

PEER NETWORK INTERVENTIONS FOR SECONDARY STUDENTS WITH ASD:
EFFECTS ON SOCIAL INTERACTION AND BULLYING VICTIMIZATION

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ABSTRACT

Melissa A. Sreckovic: Peer Network Interventions for Secondary Students with ASD: Effects on Social Interaction and Bullying Victimization
(Under the direction of Drs. Harriet Able and Kara Hume)

Students with autism spectrum disorder (ASD) may experience limited positive social interactions with their peers and high rates of bullying victimization, especially during adolescence when peer groups become more selective. Limited positive social interactions with peers and bullying victimization have been associated with a myriad of negative consequences. Adolescents with ASD often require targeted supports to help them develop positive peer relationships and to reduce frequency of bullying victimization. This study examined the effects of a school-based, social intervention for high school students with ASD. Three adolescent males with ASD participated in a peer network intervention. A single case, multiple-probe across participants design was used to evaluate the effects of the intervention on two elements of social interaction: initiations and responses to and from students with ASD. Additionally, this study employed questionnaires at four time points to explore the effects of the intervention on frequency of social contacts and bullying victimization of the participants with ASD.

This study demonstrated that the implementation of the peer network intervention resulted in increases in initiations and responses to and from participants with ASD. Overall increases in social interaction, as indicated by comparing interactions across participants and phases, were substantial. Findings provide evidence that peer network interventions are effective for increasing the social interactions of high school students with ASD. Further, results indicate preliminary support for the use of peer networks as an intervention to increase rates of social contacts and reduce rates of bullying victimization among students with ASD.

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Chapter 1

Introduction

Since the initial establishment of the Education for All Handicapped Children Act of 1975, federal legislation and school reforms have focused on ways to provide equal educational opportunities for students with disabilities and provide access to the general education curriculum. Despite increased access to Free and Appropriate Public Education (FAPE) and to the least restricted environment under the Individuals with Disabilities Education Improvement Act (IDEA, 2004), secondary students with autism spectrum disorder (ASD) often experience difficulties accessing afforded rights within educational environments. Indeed, two critical problems in the school context can severely impact the full participation of secondary students with ASD: limited social interactions with peers (Wagner, Cadwallader, Garza, & Cameto, 2004) and frequent bullying victimization (Zablotsky, Bradshaw, Anderson, & Law, 2013).

Statement of the Problem

Limited social interactions with peers and frequent bullying victimization are associated with a myriad of negative consequences and thus require additional research to provide students with a free and appropriate public education that fosters full participation in academic and social domains of secondary education. The negative consequences of limited social interactions and frequent bullying victimization not only impact students with ASD and their families, but school administration and teachers experience challenges in providing these students the support needed to succeed academically, socially, and emotionally. Educators are increasingly finding their roles and responsibilities are expanding and report not being able to adequately provide the supports secondary students with ASD need in their classes (Hedges et al., 2014). Even with the abundance of research based practices available for individuals with ASD, educators struggle to

meet their multifaceted needs. In fact, in a recent survey, general and special educators expressed only moderate levels of confidence implementing evidence-based practices with students with ASD, with special educators expressing more confidence than general educators (Brock, Huber, Carter, Juarez, & Wareen, 2014). This is concerning, especially since students with ASD are increasingly being educated in general education classrooms for 80% or more of the school day (National Center for Educational Statistics, 2012). Further, some students with ASD do not qualify for special education services (because they are academically on or above grade level) despite their significant social challenges (Lukasik, 2011), resulting in general educators having the sole responsibility of providing social supports. As the prevalence of ASD continues to rise, schools are seeing a significant increase in children and adolescents with ASD being educated in primary and secondary school settings. In 2010, the Center for Disease Control and Prevention (CDC; 2014) estimated 1 in every 68 children eight years of age in the United States had been diagnosed with ASD. Although the prevalence estimates of ASD have been higher in younger grades in the past, recent research indicates for the first time prevalence of ASD in 14-17 year old cohorts matches that of younger cohorts (Blumberg et al., 2013). As both the prevalence of ASD increases among youth and the press for their inclusion continues, high school teachers need interventions that can be feasibly integrated into the school day that address the social deficits of students with ASD.

Students with ASD bring a myriad of social challenges to secondary education classrooms, resulting in a continuing need to provide interventions to ensure full social inclusion and protection from negative social interactions. Currently, the literature base is limited in social interventions for secondary students with ASD. For example, in a review of interventions aimed at increasing the social behavior of individuals with ASD, Reichow and Volkmar (2009) identified 66 studies and only three included adolescents or adults. Similarly, in a meta-analysis of 55 school-based social skills intervention studies, only five studies included secondary-aged students with ASD (Bellini, Peters, Laurenbenner, & Hopf, 2007). More recently, in a review of intervention studies addressing social interaction outcomes, Carter and colleagues identified 55

studies implemented with school-age youth with ASD and only 14 studies included participants in middle or high school (Carter, Sisco, Chung, & Stanton-Chapman, 2010). Unfortunately, even less is known about interventions to reduce rates of bullying victimization among school-age youth with ASD. Only one study, to the author's knowledge, has been conducted that examined the effects of a program on rates of bullying victimization among youth with ASD (Humphrey, Lendrum, Barlow, Wigelsworth, & Squires, 2013). While statistically significant effects were found in relation to increasing positive relationships and decreasing bullying experiences, the effect sizes were small and data were aggregated across disability groups so it is unknown how effective the program was specifically for students with ASD. While anti-bullying and tolerance programs are increasingly more common in schools to address bullying among the general population, two meta-analyses of anti-bullying programs indicated very few programs are actually effective and those that are effective have produced minimal overall reductions in bullying victimization rates (Merrell, Gueldner, Ross, & Isava, 2008; Ttofi & Farrington, 2011).

Without targeted interventions and intentional efforts to foster meaningful relationships for students with ASD and decrease victimization rates, students with ASD are unlikely to develop relationships (Carter, Sisco, Brown, Brickham, & Al-Khabbaz, 2008) and are at risk for continued and chronic victimization (Cappadocia, Weiss, & Pepler, 2012). The remainder of this chapter will explore these two critical issues in more detail. First, an overview of why social interactions may be more challenging for secondary students with ASD is provided, followed by research documenting the social interaction patterns and friendships of secondary students with ASD. Next, a brief overview of the victimization of students with ASD during adolescence is presented including research documenting the high prevalence rate of victimization among this subgroup. Then, the negative consequences associated with limited social interactions and bullying victimization are provided. Finally, an overview of the purpose of the study is presented.

Social Challenges for Secondary Students with ASD

Engaging in positive social interactions can be challenging for students with ASD because of deficits in social-communication skills and behavioral characteristics (Rao, Beidel, & Murray, 2008; Weiss & Harris, 2001). To engage in positive social interactions one needs to understand the social conventions of joining and exiting a conversation and appropriately responding to verbal and non-verbal communication. For students with ASD, making initiations and responding to peers can be quite challenging. Individuals with ASD often have difficulty using appropriate greetings, establishing joint attention, and introducing topics of interest and relevance, all of which can make initiating interactions difficult (Paul, Orlovski, Marcinko, & Volkmar, 2009; Weiss & Harris, 2001). Further, difficulties understanding facial expressions, humor, and other people's feelings can result in the individual with ASD not fully comprehending the communicative intent of the message, thus making responding difficult (Weiss & Harris, 2001). Some students with ASD who have narrow interests may monopolize a conversation and not allow others to contribute their thoughts and/or interests resulting in an unbalanced conversation. Researchers have also noted an initial increase in aggression, self-injurious behavior, anxiety, and depression during adolescence (Hammond, & Hoffman, 2014; Shall & McDonough, 2010), which may further make engaging in social interactions difficult. For example, students with ASD may experience anxiety when attempting to initiate to peers and/or peers may be hesitant to initiate a conversation with a student with ASD who engages in self-injurious behaviors or expresses symptoms of depression.

As students transition to secondary settings these social challenges often become more prominent (Tantam, 2003), possibly due to the social structure of secondary settings and the increasing importance of the peer group. When students transition to middle and high school they are expected to navigate multiple teachers and peers daily and adjust their social behavior to the relevant context (Tobias, 2009). For example, students need to discriminate between appropriate responses to adults and appropriate responses to peers. Further, students need to recognize when initiating a conversation with peers is appropriate, as some teachers may allow students to talk in class and others may not. During adolescence peer culture sets the

expectations for student behaviors (Lynch, Lerner, & Leventhal, 2013), which can further create challenges for students with ASD, as they have to not only successfully perform the behaviors, but be able to discriminate what behaviors are expected across various social contexts. Furthermore, during adolescence peer relationships become more complex and friendships become more selective, making developing relationships challenging (Brown & Klute, 2003). Given that friendship development is highly dependent on frequent social interactions (Fehr, 2009), challenges in initiating and responding to peers can have a direct impact on friendship development. Indeed, adolescent students with ASD have reported difficulties in establishing friendships and noted difficulties were linked to not initiating interactions (Daniel & Billingsley, 2010). Other contributing factors noted by adolescents included being hesitant to try and establish friends to protect oneself from being exploited and having difficulty recognizing who might be a good choice as a friend (Daniel & Billingsley, 2010). Thus, the combination of social skill deficits, complexity of high school contexts, and students with ASD struggling to identify potential friends and initiate interactions can make social interactions and developing peer relationships extremely difficult for these students. Indeed, despite inclusion initiatives, research suggests students with ASD engage in limited social interactions with peers and have significantly fewer reciprocal and high quality friendships compared to their typically developing peers (Humphrey & Symes, 2011; Locke, Ishijima, Kasari, & London, 2010).

Social interaction patterns and friendships of students with ASD. While inclusion settings provide opportunities for social interaction, secondary students with ASD have been reported to spend significantly more time in solitary activities and less time in cooperative activities at school when compared to their typically developing peers (Bauminger, Shulman, & Agam, 2003; Humphrey & Symes, 2011; Wainscot, Naylor, Sutcliffe, Tantam, & Williams, 2008). Further, research indicates without targeted interventions in place, secondary students with ASD rarely initiate and respond to peers (e.g., Hughes et al., 2011; Morrison, Kamps, Garcia, & Parker, 2001; Schmidt & Stichter, 2012). Therefore, students with ASD attending middle and high schools may not fully participate in or benefit as much as they could be from the

social aspects of school, such as establishing friendships and participating in group activities. Indeed, in a nationally representative longitudinal study of the involvement of adolescent students with disabilities, students with ASD were reported as the least likely to frequently see friends outside of school, receive telephone calls from friends, and get invited to another student's social event (Wagner et al., 2004). Further, only 30% of the students with ASD participated in an organized group activity at school within the previous year (Wagner et al., 2004). Thus, due to lack of social involvement with their peers and high engagement in solitary activities, students with ASD do not get many opportunities to practice social skills and develop the communication skills needed to form relationships with their peers.

Recently, Locke and colleagues (2010) documented in a sample of high school students with and without ASD, those with ASD had significantly poorer friendship quality in relation to companionship, fewer perceived friendships, received more rejection nominations, and reported significantly more feelings of loneliness. Additionally, in relation to the social structure of the classroom, typically developing students had secondary or nuclear centrality (92.4%; i.e., they were significantly connected and recognized in the social structure of their classroom) whereas the majority of students with ASD had peripheral status or were isolated (71.4%; i.e., students with peripheral status were not well connected to the social structure of the classroom and isolated students were not connected at all). More recently, a systematic review of the nature of friendships in youth with ASD revealed that compared to typically developing peers, studies have found youth with ASD have fewer friends, lower frequency of contact with peers outside of school, shorter duration of friendships, and lower level of reciprocity in friendships (Petrina, Carter, & Stephenson, 2014). In relation to friendship quality, the reviewed studies indicated youth with ASD reported lower levels of closeness, security-intimacy, and companionship compared to their typically developing peers (Petrina et al., 2014). Unfortunately, secondary students with ASD not only have limited social interactions and friendships, but research also suggests many of the social interactions they do have with their peers are negative and in the form of bullying victimization (Humphrey & Symes, 2010).

Bullying Victimization of Students with ASD during Adolescence

Bullying is a serious public health issue that has severe implications for those victimized (Gini and Pozzoli, 2009; Swearer, Espelage, Vaillancourt, & Hymel, 2010), especially individuals with ASD (Zablotsky et al., 2013). Bullying is defined as “any unwanted aggressive behavior(s) by another youth or group of youths who are not siblings or current dating partners that involves an observed or perceived power imbalance and is repeated multiple times or is highly likely to be repeated. Bullying may inflict harm or distress on the targeted youth including physical, psychological, social, or educational harm.” (Gladden, Vivolo-Kantor, Hamburger, & Lumpkin, 2014, p. 7). Consequently, bullying victimization is “the experience among children of being a target of the aggressive behavior of other children...” (Hawker & Boulton, 2000, p. 441). Bullying victimization is also cited in the literature as peer victimization or victimization, and individuals who are victimized are also referred to as being bullied.

While the bullying dynamic involves bullies (i.e., the aggressors), victims (i.e., the targets of aggression), bully-victims (i.e., individuals who bully and are also victims), and bystanders (i.e., the observers; Olweus, 1994), research suggests students with ASD are more commonly victims than bullies or bully-victims (Zablotsky et al., 2013). This may not be surprising given that the profiles of students with ASD are often very similar to the profiles of both provocative and passive victims (Sofronoff, Dark, & Stone, 2011). For example, provocative victims are often described in the literature as having poor social skills, few friends, and engaging in behaviors that are annoying to their peers (e.g., calling out in class); however they often do not recognize their actions are irritating others (Orpinas & Horne, 2006). Passive victims often engage in solitary activities, typically do not have a network of friends, tend to be physically weak and may show signs of low self-esteem and insecurity, and are singled out for character traits that make them appear different (e.g., dressing against gender norms or having a disability; Olweus, 1993; Orpinas & Horne, 2006). In comparison, students with ASD often have motor deficits, including clumsiness and odd gait, are typically physically weaker than their peers, may demonstrate behaviors annoying to their peers without knowing due to social skill deficits, have

been reported to frequently work alone and engage in solitary activities, and have significantly fewer friends than their typically developing peers (APA, 2013; Biggs, Simpson, & Gaus, 2010; Heinrichs, 2003; Petrina et al., 2014). Thus, the common characteristics associated with victims of bullying are also characteristics commonly used to describe students with ASD.

While research has documented students with ASD experience bullying victimization across age-groups, recent research suggests victimization is more common during adolescence (Zablotsky et al., 2013). Adolescents often engage in bullying behavior to attain higher social status and to form peer groups (Pellegrini & Van Ryzin, 2011). As adolescent students engage in bullying behavior, students with ASD often become victims due to their social skill deficits. For example, as the peer culture sets the expectations for behaviors, students with ASD may not recognize what behaviors are expected or have the skills in their repertoire to perform the peer-expected behaviors (Attwood, 2007). When students do not demonstrate the peer-expected behaviors they often stand-out from their peer group and are victimized. Further, during adolescence there is a strong push to conform to the expectations of peer culture (Berndt, 1979) and a strong press for homogeneity within the peer group (Bukowski & Sippola, 2001). Given the pressure for homogeneity, when a student does not conform to the expectations of the peer culture it creates conditions for victimization (Bukowski & Sippola, 2001).

Additionally, students with ASD are more likely to become chronic victims, because of their inability to effectively use coping strategies (Cappadocia et al., 2012), such as reporting the bullying (Smith, Shu, & Madsen, 2001), or have had unsuccessful attempts at using coping strategies in the past (Bitsika & Sharpley, 2014). Due to social skill deficits and impaired Theory of Mind (ToM), students with ASD may not recognize when they are being bullied, and therefore often do not tell the bully to stop and do not report it (Attwood, 2004). Further, studies have indicated students with ASD are emotionally reactive (Rieffe, Camodeca, Pouw, Lange, & Stockmann, 2012) and when bullied their reaction reinforces the bully (Kochenderfer-Ladd, Ladd, & Kochel, 2009). Consequently, as students use aggressive strategies to attain social status and form peer affiliations they may be more likely to target students with ASD, because

they are more likely to receive a reaction and less likely to be penalized for it. Indeed, researchers have documented the high prevalence rates of victimization among students with ASD (Sreckovic, Brunsting, & Able, 2014).

