term adverse effects on neurological development and functioning pertaining to social interaction (Abrams et al., 2013, Chevallier et al., 2012).

Positive Reinforcement

Since the first published account of an ABA intervention (Ayllon & Michael, 1959), positive reinforcement has been a core component of numerous procedures based on the science

of behavior analysis. The use of positive reinforcement to improve socially important behaviors for individuals with ASD was advanced throughout the 1960s, 1970s, and 1980s (Eason, White & Newsome, 1982; Favell, McGinsey & Jones, 1978; Hall, Lund & Jackson, 1968). Research focusing on social skills for individuals with ASD increased in the 1990s and beyond, as evidenced in Thorp and colleagues' (1995) examination of the effects of teaching social play combined with positive reinforcement, on social behavior. Positive reinforcement for attempts of correct responding within pivotal response training were used to promote social play for three preschool aged boys with ASD. Pivotal response training is a naturalistic behavioral tactic designed to increase motivation and the probability of novel play with the use of multiple exemplars and reinforcement following correct responses. Study results demonstrated an increase in the percentage of time engaged in the targeted social behavior for all three participants and maintained over a three-month period following treatment (Thorp et al., 1995).

McDonald and Hemmes (2003) analyzed the level of spontaneous social initiating by three adult caregivers during a program designed to increase social initiations for an 18-year-old male with ASD. The participant's social initiations toward each adult were systematically reinforced in two daily sessions. In baseline and training sessions prompts, token reinforcers, and verbal praise were administered. Only verbal praise was administered during probe sessions. Social initiations for the participant increased during baseline and training sessions, when spontaneous initiations from the adult caregivers also increased.

Gonzalez-Lopez and Kamps (1997) analyzed the effects of social skills training with and without reinforcement, on social behavior. Sixteen students ages 5 – 8 (i.e., four students with ASD and 12 typical students) participated in this study. Both the students with ASD and typical students received instruction in social skills such as greetings, sharing and taking turns. Typical

students received additional training on disabilities and basic behavioral management procedures. Reinforcement was delivered via verbal praise and a token system of stars and sticker cards to promote increased social interaction. Social skills instruction with and without reinforcement were immediately followed by free play for all students, where social interaction was monitored. Results showed social interaction with reinforcement to be most effective in promoting increased duration and frequency of social interaction with typical students for the participants with ASD. Some instances of problem behavior such as aggression, prompted the researchers to suggest future use of an additional reinforcement system for appropriate behavior. Another consideration is the possibility that verbal praise and stickers were not strong reinforcers for the students demonstrating problem behaviors. This speaks to the importance of identifying stimuli or activities that are most likely to function as reinforcers when teaching individuals with ASD.

Preference Assessment

A common approach to individualization in ABA is the use of preference assessment procedures to determine stimuli and activities that are likely to be reinforcing (Newman et al., 2011). This is especially critical for the success of interventions for individuals with ASD, who often have unique strengths, needs, likes and dislikes (American Psychological Association, 2013). Social praise is frequently used as a reinforcer by teachers and other service providers in school settings. However, some students with ASD will not find social praise motivating and will require individualized types of reinforcers. In order to effectively deliver positive reinforcement, reinforcers must first be determined. When described by their physical properties, reinforcers are typically classified as edible, sensory, tangible, activity, or social, as shown with examples in Table 2.1.

Table 2.1

Classification of Reinforcers with Examples.

Reinforcer Classifications	Examples
Edible Reinforcers	Bites of: preferred foods, snacks, candy
	Sips of: beverages
Sensory Reinforcers	Vibration: electronic massager
	Tactile: working with clay, koosh ball, Velcro
	Visual: sparkling lights, colors
	Auditory: music
Activity Reinforcers	Everyday Activities: playing a card or board game, leisure reading, listening to music
	Privileges: free time on computer or iPad ®, lunch with teacher, shooting baskets in gym, line leader
	Special Events: a trip to the cider mill, bowling or other preferred special day trip
Social Reinforcers	Physical Contact: high five, fist bump
	Proximity: approaching, standing, or sitting near a person
	Adult Attention: positive comments, interaction
	Peer Attention: interaction, shared engagement in preferred activities, positive comments

Extensive research has demonstrated the effectiveness of preference assessments to identify reinforcers for individuals with disabilities (Carr, Nicholson, & Higbee, 2000; Kennedy & Haring, 1993; Logan & Gast, 2001; Roane, Vollmer, Ringdahl, & Marcus, 1998). There are numerous types of preference assessments, thus thoughtful consideration is required to maximize their effective use within the ABA assessment and treatment process. Several preference assessment procedures are described below, followed by a discussion of the most appropriate type for adolescents to administer with peers with ASD.

Trial-based preference assessment. Trial-based preference assessments allow adult service providers to determine a preference hierarchy for a learner (Cooper et al., 2007). Stimuli such as preferred items or activities are presented to the learner in a series of trials. The service provider records whether or not the participant approaches a stimulus (Hagopian, Wilson, & Wilder, 2001). The learner's responses indicate which items are the learner's highly-preferred, moderately-preferred, and low-preferred items. This hierarchy is based on measures of approach, contact and engagement with the stimuli, within a trial-based preference assessment (DeLeon & Iwata; 1996).

     Free-operant preference assessment. In addition to trial-based preference assessments, free-operant preference assessments can be used to determine what stimuli are likely to serve as reinforcers within a given intervention. Observation and measurement of participant choice and duration of engagement during periods of unrestricted access to various activities is known as free operant observation (Cooper et al., 2007). Thorp and colleagues' (1995) demonstrate the free-operant preference assessment procedure in their use of positive reinforcement within a comprehensive intervention, promoting novel play in preschool children. The presentation of individual toys was based on and varied according to participant interest. This is a type of stimulus preference assessment referred to as contrived free operant observation and is conducted in settings within the student's everyday environment such as the classroom or school gym. In contrived free-operant observation, potentially reinforcing items are "planted" throughout the natural environment to determine if and to what extent the student engages with the activities and materials. The total duration of time in which the student engages with each stimulus item or activity is then recorded (Cooper et al., 2007). A contrived free-operant procedure would likely result in a more natural administration by typical peers for adolescents

and young adults with ASD when compared to a highly contrived, discrete trial type of procedure.

Koegel, Dyer, and Bell (1987) investigated the effects of engagement in child-preferred activities versus those arbitrarily chosen by an adult on social avoidance behavior for children with ASD and co-existing intellectual disability. Preference assessments were conducted each day for four male and six female participants ranging in age from 4 to 13 years. Activities maintained by the participants for more than 15s were defined as *child-preferred activities*. Study results demonstrated that initiations of *child-preferred activities* could be prompted within the intervention setting, with reductions of social avoidance behaviors generalizing to community settings without prompts. Such findings suggest that youth with ASD are more likely to engage in social scenarios if preferred items or activities are included. Thus, the use of preference assessment in combination with positive reinforcement by typical adolescents within a PMI may strengthen the chances of increased social interaction for adolescents and young adults with ASD.

Prompting

Another often-used component of behavioral interventions are response prompts, which bring the behavior of interest into contact with reinforcers in the environment (Billingsley, 2003). Thirty-three prompting studies were identified by Wong et al. (2015) in their systemic evaluative review of the literature. Prompts are an extraneous antecedent stimulus that increase the likelihood of the desired response, thereby allowing interventionists to assist individuals with disabilities in accurately performing various responses. Prior to or as one attempts to perform a response, the interventionist may provide verbal, gestural, or physical assistance to ensure the correct response occurs.

Least-to-most prompting. Libby and colleagues (2008) analyzed prompting within participant performance of Lego® construction tasks. The goal was to increase appropriate play skills for five male participants with ASD, aged 9 to 15. Three of the five participants learned more quickly using least-to-most prompting. Least-to-most prompting is a fading method designed to promote accurate responding in the presence of natural stimuli. In order to encourage independent responding, interventionists must eventually fade supplemental prompts. Least-to-most prompting is designed to provide students the chance to perform a new skill with the least amount of assistance per opportunity (Cooper et al., 2007). Not only does it promote rapid acquisition, particularly when targeted skills may already be in a learner's repertoire, it is also one of the more natural, least invasive, and simpler prompt fading methods to perform.

Least-to-most prompting may be performed by: a) setting a consistent time limit between stimulus presentation and participant response, b) adhering to a pre-determined response prompt hierarchy, which involves c) providing prompts with greater degrees of assistance in successive trials where a correct response is not demonstrated (McClannahan & Krantz, 2005). During a least-to-most administration the student is required to perform the target behavior within a set time limit (e.g., 5 seconds) during each opportunity or trial. If the target behavior is not demonstrated independently within the specified time the teacher will contrive another trial, this time accompanied by a prompt of least assistance such as a partial verbal prompt or model. As an illustration, saying part of a targeted phrase or sentence, "Nee . . ." for "Need pencil.". If after another 5 seconds the student does not demonstrate the target behavior, the teacher will contrive another trial and deliver another prompt, such as the half verbal model. For example, expanding the preceding phrase by saying, "Need p . . .". The full verbal model, such as saying "Need pencil", is provided to the student if the lesser prompts do not evoke the target behavior. Least-

to-most prompting strategies could be taught to typical peers for use within a peer mediated

intervention, based on the learning history of their peers with ASD.

Peer Mediated Intervention

Social interactions between children with autism and typically developing peers are

unlikely without systematic and planned social interventions, even when students are placed

together in inclusive settings (Brown & Odom, 1995; Guralnick, 1999; Hundert & Houghton,

1992; Kohler & Strain, 1999). Peer mediated intervention (PMI) is an evidence-based practice

emphasizing the involvement of typical peer confederates to teach social interaction to learners

with ASD. In PMI, typically developing peers assume the role of primary instructional

interventionist and are systematically taught methods of engaging their counterparts with ASD in

positive and extended social interactions (Carter & Kennedy, 2006). Peer interactions may be

teacher-directed or peer-initiated (English, Goldstein, Shafer, & Kaczmarek,1997; Odom et al.,

1999; Strain & Odom, 1986; Zhang & Wheeler, 2011). Typical peers may be trained to provide

reinforcement and prompting as part of a PMI, preventing the learner with ASD from becoming

dependent solely on the teacher and other adult service providers (Carter et al., 2014). Accessing

the more natural support of a typical peer promotes independent performance of targeted

behaviors for the student with ASD. Higher quality social interactions, increased social

initiations and friendships among individuals with ASD and their typically developing peers

have all been associated with the use of PMI (Carter et al., 2014). Additionally, the creative

structure of PMI including ongoing classroom, extracurricular and community–based activities,

allows students with ASD to learn and practice social skills in context, a tactic recommended for

enhancing generalization (Bellini et al., 2007; Cooper et al., 2007; Stokes & Baer, 1977).

PMI has a long history of demonstrating improved social interactions for students with and without disabilities. Landmark research in PMI demonstrated improved social behaviors for young children with ASD when social skills were taught by typically developing peers (Strain, Kerr, and Ragland, 1979; Strain, Shores and Kerr, 1976; Strain, Shores, and Timm, 1977). This led to frequent use of PMI for enhancing the social skills of preschool children (Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Odom & Strain, 1986; Sainato, Goldstein, & Strain, 1992). Goldstein et al. (1992) evaluated the effects of PMI on the social interaction of five triads totaling 15 children (i.e., aged 2 – 6) with ASD and their typical peers. The researchers sought to determine whether typical peers could be taught to use mutual attention, commenting, and acknowledging to promote social interaction with their peers with ASD. Prompting and reinforcement were used to train the identified strategies to typical peers for use with their peers with ASD. Following implementation of the PMI, improved social interaction between typical peers and four of the five participants with ASD was clearly demonstrated.

Shafer, Egel, and Neef (1984) examined the effects of a peer-training strategy comprised of two behavioral practices, prompting and in-vivo modeling. In a multiple baseline design across four children (i.e., aged 5 – 6) with ASD, peer training produced immediate and notable increases in the occurrence and duration of social interactions between the students with ASD and the typical peer-trainers, with above baseline maintenance of these increases. Further, the use of in-vivo modeling demonstrates its effectiveness in teaching 5 to 6-year-olds to imitate the modeled social interactions, eventually transferring performance of the skill to actual students with ASD.

At the secondary level, Hughes and colleagues (2000; 2011) used PMI to investigate the effects of incorporating typical adolescents into social skills instructional programs with a goal

of increasing social interaction skills of high school students with ASD. This was accomplished through communication book use (i.e., 3-hole punched binder containing laminated pages with text and Picture Communication Symbols [Mayer-Johnson, 2008] depicting socially appropriate conversation starters such as "What class do you have next?" or "What kind of music do you like?", combined with opportunities to interact with typical adolescents (Hughes et al., 2000; 2011). Typical adolescent peers were the sole trainers during the instructional phase of both studies (Hughes et al., 2000; 2011), resulting in increased, self-prompted conversational initiations to a variety of general education partners. The second study (Hughes et al., 2011) expanded the role of peers during generalization sessions, promoting engagement in reciprocal social interactions, representative of typical high school student conversations. Participants displayed generalization of social skills across school settings.

Hughes and colleagues (2002) used a multiple-baseline design across five high school students with either intellectual disabilities or ASD, to analyze the effects of delivering a verbal directive to typical adolescents to interact with a participant "as a friend" while engaged in various leisure activities. The researchers approached typical adolescents who were in proximity to the participants, sharing that the participants had limited opportunities to interact with classmates, and delivered the verbal directive. Results showed increases in social interaction and participants' communication behaviors, improved observer ratings of overall interaction quality, and greater variety of conversational topics discussed. In spite of such demonstrations of effective social skills instruction by typical peers for youth with ASD, widespread implementation of PMI is not observed in practical settings (Hughes et al., 2012). Perhaps one reason involves the challenges of training typical peers to participate in a PMI. Training and implementation of a PMI program requires careful and comprehensive instruction, with a

substantial time investment from teachers and other adult service providers (Carter, Cushing & Kennedy, 2008; Carter & Kennedy, 2006; Hughes & Carter, 2008; Plavnick & MacFarland, 2014).

Haring and Breen (1992) analyzed the frequency, appropriateness, and opportunities for social interaction for two 13-year-old middle school students (i.e., one with autism and one with intellectual disability) following implementation of a peer-mediated social network. The comprehensive PMI package consisted of recruitment of typical adolescent peers, weekly feedback and planning meetings with adult facilitation, scheduling of interactions, peer data collection of social interaction, adult feedback on peer performance, peer reinforcement of participant social behavior and social skill training for participants. Following introduction of the intervention package, frequency of social interaction increased substantially for both participants. However, such an intervention package likely requires a substantial amount of preparation, training and implementation time. This may be prohibitive from the perspective of service providers for whom time may be limited.

Video Modeling in Service Provider Training

Video modeling is a procedure with recent research showing its efficacy for teaching service providers to implement behavioral strategies. Research has shown that using video modeling within a training package may decrease training time, but also contributes to increased fidelity of implementation and generalization of trained skills (Moore & Fisher, 2007; Vladescu et al, 2012). To date, several studies have examined video modeling for training service providers such as teachers, paraeducators, and behavioral therapists (Brock & Carter, 2013; Catania et al., 2009; Digennaro-Reed et al., 2010; Lipschultz et al., 2015; Moore & Fisher, 2007; Vladescu et al., 2012; Weldy, Rapp, & Capocasa, 2014).