Prevalence of bullying victimization among students with ASD. Over the last decade 16 descriptive studies have been conducted documenting the alarmingly high frequency of bullying victimization among school-age youth with ASD (see Appendix A). Research suggests students with ASD are bullied significantly more than the general population (e.g., Little, 2002) and more than their peers with other disabilities (e.g., Humphrey & Symes, 2010; Rowley et al. 2012; Twyman et al., 2010). While prevalence of bullying victimization rates among youth with ASD range across studies, a recent review indicated prevalence estimates reported within the past year to be between 46% and 94% across studies (Sreckovic et al, 2014). The range among studies may be due to variations in methodology (e.g., bullying measure used, characteristics of participants) or selection bias. In contrast, bullying victimization rates among the general adolescent population in the United States were estimated to be 28% in 2011 (Robers, Kemp, & Truman 2013).

Consequences of Limited Social Interactions and Bullying Victimization

Positive peer relationships are important, especially during adolescence as adolescents have reported friends to be the most significant factor influencing quality of life (Helseth & Misvaer, 2010). The limited positive social interactions and friendships students with ASD have with their peers are concerning considering interactions and relationships with peers can make important contributions not only to their overall quality of life, but to their success in school, as well (Rubin, Bukowski, & Laursen, 2009). During school, rejected students are less likely to participate in classroom activities and more likely to perform poorly on achievement assessments (Buhs & Ladd, 2001). Peer rejection can also lead to an array of psychological problems including loneliness (Parker & Asher, 1993) and internalizing and externalizing behavioral problems (Ladd, 2006). Further, adolescents with poor social adjustment are at risk for school drop-out and delinquency (Parker & Asher, 1987). For individuals with ASD, social problems

can persist into adulthood and make navigating work and community relationships challenging (Sperry & Mesibov, 2005). On the contrary, research suggests adults with ASD who have greater quantity and quality of friendships report lower levels of loneliness (Mazurek, 2014). Thus, it is important to address these concerns during adolescence, but it is equally important to address these concerns to prepare individuals with ASD for employment and independent living beyond the high school context and improve overall quality of life.

When these individuals are subjected to bullying victimization, the negative consequences become even greater. When students are victimized they experience an array of negative consequences and are at risk for dropping out of school, developing internalizing and externalizing behavioral problems (Parker & Asher, 1987), and in severe cases, suicide (Olweus, 1993). Research in the general population indicates victimization is significantly related to depression, loneliness, general and social anxiety, low self-esteem, and negative self-concept (Hawker & Boulton, 2000). Researchers have recently documented the negative outcomes students with ASD experienced as a result of being victimized. Zablotsky and colleagues (2013) reported of their participants with ASD who were bullied approximately 8% experienced physical injuries and almost 70% experienced emotional trauma. Further, 14% were scared for their safety (Zablotsky et al., 2013). The National Autistic Society reported students with ASD who were victimized suffered from damaged self-esteem, poorer school work quality, and experienced negative impacts on mental health, social skills, and relationships (Reid & Batten, 2006). Additionally, more than 30% of students with ASD missed school and almost 20% changed schools due to bullying (Reid & Batten, 2006). Moreover, peer victimization has been identified as a risk factor of suicidality in individuals with ASD (Segers & Rawana, 2014). And, both bullying victimization and social rejection have been identified as precipitating factors for offending behavior (Allen et al., 2008).

Intervening to protect students with ASD from experiencing these negative consequences is imperative and if school staff and administrators do not intervene it may result in legal implications. On October 21, 2014, a Dear Colleague letter was released from the Office for

Civil Rights in the U.S. Department of Education that outlined the legal protection of students with disabilities in regards to bullying. In brief, the letter stated that students with disabilities are protected under Section 504 of the Rehabilitation Act of 1973 and under IDEA (2004) if the bullying is disability-based harassment or if the bullying results in denial of FAPE regardless if the bullying was based on the student's disability. If school districts do not appropriately respond to the bullying of a student with disability they could lose federal funding (Maag & Katsiyannis, 2012).

Summary

Research indicates students with ASD rarely initiate and respond to social bids with their peers, thus engaging in limited social interactions (Humphrey & Symes, 2011; Wainscot et al., 2008), are overrepresented as victims in the bullying dynamic (Zablotsky et al., 2013), and consequently experience a myriad of negative outcomes associated with social rejection and bullying victimization (Reid & Batten, 2006; Zablotsky et al., 2013). During adolescence peer relationships become increasingly important and the desire to attain social status and establish peer affiliations often cause students to engage in bullying behaviors and ostracize students making prevention and intervention efforts critical during this time period (Pellegrini & Van Ryzin, 2011). Empirical studies related to increasing social interactions and decreasing bullying victimization for secondary students with ASD are sparse. Addressing these two negative aspects of school simultaneously may be the best approach to provide optimal social outcomes for students with ASD, as both are social issues. Interventions targeting social outcomes will not only provide students with opportunities to increase social interactions with peers and establish relationships, but will likely increase student participation in social activities and decrease their vulnerability to bullying victimization.

Purpose of Study

The *objective* of this study was to examine the effects of a peer-mediated instruction/intervention (i.e., peer networks) implemented with high school students with ASD on frequency of: (a) social interactions with peers, (b) social contacts with peers within and

outside of school, and (c) bullying victimization. This study is among the very few peer network studies implemented with high school students with ASD and marks the first study to specifically examine the effects of an intervention on rates of bullying victimization among students with ASD.

The *long-term goal* of this research was to build the evidence-base of peer network interventions and provide a first step for interventions aimed at reducing rates of bullying victimization among students with ASD. This study replicated and expanded on previous peer network intervention studies by implementing peer networks with high school students with ASD without intellectual disabilities (ID) and addressed several limitations posed in previous studies. The results of this study offer a better understanding of the use of peer network interventions implemented with high school students with ASD. Secondary teachers need evidence-based practices that address the social challenges of individuals with ASD that can be feasibly implemented within the context of high school settings. Further, they need interventions that can be implemented with students with ASD with varying profiles of abilities.

Research aims. The primary research aim was to investigate the effects of a peer network intervention on the levels of social interactions between high school students with ASD and their typically developing peers. More specifically, the aim was to examine if initiations and responses to and from students with ASD increase once the intervention is implemented. To determine the effects of peer network interventions on social interactions, a single case, multiple-probe across participants design was employed.

The secondary research aims were to investigate the effects of a peer network intervention on the frequency of social contacts between students with ASD and their peers and frequency of bullying victimization of students with ASD. To explore the effects of the intervention on social contacts and bullying victimization, students with ASD completed two questionnaires at four different time points throughout the study.

Chapter 2

A Review of the Literature

Literature specifically focused on interventions aimed at increasing positive social outcomes for secondary students with ASD is limited. However, to better understand why students with ASD are at-risk for limited social interactions and bullying victimization, it is necessary to review the defining features of ASD and how these features may impact social interactions and bullying victimization. It is equally important to understand how social interactions and bullying victimization are related so these problems can be addressed concurrently. This chapter will include the following: (a) a review of the defining features of ASD; (b) a conceptual framework integrating social interaction and bullying victimization; (c) promising points of intervention; (d) a review of peer network intervention studies; and (e) the research questions this study addressed.

Autism Spectrum Disorder

Autism spectrum disorder is a neurodevelopmental disorder involving challenges in social communication and social interaction, and the presence of narrow, restricted behaviors, interests, or activities (APA, 2013). All individuals with ASD demonstrate some level of concern across these domains, however, the symptoms are expressed in a variety of ways, and the severity of impairment varies from person to person (Phetrasuwan, Miles, & Mesibov, 2009). These challenges permeate all areas of development including social, emotional, and academic domains (Rao et al., 2008). They can impede a student's involvement in school activities, make establishing and maintaining relationships with peers difficult, and increase vulnerability to bullying victimization. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM 5) now recognizes the previously distinct classifications (early infantile autism,

childhood autism, Kanner's autism, high-functioning autism, atypical autism, pervasive developmental disorder not otherwise specified, childhood disintegrative disorder, and Asperger's disorder) as a single diagnostic disorder, ASD (APA, 2013).

Deficits in social communication and social interaction can greatly impact the social interactions individuals with ASD have with their peers or lack thereof. Individuals with ASD often have difficulty with social-emotional reciprocity, or the ability to share thoughts and feelings with others (APA, 2013). This can result in individuals with ASD engaging in little to no initiations toward peers as well as one-sided conversations and those lacking reciprocity. Individuals with ASD may also struggle in joining or starting conversations with peers. Difficulties with joint attention and introducing topics of interest and relevance can also make initiating difficult.

Responding to peers can also be challenging for individuals with ASD, because of difficulties processing and comprehending information. For example, it has been suggested that individuals with ASD process information by focusing on details and piecemeal processing; that is, they focus on the parts that make up information rather than the information as a whole (Frith, 2012). This becomes problematic in social interactions when individuals with ASD do not process the contextual features to fully understand the information (Frith, 2012). For instance, during a conversation with classmates a student with ASD may only focus on the words of the conversation and not take into consideration the person's body language and tone of voice. This poses a problem, because the student with ASD may not fully understand the communicative intent of the person speaking. This can result in the student responding inappropriately or becoming targeted for bullying victimization. For example, if peers were saying "wouldn't it be awesome to pull the fire alarm and get out of class" in a sarcastic voice, and the student with ASD did not pick up on the sarcasm, s/he may indeed pull the fire alarm. Challenges inferring mental states (e.g., intentions, beliefs, and desires) of others and predicting others' actions based on these inferences can also make responding difficult (Baron-Cohen, Leslie, & Frith, 1985). In

relation to bullying victimization, difficulties predicting others' actions and intentions can result in the student with ASD not recognizing when their peers have bad intentions, making them socially vulnerable (Sofronoff et al., 2011). Because many of these students yearn for friendships they are often compliant to the requests of their peers, consequently making them easy targets for bullying victimization as research suggests students with ASD who are socially vulnerable are at risk for experiencing bullying victimization (Sofronoff et al., 2011).

In addition to difficulties processing and comprehending verbal language, individuals with ASD often have deficits in demonstrating and understanding nonverbal communicative behaviors (APA, 2013). For example, individuals with ASD may demonstrate atypical use of eye contact, facial expressions, speech intonation, and body gestures (APA, 2013). This may be perceived by others as odd or others may think the individual with ASD is not paying attention to them or uninterested in the conversation. Consequently, others may stop or reduce frequency of initiating conversations with individuals with ASD. Further, individuals with ASD often have difficulty interpreting others' facial expressions, body gestures, and tone of voice, resulting in challenges in responding to others. For example, a high school student with ASD may see a group of students talking with one student in the group crossing her arms with a scowl on her face. The student with ASD may not pick up on the social cues that the one student is mad and may attempt to join in on the conversation. The inappropriate timing of joining a conversation may be seen as disruptive by the peers, resulting in a negative reaction from the peers.

Not only do the defining social characteristics of ASD impact social interactions, but the presence of narrow, restricted behaviors, interests, or activities can also impede the social interactions students with ASD have with their peers. The repetitive or self-injurious behaviors demonstrated by some students with ASD may scare or confuse peers, resulting in peers making limited attempts to engage in social interactions with the students with ASD. Insistence on routines and aversion to change can also result in negative judgments by peers. As secondary students with ASD are presented with unexpected changes on a daily/weekly basis, they may

display emotional reactions, further making them stand out from their peers. Difficulties with impulse control can make peers hesitant to engage with students with ASD and can make students with ASD vulnerable to bullying victimization as bullies tend to target students who express emotional reactions (Kochenderfer-Ladd et al., 2009).

The combination of these deficits can result in individuals with ASD having extreme difficulties establishing and maintaining friendships. Individuals with ASD often desire to establish friendships, but do not have a complete understanding of what friendship entails (APA, 2013). Therefore, friendships are often one-sided.

Severity of impairment. It is clear that the defining characteristics of ASD can severely impact the social interactions students with ASD have with their peers and can place them at risk for experiencing bullying victimization. However, as previously mentioned, the severity of impairment varies from person to person. The DSM 5 describes three levels of impairment ranging from “requiring very substantial support” (Level 3; those who have severe verbal and nonverbal communication deficits) to “requires support” (Level 1; those who have social communication deficits that cause noticeable impairments without supports in place; APA, 2013). The severity of social impairment can impact the social interactions students with ASD have with their peers, and it can increase their risk of bullying victimization. For example, research suggests students with ASD with greater social severity and communication challenges are more likely to be victimized by their peers (Adams, Fredstrom, Duncan, Holleb, & Bishop, 2014; Cappadocia et al., 2012; Sterzing, Shattuck, Narendorf, Wagner, & Cooper, 2012). However, results from another study indicate students with ASD with less severe social and communication challenges are at greater risk for experiencing bullying victimization (Rowley et al., 2012). These researchers suggest students with ASD who experience less social and communication challenges may be more aware of when they are victimized and may have greater skills to be able to report the bullying to school staff and parents. These students

additionally may have more opportunities to engage in social interactions with their peers which consequently can provide more opportunities for bullying to occur (Rowley et al., 2012).

Just as the severity of impairment can impact social interactions and bullying victimization, it may also impact the educational setting the student with ASD is educated in, which can impact both frequency of social interactions and bullying victimization. While inclusive settings provide more opportunities for students with ASD to engage in social interactions with their peers without ASD, they also increase the risk of bullying victimization. Research indicates students with ASD educated in mainstreamed schools or general education classrooms experience more bullying victimization compared to their counterparts educated in special education population schools or segregated settings (Hebron & Humphrey, 2013; Rowley et al., 2012; Sterzing et al., 2012; Zablotzky et al., 2013). Students with ASD educated in special education population schools/classrooms may be in classes that have smaller teacher-student ratios and more adult supervision resulting in fewer opportunities for bullying to occur (Hebron & Humphrey, 2013). Additionally, they may share similar characteristics with their peers and therefore may be less likely to stand out (Hebron & Humphrey, 2013). It may also be that students educated in special education population schools/classrooms have more severe disabilities and students with more noticeable disabilities are less likely to be bullied by their peers, because their disability is more obvious to their peers and can serve as a protective factor (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011).

In summary, the defining characteristics of ASD can greatly impact the social interactions between students with ASD and their peers and place students with ASD at-risk for bullying victimization. Difficulties initiating and responding to peers can make conversations awkward, one sided, or may result in negative judgment from peers. Therefore individuals with ASD may engage in limited social interactions with peers, develop few friendships, and experience high rates of bullying victimization.

The Intersection between Social Interaction and Victimization

Students with ASD experience both limited positive social interactions with their peers and high rates of bullying victimization. These two problems are highly related and can be explained through the Reciprocal Effects Peer Interaction Model (REPIM) developed by Humphrey and Symes (2011; see Figure 1). The REPIM is a multidimensional conceptual framework demonstrating the interplay between individual student characteristics and the peer group and how limited interactions and friendships can lead to a cycle of bullying victimization (Humphrey & Symes, 2011). According to the REPIM, social outcomes for students with ASD originate at the individual level and at the peer group level (Humphrey & Symes, 2011).