Brock and Carter (2013) trained 25 paraeducators to implement constant time delay to fade prompts. A replicable training package called Video Modeling Plus Abbreviated Coaching (VMPAC) was used in this small randomized control trial. VMPAC utilized technology to provide low-cost training via video modeling and an hour of one-to-one consultation (Brock & Carter, 2013). The initial VMPAC training included a description and demonstration of constant time delay and opportunities to practice via role play. In the video modeling component, practitioners compared their own performance to a variety of video exemplars. The final component of the VMPAC training involved planning for implementation with an actual target student and expert performance feedback in the natural school setting. Results indicated accurate implementation of constant time delay and superior fidelity of implementation when compared to paraeducators receiving stand-alone training.

Catania and colleagues (2009) used video modeling with voiceover to train target skills needed to conduct discrete-trial instruction. An immediate increase in accuracy was observed during video modeling with voice over training of discrete-trial instruction for three new direct-service staff. High levels of performance continued throughout maintenance and generalization probes.

Vladescu et al. (2012) replicated and extended the work of Catania et al. (2009), evaluating the effects of video modeling with voiceover instruction to teach discrete-trial instruction to three staff trainees. The training videos provided models of each discrete-trial instruction component and simulations of a 12-trial discrete-trial instruction session. The primary investigator was depicted as the teacher and another researcher as the child confederate. Once trainees reached mastery criterion with an adult simulated consumer, henceforth referred to as actor, they then taught children with developmental disabilities. Implementation accuracy for

discrete-trial instruction remained high and child participants acquired new skills, suggesting the potential effectiveness of video modeling as a training method for service providers.

Most recently Lipschultz and colleagues (2015) evaluated video modeling with voiceover instruction, analyzing its effects on staff trainees' implementation of three stimulus preference assessments. The researchers aimed to reduce reliance on the presence of a staff trainer via the use of video modeling. Results indicated successful implementation of the three preference assessments by all four trainees. In addition, responding was generalized and performance was maintained for one week following training. Although a trainer was needed to assess adequate performance of the trainees and to re-administer the training video if performance continued below mastery criterion, such overall reduction in live training may remove a potential barrier to effective PMI training.

Statement of Problem

PMI has shown promise as an effective social skills intervention for adolescents (Carter, Cushing, & Kennedy, 2008). However, preparing typical adolescents for participation in a PMI requires careful and comprehensive instruction, a substantial time commitment and specific expertise that service providers may not possess (Brock & Carter, 2013; Hughes & Carter, 2008). Reductions in the amount of time and preparation required to teach typical adolescents to effectively participate in a PMI may remove barriers to its implementation (Plavnick & MacFarland, 2014). Video modeling training (VMT) may serve to reduce some of these barriers.

Research Questions

1. To what extent does VMT improve typical adolescents' implementation of simplified behavioral practices with an actor (i.e., adult model serving as a student with ASD)?

2. To what extent does VMT promote stimulus generalization of the trained behavioral practices from an actor to an adolescent with ASD?

3. Is there a difference in the percentage of intervals in which social interaction occurs between two youths with ASD and the typical adolescent participants, before and after VMT?

CHAPTER 3

METHOD

The present chapter includes a description of the methodology used to answer research questions 1 – 3 identified in Chapter 2. Each of the following components is described in detail: (a) participants, (b) researcher and observers, (c) settings within the autism center, (d) materials, (e) dependent measures and recording, (f) experimental design and procedures, (g) interobserver agreement and procedural integrity, and (h) social validity.

Participants

Typical adolescents. Five typical adolescents, four males and one female between the ages of 17 and 19 participated in this study. To participate in this study typical adolescents: (a) were enrolled in high school or college, (b) were actively serving as volunteers within the ASD center, (c) had no more than three absences from the peer hangout sessions at the ASD center over the previous three months, and (d) provided assent and parental consent. Typical adolescents received peer training prior to participating in this study as part of participating in the peer hangout at the ASD center. During peer training, typical adolescents learned about ASD (e.g., sensory, communication, organizational, and behavioral needs of a person with ASD), in addition to areas of interest and challenge unique to the teens in the peer hangout at the ASD center. Specifically, peer training consisted of 2 hr of didactic instruction (i.e., lecture) combined with question and answer, modeling, and role-play covering the following topics: (a) ASD, (b) characteristics of ASD, and (c) confidentiality. The accurate delivery of trained skills was not measured, nor were any other data collected for typical adolescents within peer training.

Adolescents with ASD. Four male youths with ASD, ages 17 to 19, participated in the generalization sessions. Two additional male youths with ASD, ages 17 and 20, participated in

the social validation measurement sessions. To participate in this study, youth with ASD: (a) had a previous diagnosis of ASD determined by a school team evaluation, (b) were enrolled in high school or a post-secondary academic program, (c) were actively enrolled in a peer mediated class (i.e. peer hangout) within the ASD center, (d) had no more than three absences from the peer hangout at the ASD center over the previous three months, and (e) provided assent and parental consent.

All participants were recruited from an ASD center. Legal guardians of all participants completed human subjects informed consent procedures as required by the University Institutional Review Board. Table 3.1 displays the participants with ASD in the generalization and social validation sessions.

Table 3.1

Participants with ASD in the Generalization and Social Validation Sessions.

Name	Session Type	Age	Gender	Diagnosis
Jarrod	Generalization	17	Male	ASD
Dave	Generalization	18	Male	ASD
John	Generalization	19	Male	ASD
Chris	Generalization	17	Male	ASD
James	Social Validation	17	Male	ASD
Joe	Social Validation	20	Male	ASD

ASD Center Settings

Participants were recruited from one local ASD center located in a Midwestern suburb. The ASD center provided art, social skills, speech, music, and applied behavior analysis

therapy for adolescents and young adults with autism and co-existing disabilities such as anxiety and attention deficit disorder. 200 clients attended the center, which was open six days per week. PMI programs had been established for at least one year prior to implementation of the current study. 20 typical adolescents attended PMI, music therapy, art therapy, and other sessions at the center at least two out of the six days that the center was open. The socio-economic level of the community where the ASD center was located was primarily middle, to upper-middle class, with a predominantly White population, that included some clients of Black, Arabic, and Asian descent. The researcher approached the Director of the autism center who granted approval for the study to be conducted and confirmed that adolescents who met inclusion criteria were participating in their peer hangout sessions.

Two rooms were used for implementation at the ASD center. The main room was 20 m x 24 m with windows lining the outer wall. Casual seating areas with various chairs, couches and tables were situated throughout the main room. The researcher, Director of the ASD center, typical adolescents, and students with ASD were the only individuals in the main room during measurements of social validity. The music room was 8 m x 10 m and typically used by the Director and other staff to conduct therapy sessions. The researcher sat on a chair at a table in the music room and one participant sat on another chair, facing the researcher. In both rooms an iPad Mini® was placed on a table and positioned to capture the participants and researcher on video. The researcher and one of the five typical adolescents were the only ones present during baseline and training sessions. The researcher, one of the five typical adolescents and one adolescent with ASD were the only ones present during generalization sessions.

Researcher & Observers

The researcher was a doctoral candidate in Special Education at Michigan State University, serving in her first year as an Assistant Professor in the Special Education Department of the College of Education at Saginaw Valley State University. She had previously completed a research apprenticeship evaluating the effects of video-based group instruction combined with a peer mediated intervention on generalization of social skills for adolescents with ASD and intellectual disability. During the apprenticeship, the researcher served as a project manager for a 2-year development study examining the use of video-based group instruction for adolescents with ASD within the high school setting. She has also been involved in researching video modeling to teach communication to pre-K children with ASD. Prior to her doctoral studies, the researcher served two Detroit-area districts as a special education teacher, curriculum coach and assistant school leader.

The researcher served as the primary observer. A special education teacher employed at the ASD center served as the secondary observer. The researcher trained the secondary observer to code events for the current study. This training included: (a) PowerPoint presentation outlining relevant details of the proposed investigation, (b) description of the target behaviors, (c) description of the steps required for accurate implementation of sessions, (d) video samples of adolescents with autism participating in social skills interventions with typical peers within a peer mediated intervention, (e) video samples of the researcher facilitating social skills interventions with typical peers and youth with ASD, and (f) coding practice sessions using videos with target behaviors and implementation procedures similar to those in the current investigation. Prior to scoring behavior for the current investigation, the secondary observer demonstrated 90% agreement with the researcher on data collected from the video samples used

in training, during three consecutive 5-min scoring sessions. Agreement was scored by dividing the number of agreements by the sum of agreements plus disagreements and multiplying by 100 to obtain a percentage.

Materials

An iPad Mini® was used to film, store, and display video clips during all sessions. A variety of putative reinforcers (e.g., markers, drawing paper, Jenga®, UNO®) for the youth with ASD in this study were used when typical adolescents offered a choice of two activities during all sessions. Pens, clipboards and data sheets (created by the researcher for this study) were used to record data (see Appendices C, D, and J).

Training videos. The researcher created four training videos demonstrating accurate performance of the peer mediated social interaction (PMSI) procedures. Young adults depicted both a typical adolescent and an individual receiving the intervention in all four training videos. Three models, ages 19 to 21 and experienced in working with individuals with disabilities, were recruited to create the videos. Video creation required one 2 hr session. All PMSI training videos modeled the procedural steps as they would be performed to promote social interaction in a peer mediated setting (see Appendices A, F, and G). Unlike previous VMT studies (Lipschultz et al., 2015; Vladescu et al., 2012), the videos in the present study did not include voiceover for purposes of clarification and saliency. Programmed fails in the present study were a range of potentially problematic responses that an individual with ASD might demonstrate during a social interaction. One of four programmed fails was systematically built into each baseline session via the use of four scripts that the actor followed (see Appendix D for data sheet with embedded systematic rotation chart and Appendix F for probe session actor scripts). This was done to expose the typical adolescents to a range of

potential behaviors that might be exhibited by individuals with ASD. Programmed fails were

also depicted within each training video as shown with examples in Table 3.2.

Table 3.2

Examples of Programmed Fails Depicted within Training Videos for Peer Mediated Social Interaction (PMSI).

Training Video	Programmed Fail
PMSI 1	When offered a choice of two potentially reinforcing activities by the typical adolescent, the adolescent with ASD will not choose an activity. He/she may look elsewhere and is not currently engaged or oriented toward choosing an activity.
PMSI 2	After selecting a potentially reinforcing activity offered by the typical adolescent, the teen with ASD walks 1-2 steps away from the typical adolescent.
PMSI 3	When offered a choice of two potentially reinforcing activities by the typical teen, the adolescent with ASD will say an off-topic comment.
PMSI 4	After selecting a potentially reinforcing activity offered by the typical adolescent, the teen with ASD begins using the activity materials differently than the typical adolescent (e.g., laying Jenga® sticks on a flat surface, parallel to one another), in a manner incompatible with interactive play.

Dependent Measures and Recording

Data for each session were collected in vivo using data sheets created by the researcher

for this study (see Appendices C and D). The dependent variable was the percentage of steps

performed correctly by the typical adolescent for the PMSI procedure as displayed in Table 3.3.

PMSI was a ten-step procedure comprised of simplified behavioral tactics effective in promoting

social interaction for individuals with autism (Neitzel, 2009; Neitzel & Wolery, 2009; Wong et

al., 2015). Each step in the PMSI procedure was scored as correct or incorrect, similar to

previous research (Lipschultz et al., 2015; Weldy et al., 2014). An accuracy percentage for each

session was calculated by dividing the number of steps delivered correctly by the total number of

steps and multiplying that product by 100. Mastery criterion was met when a typical adolescent

performed all steps for PMSI at 90% accuracy during two consecutive VMT sessions.

Table 3.3

Definitions for Each Step in the Peer Mediated Social Interaction (PMSI) Procedure.

Step	Definition
1. Offer choice	The typical adolescent will select two potential reinforcers provided by the researcher. The typical adolescent should face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"
2. Wait 5s for the learner to respond	The typical adolescent should allow the adolescent with ASD up to 5s ($\pm$ 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity (see Appendix E for detailed definitions of choosing and engaging).
3. Provide access to chosen activity or item	The typical adolescent should provide immediate access if the adolescent with ASD chooses an activity.
4. Wait 5s for the learner to respond	The typical adolescent should allow the adolescent with ASD up to 5s ($\pm$ 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity (see Appendix E for detailed definition of choosing and engaging).
5. Pair social attention with chosen activity	After providing immediate access to the chosen item, the typical adolescent should smile and make positive statements to the adolescent with ASD (e.g., "Cool, this is going to be fun!", "Jenga® is one of my favorite games!", "I heard you're really good at this!" or something similar) as he/she begins participating in the chosen activity.
6. Interrupt anti-social or non-responses	If the adolescent with ASD's response to the offer of choice is anti-social, for example he/she does not respond or makes an off-topic comment the typical adolescent should use an informal, conversational tone of voice to interrupt the anti-social response saying "Which one should we play first?" or "Which is your favorite?" or something similar. If the adolescent with ASD does not engage in the chosen activity, for example he/she walks away, the typical adolescent should interrupt the anti-social response by walking into the line of sight of the adolescent with ASD and use an informal, conversational tone of voice to say, Name, come back and play (Name of Chosen Activity)." If the adolescent with ASD engages in the chosen activity alone or in a manner that differs from that of the typical adolescent, he or she should use an informal, conversational tone of voice to say, "Name, let's play UNO ® together like this (e.g., demonstrating how the activity is typically performed)!" or something similar.
7. Wait 5s for the learner to respond	The typical adolescent should allow the adolescent with ASD up to 5s ($\pm$ 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity (see Appendix E for detailed definition of choosing and engaging).
8. Explicit redirection	If the learner does not respond to the first attempt at interrupting an anti-social or non-response, the typical adolescent should keep the tone and volume of his/her voice even and in a medium range, louder than normal conversation, but softer than a shout, and repeat the original interrupting statement by saying, "Name, do you want to play Jenga ® or Zen Art ®?" or "Name, come back and play (Name of Chosen Activity)" or "Name, let's play Jenga ® together like this!"
9. Wait 5s for the learner to respond	The typical adolescent should allow the adolescent with ASD up to 5s ($\pm$ 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity (see Appendix E for detailed definition of choosing and engaging).
10. Record chosen activity	The name of the activity that was chosen by the adolescent with ASD should be written next to the words "Selected Item" on the Preferred Items Data Sheet.

Interobserver Agreement

A secondary observer collected data to assess interobserver agreement by coding of 30%

of sessions across conditions. This occurred via video uploaded to a private OneDrive® file on

specific days arranged with the secondary observer. Interobserver agreement was calculated by

comparing the primary observer's data with the secondary observer's data using point-by-point

agreement (Cooper et al., 2007). For each opportunity to deliver PMSI, an agreement was scored

when both data collectors recorded the same response for a step of the procedure. A

disagreement was defined as one observer recording a step as being performed correctly and the

other observer recording it as being performed incorrectly, or vice versa. The number of

agreements was divided by the number of agreements plus disagreements and multiplied by 100

to obtain a percentage of agreement (Kazdin, 2011). Table 3.4 depicts mean and range IOA for

each typical adolescent participant across all conditions.

Table 3.4

Interobserver Agreement (mean and range) Across Participants and Conditions.

	Peer Mediated Social Interaction		
	Baseline	VMT	Generalization
Alex	85 (70-100)	95 (90-100)	90
Devon	85 (80-90)	95 (90-100)	100
Seb	85 (80-90)	85 (80-90)	90
Jack	100	95 (90-100)	100
Elisa	100	95 (90-100)	90

Experimental Design

A multiple probe design across participants was used to evaluate the effects of video

modeling on typical adolescents' performance of PMSI with an actor. Data were collected

intermittently prior to the introduction of the intervention, consistent with multiple probe

design baseline logic. Continuous measurement of PMSI for all participants was not required

prior to the introduction of VMT, as it was unlikely that PMSI would be acquired through

repeated testing alone (Gast, Lloyd, & Ledford, 2014) Relatedly, once mastery level

performance of PMSI was achieved it was unlikely to be reversed by simply withdrawing

VMT. The multiple probe design was selected as its use does not necessitate the withdrawal of

an effective intervention to demonstrate experimental control. The effectiveness of the

independent variable was evaluated via intersubject replication. Specifically, the intervention

was sequentially implemented across five participants. Immediate change in the dependent

variable when the intervention is introduced across a minimum of three participants

demonstrates a functional, or causal, relation (Gast, Lloyd, & Ledford, 2014).

Procedures

     Orientation. A written protocol was delivered to typical adolescent participants via

procedures similar to those of Digennaro-Reed et al. (2010). The researcher reviewed the written

protocol with the typical adolescents, detailing the steps of PMSI. A brief (i.e., ten-minute)

question-and-answer session was followed by a five-item written posttest (Appendix B).

Responses were reviewed immediately with the typical adolescents and any errors were

corrected. This orientation lasted 60 min. One day after completion of the posttest, the researcher

began the baseline sessions.

     Baseline. Baseline sessions were conducted to assess performance in PMSI for typical

adolescent participants. Baseline sessions assessed the typical adolescents' ability to deliver

PMSI without viewing the training videos or receiving feedback. All typical adolescent

participants experienced at least five, 10 min baseline sessions, not more than once per day.

Aside from the first participant, Alex, all participants remained in the baseline phase until the

previous participant performed at 90% accuracy for two consecutive sessions in the VMT phase. Baseline sessions took place after school and on weekends to accommodate participant schedules. No more than three days elapsed between sessions for all participants. The researcher acted in the role of an individual with ASD during the baseline sessions (as in Hughes & Carter, 2008; Lipschultz et al., 2015; Vladescu et al., 2012).

Each typical adolescent individually entered the music room at the ASD center during baseline sessions. The researcher instructed the typical teen to, "Do your best to try peer mediated social interaction with me acting as your buddy. I cannot answer any questions. Please let me know when you are finished." The preceding steps were repeated with each typical adolescent. Thus, baseline sessions consisted of one opportunity to perform PMSI. The researcher collected data, but did not answer questions or provide feedback. No videos were shown during baseline probe sessions.

Generalization sessions. Numerous studies report transfer of training to previously untested individuals and settings as opposed to generalization outcomes (Hughes et al., 2012; Jones, Lerman & Lechago, 2014). Such post-intervention assessments do not allow for an empirical evaluation of generalization because social behavior was not assessed with those individuals in the generalization settings prior to intervention. Generalization was assessed prior to and following intervention in the present study. Generalization probe sessions explicitly assessed the typical adolescents' performance of PMSI to an adolescent with ASD without viewing the training videos or receiving feedback from the researcher. Generalization probe sessions were conducted with adolescents with ASD instead of an actor and resembled baseline session procedures, except that the adolescents with ASD did not follow a script. Participation of the four adolescents with ASD in generalization sessions was based strictly on availability.

Although performance feedback was not provided, the researcher and Director of the ASD center were prepared to intervene in the unlikely event that problematic behavior (e.g., yelling, cursing) was displayed by a student with ASD. Instances of problematic behavior did not take place during any of the generalization probe sessions.

Video modeling training. VMT sessions resembled baseline sessions, except that typical adolescents watched a training video depicting the performance of PMSI. The training videos aligned with the actor scripts used during baseline sessions. The typical adolescents viewed one of the four training videos twice during each VMT session for PMSI. Immediately following viewing of the video, one opportunity to perform the procedure was provided to assess the typical adolescent's delivery. Each actor script aligned with the training video being shown during a given VMT session. As in baseline sessions, the researcher served as an actor and followed four scripts which were systematically rotated to provide exposure to a range of potential errors that an individual with ASD might make. Although participants could ask questions following each performance, explicit feedback did not take place. Mastery criterion was met when a typical adolescent performed all steps for PMSI at 90% accuracy during two consecutive VMT sessions. To meet standards for single-case experimental design all typical adolescents experienced five total training sessions regardless of when they met mastery criterion (Tate et al., 2016).

Maintenance. Maintenance sessions were identical to baseline sessions and took place two weeks following training with VMT. One maintenance session was conducted per typical adolescent participant to determine whether they continued performing PMSI at mastery criterion levels without viewing the video.

Procedural Integrity

Procedural integrity was assessed by the secondary observer for 30% of baseline, generalization, and VMT sessions to ensure implementation with fidelity. The researcher incorporated procedural integrity checklists for all sessions into the main data collection sheets for this study (see Appendix C; D). The second observer scored the extent to which the researcher administered the sessions as intended. Items on the checklist that were implemented accurately were divided by the total number of items to derive a percentage. Mean procedural integrity was 98% (range, 88% to 100%).

Social Validity

A program that is considered effective through empirical study may not be deemed so by its recipients or those who deliver it (Carter, 2010). Thus, it is critical that thorough and complete social validation is conducted to ensure the highest possibility of the effective selection and implementation of evidence-based practices for use with individuals with ASD (Callahan, Hughes, Mehta, Toussaint, Nichols, Ma, Kutlu & Wang, 2016). Social validation of VMT was conducted using pre- and post-VMT time measurements of social interaction for two youths with ASD in a peer mediated setting with the typical adolescent VMT participants. A subjective evaluation (Kennedy, 1992) in the form of a questionnaire was also administered to the typical adolescent participants. Subjective evaluations such as surveys and questionnaires serve to obtain consumers' opinions of the acceptability of behavioral interventions (Kazdin, 2011).

The pre- and post-VMT social interaction measurements in the present study addressed research question three, which analyzed the percentage of intervals in which two youths with ASD, James and Joe, ages 17 and 20, were engaged in social interaction with the typical adolescent participants in a natural setting before and after VMT. The pre-VMT social

interaction measurement session took place prior to baseline and following the peer orientation. The five typical adolescents were instructed to interact with the two youths with ASD as they normally would during a peer hangout session. During the post-VMT social interaction measure, the five typical adolescents were instructed to use PMSI when interacting with the two youths with ASD during a peer hangout session. Although other youths with and without disabilities were present within the peer hangout setting, the five typical adolescent participants were the only peers interacting with James and Joe, the two youths with ASD, during the pre- and post-VMT social interaction measurement sessions. Typical adolescents attending the peer hangout session who had not participated in VMT were asked not to approach James and Joe during the social interaction measurement sessions in order to explicitly assess the impact of PMSI on social interaction for James and Joe. Peers with ASD did not initiate social interactions with James and Joe during the social validation sessions. Peers with ASD were not asked to refrain from approaching James and Joe during these sessions, as this behavior was not previously observed without prompting in this setting.

Data for all pre- and post-VMT social interaction sessions were collected in vivo for a total of 30 min, beginning when the focal participant with ASD entered the main room of the ASD center during a peer hangout. One pre-VMT social interaction measurement session was conducted for James, and a simultaneous though independent observation was conducted for Joe. Post-VMT social interaction measurement sessions were conducted identically. Similar to the whole interval time sampling procedures described by Brock (2014), a smartphone interval timer application was set to vibrate every 5 s, as a reminder to use the next 5 s to record whether social interaction was observed in the preceding 5-s interval. If the youth with ASD being observed was in proximity to one or more of the typical adolescent participants, interacting with one or more of

the typical adolescent participants, and engaged in social activity consistent with the group for the entire 5 s, a check was made for each corresponding behavior (see Appendix J for data collection sheet; Brock, 2014). The interval timer was set to remind the researcher to repeat this sequence of observation and data recording throughout each session. All 5-s intervals were converted to the percentage of intervals in which social interaction occurred during each 30-min observation session.

The second method of social validation was an acceptability questionnaire. Adapted from a questionnaire developed by Brock (2014), the acceptability questionnaire was administered to typical adolescent participants, post-intervention. It facilitated examination of their attitudes following VMT at the ASD center (Appendix K). The questionnaire asked typical adolescents to characterize: (a) the length and effectiveness of VMT, (b) the likelihood that they would recommend VMT to other peer groups, (c) the likelihood that they would participate in VMT to learn other practices/strategies in the future, (d) the level of difficulty of VMT, (e) the likelihood that they will continue to utilize the behavioral strategies trained via VMT, and (f) the likelihood that they would recommend the use of behavioral practices in future peer groups. A 5-point scale was used to rate each of these questions. Typical adolescents were also asked six open-ended questions regarding their experience (Appendix K).

Data Analysis

Visual analysis (Horner et al., 2005) was used to identify relations between accurate performance of PMSI by each typical adolescent and the application of VMT. Visual analysis is not sensitive to small changes in behavior, thereby making it ideal for identifying meaningful changes in participant behavior that can be attributed to a behavioral intervention (Cooper et al., 2007). A complete description of the effects of VMT were provided by analyzing multiple

dimensions of behavior (i.e., immediacy of effect, consistency of data pattern in similar conditions) across all participants. Repeated changes in the dependent variable with each successive introduction of the independent variable increased confidence that the intervention was responsible. Such repeated demonstrations of the effects at different times show experimental control, as it is unlikely that a confound could repeatedly coincide with the introduction of the independent variable (Gast, Lloyd, & Ledford, 2014).

CHAPTER 4

RESULTS

The current chapter discusses results of the present study in relation to Research

Questions 1 – 3. A preliminary statement about the overall results for Research Questions 1 and

2 precedes a detailed description of individual participant results. Figure 4.1 displays results for

the typical adolescent participants in the present study. An overview of the results for Research

Question 3 follows; Figure 4.2 displays the percentage of intervals in which social interaction

occurred between two adolescents with ASD and the typical adolescent participants, before and

after VMT. Post-VMT responses to the acceptability questionnaire from the typical participants

are also discussed within this chapter.

Research Questions

Question 1

To what extent does VMT improve typical adolescents' performance of peer

mediated social interaction (PMSI) with an actor (i.e., adult model serving as a student

with ASD)?

Stable rates of performance with below-mastery levels of accuracy in PMSI were

observed in baseline sessions for all five participants. Following the administration of VMT,

mastery of PMSI was quickly achieved by all participants (see Figure 4.1). High levels of

performance for PMSI were maintained in follow-up sessions. These results demonstrate a clear

functional relation between VMT and improved performance of PMSI.

Question 2

To what extent does VMT promote stimulus generalization of PMSI to an

adolescent with ASD?

The current study included the empirical analysis of generalization of the PMSI procedure from an actor to an adolescent with ASD. Consistent with previous research (Catania et al., 2009; Lipschultz et al., 2015; Vladescu et al., 2012), generalization assessments for delivery of PMSI were administered during baseline and post-VMT probe sessions. All five typical adolescents demonstrated accurate performance of PMSI during post-VMT generalization probes with adolescents with ASD. High levels of accurate performance were maintained in follow-up sessions two weeks after removal of treatment (see Figure 4.1).

Individual Results

Alex

Results of VMT on the percentage of correctly performed steps for PMSI for Alex are displayed in Figure 4.1. Alex demonstrated stability during baseline, with a mean percentage of 38% (range, 30% to 40%). Alex's performance immediately increased when VMT was applied, with a mean of 88% (range, 80% to 90%) and remained at that level during maintenance probes. There were zero overlapping data points between baseline and VMT phases. During VMT, Alex demonstrated a high level of accuracy and met the mastery criterion (i.e., 90 % accuracy over two consecutive sessions) for PMSI in four VMT sessions. The percentage of accurately performed steps during the baseline generalization probe session for PMSI was 17% and quickly increased to 100% following VMT. Alex's total video viewing time prior to mastery was 6 min, 24 s.

Devon

Results of VMT on the percentage of correctly performed steps for PMSI for Devon are displayed in Figure 4.1. During baseline Devon demonstrated some variability with a mean percentage of 39% (range, 20% to 50%). Devon's performance immediately increased to a mean

percentage of 88% (range, 80% to 90%) when VMT was applied and maintained at that level during maintenance probes. There were zero overlapping data points between baseline and VMT phases. During VMT, Devon demonstrated a high level of accuracy and met the mastery criterion for PMSI in four sessions. The percentage of accurately performed steps during the baseline generalization probe session for PMSI was 17% and quickly increased to 100% following VMT. Devon's total video viewing time prior to mastery was 6 min, 24 s.

Seb

Results of VMT on the percentage of correctly performed steps for PMSI for Seb are displayed in Figure 4.1. During baseline Seb demonstrated stable responding with a mean percentage of 44% (range, 40% to 50%), Seb's performance rapidly increased to a mean percentage of 86% (range, 80% to 90%) when VMT was applied and was maintained at that level during maintenance probes. There were zero overlapping data points between baseline and VMT phases. During VMT, Seb demonstrated a high level of accuracy and met the mastery criterion for PMSI in four sessions. The percentage of accurately performed steps during the baseline generalization probe session for PMSI was 30% and quickly increased to 90% (range, 80% to 100%) following VMT. Seb's total video viewing time prior to mastery was 6 min, 24 s.

Jack

Results of VMT on the percentage of correctly delivered steps for PMSI for Jack are displayed in Figure 4.1. During baseline, Jack demonstrated some variability with the mean percentage of accurately performed steps at 41% (range, 20% to 50%). Jack's responding immediately increased to a mean of 94% (range, 90% to 100%) when VMT was applied and remained at that level during maintenance probes. There were zero overlapping data points between baseline and VMT phases. During VMT Jack met the mastery criterion for PMSI in two

sessions and maintained a high level of accuracy. The percentage of accurately performed steps during the baseline generalization probe session for PMSI was 17% and quickly increased to 100% following VMT. Jack's total video viewing time prior to mastery was 3 min, 36 s.