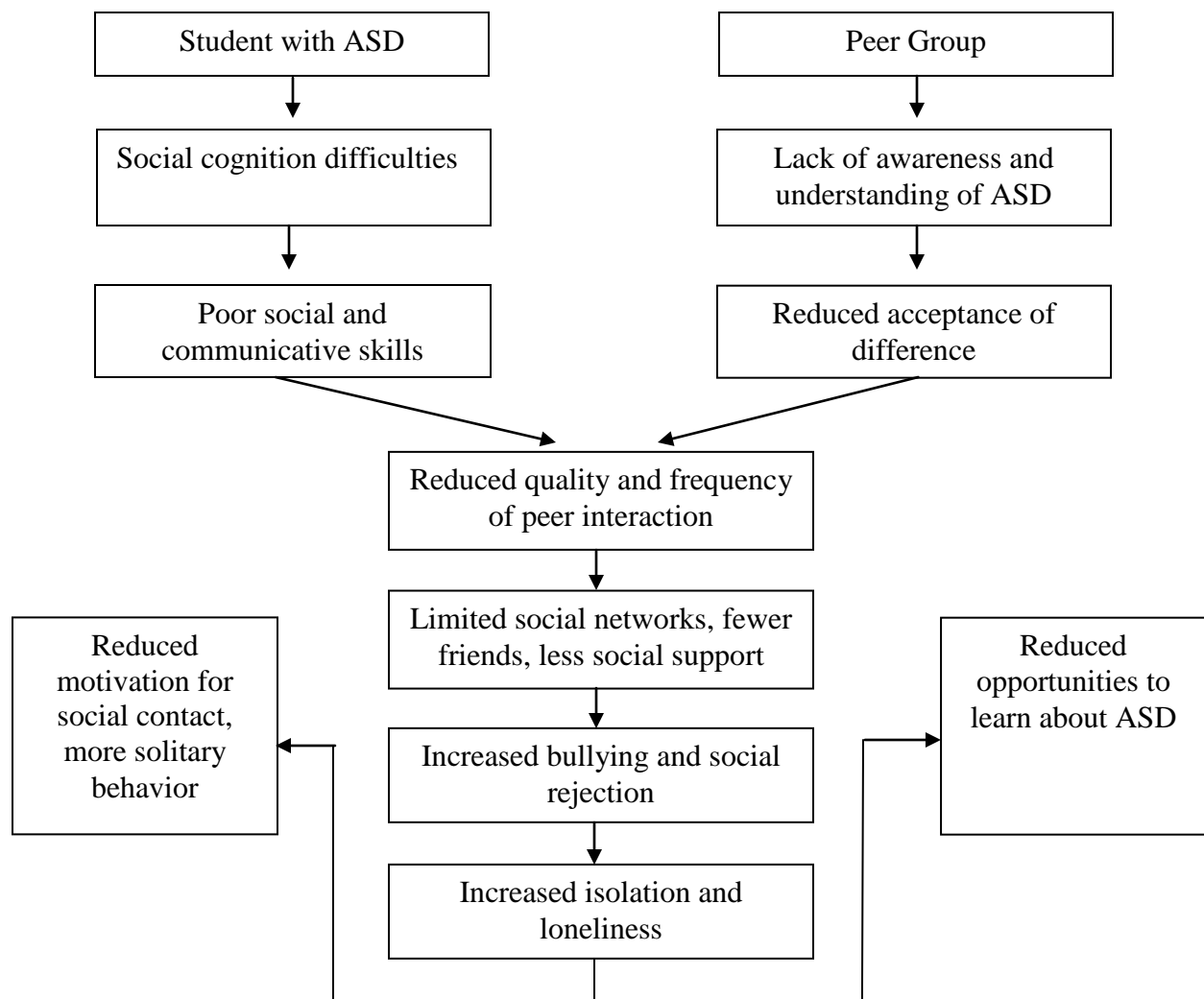


Figure 1. The Reciprocal Effects Peer Interaction Model for Understanding Negative Social Outcomes Among Students with ASD (Humphrey and Symes, 2011, p. 400).

At the individual level, the student with ASD has social cognitive and social-communication skill deficits (Weiss & Harris, 2001). Social cognition encompasses the mechanisms that help individuals understand and make sense of the social world (Bauminger-Zviely, 2013). This includes understanding emotions, because they provide the communicative meaning of each social behavior (Bauminger-Zviely, 2013). Students with ASD have difficulties matching emotions to varying contexts and understanding why emotions occur (Bauminger et al., 2003). As previously noted, these students present an array of social and communication difficulties, which make social reciprocity with peers challenging.

At the peer group level, students often lack awareness and understanding of ASD (Campbell, Morton, Roulston, & Barger, 2011). Therefore, when students with ASD demonstrate atypical behaviors, their peer group often views them negatively (Humphrey & Symes, 2011). This ignorance can lead to a lack of acceptance for the student with ASD and little motivation by typically developing students to engage in social interactions with the student with ASD (Campbell, Ferguson, Herzinger, Jackson, & Marino, 2004; Copeland et al., 2004).

The interplay between individual characteristics and lack of awareness and acceptance from the peer group can lead to reduced frequency and quality of interactions between students with ASD and their peers (Humphrey & Symes, 2011). Given that relationships are built upon interacting and frequent social contact (Fehr, 2009; Newcomb & Bagwell, 1995), limited social interactions pose a problem for developing relationships. Indeed, as previously noted, it has been documented that adolescents with ASD have fewer reciprocal friendships and less high quality friendships than their typically developing peers (Petrina et al., 2014). When students with ASD form fewer friendships and have limited social networks the result is less social support from peers (Humphrey & Symes, 2010). This in turn places students with ASD at great risk for bullying victimization (Humphrey & Symes, 2010). Indeed, there is a robust amount of research in the general population indicating limited reciprocal friendships is linked to increased risk of bullying victimization (e.g., Boulton, Trueman, Chau, Whitehand, & Amatya, 1999;

Hodges, Boivin, Vitaro, & Bukowski, 1999). This research has also extended to students with ASD, as recent research indicates students with ASD who have fewer friends or who have difficulty making friends are more likely to be victimized (Cappadocia et al., 2012; Zablotzky et al., 2013). On the contrary, research has indicated higher levels of support from peers predicts reductions in frequency of victimization (Humphrey & Symes, 2010) and students who engage in positive peer relationships experience lower levels of victimization (Hebron & Humphrey, 2013).

When students with ASD are victimized, they experience the negative consequences of victimization, including increased levels of loneliness, depression, and anxiety (Hawker & Boulton, 2000; Shtayermman, 2007). In turn, these negative outcomes impact both the student with ASD and the peer group. For the student with ASD, experiencing these negative outcomes may lead to reduced motivation to engage with the peer group. This can result in increased isolation and engagement in solitary activities (Humphrey & Symes, 2011). For the peer group, students with psycho-social problems, such as depression and anxiety, are often irritating to their peers, further leading to reduced acceptance (Coyne, 1976). This can result in reduced motivation for peers to engage in social interactions with students with ASD. In addition, reduced opportunities for social interactions can lead to limited opportunities for peers to gain awareness of ASD, which can further create feelings of differences (Humphrey & Symes, 2011).

Based on this conceptual framework, to increase the frequency of social interactions and reduce bullying victimization rates among these students, an intervention that targets both the peer group and the student with ASD may be most effective. By focusing on both the peer group and the student with ASD, the peer group can learn about social challenges of students with ASD which will likely increase acceptance (Campbell et al., 2004) and the student with ASD can learn and practice social skills, making reciprocal interactions easier. This multidimensional conceptual framework was used to guide this study.

Points of Intervention

Based on the REPIM (Humphrey & Symes, 2011) and the relationship between limited social interactions and bullying victimization, interventions that target social outcomes for students with ASD may be most effective at both increasing social interactions and reducing rates of bullying victimization. Recently, nine interventions have been identified as evidence-based practices for addressing social outcomes of youth with ASD, all of which have been effective for adolescents (Wong et al., 2014). These intervention practices include: antecedent based interventions, modeling, peer-mediated instruction/interventions (PMII), reinforcement, scripting, social skills training (SST), technology-aided instruction and interventions, video modeling, and visual supports (Wong et al., 2014). While all practices provide support for the effectiveness at the secondary level, some practices only included limited studies implemented with adolescents. Two primary pathways for improving the social outcomes for adolescents with ASD include intervention approaches focused on students with ASD, such as SST, and intervention approaches focused on peers, such as PMII (Carter, Common, et al., 2014).

Social skills training. Social skills training is defined as “group or individual instruction designed to teach learners to appropriately interact with typically developing peers” (Wong et al., 2014, p. 91). These interventions typically involve meetings which include instruction on social skill concepts, practice and role-play of newly taught skills, and feedback from an instructor. While the overall goal of SST is to promote positive interactions with others, SST has been used to address skills related to social, communication, behavior, play, and cognitive domains (Wong et al., 2014).

Recently, Miller, Vernon, Wu, and Russo (2014) reviewed 44 social skills group interventions implemented with adolescents with ASD. The majority of the reviewed studies targeted global social competence, however, some studies focused on specific skill areas such as social cognition, ToM, perspective taking, emotional expressiveness, self-determination, and understanding non-verbal communication. While the authors concluded that there is evidence for the usefulness of social skills group interventions, they also suggested that frequency and

intensity of the intervention was related to treatment gains. More specifically, studies which implemented interventions for 10 weeks or longer resulted in greater likelihood of treatment gains, whereas shorter-term interventions resulted in limited treatment gains. Almost half of the reviewed studies held intervention sessions for approximately 10-16 weeks and each session lasted between 40 min to 2 hrs. While some studies resulted in treatment gains, there is limited information available on whether or not treatment gains resulted in improved social interactions with peers outside of the social skills group context. Further, limited information is available regarding what these social skills groups look like within the context of school settings, as only six of the 44 studies were implemented in such contexts, two of which also included peer-mediated components.

Two social skills group programs with an emerging evidence base at the secondary level are the Program for the Education and Enrichment of Relational Skills (PEERS; Laugeson et al. 2009) and the Social Competence Intervention (SCI; Stichter et al, 2010). The PEERS program is a manualized treatment program implemented in a clinic setting. Adolescents with ASD attend 12, 90 min weekly sessions and their parents attend concurrent but separate sessions to receive instruction on how to supervise their youth's newly learned skills. Several skills are targeted during these sessions including: conversational skills, developing and expanding networks, handling bullying, teasing, and arguments with peers, demonstrating good sportsmanship and host behaviors, and changing bad reputations (Laugeson et al., 2009, p. 597). Several studies have indicated PEERS is an effective social skills group intervention demonstrating long-term maintenance of treatment gains in relation to social functioning, social skills knowledge, and frequency of peer interactions (Mandelberg et al., 2014). Recently, an adapted school-based version of the PEERS curriculum was developed to fit within the context of classroom settings (PEERS Curriculum for School-Based Professionals; Laugeson, 2014). The adapted version is facilitated daily by teachers (Laugeson, Ellingsen, Sanderson, Tucci, & Bates, 2014). Results from a study conducted by Laugeson and colleagues (2014) indicated the

adapted version of PEERS resulted in improvements in social skills knowledge, frequency of get-togethers with peers, and decreases in social anxiety.

Similar to PEERS, the SCI program is also a manualized treatment program (Stichter et al., 2010). The SCI program is based on cognitive behavior principles and utilizes social cognitive strategies, such as self-monitoring and self-regulation. Students with ASD attend 20, one hr sessions over the course of 10 weeks. While SCI has been implemented with elementary age students (e.g., Stichter, O'Connor, Herzog, Lierheimer, & McGhee, 2011), Social Competence Intervention for Adolescents (SCI-A) was uniquely designed for adolescents with ASD who have full scale IQ scores above 70 (Stichter, Herzog, O'Connor, & Schmidt, 2012). The treatment program consists of five units including: recognizing facial expressions, sharing ideas, turn taking in conversations, recognizing feelings and emotions, and problem solving (Stichter et al., 2010, p. 1071). Research suggests adolescents with ASD who participated in the SCI-A program demonstrated significant growth on social skills, executive functioning, facial expression recognition, ToM, and problem solving (Stichter et al., 2010). While the results of SCI-A studies are promising, less is known about how these results translate to greater improvement in social interactions with peers. To address this gap in the literature Schmidt and Stichter (2012) investigated the effects of the SCI-A program and two PMIs on the social interaction and engagement of three middle school students with high functioning autism/Asperger's syndrome. Results indicated when the PMIs were implemented social interaction increased for all three focal students above levels of interaction during baseline and during the SCI-A program (Schmidt & Stichter, 2012), indicating that PMIs may be a useful strategy to help promote the generalization of social skills learned during the SCI-A program.

Peer-mediated instruction/intervention. Peer-mediated instruction/interventions are a set of focused intervention practices used to teach typically developing peers appropriate ways to engage with students with disabilities (Sperry, Neitzel, & Engelhardt-Wells., 2010). With PMIs, peers act as intervention agents and are systematically taught strategies to engage

students with disabilities and to help them learn new skills in both learner-initiated and teacher-directed activities (Chan et al., 2009; Sperry et al., 2010; Strain & Odom, 1986). These interventions have been effective at addressing both social and academic skills (Wong et al., 2014). During PMIs aimed at improving social outcomes for students with ASD, one or more typically developing peers are taught how to provide ongoing social support to the student with ASD (Carter, Sisco, & Chung, 2012). The primary goal of peer-mediated social communication instruction/interventions is to promote positive peer interactions between the student with ASD and their typically developing peers (Ostrosky, Kaiser, & Odom, 1993). Additional goals include: teaching peers ways to engage with the student with ASD, increasing the frequency of interactions between students with ASD and their typically developing peers, extending social interactions within and across the school day, minimizing adult supports, teaching social skills, and promoting positive and natural interactions (Sperry et al., 2010). While each PMI is individualized to meet the needs of the student with ASD, Carter and colleagues (2012) have identified the following quality components typically included in PMIs: (a) identifying students with disabilities who would benefit from the intervention; (b) selecting peer partners; (c) equipping peer partners; (d) providing opportunities for social interaction; (e) providing guidance and support for peer partners and students with disabilities; and (f) evaluating student progress.

Research suggests PMIs are not only advantageous for students with ASD, but are also beneficial for peer partners. For example, peer partners in a study conducted by Cushing and Kennedy (1997) increased their academic engagement while serving as peer partners to students with disabilities. Additionally, Copeland and colleagues (2004) conducted six focus groups with students who participated as peer partners during PMIs across six high schools. Participants across schools highlighted several benefits of being a peer partner including improving their attitudes toward students with disabilities, developing new friendships with students with disabilities, feeling a sense of accomplishment, and having fun. These interventions have also been rated by educators as one of the most feasible and effective interventions aimed at

increasing social interactions between high school students with and without severe disabilities (Carter & Pesko, 2008).

Recently, Watkins et al. (2014) reviewed PMII studies aimed at improving social interaction skills of students with ASD educated in inclusive settings. Fourteen articles were reviewed, five of which included participants who were mostly adolescents or young adults. The studies measured a variety of outcomes including social interaction, social engagement, turn-taking, and gaining attention. While some PMII studies included both peer-mediated and social skills training components (e.g., Morrison et al., 2001), others included only peer-mediated components and found strong outcomes (Koegel et al., 2012). Of the 14 articles, 10 reported positive intervention outcomes indicating promising support for PMII implemented with students with ASD in inclusive settings. However, most of the reviewed PMII studies did not examine friendship development. One type of PMII increasingly gaining efficacy at the secondary level that has examined friendship development are peer network interventions.

Peer network interventions. Peer network interventions are a PMII created when a group of students are established around a student with ASD to form a network and extended opportunities for social interactions are provided across the school day during non-instructional times (e.g., lunch, between classes; Carter et al., 2012; Haring & Breen, 1992). As with other PMII, peer network interventions are based on principles of both behavioral theory and social learning theory (Sperry et al., 2010). During peer network interventions, peer partners can be taught how to prompt, model, and reinforce target behaviors, thus focusing on the antecedents and consequences of behaviors. In addition, improvements in social interactions between students with ASD and their peers without disabilities may be attributed to observational learning (Carter et al., 2012). Social learning theory suggests people learn through observing other people in their environment and recognizing the outcomes of their behaviors (Bandura, 1977). Thus, within peer network interventions, peers serve as natural models and the number and proximity of models increases providing many opportunities for observational learning.

The primary goals of peer network interventions implemented with students with ASD are to increase opportunities for students to meet new people, foster friendship development, and encourage students to engage in social activities during and outside of school (Carter et al., 2012). During these interventions, extended opportunities for social interaction are provided for the student with ASD and their peers. These interactions may occur during transitions between classes, during lunch, and/or during after-school activities (e.g., debate club, sporting events). Before the intervention begins, peer partners can participate in an orientation where they are provided with information about social areas that may be challenging for students with ASD (e.g., joining in on a conversation), and learn how to include the student with ASD in social interactions and activities. Peers can additionally be taught how to model appropriate social skills for students with ASD (e.g., initiating and responding), how to positively reinforce students with ASD, and how to intervene if a bullying situation happens (e.g., tell the bully to stop, walk away with the student with ASD, and report the bullying). Similar to other PMIs, peer network interventions typically include the six quality components outlined above under “Peer-Mediated Instruction/Intervention”, which are individualized to meet the specific needs of the students with ASD and their peer partners.