Elisa

Results of VMT on the percentage of accurately performed steps for PMSI for Elisa are displayed in Figure 4.1. During baseline, Elisa demonstrated some variability with a mean percentage of 46% (range, 30% to 50%). Elisa's low to moderate level of performance increased to a mean percentage of 84% (range, 70% to 90%) when VMT was applied and increased to 90% during the maintenance probe. There were zero overlapping data points between baseline and VMT phases. During VMT, there was an increasing trend as Elisa met the mastery criterion in four sessions. The percentage of accurately performed steps during the baseline generalization probe session for PMSI was 30% and quickly increased to 100% following VMT. Elisa's total video viewing time prior to mastery was 6 min, 24 s.

Figure 4.1 Effects of Video Modeling Training (VMT) on the Percentage of Accurately Performed Steps for Peer Mediated Social Interaction (PMSI)
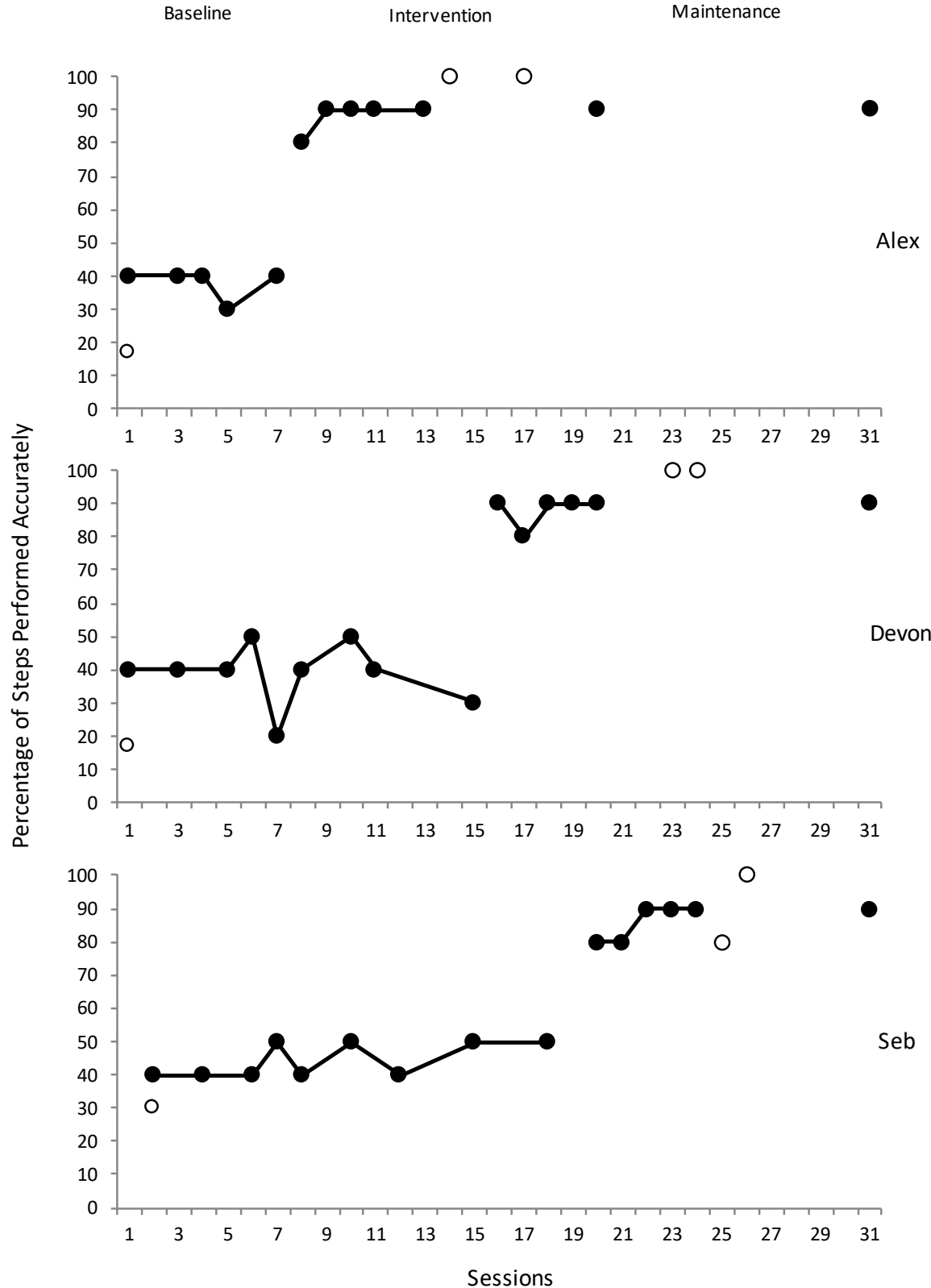
Figure 4.1 (cont'd)
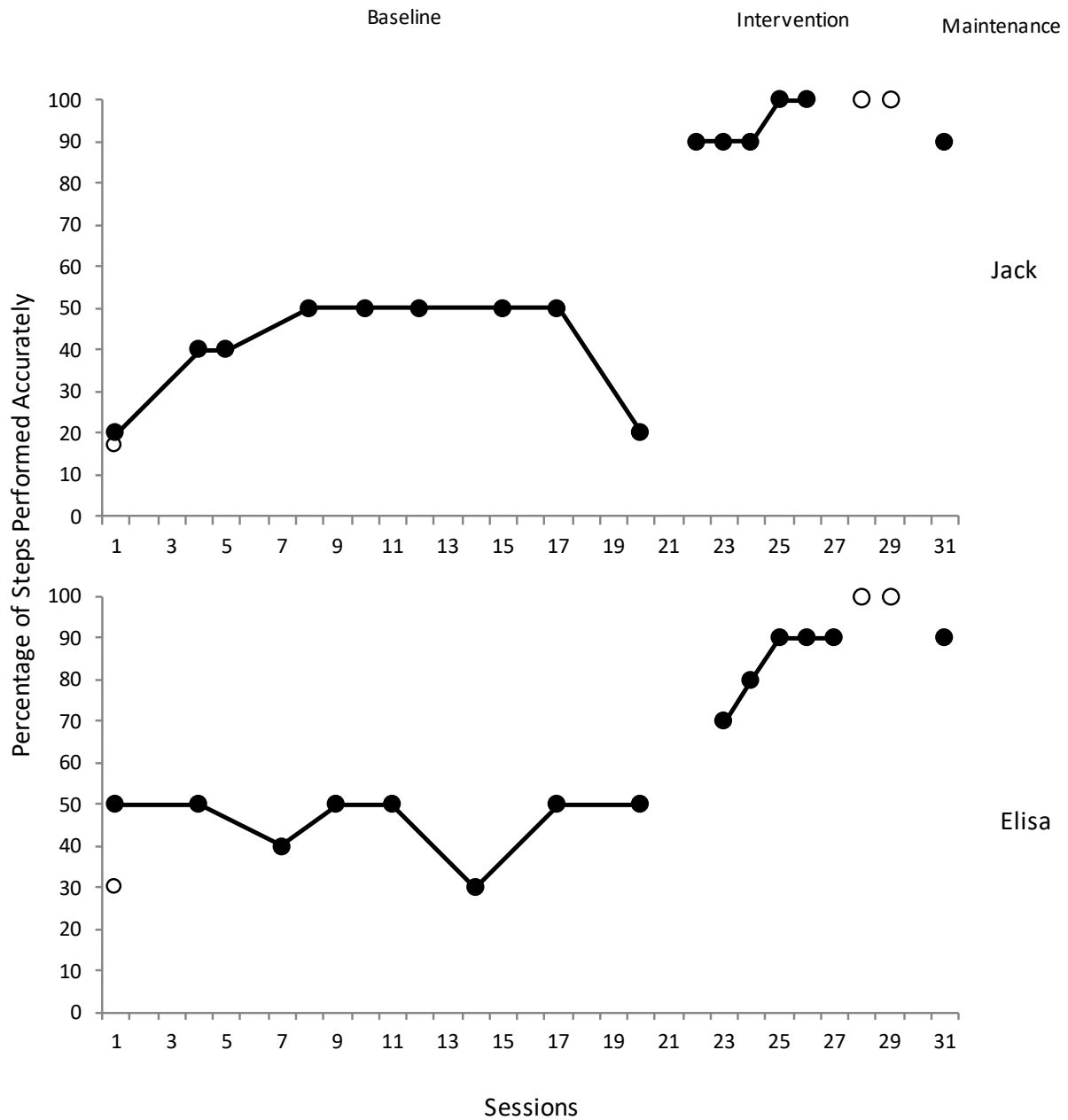
Figure 4.1. Effects of video modeling training (VMT) on the percentage of accurately performed steps for peer mediated social interaction (PMSI) across five typical adolescent participants. Results for all five typical participants are displayed in this figure. Open circles represent probes measuring generalization of PMSI to an adolescent with ASD.

Question 3

    Is there a difference in the percentage of intervals in which social interaction occurs between two adolescents with ASD and the typical adolescent participants, before and after VMT?

    The percentage of intervals in which the teens with ASD and the typical adolescents were engaged in social interaction before and after VMT, was used to evaluate whether a socially significant change took place. As demonstrated in Figure 4.2, the percentage of intervals in which social interaction took place prior to VMT was 9% for James and 19% for Joe. The post-VMT percentage of intervals increased significantly for both adolescents with ASD, with James at 44% and Joe at 66%. Pre-and post-VMT social interaction measures for both adolescents with ASD suggest the occurrence of a socially significant change (see Figure 4.2).

Figure 4.2 Social Validation Measurement for Two Youths with ASD
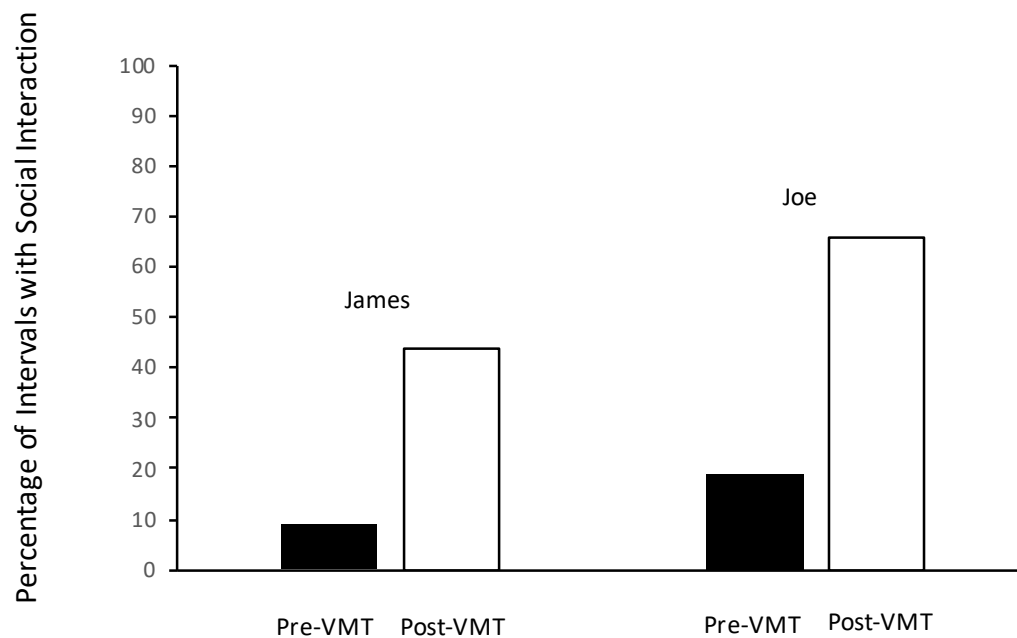
Figure 4.2. The percentage of intervals in which social interaction with one or more typical peers occurred for 2 youths with ASD prior to and post-VMT.

Social Validation

  Acceptability questionnaire responses. All typical adolescents perceived peer support arrangements to be substantially more effective when compared to the peer training given when they began the peer mediated class. One typical adolescent indicated that video modeling training was a little long, while four perceived it to be not long at all. Three typical adolescents reported they would be extremely likely and two quite likely to recommend video modeling training to other peer groups and to participate in video modeling to learn other practices/strategies in the future. Four typical adolescents shared that they thought the behavioral strategies were quite helpful and one extremely helpful in improving social interactions with buddies (i.e., adolescents with ASD) in the peer mediated class. Four typical adolescents indicated that it was a little difficult, and one somewhat difficult to use the behavioral practices they learned in video modeling training with their buddies. Four typical adolescents reported that they would be extremely likely and one quite likely, to keep using the behavioral practices with their buddies now that video modeling training is over and to recommend the use of behavioral practices with other peer groups.

  When asked what advice they had for other typical adolescents who may learn to use behavioral practices with adolescents with ASD, one typical adolescent recommended, "I definitely felt a lot more comfortable and confident when interacting with my buddy after the video training." Another peer wrote, "It may feel awkward and you may feel uncertain at first, but if you stick to your training you will have a successful outcome with your buddy" and "I enjoyed learning the skills in a way that directly displayed what was expected of me." Peers also wrote, "I found the videos very helpful." and "When my buddy engaged and participated in our activities I knew that my skills were successful."

CHAPTER 5

DISCUSSION

The primary purpose of the current study was to examine the effects of VMT on the

accurate performance of the behavioral-based procedure of peer mediated social interaction

(PMSI) by typical adolescents. Further, this study empirically analyzed generalization via pre-

and post-VMT measurement of the transfer of accurate performance of PMSI to an adolescent

with ASD. An additional purpose was to determine whether the amount of time spent socially

engaged prior to and following VMT changed for youths with ASD. This was examined via

comparison of the percentage of intervals in which two youths with ASD and the typical

adolescent participants engaged in social interaction before and after VMT. The present chapter

interprets the results of this study in relation to the previous research on VMT. Limitations of the

experiment and suggestions for future research are also discussed.

This is the first known study to use VMT to prepare typical adolescents to perform

behavioral-based procedures with youths with ASD in a peer mediated setting. Prior to the

current study, VMT had been examined for teachers, therapists, paraeducators and other adult

service providers (Brock & Carter, 2013; Catania et al., 2009; Digennaro-Reed et al., 2010;

Lipschultz et al., 2015; Moore & Fisher, 2007; Vladescu et al., 2012; Weldy, Rapp, & Capocasa,

2014). Previous research suggests VMT is effective in training adult service providers to conduct

such behavioral practices as constant time delay, stimulus preference assessments, and discrete

trial instruction. The present study extends the findings of previous VMT research by

successfully administering VMT to typical adolescents as opposed to adult service providers. All

participants demonstrated immediate improvement following the first video training session, and

then quickly met mastery criteria. These outcomes align with previous investigations that have

administered VMT to adult service providers (Catania et al., 2009; Lipschultz et al., 2015; Vladescu et al., 2012). However, the present results show that VMT can also be effective when administered to typical adolescents.

Reduced training time and the amount of time a trainer must be physically present may be indirect potential benefits of the present study. In the current study, mastery was achieved by all typical adolescent participants within four or fewer sessions of VMT. The mean total viewing time for all participants was 7 mins, 32 s. This is substantially lower than the mean total viewing times for adult service providers reported by Vladescu and colleagues (2012) and Catania and colleagues (2009), which were 48 min 30 s and 40 min 52 s, respectively. However, the overall ease of PMSI as compared to other trained procedures within the extant literature must also be considered. Behavioral practices such as discrete trial training and stimulus preference assessments trained via VMT in previous studies (Catania et al., 2009; Vladescu et al., 2012) are substantially more complex than PMSI. Nevertheless, simple interaction procedures were efficient for use with the typical adolescent participants and allowed the researchers to extend VMT to adolescent interventionists. Efficiency and acceptability of VMT as a method of preparation for typical adolescent peers is critical given the barriers to implementation of PMI expressed by teachers (Brock & Carter, 2013; Hughes & Carter, 2008).

Voiceover was not used within the training videos in the present study, in contrast to previous research (Catania et al., 2009; Lipschultz et al., 2015; Vladescu et al., 2012). Prior studies combined VMT and voiceover into a packaged treatment, as is common in behavior-change interventions (Mayer, Sulzer-Azaroff, & Wallace, 2014). When treatments are assessed in combination it may limit knowledge of each component's contribution to observed change. As such, the researcher hypothesized that it might be possible to teach the procedural steps within

PMSI to typical adolescents via VMT without voiceover. By assessing a single component, she learned that VMT could effectively teach PMSI to typical adolescents. As shown within Chapter 4 of the present study, all participants rapidly achieved mastery (i.e., 90% accuracy over two consecutive VMT sessions) upon administration of VMT without voiceover (see Figures 4.1 & 4.2). Although voiceover would have been added if mastery of PMSI was not achieved, the results did not necessitate it.

Typical adolescents who are proficient in promoting social interaction via peer mediated intervention (PMI) have the potential to provide explicit, embedded, behavior-based instruction within social interaction throughout the school day. Although somewhat speculative, it is possible that training typical adolescents in basic behavioral strategies such as PMSI could lead to exponential changes in social learning opportunities for youth with ASD. Activities throughout high school such as sporting events, community service initiatives, and school dances, are often a source of social interactions between typical adolescents. These activities can also be a source of numerous target behaviors promoting social interaction within a peer mediated relationship (Plavnick & MacFarland, 2014). Adolescents with and without ASD participating in a PMI are likely to encounter one another in natural, non-academic settings such as a football game, or at a local ice cream shop. Such encounters potentially allow for additional social interactions across many different settings and scenarios, thus increasing the likelihood of generalization beyond the peer mediated classroom setting (Paul, 2008).

Generalization percentages for all five participants immediately improved following VMT. This aligns with previous investigations that have administered VMT to adult service providers (Catania et al., 2009; Lipschultz et al., 2015; Vladescu et al., 2012). Additionally, it extends these prior investigations by demonstrating that VMT can also be effective with typical

adolescents in promoting the transfer of trained behavioral practices to youth with ASD. This is not unexpected due to programming for generalization within the present study. The typical adolescents were exposed to a range of potential problematic responses that an individual with ASD might demonstrate. This range of responses referred to as programmed fails within the present study, was embedded within each training video and the actor scripts used during probe sessions. The use of VMT also provided a modeled sequence of PMSI including multiple examples of potential initiations and responses that the typical adolescents could use to promote social interaction with the adolescents with ASD. The use of these tactics may have increased the likelihood that PMSI would be delivered accurately with adolescents with ASD after VMT was terminated.

There is a scarcity of studies targeting social interaction skills for adolescents with ASD when compared to those at preschool and elementary school levels over the past 20 years (Bellini et al., 2007; Odom et al., 2010; Wong et al., 2015). This was a consideration in the present study's focus on adolescents and young adults. Four of the typical participants and three of the participants with ASD in the current study are within the older (i.e., ages 16-18; Greydanus & Bashe, 2003) adolescent age-range. Older adolescents with ASD may continue to experience significant challenges with social interaction, paired with the added pressures of preparing for life after high school (Carter, Austin & Trainor, 2011). For adolescents and young adults with ASD who may struggle with deficits in social communication, evidence-based practices designed to enhance social interaction, such as PMI, are critical to post-secondary success (Carter, Austin

& Trainor, 2011). VMT has potential as a procedure for preparing typical adolescents to administer PMI.

Implications for Practice

Teaching behavioral strategies to typical adolescents via VMT could remove a demand on teachers to manage all opportunities for social interaction for individuals with ASD (Plavnick & MacFarland, 2014). As the demands of delivering requisite academic instruction increase, the amount of time that teachers may devote to explicit social skills instruction decreases (Carter, Bottema-Beutel, & Brock, 2014; Hochman, Carter, Bottema-Beutel, Harvey, & Gustafson, 2015). Although the majority of the school day is heavily focused on academic instruction, social skills instruction can be a complementary portion of a student's instructional day (Odom & Strain, 1984). For example, students may practice giving or receiving assistance on a project, conversing about upcoming school and other activities when there is no instruction, or taking turns contributing to whole-group or small-group discussion (Carter et al., 2017). Further, typical adolescents who are proficient in the delivery of preference assessment could help to ensure that informal preference assessments, such as the simplified version taught within the PMSI procedure in the present study, are conducted regularly. VMT for typical adolescents may also support the successful delivery of reinforcement and other strategies that service providers may implement via typical adolescents serving within a peer mediated setting (Pitts & Dymond, 2012; Zuluaga & Normand, 2008).

The relative simplicity of VMT procedures in the present study, such as the omission of voiceover, may appeal to educators considering implementation of a PMI. The reduction in training time also has important practical implications. Teachers, therapists, and other service providers may lack the qualifications or the time to become qualified to effectively train typical

adolescents to promote social interaction within a peer mediated setting (Brock & Carter, 2013; Hughes & Carter, 2008). There may also be very limited flexibility in the coordination of training schedules involving both service providers and typical adolescents serving as peer mentors. Procedures that require excessive amounts of time devoted to preparation, implementation, and delivery of training may be prohibitive (Giannakakos, Vladescu, Kisamore, & Reeve, 2016). The potential reductions in time and preparation associated with the use of VMT to effectively train typical adolescents in the present study, may promote the increased implementation of PMI in educational settings.

Procedures for successful implementation of peer mediated intervention within the extant literature recommend the provision of ongoing support for typical peers following the initial peer training (Hughes & Carter, 2012). Beyond weekly meetings focusing on peers with ASD, there are minimal recommendations for what that additional support should consist of for typical adolescent peers. The VMT procedures examined in the present study offer some guidance for an efficacious and efficient method of ongoing support. For example, additional components of the behavior-based practices within PMSI, or other, more complex practices may be beneficial for typical adolescents to learn during participation in a peer mediated intervention.

There were practical benefits to determining whether VMT and practice with an adult actor promoted accurate transfer of PMSI to youth with ASD. For example, practice with an adolescent or young adult with ASD may not always be possible due to scheduling constraints. Additionally, roleplay and practice with an adult actor in a low-pressure environment may increase the typical adolescents' confidence, providing for a better experience when interacting with a peer with ASD. This may increase the likelihood that both the youths with ASD and typical adolescents will participate in similar social interactions in the future. It may also help to

expose typical adolescent participants to a range of responses that they might encounter when performing PMSI with youths with ASD, further promoting generalization.

Impact for Youth with ASD

The social interaction observed for two youths with ASD in natural settings prior to and following VMT, is an important component of the present study. Social validity is typically assessed via questionnaires or surveys in which consumers generally rate treatments in a positive manner. Seminal papers on social validity call for improved measures, specifically measures that rely on wider sampling of observable and potentially relevant behaviors, yet the majority of studies continue to rely only on questionnaires to assess social validity (Hurley, 2012; Kazdin, 2011; Kennedy, 1992; 2002; Miramontes, Marchant, Heath & Fischer, 2011).

The social validity measures developed within the present study reflect behavioral changes for youth with ASD within a social context. The PMSI procedures were designed to eventually help youth with ASD improve their social interactions. Although the current experiment demonstrates the promise of VMT to teach behavioral practices to typical adolescents, the effects on naturally occurring social interactions with peers with ASD speak to the potentially strong social validity of PMSI.

During the pre-VMT social interaction measurement, typical adolescents were observed initiating social interaction by simply greeting a youth with ASD. Often, the youth with ASD was engaged in a solitary activity such as playing with a Rubik's cube®. The typical adolescents might have commented, "Oh, I see you like Rubik's cube®" to which the youth with ASD may not have responded or may have replied, "Yeah" and continued the solitary activity. Following VMT typical adolescents successfully initiated social interaction by offering interactive and potentially reinforcing activities. This aligns with previous research in naturalistic behavioral

interventions which shows that youth with ASD are more likely to engage in social scenarios if preferred items or activities are included (Koegel, Dyer & Bell, 1987; Koegel et al., 2012). Thus, the use of preference assessment in combination with contingent and natural reinforcement by typical adolescents within PMSI may have increased the likelihood of social interaction for the youth with ASD.

The typical adolescents only reinforced pro-social behaviors, providing enthusiastic and immediate reinforcement upon every opportunity. This resembles the use of contingent and natural reinforcement in pivotal response treatment (PRT; Cowan & Allen, 2007; Wong et al., 2015). In PRT choice, clear opportunities for participant responding, and contingent and natural reinforcement target pivotal areas which can produce collateral improvements in the overall quality of social interactions for individuals with ASD (Cowan & Allen, 2007; Koegel, Ashbaugh & Koegel, 2016; R.L. Koegel, Vernon & Koegel, 2009). Similarly, PMSI teaches typical adolescents to offer a choice of two potentially reinforcing activities that require shared control and involve clear opportunities for the youth with ASD to respond using the targeted behaviors, for which they receive contingent and natural reinforcement.

The youths with ASD responded to the post-VMT delivery of PMSI by the typical adolescents with increased social exchanges, engagement in a social activity consistent with the group such as playing a game or sharing a snack, and increased time in proximity to a peer. Thus, VMT for typical adolescents may have promoted growth for the youths with ASD in the pivotal area of social interaction, which can lead to gains across untargeted skills and improvement in overall socio-communicative interactions (Cowan & Allen, 2007; Koegel, Ashbaugh & Koegel, 2016; R.L. Koegel, Vernon & Koegel, 2009). Delivery of PMSI following VMT may have also facilitated the initial process of establishing social interaction with peers as

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a reinforcer for youths with ASD by pairing it with preferred stimuli. Results of the present study are promising for the use of VMT to train typical adolescents to carry out behavioral practices within natural social interactions with peers.

Limitations and Future Research

There are some limitations of the current study that should be considered. First, only one of the five typical adolescents demonstrated 100% accuracy of PMSI during VMT. Despite all typical adolescents rapidly achieving mastery upon administration of VMT, only Jack was able to accurately perform procedural step 8, explicit redirection (see Table 3.2). It is possible that components of explicit redirection were not salient enough in VMT without voiceover. For example, participants are expected to "…keep the tone and volume of his/her voice even and in a medium range, louder than normal conversation, but softer than a shout, and repeat the original interrupting statement by saying, 'Name, do you want to play Jenga ® or Zen Art ®?' or 'Name, come back and play (Name of Chosen Activity)' or 'Name, let's play Jenga® together like this!'" It is not currently known if skills relating to tone and volume are too subtle to teach to typical adolescents using VMT alone. Future examination of VMT for typical participants could consider methods of drawing attention to critical aspects of skills that may not be salient via VMT alone.

A second limitation was that explicit redirection was not necessary for typical adolescents to use during the generalization sessions. Explicit redirection was included in the procedural steps for PMSI and assessed within all phases of the present study (see Table 3.2). However, all participants achieved mastery in one or both of their post-VMT generalization probe sessions without the use of explicit redirection. In the event that one of the adolescents with ASD failed to select an activity or engage with the selected activity, the typical participants successfully used

step 6, interrupt anti-social or non-responses, to occasion a correct response. An additional prompt beyond interrupting anti-social or non-responses was not required to successfully mediate social interaction. One potential explanation for explicit redirection not being used during generalization sessions is that the adolescents with ASD involved in the generalization sessions were moderately effective verbal communicators, despite notable language and communication challenges. Although adolescent participants with ASD demonstrated language and communication challenges, they were not diagnosed with a co-occurring intellectual disability (ID). Future studies of VMT with typical adolescents could replicate the current study with youth with ASD and co-occurring ID to determine if it is necessary to teach explicit redirection to successfully promote social interaction.

A third limitation was that the behavioral practices within PMSI, as taught to the typical participants via VMT in the present study, were not as complex as other practices. As such, it is possible that VMT may not be generalizable to teach more complex practices (i.e. discrete trial training, stimulus preference assessments) with the same level of efficiency. The researcher minimized the number of steps required to perform each practice to facilitate acquisition of a naturalistic approach by typical adolescents. For instance, upon selection of an activity by an adolescent with ASD continuous reinforcement was taught because it was appropriate for typical adolescents to deliver reinforcement immediately upon every opportunity when beginning to promote social interaction. It was also potentially easier and more natural for typical adolescents learning these tactics for the first time. Additional components of reinforcement, such as intermittent reinforcement schedules that can support maintenance of a behavior by providing reinforcement after a certain amount of time or a certain number of correct responses, were not addressed within VMT in the present study. Perhaps additional components of the three

behavioral practices in this investigation, or other, more complex practices may be beneficial for typical adolescents to learn in preparation for and during participation in a peer mediated intervention. It is currently not known whether VMT would function effectively to teach more complex behavioral practices to typical adolescents. Future research could sequentially increase the complexity of PMSI to determine the level at which VMT continues to be effective to teach typical adolescents.

The next limitation was that VMT within the present study did not prepare the typical adolescents for ongoing social interaction and concluding a social interaction with an adolescent or young adult with ASD. Although typical adolescent participants reported finding VMT to be effective and helpful in improving social interactions with youth with ASD, they also shared suggestions for improvement. Following participation in generalization sessions several typical adolescent participants shared anecdotally that they wished they had learned "more about how to keep the conversation going" and "I wasn't exactly sure the best way to wrap things up". Future studies should examine the use of VMT to train typical adolescents to perform additional aspects of social interaction within a PMI such as ongoing social interaction and concluding a social interaction.

An additional limitation was that although the social validity measures demonstrated some changes in social behavior for the youths with ASD, they do not explicitly demonstrate social skills acquisition. The empirical assessment of social skills for the youths with ASD in the present study represents an earnest attempt at improved rigor in social validity assessment. However, it does not explicitly show that the youths with ASD made social skills gains. Future research could determine and implement methods of explicit measurement of gains for youth with ASD, resulting from the use of VMT to teach PMSI to typical adolescents.

Conclusion

Preparing typical adolescents for participation in a PMI requires careful and comprehensive instruction, a substantial time commitment, and specific expertise that service providers may not possess (Brock & Carter, 2013; Hughes & Carter, 2008). VMT has been shown to reduce implementation challenges such as time investment and consistent delivery (Catania et al., 2009; Lipschultz et al., 2015) when used with adult service providers to train evidence-based practices. However, VMT had not yet been analyzed in the training of typical adolescents involved in a PMI.