Benefits of peer network interventions. Like other PMIs, peer network interventions are especially advantageous for students with ASD. For example, peer network interventions may help foster inclusion across school settings as the nature of the intervention involves direct interaction between students with ASD and their typically developing peers (Chan et al., 2009). In addition, peer network interventions provide many opportunities for peer modeling, which encourages independence (Ostrosky et al., 1993), as opposed to adult-mediated interventions which can cause students to become dependent on adults (Weiss & Harris, 2001). Also, peer network interventions may promote generalization of skills across settings and peers, because they are conducted in natural settings with multiple exemplars and there is no need to transfer the learned skill from the adult interventionist to peers, as peers are the interventionists (Rogers,

2000). Further, given the format of peer network interventions, peer partners can be provided with information to explain atypical behaviors and specific social-communication difficulties of students with ASD, which may increase feelings of acceptance (Campbell et al., 2004). Peer network interventions also may be beneficial for addressing the bullying victimization of students with ASD, because they can be designed to target factors that make students with ASD vulnerable to victimization (e.g., social skills deficits, limited friendships). More specifically, by participating in peer network interventions students with ASD may gain greater social skills and may develop friendships with their peers, thus reducing their risk for experiencing bullying victimization. Finally, given that peer network interventions are implemented during non-instructional times they do not compete with the academic demands presented at the secondary level.

Given the advantages of this intervention, and the flexibility to tailor each intervention to meet the direct needs of students, peer network interventions may be a practical intervention to address both the low rates of social interaction and the high rates of bullying victimization among students with ASD. Further, peer network interventions address both the peer group and the individual with ASD which may promote greater social outcomes based on the REPIM (Humphrey & Symes, 2011). While peer network interventions have not been investigated to determine the extent they reduce the bullying victimization of students with ASD, they have been investigated to address other social outcomes for secondary students with ASD. Described next is a review of peer network interventions implemented with middle and high school students with ASD.

Review of Peer Network Studies Conducted with Secondary Students with ASD

While social intervention research is expanding to middle and high schools, the PMII literature base is still minimal for middle and high school students with ASD, including peer network intervention studies. To the author's knowledge five empirical peer network intervention studies have been implemented with middle or high school students with ASD. All

studies used single-case design methodology. Appendix B outlines descriptive information about each study, including characteristics of participants with ASD and their peer partners, research design, a description of the intervention implemented by peers, outcome variables, and results. Appendix C outlines the quality components of the peer network intervention studies, including the method used for selecting students with ASD and their peer partners, method used for training peers and the content taught, opportunities provided for social interaction, on-going support provided to students, and data collection methods.

A brief summary of each study is provided below including an evaluation of each study based on single case design quality indicators (Horner et al., 2005). More specifically, each study was evaluated to determine if it can be considered “high quality”. Based on the National Professional Development Center for ASD to be determined high quality the following criteria need to be met in entirety: (a) the dependent variable needs to align with the research question or purpose of study; (b) the dependent variable needs to be operationally defined; (c) the measurement system needs to align with the dependent variable and produce a quantifiable index; (d) a second observer needs to collect data on the dependent variable for a minimum of 20% of observations across conditions; (e) mean inter-observer agreement (IOA) needs to be 80% or greater or kappa of .60 or greater; (f) the independent variable needs to be defined in such a way that there is a clear difference between baseline and intervention conditions; (g) baseline condition needs to be described to provide a clear understanding of the differences between baseline and intervention conditions; (h) results need to be displayed in a graphical format demonstrating repeated measures for a single case across time; and (i) results need to demonstrate changes in the dependent variable when the independent variable is manipulated by the experimenter at three different points in time or across three phase repetitions (Wong et al., 2014, p. 46). Following the descriptions of the studies are the limitations in the current literature base that are addressed in the current study.

Summary of peer network studies. While all five of the reviewed studies implemented a peer network intervention, the context of the interventions varied. The first published peer network intervention study was conducted by Haring and Breen (1992) and included two junior high students (one student with ASD and one student with ID and language delay). During this intervention study each focal student was grouped with 4-5 typically developing peers to form a network. Peer partners walked with the focal students in between classes, ate lunch with the focal students, and once a week the facilitator and network met to talk about times to interact, assess the group's satisfaction, and casually interact. Using a multiple baseline across participants design, the researchers measured social interactions, appropriate social responding, and extended social interactions. During intervention, the frequency of appropriate social interactions increased between the focal students and their peers. Further, both focal students participated in non-prompted events outside of school with their peer networks. One focal student's mother noted that was the first time her son had been invited to an event outside of school by a peer. At the conclusion of the intervention 89% of the peer partners rated focal students as a friend and 11% rated focal students as a best friend. Though this study produced favorable treatment outcomes, it did not meet high quality standards as IOA was not collected and the independent variable was only manipulated by the experimenter at two different points in time.

The peer network interventions implemented by Koegel and colleagues (2012) and Koegel, Kim, Koegel, and Schwartzman (2013) differed from the peer network intervention implemented by Haring and Breen (1992) in that the network was a club developed around the student with ASD's preferred interest. In the studies conducted by Koegel et al. (2012; 2013) flyers advertising the new clubs were posted around the school and teachers made announcements to recruit students. Any student in the school was allowed to participate in the club and a separate club was created for each student (3 students with ASD participated in Koegel et al., 2012; 7 students with ASD participated in Koegel et al., 2013). The facilitator of

each club provided support mainly in the context of providing and preparing materials for the club and no peer partner training was provided. Using a repeated measures multiple baseline across participants design, time engaged with peers and rate of initiations to peers were measured in both studies. Results indicated level of engagement and frequency of initiations made to peers increased for all students with ASD across both studies. Data on friendship development and generalization of skills were collected in the study conducted by Koegel et al. (2013). Results indicated approximately half of the students with ASD reported they made friends; however, once the clubs ended, social engagement and interaction decreased to baseline levels and did not generalize outside the context of the clubs. Both studies met all nine quality indicators of single case design studies and therefore are considered high quality studies.

The final two peer network intervention studies were also very similar to one another (Gardner et al., 2014; Hochman, Carter, Bottema-Beutel, Harvey, & Gustafson, in press). Both studies held weekly or biweekly meetings where students with ASD and their peer partners participated in a shared activity either during their advisory period (Gardner et al., 2014) or during their lunch period (Hochman et al., in press). Participants in both studies included male students with ASD and ID (with the exception of one student in the study conducted by Gardner et al., 2014 who had ASD, Attention Deficit Hyperactivity Disorder [ADHD], and oppositional defiant disorder). Both focal students and peer partners participated in an orientation meeting to familiarize students with their roles and discuss the goals of the peer network. Both studies included frequency of social interaction and social engagement as outcome measures (see Appendix B for additional outcome measures). Results indicated social engagement and peer interactions increased for all focal students once the intervention was in place. Further, all peer partners and focal students in the study conducted by Hochman et al. (in press) considered each other as friends at the conclusion of the intervention, and almost all peer partners and focal students considered one another to be friends at the conclusion of the intervention implemented by Gardner et al. (2014). Hochman et al. (in press) additionally collected data on generalization

of social interactions and social engagement outside of network meeting days. Results indicated generalization occurred for one out of the four participants. Both studies met all nine quality indicators of single case design studies and therefore are considered high quality studies.

Limitations of the existing literature and directions for the current study. Based on the empirical literature, it is evident the five quality components of PMIs can be tailored to meet the individual needs of focal students when implementing peer network interventions. This is evidenced by how widely the studies varied in each component. For example, the studies conducted by Koegel and colleagues (2012; 2013) did not include peer partner training, whereas the studies conducted by Haring and Breen (1992), Gardner et al. (2014), and Hochman et al. (in press) all included some element of peer partner training/orientation. However, all studies were effective in achieving the desired outcomes. This provides further support for the flexibility of these interventions.

While the evidence-base for peer network interventions implemented with secondary students with ASD is expanding, some limitations exist in the current literature, specifically around data collection. For example, only two of the five studies documented treatment fidelity during the intervention (Gardner et al., 2014; Hochman et al., in press). This is concerning, because the absence of treatment fidelity threatens both internal and external validity (Horner et al., 2005). While all studies did demonstrate a functional relationship between the implementation of the independent variable and an increase in the desired social outcomes, without treatment fidelity conclusions cannot be drawn on the efficacy, because it is unknown if the intervention was actually implemented as designed. Further, only two studies collected data on generalization to see if the outcome variables generalized to other settings/peers and results were inconsistent (Koegel et al., 2013; Hochman et al., in press). Peer network interventions provide optimal conditions for the generalization of skills, however more research is needed to determine if skills successfully generalize across settings and peers for secondary students with ASD.

Additionally, while these studies included a range of dependent variables, most involved frequency of social interactions and social engagement of focal students. As noted previously, peer network interventions may be beneficial at producing positive, meaningful effects of other dependent variables, such as frequency of bullying victimization. While the intention of the reviewed studies was not to measure bullying victimization, more research is needed on the effects of peer network interventions on other dependent variables.

Finally, four of the five peer network intervention studies meet high quality standards as proposed by the National Professional Development Center on ASD (Wong et al., 2014). While this isn't necessarily a limitation of individual studies, replication of these studies is needed to expand the research base to determine if peer network interventions can be deemed an evidence-based practice for secondary students with ASD. According to Horner et al. (2005) when evaluating single case design studies to determine if a practice can be considered evidence-based a minimum of five high quality studies need to be conducted, across three different research teams, and a minimum of 20 participants need to be included across the studies. Currently, four high quality studies exist across two different research teams, which have included a total of 16 participants.

Summary

Research indicates secondary students with ASD experience two critical problems within the school context that severely limit their full participation in academic and social domains of high school: they engage in limited social interactions with their peers and they experience high rates of bullying victimization (Humphrey & Symes, 2011; Wainscot et al., 2008; Zablotsky et al., 2013). Consequently, students experience a myriad of negative consequences associated with social rejection and bullying victimization (Reid & Batten, 2006; Zablotsky et al., 2013) making intervention efforts critical. Researchers contend limited social interactions and bullying victimization are highly related (Humphrey & Symes, 2011). While interventions aimed at increasing social interactions and reducing victimization rates for secondary students with ASD

are minimal, the existing literature makes a strong case for targeting these two issues simultaneously through the use of a social intervention.

Research indicates two primary pathways to address the social concerns of secondary students with ASD include SST and PMII (Carter, Common, et al., 2014). While implementing SST and PMII concurrently may result in positive outcomes (e.g., Schmidt & Stichter, 2012), previous PMII studies have indicated strong results without the implementation of direct SST (e.g., Hochman et al., in press), indicating that perhaps a treatment package that includes both SST and PMII is not necessary to increase the social interactions of secondary students with ASD. Peer network interventions are one type of PMII that have shown promising results at both increasing social interactions and fostering friendship development and therefore may be an effective intervention to address both limited social interactions and bullying victimization. Addressing these two negative aspects of school simultaneously may be the best approach to provide optimal social outcomes for students with ASD.

Research Questions

The overall purpose of this study was to examine the effects of a peer network intervention on the social interactions between students with ASD and their typically developing peers and the frequency of bullying victimization of students with ASD. This study expands on the current literature in two ways. First, the research base for empirical peer network intervention studies implemented with middle and high school students with ASD is minimal. Replication is needed to determine the efficacy of peer network interventions as an evidence-based practice. This study most closely replicates the studies conducted by Gardner et al. (2014) and Hochman et al. (in press); however, it expands the literature by implementing peer network interventions with students with ASD without ID. Exploring the effects of peer network interventions implemented with students with ASD with varying profiles of abilities is important to better understand what population of students benefit from these interventions. Further, this

study addresses the limitations of the existing literature base previously posed and includes measures of treatment fidelity and generalization of outcome variables.

Second, peer network studies have been efficacious at achieving a range of social goals for students with ASD, but they have not been explored to determine if they increase rates of social contacts between students with ASD and their peers within and outside the context of the school day. Further, they have not been explored to examine if they reduce the frequency of bullying victimization of students. Moreover, only one study to the author's knowledge has been designed and implemented to reduce rates of bullying victimization for students with ASD (Humphrey et al., 2013), but the data were aggregated across students with a range of disabilities and the extent they reduced the victimization of students with ASD is unknown. Therefore, this study was the first to pilot an intervention to explore the level of change in bullying victimization rates for students with ASD as a result of a targeted intervention. This study addressed the following research questions:

1. Does the implementation of a peer network intervention produce increases in initiations and responses from students with ASD to their peers?
2. Does the implementation of a peer network intervention produce increases in initiations and responses from peers to students with ASD?
3. What effects does the implementation of a peer network intervention have on the social contacts between students with ASD and their peers?
4. Do students with ASD perceive a change in the frequency they are victimized after participating in a peer network intervention?

Chapter 3

Methodology

This investigation used a single case, multiple-probe across participants design to study the effects of a peer network intervention on the frequency of social interactions between three high school students with ASD and their typically developing peers. The frequency of social contacts and bullying victimization of students with ASD were also examined before, during, and after the peer network intervention. Participant characteristics, setting, intervention procedures, design considerations, and data analysis techniques are described below.

Participants, Setting, and Materials

Students with ASD. Three high school students with ASD participated. For inclusion in this study students had to: (a) have an ASD diagnosis and no comorbid diagnosis of ID as stated in their Individualized Education Plan (IEP); (b) be included in the general education classroom for a portion of their school day; (c) have limited social interaction with peers and/or few friends per teacher report; (d) currently be bullied or at-risk for being bullied per parent or teacher report; and (e) be interested and committed to participating in the peer network intervention for one semester. Students were required to have limited social interactions with peers (e.g., eat lunch alone, limited or no contact with peers outside of school, limited or no interaction with peers during classes or in the halls) because the primary goal of the peer network intervention is to increase social interactions between students with ASD and their peers. Students were required to be educated for a portion of their school day in general education settings, because research suggests students with ASD who are educated in general education settings are at greater risk for bullying victimization than their counterparts educated in special education classes (Sreckovic et al., 2014).

Recruitment. The Exceptional Children's (EC) facilitator and a special education teacher at the school identified students with ASD who were educated in the general education classroom for a portion of their school day and had limited social interactions with peers and/or few friends. The EC facilitator contacted the parents/guardians of potential participants via phone ($n = 7$), briefly explained the study, and mailed consent packets for families to consider. Parents/guardians who were interested in having their child participate mailed the signed consent directly to the investigator ($n = 4$). The investigator followed up with a phone call to gather more information about the potential participant and determine if the potential participant met all inclusion criteria.

During the phone conversation with the parents/guardians, the investigator and parents discussed if the student expressed a willingness to participate in the study and was committed to being involved throughout the semester. The investigator asked parents/guardians if they were concerned their child was being bullied or was at-risk for bullying victimization. The investigator also asked parents/guardians what motivates the student to be involved in groups (to help keep the student engaged throughout the semester if he met inclusion criteria), inquired about the student's interests (e.g., football, video games; to help in peer partner recruitment if he met inclusion criteria), and asked if the student discloses his diagnosis to his peers (to protect the student's privacy during the intervention if he met inclusion criteria). One student did not meet the inclusion criteria to be included in the study, because his guardian and teachers reported he was not currently being bullied and had no concerns about him being at-risk for bullying victimization.

Once the investigator received parental permission and consent, the investigator met individually with the three participants to explain the study and obtain assent. During this meeting the intervention was explained to the student with ASD. The investigator explained that the school was implementing a new program called peer networks. The purpose of the program was to get to know students at school and to spend time with students who have similar interests

(e.g., like to read the same books). The student was asked if he would like to participate in the program and if he could commit to participation through the semester. All students agreed and the investigator obtained assent. During this initial meeting the investigator also asked the students questions to aid in recruiting peer partners. This included questions about their hobbies, what they like to do in their free time, if they participate in any extracurricular clubs and if not if they would be interested in joining any specific clubs, and if they had any suggestions of peers they would like to join their network (recruitment procedures for peer partners is described in more detail below under “Peer partners”; see Table 1 for the list of questions the investigator asked students with ASD during the initial meeting).

Table 1

Questions to Aid in Peer Partner Recruitment

During the initial meeting with each student with ASD, the investigator asked the student the following questions to aid in peer partner recruitment:

1. What are your hobbies?
 2. What do you like to do in your free time?
 3. Are you in any extra-curricular clubs? If not, would you like to join one?
 4. Do you have any suggestions of peers you would like to join your network?
-

Before the start of the study the investigator observed the participants during their lunch period for one week to gather more information about their social interactions during lunch, where they ate lunch, and their typical lunch routine (e.g., Did they buy lunch? Did they come late to lunch? Did they sit with any other students?). The investigator determined the participants’ present levels of social contacts and frequency of bullying victimization by having students complete two descriptive assessments described below. These assessments were not used for inclusion criteria; rather they were used to describe the present level of social contacts and bullying victimization of the participants with ASD from their perspective.