The present study contributes to current ASD social skills research of behavioral and evidence-based practices focused on adolescents and young adults, empirical analysis of generalization, and thorough social validation. VMT was extended to successfully teach typical adolescents to deliver the behavioral procedure of PMSI with maintained performance following training. Typical adolescent participants provided favorable ratings and responses indicating the acceptability of VMT. Most importantly, an increase in socially significant behaviors was demonstrated by youth with ASD. Based on these outcomes, VMT for typical adolescents may support the increased implementation of PMI and the overall quality of social skills instruction for individuals with ASD.

APPENDICES

APPENDIX A:

PRE-VMT PRACTICE PROTOCOL/TASK ANALYSIS

Pre-VMT Protocol/Task Analysis

Steps	Choice	Redirection	Promoting Social Interaction
1	Offer choice		
2	Wait five seconds for the learner to respond		
3	Provide access to chosen activity		
4	Wait five seconds for the learner to respond		
5			Pair social attention with chosen activity
6		Interrupt anti-social or non-responses	
7	Wait five seconds for the learner to respond		
8		Explicit redirection	
9	Wait five seconds for the learner to respond		
10	Record the chosen activity on the Preferred Items Data Sheet		

Definitions for each step in the Peer Mediated Social Interaction procedure

Step	Target Behavior	Definition
1	**Offer choice**	The typical adolescent will select two potential reinforcers provided by the researcher. The typical adolescent should face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"
2	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity. Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.
3	**Provide access to chosen activity or item**	The typical adolescent should provide immediate access if the adolescent with ASD chooses an activity.
4	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity. Engaging in the chosen activity is defined as using the activity materials in proximity (i.e., within 61 cm) to the typical peer, in a similar manner as the typical peer.
5	**Pair social attention with chosen activity**	After providing immediate access to the chosen item, the typical adolescent should smile and make positive statements to the adolescent with ASD (e.g., "Cool, this is going to be fun!", "Jenga® is one of my favorite games!", "I heard you're really good at this!" or something similar) as he/she begins participating in the chosen activity.

6	**Interrupt anti-social or non-responses**	If the adolescent with ASD's response to the offer of choice is anti-social, for example he/she does not respond or makes an off-topic comment the typical adolescent should use an informal, conversational tone of voice to interrupt the anti-social response saying "Which one should we play first?" or "Which is your favorite?"or something similar. If the adolescent with ASD does not engage in the chosen activity, for example he/she walks away, the typical adolescent should interrupt the anti-social response by walking into the line of sight of the adolescent with ASD and use an informal, conversational tone of voice to say, Name, come back and play (Name of Chosen Activity)." If the adolescent with ASD engages in the chosen activity alone or in a manner that differs from that of the typical adolescent, he or she should use an informal, conversational tone of voice to say, "Name, let's play UNO ® together like this (e.g., demonstrating how the activity is typically performed)!" or something similar.
7	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity. Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.
8	**Explicit redirection**	If the learner does not respond to the first attempt at interrupting an antic-social or non-response, the typical adolescent should keep the tone and volume of his/her voice even and in a medium range, slightly louder than normal conversation, but softer than a shout and repeat the original interrupting statement by saying, "Name, do you want to play Jenga ® or Zen Art ®?" or "Name, come back and play (Name of Chosen Activity)" or "Name, let's play Jenga ® together like this!"
9	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any

| | | part of their hand, verbally naming, or verbally requesting one activity.

Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer. |
|---|---|---|
| **10** | **Record the chosen activity on the Preferred Items Data Sheet** | The name of the activity that was chosen by the adolescent with ASD should be written next to the words "Selected Item" on the Preferred Items Data Sheet. |

APPENDIX B:

PRE-VMT ORIENTATION POST-TEST

VMT Orientation Post-Test

1. Circle: True or False

    Always pick at least 3 items from the Preferred Reinforcer List to start using Choice with your buddy.

2. Choose the best answer:

    During Peer Mediated Social Interaction, before starting an activity with my buddy, I should:

    a. Check my phone to be sure I don't have any incoming messages.
    b. Gain my buddy's attention by saying his/her name
    c. Wait patiently to see if my buddy is interested in hanging out with me.

3. Choose the best answer:

    When practicing Peer Mediated Social Interaction, if my buddy responds anti-socially when I offer Peer Hangout choices, I should:

    a. Use an informal, conversational tone of voice to interrupt the anti-social response saying "Which one should we play first?" or "Which is your favorite?"or something similar.
    b. Call the teacher over right away.
    c. Wait five minutes to see if my buddy decides what he/she would like to do during Peer Hangout time.

4. Circle: True or False

    Even if my buddy doesn't sit by me, or try to hang out with me during Peer Hangout time, I can still give them social praise, or another preferred item. That might encourage them to hang out with me next time.

5. Choose the best answer:

    When taking data while performing the Peer Mediated Social Interaction procedure with my buddy, I should:

    a. Jot down the items my buddy selects on a scrap sheet of paper that I can give to Mrs. MacFarland at the end of the Hangout.
    b. Pay close attention to my buddy's choices, so I can remember what to tell the teacher or Mrs. MacFarland later.
    c. Use the Preferred Items data sheet to write down the preferred items that my buddy chooses.

APPENDIX C:

BASELINE SESSION DATA COLLECTION SHEETS

Baseline Task Analysis: PMSI (for Actor Scripts 1 & 3)	

Investigator: _____ Observer: _____ Participant: _____

Date: _____

Total items: _____	Key:
Total items marked: _____	+ happened
	- did not happen
PI Ratio: _____	N/A if not applicable

Script Rotation
PMSI1
PMSI2
PMSI3
PMSI4

	Getting Started (Researcher)	
1	Begins video recording prior to starting session.	
2	Ensures props and items needed for session are in close proximity to participant.	
3	Participant is instructed to, "Try to practice prompting with me acting as your buddy. I cannot answer any questions. Do your best and let me know when you are finished." , or something similar.	
	Mediating Social Interaction Performance (Participant)	
1	**Offer Choice:** Select two potential reinforcers provided by the researcher. Face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"	
2	**Wait:** Allow the adolescent with ASD up to 5s ($\pm$ 1s) to choose one of the presented items.	
3	**Interrupt:** If the adolescent with ASD's response to the offer of choice is anti-social, for example he/she does not respond or makes an off-topic comment, the typical adolescent should use an informal, conversational tone of voice to interrupt the anti-social response saying "Which one should we play first?" or "Which is your favorite?" or something similar.	
4	**Wait**: The typical adolescent should allow the adolescent with ASD up to 5s ($\pm$ 1s) to respond to choose one of the presented items.	
5	**Explicit Redirection:** If the learner does not respond to the first attempt at interrupting an anti-social or non-response, the typical adolescent should keep the tone and volume of his/her voice even and in a medium range, slightly louder than normal conversation, but softer than a shout and repeat the original interrupting statement by saying, "Name, Jenga ® or Zen Art ®?"	
6	**Wait:** The typical adolescent should allow the adolescent with ASD up to 5s ($\pm$ 1s) to choose one of the presented items.	
	Mediating Social Interaction Performance (Participant)	
7	**Provide Access to Chosen Activity**: The typical adolescent should provide immediate access if the adolescent with ASD chooses an activity.	
8	**Wait:** The typical adolescent should allow the adolescent with ASD up to 5s ($\pm$ 1s) to respond to engage in the chosen activity.	
9	**Pair Social Reinforcement with Chosen Activity:** After providing immediate access to the chosen item, the typical adolescent should smile and make positive statements to the adolescent with ASD (e.g., "Cool, this is going to be fun!", "Jenga® is one of my favorite games!", "I heard you're really good at this!" or something similar) as he/she begins participating in the chosen activity.	
10	**Record Chosen Activity**: The name of the activity that was chosen by the adolescent with ASD should be written next to the words "Selected Item" on the Preferred Items Data Sheet.	
	Probe Administration (Researcher; continued from Getting Started section)	
4	Conducts one trial for mediating social interaction.	
5	Reminds participant that she cannot answer any questions, if questions are asked.	

Notes or Comments:

Investigator: _____ Observer: _____ Participant: _____

Date: _____

Total items:	
Total items marked:	
PI Ratio:	

Key:
+ happened
-
did not happen
N/A
if not applicable

	Getting Started (Researcher)	
1	Begins video recording prior to starting session.	
2	Ensures props and items needed for session are in close proximity to participant.	
3	Participant is instructed to, "Try to practice prompting with me acting as your buddy. I cannot answer any questions. Do your best and let me know when you are finished.", or something similar.	

	Mediating Social Interaction Performance (Participant)	
1	**Offer Choice:** Select two potential reinforcers provided by the researcher. Face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"	
2	**Wait:** Allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.	
3	**Provide Access to Chosen Activity**: The typical adolescent should provide immediate access if the adolescent with ASD chooses an activity.	
4	**Wait:** Allow the adolescent with ASD up to 5s (± 1s) to engage in the chosen activity.	

	Mediating Social Interaction Performance (Participant)	
5	**Interrupt:** If the adolescent with ASD's response to the offer of choice is anti-social, for example he/she walks away, the typical adolescent should interrupt the anti-social response by walking into the line of sight of the adolescent with ASD and using an informal, conversational tone of voice say, "Name, come back and play (Name of Chosen Activity)" or "Name, let's play Jenga ® together, like this (e.g., demonstrating how the activity is typically performed).	
6	**Wait:** Allow the adolescent with ASD up to 5s (± 1s) to engage in the chosen activity.	
7	**Explicit Redirection:** If the learner does not respond to the first attempt at interrupting an anti-social or non-response, the typical adolescent should keep the tone and volume of his/her voice even and in a medium range, louder than normal conversation, but softer than a shout and repeat the original interrupting statement by saying, "Name, it's time to play (Name of Chosen Activity)" or "Name, together, like this."	
8	**Wait:** The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to engage in the chosen activity.	
9	**Pair Social Reinforcement with Chosen Activity:** After providing immediate access to the chosen item, the typical adolescent should smile and make positive statements to the adolescent with ASD (e.g., "Cool, this is going to be fun!", "Jenga® is one of my favorite games!", "I heard you're really good at this!" or something similar) as he/she begins participating in the chosen activity.	

Notes or Comments:

APPENDIX D:

VMT DATA COLLECTION SHEET

VMT Task Analysis: Mediating Social Interaction		

Investigator: _____ Observer: _____ Participant: _____

Date: _____

Script Rotation
PMSI1
PMSI2
PMSI3
PMSI4

Total items: _____	Key:
Total items marked: _____	+ happened
PI Ratio: _____	- did not happen
	N/A if not applicable

Getting Started (Researcher)	
1	Begins video recording prior to starting session	
2	Ensures props and items needed for session are in close proximity to participant	
3	Shows video for mediating social interaction to participant	
4	Following video, participant is instructed, "Now that you've seen the video, try to do the reinforcement strategy with me acting as your buddy. Try and do what the people in the video did. Do your best and let me know when you are finished." Or something similar.	

PMSI Performance (Participant)	
1	Offer Choice: Select two potential reinforcers provided by the researcher. Face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"	
2	Wait: Allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.	
3	Interrupt: If the adolescent with ASD's response to the offer of choice is anti-social, for example he/she does not respond or makes an off-topic comment, the typical adolescent should use an informal, conversational tone of voice to interrupt the anti-social response saying "Which one should we play first?" or "Which is your favorite?"or something similar.	
4	Wait: The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to choose one of the presented items.	
5	Explicit Redirection: If the learner does not respond to the first attempt at interrupting an anti-social or non-response, the typical adolescent should keep the tone and volume of his/her voice even and in a medium range, louder than normal conversation and softer than a shout, repeat the original interrupting statement by saying, "Name, Jenga ® or Zen Art ®?"	
6	Wait: The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.	

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Notes or Comments:

Investigator: _____	Observer: _____	Participant: _____	

Investigator:
Observer:
Date: _____

			Script Rotation
Total items: _____	Key:	+ happened	PMSI1
Total items marked: _____		- did not happen	PMSI2
PI Ratio:		N/A if not applicable	PMSI3
			PMSI4

	Getting Started (Researcher)	
1	Begins video recording prior to starting session	
2	Ensures props and items needed for session are in close proximity to participant	
3	Shows video for mediating social interaction to participant	
4	Following video, participant is instructed, "Now that you've seen the video, try to do the reinforcement strategy with me acting as your buddy. Try and do what the people in the video did. Do your best and let me know when you are finished." Or something similar.	

	PMSI Performance (Participant)	
1	Offer Choice: Select two potential reinforcers provided by the researcher. Face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"	
2	Wait: Allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.	
3	Provide Access to Chosen Activity: The typical adolescent should provide immediate access if the adolescent with ASD chooses an activity.	
4	Wait: The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to engage in the chosen activity.	
5	Interrupt: If the adolescent with ASD's response to the offer of choice is anti-social, for example he/she walks away, the typical adolescent should interrupt the anti-social response by walking into the line of sight of the adolescent with ASD and using an informal, conversational tone of voice say, "Name, come back and play (Name of Chosen Activity)" or "Name, let's play Jenga ® together, like this (e.g., demonstrating how the activity is typically performed).	
6	Wait: The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to engage in the chosen activity.	
7	Explicit Redirection: If the learner does not respond to the first attempt at interrupting an anti-social or non-response, the typical adolescent should keep the tone and volume of his/her voice even and in a medium range, louder than normal conversation and softer than a shout, repeat the original interrupting statement by saying, "Name, it's time to play (Name of Chosen Activity)" or "Name, together, like this."	
8	Wait: The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to engage in the chosen activity.	

Notes or Comments

APPENDIX E:

DEFINITION TABLES

Definitions for each step in the PMSI procedure

Step	Target Behavior	Definition
1	**Offer choice**	The typical adolescent will select two potential reinforcers provided by the researcher. The typical adolescent should face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"
2	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity. Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.
3	**Provide access to chosen activity or item**	The typical adolescent should provide immediate access if the adolescent with ASD chooses an activity.
4	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity. Engaging in the chosen activity is defined as using the activity materials in proximity (i.e., within 61 cm) to the typical peer, in a similar manner as the typical peer.
5	**Pair social attention with chosen activity**	After providing immediate access to the chosen item, the typical adolescent should smile and make positive statements to the adolescent with ASD (e.g., "Cool, this is going to be fun!", "Jenga® is one of my favorite games!", "I heard you're really good at this!" or something similar) as he/she begins participating in the chosen activity.
6	**Interrupt anti-social or non-responses**	If the adolescent with ASD's response to the offer of choice is anti-social, for example he/she does not respond or makes an off-topic comment the typical adolescent should use an informal, conversational tone of voice to

interrupt the anti-social response saying "Which one should we play first?" or "Which is your favorite?"or something similar.

If the adolescent with ASD does not engage in the chosen activity, for example he/she walks away, the typical adolescent should interrupt the anti-social response by walking into the line of sight of the adolescent with ASD and use an informal, conversational tone of voice to say, Name, come back and play (Name of Chosen Activity)."

If the adolescent with ASD engages in the chosen activity alone or in a manner that differs from that of the typical adolescent, he or she should use an informal, conversational tone of voice to say, "Name, let's play UNO ® together like this (e.g., demonstrating how the activity is typically performed)!" or something similar.