Descriptive assessments. Prior to the start of the study all participants with ASD completed the Reynolds’ Bully Victimization Scale (BVS; Reynolds, 2003) which was used to

provide descriptive information on the current level of victimization the student with ASD was experiencing. The BVS has been administered to adolescents with ASD in previous studies (e.g., Twyman et al., 2010) and is normed for students in grades 3-12 and has internal consistency reliability of 0.93 with test-retest reliability of 0.80 (Twyman et al., 2010). For the BVS, students answered 46 questions. Their answers were ranked and totaled. A higher score indicated a higher level of victimization. Based on total raw score students are classified into categories: normal (0-15), clinically significant (16-23), moderately severe (24-29), and severe (30-69). Students were not required to score a certain level to be included in the study if their parent or teacher reported they were concerned of bullying victimization. Therefore a student could score 0 (no victimization) but still be included in the study if their parents or teachers expressed concern about bullying victimization. Participants with ASD also completed a social contacts questionnaire (see Appendix D), which was adapted from the Social Connections and Relationships Assessment (Carter & Asmus, 2010-2014). The social contacts questionnaire was used to provide descriptive information on the types and frequency of social contacts participants with ASD had with their peers. Students were asked to report the interactions they had throughout the school day and outside of school with their peers within the past week.

In addition to the BVS and social contact questionnaire, each student filled out a pre-social validity form (see Appendix E). The purpose of the pre-social validity form was to gain an understanding of the student's current feelings about school (e.g., does he like going to school), perceptions of social interactions with peers (e.g., does he think his peers are nice, does he report he has friends), and if the student thinks social interactions with peers can be challenging (e.g., does he think it is hard to talk to peers). In addition, students were asked to report on the form if they were currently being bullied or concerned about being bullied and if so where the bullying was happening (i.e., between what classes), or if the student was just concerned about potentially getting bullied, where the student was most concerned it could happen. This information was gathered to create social interaction schedules for peer partners

and the students with ASD (i.e., during the identified times the facilitator encouraged peer partners and the student with ASD to walk together once the intervention began). Please see Figure 2 for a flow chart outlining the recruitment and enrollment steps.

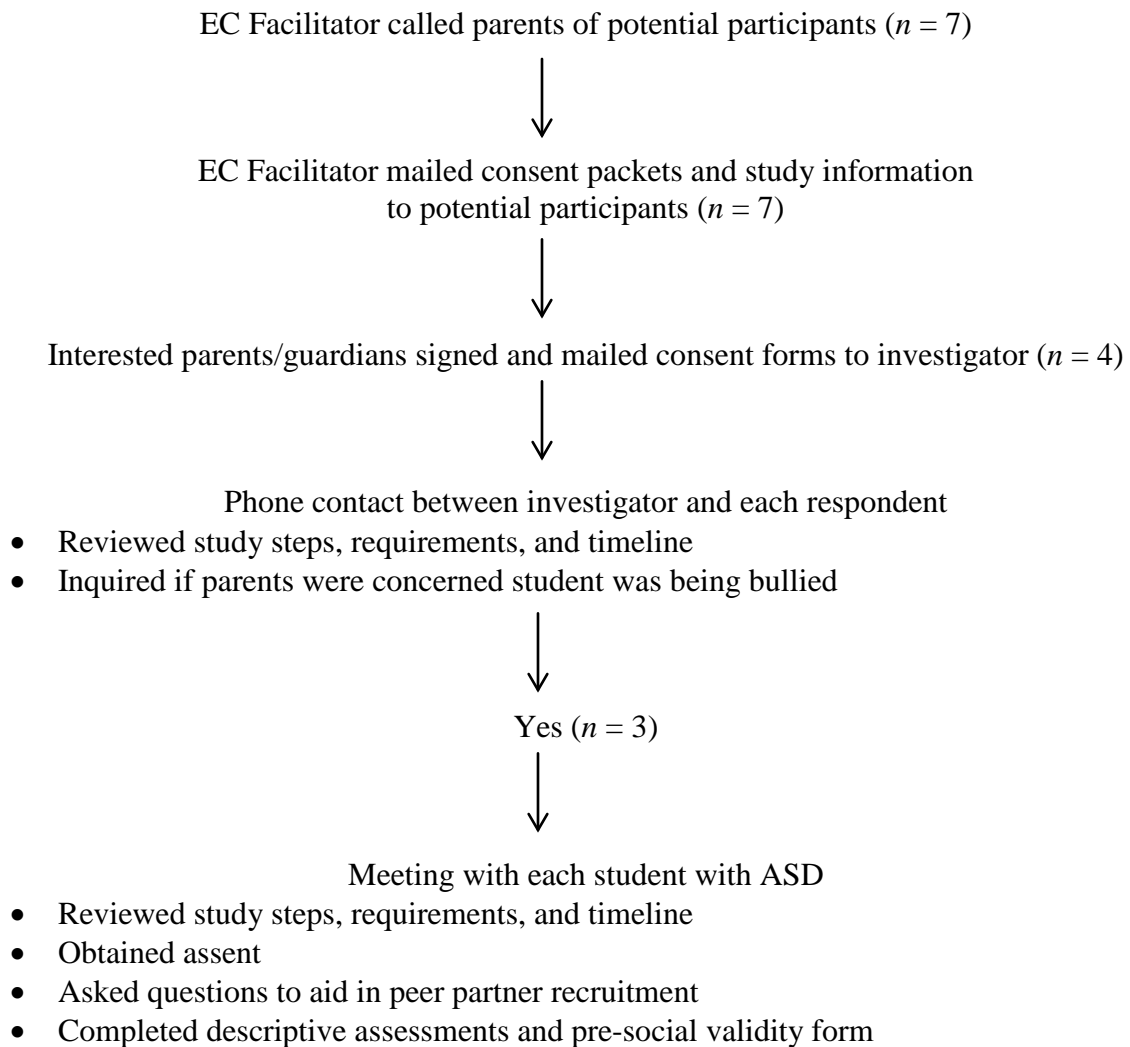


Figure 2. Recruitment to Enrollment Process Flow Chart.

Autism severity. As required by the study inclusion criteria, each participant had an educational diagnosis of ASD and was served under the autism eligibility category in their IEP. To better understand the autism severity and areas of strength and difficulties of each participant with ASD, the Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1988) was completed for each participant by the investigator. The CARS is a well-known diagnostic and evaluation tool used with individuals 3 years old through adulthood. Evaluators observe students and rate behavior on a scale of one to four (1 = no evidence of difficulty; 4 = severely abnormal) on 15 items related to social interaction, communication, imitation, emotional responses, sensory responses, and adaptability. Each participant was observed by the investigator and a research assistant (RA) for a minimum of 2.5 hours during the student's lunch period. A total score was computed by adding the responses from the 15 items. Based on the total score students are classified as non-autistic (15-29), mildly-moderately autistic (30-36), and severely autistic (37-60).

Participant 1. Participant 1 (Colton) was a 15 year old multiracial male. He received an autism diagnosis at age three years from a psychiatrist. Colton's score of 31 on the CARS placed him in the mildly-moderately autistic range. Based on scores from individual CARS items, Colton had strengths in sensory responses and imitation, and difficulties with social interaction. For example, Colton explored food and games during lunch in an age-appropriate manner and was able to imitate his peers during games (e.g., place Jenga pieces following a pattern with his peers). However, Colton demonstrated difficulties actively listening and responding to peers. He often required prompts to ask or answer questions while playing games with peers. When conversing with peers he occasionally expressed inappropriate emotional responses, such as laughing excessively or showing no emotions, but typically demonstrated good use of eye contact. Colton expressed concern over weather related topics (i.e., thunderstorms, snow) and talked excessively about such topics if thunderstorms or snow were in the forecast. Colton did not disclose his diagnosis to his peers.

Colton was in 10th grade at a public, rural high school and accessed the Occupational Course of Study (OCS) and general education curriculum. In the first semester he was educated 50% in general education classes and 50% in OCS classes. In the second semester he was educated 25% in general education classes and 75% in OCS classes. When educated in general education classroom settings he did not receive any extra assistance from support personnel (e.g., teaching assistant, paraprofessional). He did not participate in any extracurricular activities, but had previously participated in a peer group in 9th grade. Colton's teacher expressed concern over his limited social interactions with his peers and was concerned that he was being bullied. Colton scored a 12 on the BVS administered before the start of the study indicating normal levels of bullying victimization by peers. Prior to the beginning of the study the research team observed him eating lunch alone, standing at a table, and walking around the cafeteria when his lunch was finished. During the initial meeting with the investigator, Colton reported on the social contact questionnaire that in the previous week he had not interacted with peers outside of school or participated in any in-school activities. He additionally reported very limited engagement with peers during lunch and in between classes (see Table 2 for more information regarding his social contacts with peers before the study began).

Participant 2. Participant 2 (Thomas) was a 15 year old Caucasian male. He received an autism diagnosis at age 2.5 years from a team of professionals (specific details about the team were not disclosed by his parents). Thomas also had a diagnosis of ADHD. His score of 30 on the CARS placed him in the mildly-moderately autistic range. Based on scores from individual CARS items, Thomas had strengths in sensory responses, imitation, and adapting to change, and difficulties in social interaction and age-appropriate use of objects. For example, Thomas used his senses in an age-appropriate manner to explore his lunch food and objects, and was able to imitate peers' use of objects and language. He adapted to change well; when the network could not meet for lunch due to weather related problems he was disappointed, but was able to go about his day without focusing on missing lunch. While Thomas demonstrated good listening

skills and usually responded to peers, he rarely initiated to peers. He often expressed excessive reactions during a conversation, such as continually laughing when everyone else had stopped. His use of objects during social situations was often immature. For example, when playing a game he often bent over with the card so his peers would have to read the card upside down. Thomas used very limited nonverbal communication; he rarely used gestures and often reached for what he wanted. Thomas did not disclose his diagnosis to his peers.

Thomas was in 9th grade at a public, rural high school. He accessed the general education curriculum 100% of the school day and did not receive any extra assistance from support personnel. He did not participate in any extracurricular activities; however he had previously participated in a peer group in 7th grade. Thomas' mother reported that he was frequently bullied in middle school and she was concerned the bullying would continue in high school. He scored a 1 on the BVS administered before the start of the study indicating normal levels of bullying victimization by peers. Before the start of the study the research team observed him eating lunch with other students every day, with sporadic communication. During the initial meeting with the investigator, Thomas reported limited engagement with peers within and outside of school in the previous week as indicated on the social contacts questionnaire. More specifically, he reported that he did not participate in any in-school activities or talk with or participate in any activities with peers outside of school. While he did report eating lunch with peers every day, he reported never talking with students at the end of the day and talking with another student before the bell rang only 1-2 times.

Participant 3. Participant 3 (Jackson) was a 15 year old Caucasian male. He received an autism diagnosis at age 3 from a developmental team (specific details about the team were not disclosed by his parents). His score of 36 on the CARS placed him in the mildly-moderately autistic range. Based on scores from individual CARS items, Jackson had strengths in imitation skills and age-appropriate use of objects, and difficulties in social interaction and adaptation to change. For example, Jackson was able to imitate peers' use of objects, as well as language, and

use objects in games, such as Jenga© and Heads Up©, in an age-appropriate way. While Jackson was very eager to talk to peers, he often over initiated and would ask peers a list of questions. He occasionally had difficulty comprehending what his peers were saying, but usually asked his peers for clarification. Jackson often demonstrated excessive emotional responses. For example, if his peers were laughing and he did not understand why he would get very frustrated. Once he was in a bad mood it was difficult to change. He demonstrated rigidity to schedules and would become very upset if there was a change in his schedule. If the peer network was unable to have lunch together due to weather related issues, Jackson would become very upset, and continually mention during subsequent lunches the fact that the network did not eat lunch together on that day. Jackson shared with some of his peers that he had a disability, but did not always disclose his diagnosis.

Jackson was in 10th grade at a public, rural high school and accessed the OCS curriculum and general education curriculum. In the first semester he was educated 50% in general education classes and 50% in OCS classes. In the second semester he was educated 25% in general education classes and 75% in OCS classes. When educated in general education classroom settings he did not receive any extra assistance from support personnel. He was actively involved in track and field and Fellowship of Christian Athletes (an extracurricular club offered at the high school). He had previously participated in a peer group in 9th grade. Jackson's teacher was very concerned that he was experiencing bullying victimization and his mother reported that he really wanted friends and becomes very upset when he does not have someone to sit with at lunch. His pre intervention score of 35 on the BVS placed him in the severe category of bullying victimization. Before the start of the study Jackson was observed sporadically sitting with other students during lunch, but rarely engaging in social interactions. This is consistent with what he reported in the pre-intervention social contact questionnaire. Jackson reported in the previous week he sat with peers during lunch 1-2 times, walked to class and talked to another student at the end of the day 1-2 times, and never talked to another student

in the morning before the bell rang. He reported he never talked with another student outside of school, but did report going to the mall with another peer and participated in an in-school pep rally. Please see Table 2 for descriptive information for each participant.

Table 2

Descriptive Information for Participants with ASD

Participant	Age	Race	CARS	BVS	Social Contact Form
1 (Colton)	15	Multiracial	31	12	In-school activities: No Eat lunch with peers: 1-2 times Walk to class with peers: 0 times Talk with peers in the morning: 1-2 times Talk with peers at end of day: 1-2 times Talk with peers outside of school: No Activities with peers outside of school: No
2 (Thomas)	15	Caucasian	30	1	In-school activities: No Eat lunch with peers: Everyday Walk to class with peers: 3-4 times Talk with peers in the morning: 1-2 times Talk with peers at end of day: 0 times Talk with peers outside of school: No Activities with peers outside of school: No
3 (Jackson)	15	Caucasian	36	35	In-school activities: Yes Eat lunch with peers: 1-2 times Walk to class with peers: 1-2 times Talk with peers in the morning: 0 times Talk with peers at end of day: 1-2 times Talk with peers outside of school: No Activities with peers outside of school: Yes

Note. On the social contact form students reported in the past week how many times they engaged in the above activities or if they participated in the above activities; CARS = Childhood Autism Rating Scale CARS (Schopler et al., 1988); BVS = Bully Victimization Scale (Reynolds, 2003).

Peer partners. Fourteen students participated as peer partners. All were high school students at the same high school as the students with ASD. Peer partners were recruited using the following procedures. First, all student participants with ASD were asked if they wanted to invite any particular students (Jackson was the only participant to suggest students). Second, the investigator asked all participants with ASD what their hobbies and interests were and if they were interested in joining any extracurricular clubs or sports teams. The investigator shared this information with a guidance counselor at the school who was familiar with the participants with ASD and the general student population. Using the information provided, the guidance

counselor approached potential peer partners and briefly explained what peer networks were and what their responsibilities would include as a peer partner. The guidance counselor only approached students who demonstrated age-appropriate social skills, were well liked by peers, and had the same lunch schedule as the participant with ASD. The guidance counselor was qualified to identify which students met those qualifications since he often supervised students in the lunchroom, was an athletic coach for the high school, and worked with a variety of students. When the guidance counselor approached potential peer partners he inquired if the student was willing to participate, was motivated to develop an ongoing social relationship with the student with ASD, had similar interests as the focal student, and was committed to staying involved throughout the semester. If the above criteria were met, the guidance counselor gave the student a consent packet. Students interested in participating returned their consent packets to the guidance counselor who in turn gave them to the investigator. Once the investigator had parental permission and consent, she met with each of the peer networks to obtain student assent from all peer partners. Specific information about the peer partners in each peer network is described below.

Peer network 1. Five peer partners participated in peer network 1; three females and two males. Four peer partners were in 10th grade and one was in 9th grade; all were 15-16 years old. Three peer partners were African American and two were Caucasian. None of the peer partners had previously participated in a peer group. All peer partners participated in a sports team, two were additionally in music groups, and one was also in an academic club, student government, service learning or volunteer activities, and Fellowship of Christian Athletes. Colton was grouped with peer network 1. While Colton was not involved in any extracurricular activities he did know one of the peer partners prior to the intervention, because the peer partner's brother was in the same class at Colton.