7	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity.
		A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.
		Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.
8	**Explicit redirection**	If the learner does not respond to the first attempt at interrupting an anti-social or non-response, the typical adolescent should keep the tone and volume of his/her voice even and in a medium range, louder than normal conversation, but softer than a shout and repeat the original interrupting statement by saying, "Name, do you want to play Jenga ® or Zen Art ®?" or "Name, come back and play (Name of Chosen Activity)" or "Name, let's play Jenga ® together like this!"
9	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to the SD. This will involve choosing one of the presented items or engaging in the chosen activity.
		A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.

		Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.
10	**Record the chosen activity on the Preferred Items Data Sheet**	The name of the activity that was chosen by the adolescent with ASD should be written next to the words "Selected Item" on the Preferred Items Data Sheet.

APPENDIX F:

PROBE SESSION ACTOR SCRIPTS

Probe Session Actor Scripts: PMSI 1

Step	Target Behavior	Definitions	
		Typical Adolescent	**Actor**
1	**Offer choice**	The typical adolescent will select two potential reinforcers provided by the researcher. The typical adolescent should face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"	
2	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s ($\pm$ 1s) to choose one of the presented items. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.	**Programmed fail:** After counting to 5 ($\pm$ 1s) privately, the actor will not choose an activity.
3	**Interrupt anti-social or non-responses**	If the adolescent with ASD's response to the offer of choice is anti-social, for example he/she does not respond or makes an off-topic comment, the typical adolescent should use an informal, conversational tone of voice to interrupt the anti-social response saying "Which one should we play first?" or "Which is your favorite?"or something similar.	
4	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s ($\pm$ 1s) to respond to choose one of the presented items. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.	**Programmed fail continued:** The actor will count to 5 ($\pm$ 1s) privately and remain unresponsive.
5	**Explicit redirection**	If the learner does not respond to the first attempt at interrupting an anti-social or non-response, the typical adolescent should keep the tone and	

		volume of his/her voice even and in a medium range, slightly louder than normal conversation, but softer than a shout and repeat the original interrupting statement by saying, "Name, do you want to play Jenga ® or Zen Art ®?"	
6	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.

A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity. | The actor will count to five (± 1s) privately and gesture or point toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity. |
| 7 | **Provide access to chosen activity or item** | The typical adolescent should provide immediate access if the adolescent with ASD chooses an activity. | |
| 8 | **Wait five seconds for the learner to respond** | The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to engage in the chosen activity.

Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer. | The actor will use the activity materials in proximity to the typical peer, in a similar manner as the typical peer |
| 9 | **Pair social reinforcement with chosen activity** | After providing immediate access to the chosen item, the typical adolescent should smile and make positive statements to the adolescent with ASD (e.g., "Cool, this is going to be fun!", "Jenga® is one of my favorite games!", "I heard you're really good at this!" or something similar) as he/she begins participating in the chosen activity. | The actor's responses will be compliant with the behavior of the typical adolescent, whether the typical adolescent performs the step correctly or incorrectly. |
| 10 | **Record the chosen activity on the Preferred Items Data Sheet** | The name of the activity that was chosen by the adolescent with ASD should be written next to the words "Selected Item" on the Preferred Items Data Sheet. | No response necessary. |

Probe Session Actor Scripts: PMSI 2

Step	Target Behavior	Definitions	
		Typical Adolescent	**Actor**
1	**Offer choice**	The typical adolescent will select two potential reinforcers provided by the researcher. The typical adolescent should face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"	
2	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.	The actor will count to five (± 1s) privately and gesture or point toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.
3	**Provide access to chosen activity**	The typical adolescent should provide immediate access if the adolescent with ASD chooses an activity.	
4	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to engage in the chosen activity. Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.	**Programmed Fail:** The actor will count to five (± 1s) privately and walk 1-2 steps away from the typical adolescent.
5	**Interrupt anti-social or non-responses**	If the adolescent with ASD does not engage in the chosen activity, for example he/she walks away, the typical adolescent should interrupt the anti-social response by walking into the line of sight of the adolescent with ASD and using an informal, conversational tone of voice say, Name, come back and play (Name of Chosen Activity)."	
6	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to the SD. This	**Programmed fail continued:** The actor will count to 5 (± 1s)

		will involve engaging in the chosen activity. Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.	privately and remain a few steps away from the typical adolescent.
7	**Explicit redirection**	If the learner does not respond to the first attempt at interrupting an anti-social or non-response, the typical adolescent should keep the tone and volume of his/her voice even and in a medium range, louder than normal conversation, but softer than a shout and repeat the original interrupting statement by saying, "Name, come back and play (Name of Chosen Activity)".	
8	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to engage in the chosen activity. Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.	The actor will use the activity materials in proximity to the typical peer, in a similar manner as the typical peer.
9	**Pair social reinforcement with chosen activity**	After providing immediate access to the chosen item, the typical adolescent should smile and make positive statements to the adolescent with ASD (e.g., "Cool, this is going to be fun!", "Jenga® is one of my favorite games!", "I heard you're really good at this!" or something similar) as he/she begins participating in the chosen activity.	The actor's responses will be compliant with the behavior of the typical adolescent, whether the typical adolescent performs the step correctly or incorrectly.
10	**Record the chosen activity on the Preferred Items Data Sheet**	The name of the activity that was chosen by the adolescent with ASD should be written next to the words "Selected Item" on the Preferred Items Data Sheet.	No response necessary.

Probe Session Actor Scripts: PMSI 3

Step	Target Behavior	Definitions	
		Typical Adolescent	**Actor**
1	**Offer choice**	The typical adolescent will select two potential reinforcers provided by the researcher. The typical adolescent should face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"	
2	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.	**Programmed fail:** The actor will say an off-topic comment (e.g., Can we go get frozen yogurt? Or I heard it's supposed to rain today!)
3	**Interrupt anti-social or non-responses**	If the adolescent with ASD's response to the offer of choice is anti-social, for example he/she does not respond or makes an off-topic comment, the typical adolescent should use an informal, conversational tone of voice to interrupt the anti-social response saying "Which one should we play first?" or "Which is your favorite?"or something similar.	
4	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items or engaging in the chosen activity. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.	**Programmed fail continued:** The actor will count to 5 (± 1s) privately and repeat the off-topic comment (e.g., Can we go get frozen yogurt? Or I heard it's supposed to rain today!)
5	**Explicit redirection**	If the learner does not respond to the first attempt at interrupting an anti-social or non-response, the typical adolescent should keep the	

		tone and volume of his/her voice even and in a medium range, slightly louder than normal conversation, but softer than a shout and repeat the original interrupting statement by saying, "Name, do you want to play Jenga ® or Zen Art ®?"	
6	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.	The actor will count to five (± 1s) privately and gesture or point toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.
7	**Provide access to chosen activity or item**	The typical adolescent should provide immediate access if the adolescent with ASD chooses an activity.	
8	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to engage in the chosen activity. Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.	The actor will use the activity materials in proximity to the typical peer, in a similar manner as the typical peer.
9	**Pair social reinforcement with chosen activity**	After providing immediate access to the chosen item, the typical adolescent should smile and make positive statements to the adolescent with ASD (e.g., "Cool, this is going to be fun!", "Jenga® is one of my favorite games!", "I heard you're really good at this!" or something similar) as he/she begins participating in the chosen activity.	The actor's responses will be compliant with the behavior of the typical adolescent, whether the typical adolescent performs the step correctly or incorrectly.
10	**Record the chosen activity on the Preferred Items Data Sheet**	The name of the activity that was chosen by the adolescent with ASD should be written next to the words "Selected Item" on the Preferred Items Data Sheet.	No response necessary.

Probe Session Actor Scripts: PMSI 4

Step	Target Behavior	Definitions	
		Typical Adolescent	**Actor**
1	**Offer choice**	The typical adolescent will select two potential reinforcers provided by the researcher. The typical adolescent should face the adolescent with ASD and gain his/her attention by saying, "(Name), want to play (Name of Potential Reinforcer) or (Name of Potential Reinforcer)?"	
2	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items or engaging in the chosen activity. A choice is defined as the adolescent with ASD gesturing or pointing toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.	The actor will count to five (± 1s) privately and gesture or point toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.
3	**Provide access to chosen activity**	The typical adolescent should provide immediate access if the adolescent with ASD chooses an activity.	
4	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to respond to the SD. This will involve engaging in the chosen activity. Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.	**Programmed Fail:** The actor will count to five (± 1s) privately and begin using the activity materials differently than the typical adolescent (e.g., laying Jenga ® sticks on a flat surface, parallel to one another), in a manner that is incompatible with interactive play.
5	**Interrupt anti-social or non-responses**	If the adolescent with ASD engages in the chosen activity alone or in a manner that differs from that of the typical adolescent, he or she should use an informal, conversational tone of voice to say, "Name, let's play UNO ® together like this (e.g., demonstrating how the activity is typically performed)!" or something similar.	

6	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to engage in the chosen activity. Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.	**Programmed fail continued:** The actor will continue using the activity materials differently than the typical adolescent (e.g., laying Jenga ® sticks on a flat surface, parallel to one another), in a manner that is incompatible with interactive play.
7	**Explicit redirection**	If the learner does not respond to the first attempt at interrupting an anti-social or non-response, the typical adolescent should keep the tone and volume of his/her voice even and in a medium range, slightly louder than normal conversation, but softer than a shout and repeat the original interrupting statement by saying, "Name, let's play Jenga ® together like this!"	
8	**Wait five seconds for the learner to respond**	The typical adolescent should allow the adolescent with ASD up to 5s (± 1s) to engage in the chosen activity. Engaging in the chosen activity is defined as using the activity materials in proximity to the typical peer, in a similar manner as the typical peer.	The actor will use the activity materials in proximity to the typical peer, in a similar manner as the typical peer.
9	**Pair social reinforcement with chosen activity**	After providing immediate access to the chosen item, the typical adolescent should smile and make positive statements to the adolescent with ASD (e.g., "Cool, this is going to be fun!", "Jenga® is one of my favorite games!", "I heard you're really good at this!" or something similar) as he/she begins participating in the chosen activity.	The actor's responses will be compliant with the behavior of the typical adolescent, regardless if the typical adolescent performs the step correctly or incorrectly.
10	**Record the chosen activity on the Preferred Items Data Sheet**	The name of the activity that was chosen by the adolescent with ASD should be written next to the words "Selected Item" on the Preferred Items Data Sheet.	No response necessary.

APPENDIX G:

TRAINING VIDEO SCRIPTS

Training Video Script: PMSI 1 (initial fail occurs prior to choosing an item; unresponsive)

Typical adolescent: *select two potential reinforcers from the table. Face the adolescent with ASD and casually gain his/her attention by saying,* "Hey Name, why don't we play Jenga or do Zen Art?" *Allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.*

Adolescent with ASD: *After counting to 5 (± 1s) privately, the teen with ASD will not choose an activity. He/she may look elsewhere and is not currently engaged or oriented toward choosing an activity.*

Typical adolescent: *use a clear, informal, conversational tone of voice to gain the teen with ASD's attention by saying,* "Hey Name, which one should we play first, Jenga or Zen Art?" *Allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.*

Adolescent with ASD: *After counting to 5 (± 1s) privately, the teen with ASD will not choose an activity. He/she may look elsewhere and is not currently engaged or oriented toward choosing an activity.*

Typical adolescent: *Using a firm, medium tone, slightly louder than normal conversation, but softer than a shout, look directly at the teen with ASD and say,* "Name, do you want to play Jenga ® or Zen Art ®?" *Use your hand to gesture toward each activity as you say it. Allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.*

Adolescent with ASD: *count to five (± 1s) privately and gesture or point toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.*

Typical adolescent: *provide immediate access if the adolescent with ASD chooses an activity, saying,* "Oh, you want to play Jenga? Great choice!" *Begin setting up the game right away and allow the adolescent with ASD up to 5s (± 1s) to respond to engage in the chosen activity.*

Adolescent with ASD: *count to five (± 1s) privately and use the activity materials in proximity to the typical peer, in a similar manner as the typical peer.*

Typical adolescent: *smile and make positive statements to the adolescent with ASD* "I heard you're really good at this!" *as he/she begins participating in the chosen activity. When he/she successfully places a Jenga piece smile and say,* "Nice move!"

Adolescent with ASD: *comply with the behavior of the typical adolescent, playing Jenga similar to him/her.*

Typical adolescent: *quickly write the name of the activity that was chosen by the adolescent with ASD next to the words "Selected Item" on the Preferred Items Data Sheet and resume playing Jenga.*

Training Video Script: PMSI 2 (initial fail occurs following choosing an item and prior to engaging in the chosen activity; walks away)

Typical adolescent: *standing between the foosball and TV, face the adolescent with ASD and casually gain his/her attention by saying,* "Hey Name, want to play foosball or Halo with me?" *Allow the adolescent with ASD up to 5s (±1s) to choose one of the presented items.*

Adolescent with ASD: *count to five (±1s) privately and gesture or point toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.*

Typical adolescent: *provide immediate access if the adolescent with ASD chooses an activity, saying,* "Oh, you want to play Foosball? Great choice!" *Begin setting up the game right away and allow the adolescent with ASD up to 5s (±1s) to respond to engage in the chosen activity.*

Adolescent with ASD: *after counting to five (±1s) privately, walk 1-2 steps away from the typical adolescent.*

Typical adolescent: *walk into the line of sight of the adolescent with ASD and use a clear, informal, conversational tone of voice to gain the teen with ASD's attention by saying* "Name, come on let's play Foosball!"

Adolescent with ASD: *After counting to 5 (±1s) privately, the teen with ASD will not move toward the activity. He/she may look elsewhere and is not currently engaged or oriented toward choosing an activity.*

Typical adolescent: *Using a firm, medium tone, louder than normal conversation, but softer than a shout, look directly at the teen with ASD and say,* "Name, it's time to play Foosball!" *Use your hand to gesture toward each activity as you say it. Allow the adolescent with ASD up to 5s (±1s) to engage in Foosball.*

Adolescent with ASD: *count to five (±1s) privately and engage materials in proximity to the typical peer, in a similar manner as the typical peer.*

Typical adolescent: *smile and make positive statements to the adolescent with ASD* "I heard you're really good at Foosball!" *as he/she begins participating in the chosen activity. When he/she successfully hits the ball smile and say,* "Nice move!"

Adolescent with ASD: *comply with the behavior of the typical adolescent, playing Foosball similar to him/her.*

Typical adolescent: *quickly write the name of the activity that was chosen by the adolescent with ASD next to the words "Selected Item" on the Preferred Items Data Sheet and resume playing Jenga.*

Training Video Script: PMSI 3 (initial fail occurs prior to making choice; off-topic comment/request)

Typical adolescent: *select two potential reinforcers from the table. Face the adolescent with ASD and casually gain his/her attention by saying,* "Hey Name, why don't we play Jenga or do Zen Art?" *Allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.*

Adolescent with ASD: *After counting to 5 (± 1s) privately, the teen with ASD will* say an off-topic comment "Can we go get frozen yogurt?"