Peer network 2. Three peer partners participated in peer network 2; one female and two males. Two peer partners were in 9th grade and one was in 10th grade; all were 14-15 years old.

One peer partner was African American and two were Caucasian. None of the peer partners had previously participated in a peer group. All peer partners participated in a sports team. In addition, two peer partners were in academic clubs, one was in a school activism club, and one was in a hobby club. Thomas was grouped with peer network 2. Thomas was not involved in any extracurricular activities; however, he was interested in potentially joining an academic or hobby club and had class with one of the peer partners.

Peer network 3. Six peer partners participated in peer network 3; five females and one male. Four peer partners were in 9th grade, one was in 10th grade, and one was in 11th grade; all were 14-16 years old. One peer partner was African American, one was Hispanic, and four were Caucasian. All peer partners participated in some sort of extracurricular activity. Five of the peer partners participated in a sports team. Additional extracurricular activities the peer partners participated in included: academic clubs, hobby clubs, social activism groups, writing groups (newspaper, yearbook), service learning or volunteer groups, student government, music groups, Model UN, and random acts of kindness club. Jackson was grouped with peer network 3. Jackson was on the track team and knew some of the peer partners prior to the intervention beginning through track. He also had class with two of the peer partners and shared similar interests in music as some of the peer partners.

Setting. This study took place at a public, rural high school located in a Southeastern state in the United States. The high school served approximately 1,000 students. Twenty-eight percent of the students were eligible for free or reduced-price meals. Thirteen percent of students were African American, 69% were Caucasian, and 13% of students were Hispanic. All peer network meetings and observations took place during lunch, (30 min. for Colton and Jackson, and 25 min. for Thomas). Peer network meetings were held in a quiet area of the school (i.e., guidance office conference room, library, empty classroom). Generalization probes took place during students' lunch period in the cafeteria or outside (wherever the student chose to

eat lunch that day). Lunch is a common setting for PMII, because it provides a natural setting for interaction to occur (Morrison et al., 2001).

Materials. Two categories of materials were used during peer network meetings. First, the investigator always supplied snacks for the students (e.g., cookies, crackers) based on the students' preference. Second, the investigator brought games for the students to play. Games were chosen based on feedback from the students. Games included Would you Rather©, Jenga©, and Heads Up©. Questions were written on the Jenga pieces to promote conversations. When students pulled the Jenga piece they would ask the question to the group before placing it on top of the Jenga stack (e.g., Do you have any pets?). All participants received a small financial incentive for the time required to complete forms (students with ASD received \$75; peer partners received \$20; school staff personnel received \$50). Other materials used in this investigation included iPhones and the application UltraTimer to keep track of intervals for coding, and a Sony HD Handycam video camera.

Dependent Variables

Primary dependent variables. Initiations and responses were the primary dependent variables. An initiation was recorded if the student made any vocal/verbal or gestural behavior to another student(s) that was not preceded in the previous 5 s by a socially oriented behavior from another student (Lee, Odom, & Loftin, 2007). All questions were coded as initiations. Questions were coded as initiations because questions are used to elicit a response and have been coded as initiations in previous PMII studies (e.g., Schmidt & Stichter, 2012).

A response was recorded when a student made any verbal or gestural behavior directed toward an initiating student that occurred within 5 s after the initiation (Lee et al., 2007). Continuations were recorded as responses unless the student asked a question, in which case it was recorded as an initiation. If one student was continually talking through multiple intervals without an interruption from a peer, only the first interval where the

student began talking was recorded. Data were only collected on initiations and responses from the focal students to their peers and from peers to focal students.

Exploratory dependent variables. Social contacts and bullying victimization were exploratory dependent variables. Social contacts were defined as interactions students have with their peers within and beyond the context of the school day. Within the school context, social contacts included eating lunch with peers, walking to class with peers, and attending school events (e.g., assemblies, clubs) with peers. Beyond the school context, social contacts included talking with peers (e.g., in person, on the phone, through text messaging, or social networking sites) and engaging in activities together (e.g., going to the movies, playing video games together). Bullying victimization was determined based on a 42 item bullying victimization measure (BVS). The measure included four types of bullying victimization: verbal (e.g., “Some kids said they would hurt my family.”), physical (e.g., “A kid threw something at me to hurt me.”), relational (e.g., “Other kids did things to make me feel bad or get mad.”), and damage to property (e.g., “Some kids broke something of mine.”; Reynolds, 2003).

Design and Procedures

Primary dependent variables. A single case, multiple-probe across participants design (Horner & Baer, 1978) was used to evaluate the effects of peer networks on the social interactions of the participants. Single case design (SCD) studies are often employed in applied settings, and frequently used with participants with ASD because of limits in sample size. This type of design is characterized by individual cases, and in this study a single participant was one case. In SCD studies the outcome variables are measured repeatedly over time, across baseline and intervention phases. Each case is its own control for comparison of outcome variables between phases.

In a multiple-probe across participants design the independent variable is systematically introduced to one participant at a time, while the independent variable is withheld for the remaining participants (Horner & Baer, 1978). When probe assessments are conducted during

baseline, probe data are collected intermittently on the dependent variables until the introduction of the independent variable. The onset of the peer network intervention was staggered across the participants and probes were conducted in baseline for Participants 2 and 3. Once a stable pattern was established in the baseline phase, participant 1 began intervention and participants 2 and 3 remained in the baseline phase. Once a stable pattern was demonstrated in the intervention phase for participant 1, participant 2 began the intervention and participant 3 remained in the baseline phase. This process continued until the intervention had been extended to all participants (Kazdin, 2011). The decision to introduce the independent variable to a new participant was based on initiations and responses from the participant with ASD. By staggering the onset of the intervention for each participant, the design can control for threats to internal validity (Kazdin, 2011).

This study followed the guidelines for high-quality multiple-probe across participants design studies outlined by Kratochwill and colleagues (2010) and Tawney and Gast (1984). Specifically, the dependent variables were clearly defined prior to the start of the study; probe data were collected on each participant at the introduction of the independent variable; a minimum of five probes were collected during baseline conditions to establish a baseline trend; three participants with similar characteristics participated in the study; and data on the dependent variables were continuously collected throughout the intervention (Kratochwill et al., 2010; Tawney & Gast, 1984).

Rationale for probe assessments during baseline. In this study, probe assessments during baseline were collected for Participants 2 and 3, because the frequent presence of researchers in the cafeteria during the baseline phase had the potential to cause reactivity. Two of the three participants had the same lunch period, which would have required a minimum of two researchers in the cafeteria collecting data and potentially three if inter-observer agreement (IOA) needed to be collected. Intermittent probe assessments provided an alternative method to

continuous measurement to prevent reactivity (Horner & Baer, 1978) and additionally required fewer resources (Kazdin, 2011).

Exploratory dependent variables. Pre, mid, and post-test measures were also employed to provide descriptive data on changes in social contacts between participants with ASD and their peers and frequency of bullying victimization. Bullying victimization and social contacts were reported from the perspective of the student. Self-report data were used, because even though self-report data may over or underestimate frequency of social contacts and bullying victimization, it is important to intervene even if a student feels they have limited social contacts or feels they are being victimized (Twyman et al., 2010), as the student will likely still experience the psychological effects associated with limited social contacts and bullying victimization.

Pre-baseline. During the pre-baseline phase students with ASD completed two questionnaires: the social contacts questionnaire and the BVS. These questionnaires, as previously described, provided descriptive information on the types and frequency of social contacts participants with ASD have with their peers and the frequency of bullying victimization experienced by the student with ASD. During the pre-baseline phase students with ASD additionally completed a pre-social validity form.

Baseline. The purpose of the baseline phase was to identify the frequency of social interactions between participants with ASD and their peers. Data collected in this phase was used as the control condition to measure the effects of the intervention on the social interactions between students with ASD and their peers. Participants with ASD were observed during their lunch period. The lunch period lasted for 25-30 min and direct observation occurred once the participant had his lunch and was seated at his lunch table or standing in the location where he typically ate lunch. The observation lasted for 10 min. No instruction was provided during this phase. Six to 11 observations per participant were collected during baseline. A stable baseline was determined by plotting the baseline observations on a line graph and analyzing the level,

trend, variability, and consistency of the data points (Kratochwill et al., 2010). Once a stable baseline was established the peer network moved to the intervention phase.

Intervention. All components of the intervention were adapted from the Center on Secondary Education for Students with Autism Spectrum Disorders Peer Network Facilitator Manual (Carter, Redding, et al., 2014). The intervention phase lasted for approximately five weeks. The intervention phase consisted of three components: (a) an initial training meeting, (b) an introduction meeting, and (c) bi-weekly peer network meetings.

Training. The purpose of the training was to explain the goals of the peer network and the roles of the peer partners. The training was held during the students' lunch period and lasted 25-30 min. Three trainings were held – one for each peer network. The training was delivered by the investigator in a friendly, casual manner with an emphasis on having fun. During the training the investigator passed out a pamphlet to each of the participants containing information about the peer network. The following content was included in the training: (a) what a peer network is, what it looks like, and why a peer network should be created; (b) participants were asked to reflect on a personal strength they have and a personal weakness they have, and a discussion followed about how everyone has strengths and weaknesses; (c) skills the focal students may have difficulty with (e.g., feeling comfortable interacting, initiating); (d) investigator asked participants about the social culture of the high school to get peers' feedback regarding the social customs of the students; based on the social customs of the high school, participants and investigator brainstormed ways to teach social customs to participants with ASD; (f) goals for the peer network (e.g., have fun, increase social interactions between all members of the social network); (g) roles of peer partners (e.g., interact with all network members throughout the school day, help students feel included); (h) benefits of being in a peer network (e.g., meet new people, talk with people who have similar interests as you, make a new friend); (i) what to do if you see someone in your network get bullied (i.e., say “stop”, walk away, and tell an adult; Ross & Horner, 2009); (j) confidentiality (diagnoses were not shared, but

students were informed that they should share only information they would want shared about themselves); and (k) discussion and questions (Carter, Redding, et al. 2014).

For participants 1 and 3 the training was conducted with only the peer partners. For participant 2 the training included both the participant with ASD and the peer partners. Participant 2 was included 100% in general education settings, did not disclose his diagnosis with his peer group, and did not want to be singled out as different. Therefore, the training was conducted with the entire peer network and the information was more general. For example, rather than saying “Sometimes it is hard for Thomas to join a conversation. If you see that Thomas is not involved in the conversation, what you can do?” the investigator said, “Sometimes it is hard for people to join in on conversations because they feel uncomfortable and do not know how to join a conversation. As a peer network how can we make sure everyone in our network is included in our conversations?”

Introduction meeting. The purpose of this component was to introduce all members of the peer network (i.e., peer partners and participants with ASD) to one another and to create interaction schedules. Each peer network was introduced separately. The investigator guided a discussion on common interests between all members in the peer network. During this meeting the investigator guided a conversation on times throughout the day the network members could “hang out” (e.g., walk to class together, eat lunch together, hangout together before or after school). The investigator encouraged at least two times per day for each participant with ASD to connect with their peer partners. These times were based on information provided in the pre-social validity form completed by the participants with ASD, regarding times throughout the day they were concerned about being bullied. Participants 1 and 3 noted they were concerned about being bullied during lunch or walking from class to lunch. Therefore, it was arranged for a peer partner from each network to walk with participants 1 and 3 to lunch and from lunch to their next class. Participant 2 did not note any times so walking to lunch and from lunch with a peer

partner was also arranged for him. All students in the peer network were encouraged to connect outside of the weekly meetings, not just participants with ASD.

Peer network meetings. During the intervention phase each peer network met approximately twice a week during lunch. Severe weather and school cancelations prevented the networks from meeting exactly twice a week (some weeks peer networks met once and other weeks they met three times, but on average they typically met twice a week). A facilitator was present during all peer network meetings. The facilitators were two doctoral students (the investigator and an RA) in education who had master's degrees and previous experience implementing social interventions with high school students with ASD. During these meetings all students from the peer network were present (peer partners and participant with ASD). The purpose of the peer network meeting was to check in with all members of the peer network and provide support as needed (e.g., model how to prompt the student with ASD to engage in the conversation; change interaction times). The meeting additionally provided time for all members of the peer network to interact. Each peer network met separately. The facilitator provided snacks (e.g., cookies, pizza) and games (e.g., Uno) based on the preference of the students.

During weekly meetings the facilitator informally assessed the satisfaction of the students, asked when students interacted throughout the week, and changed interaction times and/or discussed barriers as needed. Throughout the intervention no student reported they were unhappy with the peer network, therefore it was not necessary to make any adjustments. However, as the intervention proceeded students did suggest new games and those games were then brought to the meetings. Some days students did not want to play a game and preferred to just talk. Other social opportunities, such as attending sporting events and communicating outside of school were encouraged during each meeting. During weekly meetings all students were encouraged to interact and prompting and modeling was provided from the facilitator as needed. The primary goal was to minimize adult support and encourage students to take more control over the meeting as time progressed. Once students were interacting or playing a game,

the facilitator only played an active role as needed. At the end of each meeting the facilitator reminded students when the next meeting was and reviewed interaction times for the following days.

A typical peer network meeting began with all students staggering in with their lunches. Students began eating once they sat down and informally greeted one another and engaged in casual conversation until all students were present. Once all students were present the facilitator asked students how their week was going, if the meeting times still worked out well for them, and if they were enjoying the meetings. The facilitator also asked if they had a chance to talk to or hang out with their network members since the last time they met and discussed times for them to meet up and talk with their network members for the coming week. This lasted approximately 5-10 min. Students then played a game and engaged in conversation. The facilitator did not participate in the game to allow more opportunities for the students to interact. Before the lunch period ended the facilitator reminded students when and where the next meeting would be held.

Maintenance and generalization probes. During the maintenance phase the network meetings were reduced to once a week. The content of the meetings stayed the same. The maintenance phase lasted for approximately three weeks and began immediately following the conclusion of the intervention phase. Three data points per participant were collected during maintenance. During this phase students were additionally observed in the lunchroom on “non-meeting” days to see if social interactions were extending beyond the weekly meetings. Three data points per participant were collected for generalization.

Treatment Fidelity

To ensure the most effective intervention for the participants in the study, a measure of treatment integrity was completed during orientation and during each of the network meetings. Treatment fidelity was collected on 100% of the orientation meetings. Each orientation meeting was video-taped and an RA watched the videos and completed a checklist to ensure the

facilitator covered all content previously described. The facilitator also completed the same checklist during the orientation meetings to obtain a measure of IOA. During peer network meetings, treatment fidelity was collected on the facilitator to confirm the facilitator was covering all the components previously outlined. Treatment fidelity was also collected on the peer partners during the peer network meetings to confirm students were present, engaged with the focal student, and respectful. Two checklists outlining these components were completed by either an RA or the facilitator on 100% of the sessions. For a minimum of 50% of the sessions both the facilitator and an RA completed the checklists to obtain a measure of IOA. See Appendix F for treatment fidelity forms.

Social Validity

A researcher-developed survey was used to assess the satisfaction of the intervention from the perspectives of the participants with ASD, one of their parents, the peer partners, the guidance counselor who assisted in peer partner recruitment, and the special education teacher who assisted in recruiting students with ASD. Measures of social validity were administered before and after data collection (only post social validity data were collected for the school personnel). Social validity data were collected to determine the importance of the outcome measures from the perspectives of key stakeholders and provide stakeholders an opportunity to evaluate the intervention. On the post social validity form students with ASD and their peer partners were asked to list who in their peer network they considered as friends. This information was gathered to examine if students perceived each other as friends. If two people nominated each other as friends it was considered a reciprocal friendship (Waldrip, Malcolm, & Jensen-Campbell, 2008). See Appendix D for pre- and post-social validity forms.

To gain a better understanding of levels of social interaction of high school students without ASD, social interaction data were collected on two randomly selected students in the cafeteria during the students' lunch period. Both students were male and attended the same lunch period as one of the participants with ASD. The identical procedures used to collect social

interaction data on the participants with ASD during baseline were used with the two randomly selected students (i.e., data collection began when the student had his lunch and sat at his table, data were collected for 10 min, data were collected using the same protocol used with students with ASD which is described below). Additionally, all peer partners completed the social contacts questionnaire. This information was used as a reference to compare with the social contacts of the participants with ASD.

Data Collection

Primary dependent variables. For social interactions (i.e., initiations and responses), all baseline, intervention, maintenance, and generalization observations were conducted during live, direct observations. The researchers stood or sat within two yards of the participant with ASD to conduct the observations. See Appendix G for the data collection form. A 10 min sample was collected for each observation. Partial interval recording was used to tally the occurrence of initiations and responses (Kazdin, 2011). During weekly meetings data collection began approximately 15 min into the lunch period. This segment of time was chosen, because during the beginning of the lunch period students staggered in at different times and at the end of the lunch period students occasionally had to leave at different times to use the restroom. Therefore, this segment of time provided the most ideal time for students to be present and for casual interactions to occur.

Exploratory dependent variables. For social contacts and bullying victimization, two measures were employed during the study: a social contacts questionnaire and the BVS (Reynolds, 2003). The social contacts questionnaire was administered before the baseline phase, before intervention phase, before the maintenance/generalization phase, and after the maintenance/generalization phase concluded. This measure was used to describe types and frequency of social contacts and was descriptive in nature (see Appendix D). The BVS was also administered at the same four time points to each participant with ASD. This measure was used to describe the level of bullying victimization of students with ASD prior to intervention and

after intervention and was descriptive in nature. The social contact questionnaire and the BVS were completed in the high school library. The student and the investigator sat a table far away from other students so their conversation could not be heard. Students were given the option to read the form to themselves or have the form read aloud to them. The students' answers were recorded verbatim.

Inter-observer Agreement

Each RA participated in the following training protocol before the study began. First, all RAs read a coding manual and then independently took a 10 item quiz on coding definitions and had to earn 100%. Second, all RAs independently watched a 10 min practice video and coded social interactions. The answer key was made available so they could become familiar with the coding scheme. Third, once they felt comfortable with the practice video, all RAs independently coded two 10 min video clips and had to be at least 80% reliable with the answer key, which was checked by the investigator. Finally, the RAs and the investigator conducted a live observation together and again had to reach 80% reliability. After the study began, the primary (RAs) and reliability (investigator) observers independently recorded behaviors of the same student during a minimum of 20% of all direct social interaction observations during baseline, intervention, and maintenance/generalization phases for each participant. The percentage agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. Additionally, a second scorer conducted reliability on the scoring of the BVS.

Data Analysis

Primary dependent variables. Weekly social interactions were assessed by visual graphing and analysis. Data for all phases and participants were plotted on a line graph. The data were analyzed to determine if there was a relation between intervention and increases in initiations and responses from students with ASD and to students with ASD. The following features presented by Kratochwill et al. (2010) were examined to determine if a functional

relation existed: (a) the consistency of level, trend, and variability within each phase; (b) the immediacy of effect and proportion of overlap across phases; and (c) the consistency of data across similar phases. Initiations and responses from students with ASD were used to determine phase changes.

Exploratory dependent variables. Pre, mid, and post measures on social contacts and bullying victimization were descriptive in nature and were evaluated by comparing the social contacts and victimization scores across time points for each participant. The social contacts were compared to determine if the number and type of social contacts changed during and after students participated in the intervention. The BVS categorizes victims into four categories: normal (0-15), clinically significant (16-23), moderately severe (24-29), and severe (30-69), allowing for comparison in placement of victimization category across time points. Raw scores were used to determine the frequency of victimization.

Chapter 4

Results

The effects of the peer network intervention will be presented by research aim. First, the results of the primary research aim (social interactions) will be presented; data on total social interaction will be presented first, followed by data on initiations and responses to and from students with ASD. Next, the effects of the peer network intervention on the exploratory research aims (social contacts and bullying victimization) will be presented. Finally, treatment fidelity, IOA, and social validity results will be presented.

Primary Research Aim: Social Interactions

The effects of the peer network intervention on the social interactions between students with ASD and their peers were evaluated using visual inspection and analysis of levels, trends, and variability within each phase (Kazdin, 2011). Changes in level, trend, and variability were compared across phases and participants. The implementation of a peer network intervention was effective in increasing total social interaction between students with ASD and their peers as represented in Figure 3. Figure 3 demonstrates a clear functional relation between the implementation of the peer network intervention and total social interaction (i.e., initiations and responses from students with ASD to peers and to students with ASD from peers). The changes in initiations and responses corresponded with the manipulation of the independent variable at three different time points demonstrating experimental control (Horner et al., 2005). When compared to the total social interactions of two randomly selected peers, the total social interactions of participants with ASD closely resembled that of their peers during the intervention phase. The grey box in Figure 3 indicates the range of total social interactions of the two randomly selected peers (97% - 100%).

During the maintenance phase, total social interaction was stable and consistent compared to total social interaction during the intervention phase for Participants 2 and 3. For Participant 1 there was a slight decrease in social interaction during the first maintenance data point, but an upward trend was observed. Generalization probes indicated mixed results, however, mean total social interaction during generalization was higher than baseline for all three participants.

Mean total social interaction for each participant with ASD across all phases are displayed in Table 3. Mean changes from baseline to maintenance for Participant 1 (73.3%), Participant 2 (32.0%), and Participant 3 (56.8%) demonstrate substantial increases in social interaction from pre to post intervention.

Figure 3

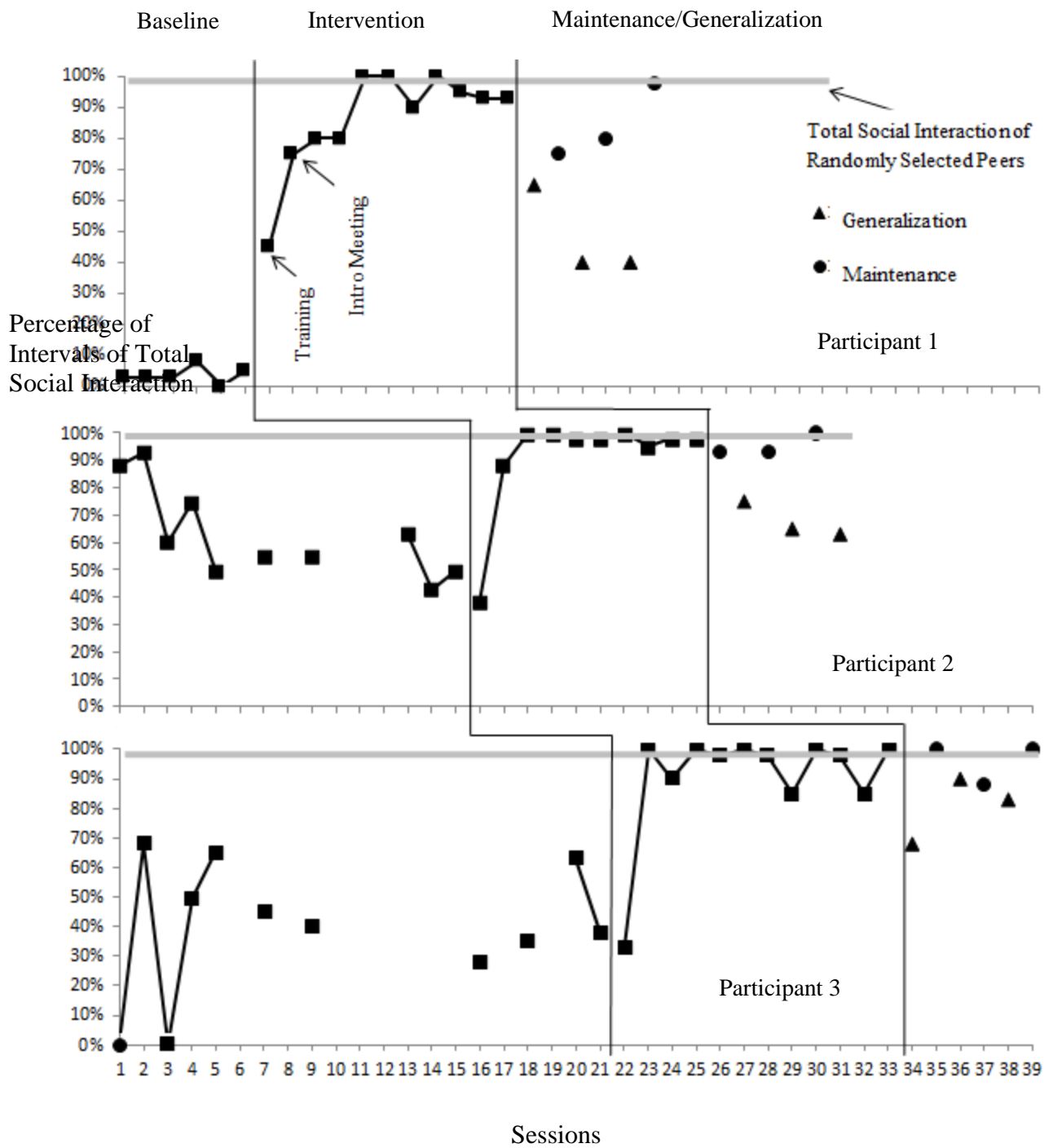


Table 3

Mean and Range Percentages of Total Social Interaction between Students with ASD and Peers

FS	Baseline	Intervention	Maintenance	Generalization
1	3.3 (0.0 - 7.5)	86.3 (45.0 - 100.0)	76.6 (75.0 - 80.0)	48.3 (40.0 - 65.0)
2	63.0 (42.5 - 92.5)	91.0 (37.5 - 100.0)	95.0 (92.5 - 100.0)	67.5 (62.5 - 75.0)
3	39.0 (0.0 - 67.5)	90.4 (32.5 - 100.0)	95.8 (87.5 - 100.0)	80.0 (67.5 - 90.0)

Note. FS = focal student (student with ASD); numbers are percentages; range numbers are in parentheses.

The following two sections dissect the data presented in the total social interaction graph (Figure 3). First, data on initiations and responses from students with ASD to their peers will be presented followed by data on initiations and responses from peers to students with ASD. At the end of each section data are presented on the mean initiations and responses from the randomly selected students to their peers and vice versa.

Research question 1: Does the implementation of a peer network intervention produce increases in initiations and responses from students with ASD to their peers? All three participants demonstrated increases in initiations and responses to their peers from baseline to intervention phases. The results are displayed in Figure 4 and mean initiations and responses from participants with ASD to peers across phases are displayed in Table 4.

Participant 1. Increases in initiations from Participant 1 to peers were observed when the peer network intervention was implemented. In the baseline phase Participant 1’s mean initiations to peers was 0.8% (range = 0.0% - 5.0%). Baseline data showed a stable trend. During the intervention phase, an immediate increase in level was observed and Participant 1’s mean initiations to peers increased to an average of 21.6% (range = 0.0% - 32.5%). Data were fairly stable during the intervention phase, with an outlier at data point 10, and a slight upward trend was observed. The mean initiations to peers slightly decreased during the maintenance phase to 20% (range = 17.5% - 22.5%); however, the data were stable. The mean for the

generalization probes decreased to 11.7% (range = 5.0% - 22.5%). There was a slight decrease in level in initiations to peers; however, as the generalization phase continued there was a stable, upward trend. The mean change from baseline to maintenance was 19.2%.

Similar changes were noted in responses from Participant 1 to peers across phases. In the baseline phase a stable trend was observed and Participant 1's mean responses to peers was 1.7% (range = 0.0% - 7.5%). An immediate increase in level was observed in responses from Participant 1 to his peers from baseline to intervention phases. The mean responses to peers during intervention phase was 45.7% (range = 27.5% - 72.5%). While the data were variable during the intervention phase, an upward trend was observed. Average responses to peers increased during the maintenance phase to 58.3% (range = 50.0% - 65.0%). Data decreased from the intervention to the generalization phase; with mean responses to peers declining to 38.3% (range = 30.0% - 42.5%). There was a slight downward trend during generalization probes; however there was no overlap with baseline data. The mean change from baseline to maintenance was 56.6%.

Participant 2. Increases in initiations from Participant 2 to peers were observed when the peer network intervention was implemented. During the baseline phase Participant 2's mean initiations to peers was 19.0% (range = 7.5% - 37.5%). Baseline data demonstrated a slight downward trend. Initiations to peers increased during the intervention phase to a mean of 24.8% (range = 5.0% - 45.0%). There was not an immediate level change, but an upward trend was observed. Mean initiations to peers increased to 35.0% (range = 22.5% - 47.5%) during maintenance probes; however, a downward trend was observed. During generalization probes mean initiations decreased to 14.2% (range = 7.2% - 22.5); however, a slight upward trend was observed. The mean change from baseline to maintenance was 16.0%.

For Participant 2, responses to peers also increased once the peer network intervention was implemented. The baseline data for Participant 2 indicated a downward trend with an outlier at data point 13. Mean responses to peers during baseline was 45.8% (range = 30.0% - 77.5).

During the intervention phase there was an increase in level after training with mean responses to peers increasing to 59.8% (range = 17.5% - 77.5%). During the intervention phase an upward trend was observed. There was a slight increase in mean responses to peers during maintenance (70.8%; range = 52.5% - 85.0%). While maintenance probes were variable, data points were within the same range or higher than intervention data points. During generalization probes mean responses to peers decreased to 52.5% (range = 37.5% - 62.5%). Generalization probe data were variable. The mean change from baseline to maintenance was 25.0%.

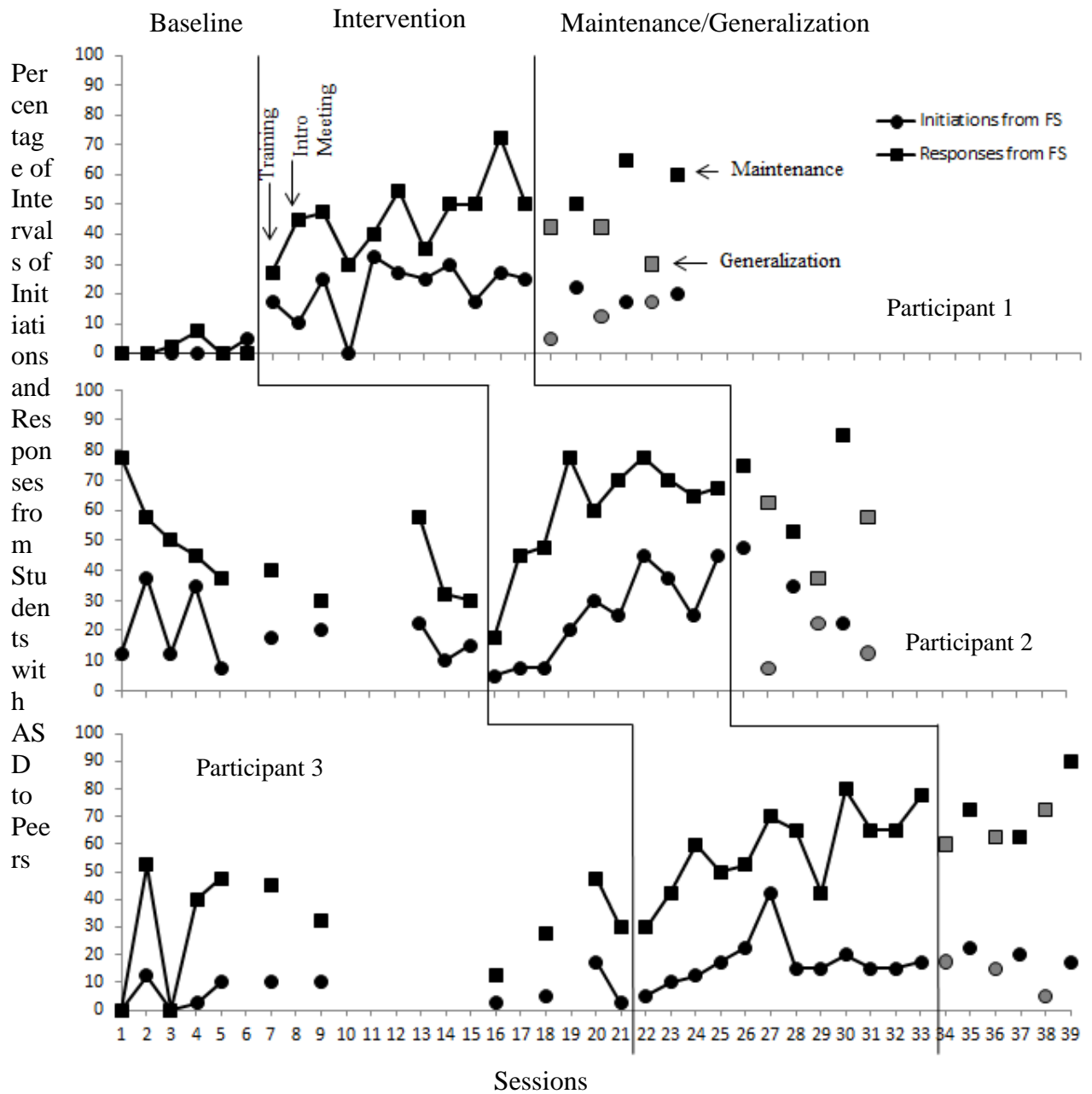
Participant 3. For Participant 3 increases in initiations to peers were observed when the peer network intervention was implemented. In the baseline phase Participant 3's mean initiations to peers was 6.6% (range = 0.0% to 17.5%). Baseline data indicated a stable trend. During intervention mean initiations to peers increased to 17.3% (range = 5.0% - 42.5%) and a slight level change was observed. Data were fairly stable with the exception of an outlier at data point 27, and demonstrated a slight upward trend. During maintenance probes, data were stable and consistent with intervention. The mean initiations to peers during maintenance probes was 20.0% (range = 17.5% - 22.5%). There was a slight decrease in mean initiations to peers during generalization (12.5%; range = 5.0% - 17.5%). Generalization data demonstrated a downward trend. The mean change from baseline to maintenance was 13.4%.