Typical adolescent: *use a clear, informal, conversational tone of voice to gain the teen with ASD's attention by saying,* "Hey Name, which one should we play first, Jenga or Zen Art?" *Allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.*

Adolescent with ASD: *After counting to 5 (± 1s) privately, the teen with ASD will repeat the off-topic comment* "I really want to get frozen yogurt."

Typical adolescent: *Using a firm, medium tone, slightly louder than normal conversation, but softer than a shout, look directly at the teen with ASD and say,* "Name, do you want to play Jenga ® or Zen Art ®?" *Use your hand to gesture toward each activity as you say it. Allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.*

Adolescent with ASD: *count to five (± 1s) privately and gesture or point toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.*

Typical adolescent: *provide immediate access if the adolescent with ASD chooses an activity, saying,* "Oh, you want to play Jenga? Great choice!" *Begin setting up the game right away and allow the adolescent with ASD up to 5s (± 1s) to respond to engage in the chosen activity.*

Adolescent with ASD: *count to five (± 1s) privately and use the activity materials in proximity to the typical peer, in a similar manner as the typical peer.*

Typical adolescent: *smile and make positive statements to the adolescent with ASD* "I heard you're really good at this!" *as he/she begins participating in the chosen activity. When he/she successfully places a Jenga piece smile and say,* "Nice move!"

Adolescent with ASD: *comply with the behavior of the typical adolescent, playing Jenga similar to him/her.*

Typical adolescent: *quickly write the name of the activity that was chosen by the adolescent with ASD next to the words "Selected Item" on the Preferred Items Data Sheet and resume playing Jenga.*

Training Video Script: PMSI 4 (initial fail occurs after choosing and prior to engaging in activity; using activity materials in a manner incompatible with social interaction)

Typical adolescent: *standing between the foosball and TV, face the adolescent with ASD and casually gain his/her attention by saying,* "Hey Name, why don't we play Jenga ® or Zen Art ®?" *Allow the adolescent with ASD up to 5s (± 1s) to choose one of the presented items.*

Adolescent with ASD: *count to five (± 1s) privately and gesture or point toward the item, touching the item with any part of their hand, verbally naming, or verbally requesting one activity.*

Typical adolescent: *provide immediate access if the adolescent with ASD chooses an activity, saying,* "Oh, you want to play Jenga? Great choice!" *Begin setting up the game right away and allow the adolescent with ASD up to 5s (± 1s) to respond to engage in the chosen activity.*

Adolescent with ASD: *after counting to five (± 1s) privately, begin using the activity materials differently than the typical adolescent (e.g., laying Jenga® sticks on a flat surface, parallel to one another), in a manner incompatible with interactive play.*

Typical adolescent: *look at the adolescent with ASD and use a clear, informal, conversational tone of voice to gain his/her attention by saying* "Name, come on let's play Jenga ® together like this!" *demonstrating how the activity is typically performed.*

Adolescent with ASD: *after counting to five (± 1s) privately, continue using the activity materials differently than the typical adolescent (e.g., laying Jenga® sticks on a flat surface, parallel to one another), in a manner incompatible with interactive play.*

Typical adolescent: *Using a firm, medium tone, louder than normal conversation, but softer than a shout, look directly at the teen with ASD and say,* "Name, play like this, together!" *demonstrating how the activity is typically performed. Allow the adolescent with ASD up to 5s (± 1s) to engage in Foosball.*

Adolescent with ASD: *count to five (± 1s) privately and engage materials in proximity to the typical peer, in a similar manner as the typical peer.*

Typical adolescent: *smile and make positive statements to the adolescent with ASD* "Now you've got it!" *as he/she begins participating in the chosen activity. When he/she successfully hits the ball smile and say,* "Nice move!"

Adolescent with ASD: *comply with the behavior of the typical adolescent, playing Jenga similar to him/her.*

Typical adolescent: *quickly write the name of the activity that was chosen by the adolescent with ASD next to the words "Selected Item" on the Preferred Items Data Sheet and resume playing Jenga.*

APPENDIX H:

PREFERRED REINFORCER LIST

Preferred Reinforcer List

Student Name: _____

Preferred Items Based on Parent & Teacher Lists	Ranking List
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Rank Order of Items Based on Peer Preference Assessments

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

APPENDIX I:

PREFERRED ITEMS DATA SHEET

Preferred Items Data Sheet

Buddy: **Peer:**

Trial 1 Date: **Trial 2 Date:**   **Trial 3 Date:**

Array Items   **Array Items**   **Array Items**

Selected Item: **Selected Item:**   **Selected Item:**

Trial 4 Date: **Trial 5 Date:**   **Trial 6 Date:**

Array Items   **Array Items**   **Array Items**

Selected Item: **Selected Item:**   **Selected Item:**

Notes:

APPENDIX J:

SOCIAL INTERACTION MEASUREMENT SHEET

Student_____ Primary Observer initials_____ Secondary Observer initials_____ Page

(circle) 1 2 3 4 5 6 7

Interval	Date	Social Interaction for Student with ASD		
		Proximity to Peer	Interacting with Peer	Consistent Engagement
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Observer Notes:

APPENDIX K:

ACCEPTABILITY QUESTIONNAIRE

Acceptability Questionnaire for Typical Adolescents

Questions about VMT Training

1. Compared to the peer training when you started the peer hangouts, how helpful was the video modeling training on peer mediated social interaction? (*Circle one*)

Much less effective   Somewhat less effective   About the same   Somewhat more effective Much more effective

2. How long was the video modeling training? (*Circle one*)

Not long at all   A little long   Somewhat long   Quite long   Extremely long

3. How likely would you be to recommend video modeling training to other peer groups? (*Circle one*)

Not at all likely   A little likely   Somewhat likely   Quite likely   Extremely likely

4. How likely would you be to participate in video modeling to learn other behavioral practices/strategies in the future? (*Circle one*)

Not at all likely   A little likely   Somewhat likely   Quite likely   Extremely likely

5. What was the best thing about video modeling training?

6. What was the worst thing about video modeling training?

7. If you could change one thing about this training opportunity, what would it be?

Acceptability Questionnaire for Peers (continued)

Questions about Peer Support Arrangements

1. How helpful do you think the evidence-based strategies were in improving social interactions for your buddies with ASD? (*Circle one*)

   Completely helpful   *A little helpful*   *Somewhat helpful*   *Quite helpful*   *Extremely helpful*

2. How difficult was it to use the evidence-based strategies you learned with video modeling with your buddies? (*Circle one*)

   Not difficult at all   *A little difficult*   *Somewhat difficult*   *Quite difficult*   *Extremely difficult*

3. How likely are you to keep using the evidence-based strategies with your buddies now that the research project is over? (*Circle one*)

   Not at all likely   *A little likely*   *Somewhat likely*   *Quite likely*   *Extremely likely*

4. How likely would you be to recommend the use of evidence-based strategies with other peers? (*Circle one*)

   Not at all likely   *A little likely*   *Somewhat likely*   *Quite likely*   *Extremely likely*

5. What are some examples of things you saw that told you evidence-based strategies were successful?

6. What was the most challenging thing about using evidence-based strategies with your buddies?

7. Looking back on this experience, what advice do you have for peers who are using evidence-based practices with a buddy in a peer program for the first time?

APPENDIX L:

CONSENTS, PERMISSION, AND ASSENT FORMS

Parental Permission Form

September 21, 2017

Dear Parent or Guardian,

We are using an evidence-based practice called video modeling, to teach behavioral strategies to typical peers for use in peer mediated interventions for teens and young adults with autism and other social skills deficits. This letter is to request your permission for your child to be included in the program and for the data we collect to help us guide current and future instruction.

Video modeling and peer mediated instruction are based on research demonstrating effective practices for individuals with autism and involves instruction in social and behavioral skills identified as skills that teens and young adults with autism may need to learn. The potential benefits to your child for taking part in this program are that he or she may learn new skills for interacting with and promoting social competence for individuals with autism. The acquisition of such skills may be beneficial for individuals with an interest in future careers in education, psychology, social work, and other related fields. During instruction with video modeling and peer mediated intervention sessions, your child will have opportunities to interact with therapists, peers, and teens and young adults with autism and other social skills deficits, in a fun and safe manner. Additionally, your child will participate in attempts to increase social and functional behaviors for teens and young adults with autism.

You can indicate your permission for your child to participate by signing the letter and returning it to research team member, Mari MacFarland. If after you sign and return the letter you change your mind, simply let Mari know and your child will not be asked to participate. There is no penalty for refusing to participate.

If you have concerns or questions about video modeling, please contact Mari MacFarland at 734-674-6916, or macfar31@msu.edu. You may also contact a member of the research team, Mari MacFarland or Dr. Joshua Plavnick, using the contact information below.

Sincerely,

Mari MacFarland, M. Ed   Joshua Plavnick, PhD
Doctoral Candidate   Assistant Professor
Michigan State University   Michigan State University
Erickson Hall   341 Erickson Hall
620 Farm Lane   620 Farm Lane
East Lansing, MI. 48824   East Lansing, MI. 48824
734-674-6916   734-395-6285
macfar31@msu.edu   plavnick@msu.edu

PERMISSION FOR CHILD'S PARTICIPATION

I consent to the participation of my child in the video modeling /peer mediated intervention program.   I have read the attached letter and the project has been thoroughly explained to me by a member of the research team.

I acknowledge that I have had the opportunity to obtain additional information regarding the project and that any questions I have raised have been answered to my full satisfaction. Furthermore, I understand that I am free to withdraw my consent at any time and to discontinue participation in the project without prejudice.

Finally, I acknowledge that I have read the consent form. I sign it freely and voluntarily. A copy has been given to me.

Child's Name: _____   Age: _____

Relationship to child: _____

Signed: _____   Date: _____
           (Parent or guardian)

I agree to allow video recording of program activities:
           ☐ **Yes**   ☐ **No**   **Initials_____**

Participant Assent Form

Michigan State University

Department of Counseling, Educational Psychology, and Special Education

Title of Project: "Using Video Modeling to Teach Youth to Deliver Evidence-based Practices for Individuals with ASD"

Student's Letter of Consent for Participation

Principal Investigator: Mari MacFarland

You have been selected to participate in a research study about delivering effective educational practices to students with disabilities in their classroom setting.

If you agree to participate, researchers and teachers will then help you learn new things that can improve school success for your peers with autism and other social skills challenges. Your participation in this is voluntary. This means that you can choose whether or not you want to do this. Even after we start, you can decide to stop, and we will not include your information in our study.

After I finish telling you other information, I will ask if you are willing to sign your name to show us that you are willing to participate.

If you have questions about the study, contact Mari MacFarland, 341 Erickson Hall, Michigan State University, East Lansing, MI 48824, Phone: 734-674-6916, Email: macfar31@msu.edu

In case you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail irb@msu.edu or regular mail at 207 Olds Hall, MSU, East Lansing, MI 48824. I can give you these phone numbers and addresses to take with you if you want. Do you have any questions?

If you are willing to participate in completing these activities, please write your name here.

Child's Signature _____ Date_____

Witness's Signature_____ Date_____

<p style="text-align: center;">Parent Participation
Form</p>

Research Participant Information and Consent Form

You are being asked to participate in a research study. Researchers are required to provide a consent form to inform you about the research study, to convey that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision. You should feel free to ask the researchers any questions you may have.

Study Title: Effects of Video Modeling on Peer Mediated Intervention for Adolescents with Autism Spectrum Disorder
Researcher and Title: Mari MacFarland, Doctoral Candidate

Responsible Project Investigator: Joshua Plavnick, Assistant Professor of Special

Education

Department and Institution: Dept. of Counseling, Educational Psychology, & Special Education at Michigan State University
Address and Contact Information: 620 Farm Lane, #341; Erickson Hall; East Lansing, MI; 48824. Phone: 517-432-8346; Email: plavnick@msu.edu

PURPOSE OF RESEARCH
You are being asked to participate in a research study of video modeling training for use in a peer mediated intervention, promoting social behavior for children with autism. The purpose of this research study is to learn about new ways to use evidence-based practices (i.e., video modeling and peer mediated intervention) to promote social skills for individuals with autism. There is currently very little information about the best way to do this. The investigators have created a technique for training typical peers to use behavioral practices and are interested in finding out if the procedures lead to changes in social behavior for your child and to obtain information regarding your opinion of the goals, procedures, and outcomes of the technique.

Your participation in this study will involve approximately 2 hours of your time spread over a period of 4 months. In the entire study, 11 people (5 typical peers, 3 adolescents with autism, and a parent for each child with autism) are being asked to participate.

WHAT YOU WILL DO
Prior to the start of the social skills training procedures, you will be asked to complete a short survey providing some information to the researchers. The information will include ratings of the social skills your child currently demonstrates and a checklist of items and activities your child prefers. You may choose not to answer a question on this survey for any reason. After the completion of the study, you will be asked to complete identical

surveys to those completed prior to your child participating in the instructional sessions. You will be provided with any findings specific to your child.

POTENTIAL BENEFITS
The potential benefits to you for taking part in this study are that your child enhances their social skills and increases social interaction with same aged peers. You may also learn about ways to teach your child additional social skills through our parent meeting, where we will share study outcomes once the study has concluded.   Research is designed to benefit society by gaining new knowledge.

POTENTIAL RISKS
There are no foreseeable risks associated with participation in this study.

PRIVACY AND CONFIDENTIALITY
The data for this project will be kept confidential. All data will be collected with paper and pencil or video recording on a password protected tablet. Data will be stored in a locked file cabinet inside a locked office or on encrypted external hard-drive. Members of the research team and the Michigan State University Institutional Review Board will be the only people to have access to data with identifying information. The results of this study may be published or presented at professional meetings but the identities of all research participants will remain anonymous. Although we will make every effort to keep your data confidential there are certain times, such as a court order, where we may have to disclose your data.

YOUR RIGHTS TO PARTICIPATE, SAY NO, OR WITHDRAW
Participation is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. You have the right to say no. You may change your mind at any time and withdraw without penalty to you or your child. You may choose not to answer specific questions or to stop participating at any time. Your child can still participate if you choose not to participate or withdraw from this study at any time. You will be told of any significant findings that develop during the course of the study that may influence your willingness to continue to participate in the research.

COSTS FOR BEING IN THE STUDY
Procedures being performed for research purposes only will be provided free of charge by members of the research team.

CONTACT INFORMATION
If you have concerns or questions about this study, such as scientific issues, how to do any part of it, or to report an injury, please contact the researchers (Mari MacFarland, Doctoral Candidate; CEPSE; 620 Farm Lane; Room 447; Erickson Hall; East Lansing, MI 48824; email: macfar31@msu.edu; phone: 734-674-6916 or Joshua Plavnick, PhD; 620 Farm Lane, #341; Erickson Hall; East Lansing, MI., 48824; email: plavnick@msu.edu; phone: 517-432-8346).

If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail irb@msu.edu or regular mail at Olds Hall, 408 West Circle Drive #207, MSU, East Lansing, MI 48824.

DOCUMENTATION OF INFORMED CONSENT

Your signature below means that you voluntarily agree to participate in this research

study.

_____ _____
Signature   Date

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REFERENCES

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