Increases in responses to peers were also observed for Participant 3 once the peer network intervention was implemented. For responses to peers, baseline data were variable, with a downward trend prior to intervention. Mean responses to peers during baseline was 30.5% (range = 0.0% - 52.5%). There was an increase in level during intervention with mean responses to peers increasing to 58.3% (range = 30.0% - 80.0%). The data were variable during intervention, but an upward trend was observed. During maintenance probes responses to peers increased to a mean of 75.0% (range = 62.5% - 90.0%). Data were variable during maintenance probes, but data points were within the range of intervention points or higher. Mean responses to

peers was similar during generalization probes (65.0%, range = 60.0% - 72.5%) and an upward trend was observed. The mean change from baseline to maintenance was 44.5%.

Data from randomly selected students. Mean initiations from the randomly selected students to their peers ranged from 5.0% to 8.0%. Mean responses from the randomly selected students to their peers ranged from 73% to 80%.

Figure 4



Research question 2: Does the implementation of a peer network intervention produce increases in initiations and responses from peers to students with ASD? For all three participants, the implementation of the peer network intervention produced increases in initiations and responses from peers. The results are displayed in Figure 5 and mean initiations and responses to participants with ASD from peers across phases are displayed in Table 4.

Participant 1. Increases in initiations from peers to Participant 1 were observed when the peer network intervention was implemented. In the baseline phase, mean initiations from peers to Participant 1 was 2.9% (range = 0.0% - 7.5%). Baseline data indicated a stable trend. Once the peer network intervention began there was an immediate increase in level after training, with mean initiations from peers increasing to 40.2% (range = 5.0% - 57.5%). A slight upward trend was observed during intervention. During maintenance probes, mean initiations from peers slightly decreased to 40.0% (range = 35.0% - 47.5%). No level change was observed, however data demonstrated a slight upward trend. During generalization probes an immediate decrease in level was observed and initiations from peers decreased to 9.2% (range = 2.5% - 20.0%). While there was a significant decrease in mean initiations from peers during generalization, an upward trend was observed and mean initiations from peers was higher than mean initiations from peers during baseline. The mean change from baseline to maintenance was 37.1%.

Similarly, responses from peers to Participant 1 increased with the implementation of the peer network intervention. In the baseline phase, mean responses from peers to Participant 1 was 0.8% (range = 0.0% - 5.0%). A stable trend was observed during baseline. There was an immediate increase in level during the intervention phase, and mean responses from peers increased to 71.4% (range = 30.0% - 92.5%). During the intervention phase data were variable, and a slight upward trend was observed. Mean responses from peers decreased to 60.8% (range = 47.5% - 80.0%) during maintenance probes. A slight decrease in level was noted, however, an upward trend was observed. During generalization probes, mean responses from peers decreased

to 35.0% (range = 30.0% - 37.5%). A decrease in level and downward trend was observed during generalization probes. The mean change from baseline to maintenance was 60.0%.

Participant 2. Similar to Participant 1, increases in initiations to Participant 2 were observed once the peer network intervention was implemented. In the baseline phase, mean initiations from peers to Participant 2 was 12.3% (range = 5.0% - 25.0%). A downward trend was observed during baseline. During intervention a slight increase in level was observed and data demonstrated an upward trend. Mean initiations from peers to Participant 2 increased during intervention to 35.8% (range = 2.5% - 62.6%). Mean initiations from peers was consistent with intervention during the maintenance probes (43.3%; range = 35.0% - 52.5%) and an upward trend was observed. During generalization probes mean initiations from peers decreased to 10.8% with a range of 2.5% to 20.0% and an immediate decrease in level was observed. The mean change from baseline to maintenance was 31.0%.

Increases in responses to Participant 2 from peers were also observed once the peer network intervention was implemented. In the baseline phase, mean responses from peers to Participant 2 was 42.8% (range = 27.5% - 67.5%). Data demonstrated a downward trend. Mean responses from peers increased to 76.0% (range = 27.5% - 95.0%) during the intervention phase with an immediate increase in level observed after training. During the intervention phase data were variable, but an upward trend was observed. During maintenance probes, mean responses from peers was consistent with intervention (75.8%; range = 70.0% - 80.0%) and an upward trend was observed. During generalization probes mean responses from peers decreased to 58.3% (range = 52.5% - 70.0%). While a downward trend was observed, mean responses from peers during generalization was higher than baseline. The mean change from baseline to maintenance was 33.0%.

Participant 3. For Participant 3, increases in initiations from peers were observed once the peer network intervention was implemented. In the baseline phase, mean initiations to Participant 3 from peers was 7.7% (range = 0.0% - 20.0%). Baseline data were variable, but

demonstrated stability beginning with data point 5 and a downward trend was observed. Mean initiations to peers increased during the intervention condition to 31.9% (range = 10.0% - 52.5%). A slight level change was observed, and a positive trend was noted. During maintenance probes mean initiations from peers increased to 45.0% (range = 22.5% - 70.0%). Maintenance probe data were variable and a clear trend was not observed. During generalization, an immediate decrease in level was observed and mean initiations from peers decreased to 4.2% (range = 0.0% - 10.0%). The mean change from baseline to maintenance was 37.3%.

Increases in responses from peers to Participant 3 were also observed when the peer network intervention was implemented. In the baseline phase, mean responses to Participant 3 from peers was 26.8% (range = 0.0% to 45.0%). Data were variable at the beginning of baseline, but stability was observed beginning with data point 7. Mean responses from peers increased to 68.8% (range = 25.0% - 90.0%) during the intervention phase. During the intervention phase an abrupt increase in level occurred after training and an upward trend was observed; however there was an outlier at data point 29. Responses from peers increased during maintenance probes to 82.5% (range = 75.0% - 97.5%). Data were consistent with the intervention phase and an upward trend was observed. During generalization probes mean responses from peers decreased to 65.8% (range = 62.5% - 70.0%); however, mean responses from peers was higher during generalization probes than the baseline phase. The mean change from baseline to maintenance was 55.7%. Please see Table 4 for mean social interactions to students with ASD and from students with ASD across all phases.

Data from randomly selected students. Mean initiations to the randomly selected students from their peers ranged from 0.0% to 3.0%. Mean responses to the randomly selected students from their peers ranged from 57% to 90%.

Figure 5

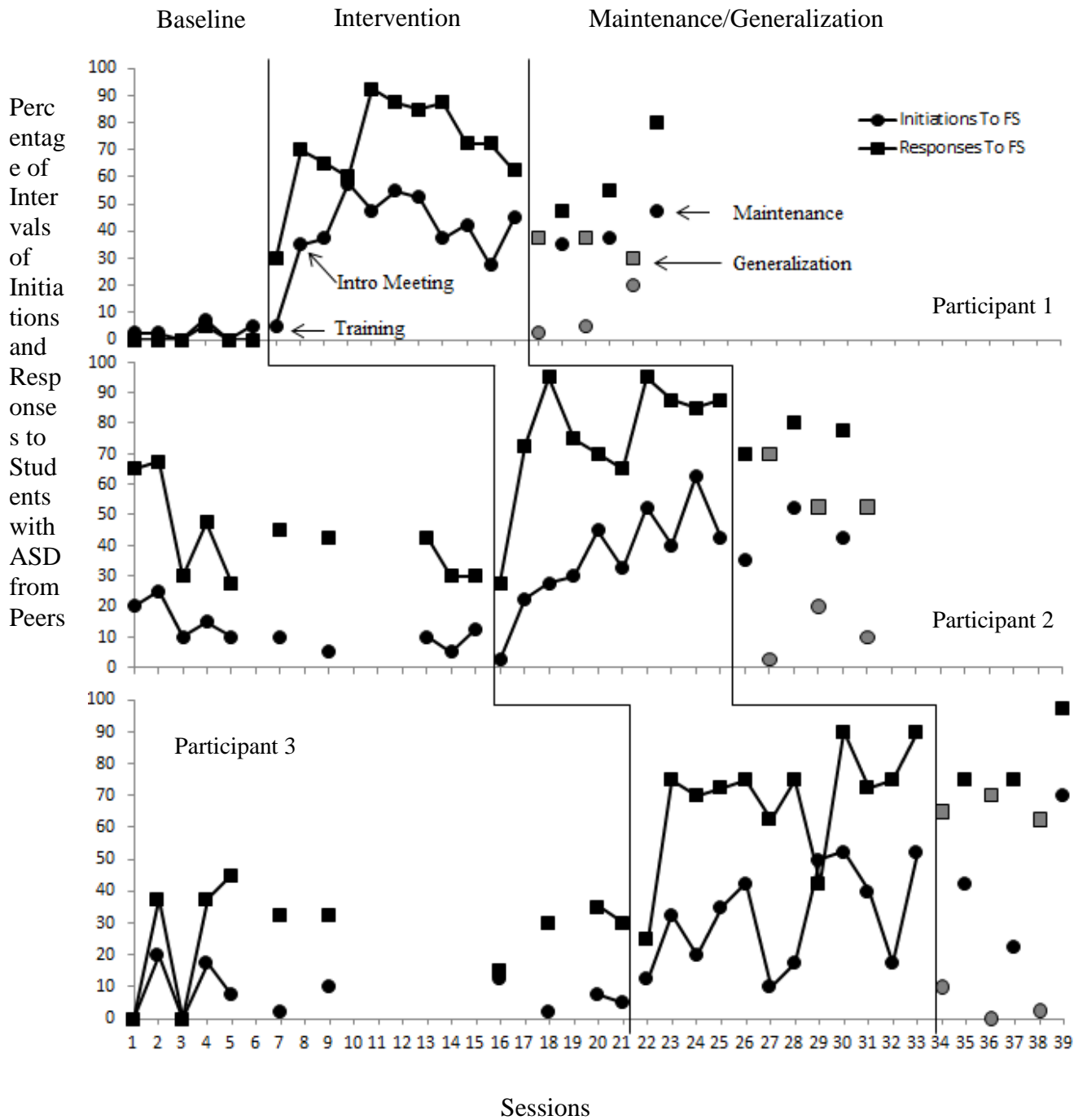


Table 4

Mean and Range Percentages of Social Interactions for all Dependent Variables

FS	DV	Baseline	Intervention	Maintenance	Generalization
1	Initiations	0.8	21.6	20.0	11.7
	From FS	(0.0 - 5.0)	(0.0 - 32.5)	(17.5 - 22.5)	(5.0 - 22.5)
1	Responses	1.7	45.7	58.3	38.3
	From FS	(0.0 - 7.5)	(27.5 - 72.5)	(50.0 - 65.0)	(30.0 - 42.5)
1	Initiations	2.9	40.2	40.0	9.2
	From Peers	(0.0 - 7.5)	(5.0 - 57.5)	(35.0 - 47.5)	(2.5 - 20.0)
1	Responses	0.8	71.4	60.8	35.0
	From Peers	(0.0 - 5.0)	(30.0 - 92.5)	(47.5 - 80.0)	(30.0 - 37.5)
2	Initiations	19.0	24.8	35.0	14.2
	From FS	(7.5 - 37.5)	(5.0 - 45.0)	(22.5 - 47.5)	(7.5 - 22.5)
2	Responses	45.8	59.8	70.8	52.5
	From FS	(30.0 - 77.5)	(17.5 - 77.5)	(52.5 - 85.0)	(37.5 - 62.5)
2	Initiations	12.3	35.8	43.3	10.8
	From Peers	(5.0 - 25.0)	(2.5 - 62.6)	(35.0 - 52.5)	(2.5 - 20.0)
2	Responses	42.8	76.0	75.8	58.3
	From Peers	(27.5 - 67.5)	(27.5 - 95.0)	(70.0 - 80.0)	(52.5 - 70.0)
3	Initiations	6.6	17.3	20.0	12.5
	From FS	(0.0 - 17.5)	(5.0 - 42.5)	(17.5 - 22.5)	(5.0 - 17.5)
3	Responses	30.5	58.3	75.0	65.0
	From FS	(0.0 - 52.5)	(30.0 - 80.0)	(62.5 - 90.0)	(60.0 - 72.5)
3	Initiations	7.7	31.9	45.0	4.2
	From Peers	(0.0 - 20.0)	(10.0 - 52.5)	(22.5 - 70.0)	(0.0 - 10.0)
3	Responses	26.8	68.8	82.5	65.8
	From Peers	(0.0 - 45.0)	(25.0 - 90.0)	(75.0 - 97.5)	(62.5 - 70.0)

Note. FS = focal student (student with ASD); DV = dependent variable; numbers are percentages; range numbers are in parentheses.

Secondary Research Aims: Social Contacts and Bullying Victimization

The effects of the peer network intervention on social contacts between students with ASD and their peers and bullying victimization of students with ASD were explored by comparing measures across four time points: before baseline phase (time one), after baseline phase (time two), after intervention phase (time three), and after maintenance/generalization phase (time four). Results for research questions 3 and 4 are described below.

Research question 3: What effects does the implementation of a peer network intervention have on the social contacts between students with ASD and their peers?

Students reported how frequently within the past week they engaged in certain activities and social interactions with their peers on a social contact questionnaire. The results of the social contact questionnaire varied among participants. Participants 1 and 3 reported changes in the frequency they engaged in social contacts with peers outside of school and eating lunch with peers when the intervention began. For Participant 2 changes were not reported. All 14 peer partners also completed the social contact questionnaire at one time point to serve as a reference for social contacts among peers without ASD. A summary of the social contact reports completed by the peer partners is described next, followed by results from the social contact questionnaires from each participant with ASD. Results from the social contact questionnaires are presented in Table 5 and 6 for peer partners and participants with ASD, respectively.

Peer partners. Before the start of the implementation of the peer network intervention, each peer partner completed a social contacts questionnaire. Results indicated that the majority of peer partners (82%) had participated in an in-school activity within the previous week. In-school activities included sport teams and school club events. All peer partners reported talking with their peers outside of school, either via email, online chat, Facebook, Instagram, another social media site, text messaging, phone calls, or in-person interaction. Approximately two-thirds (64%) reported engaging in activities with their peers outside of school. Activities included playing sports, watching movies, going to the mall, going to a friend's house, and attending church events.

Peer partners reported high rates of social interaction with peers throughout the school day. For example, all but one peer partner (93%) reported eating lunch with peers every day. Further, approximately three fourths of peer partners reported walking to class with peers five or more times (71%), talking with peers in the morning five or more times (71%), and talking with peers at the end of the day five or more times (79%).

Participant 1. Before the implementation of the intervention (time points one and two) Participant 1 reported he did not participate in any in-school activities, talk with peers outside of school, or do activities with peers outside of school within the previous week. After the intervention began (time points three and four) Participant 1 did not report participating in any in-school activities, however, he did report talking to and doing activities with peers outside of school. More specifically, Participant 1 reported he talked with peers in person, through Facebook, and went to a birthday party. Therefore, social contact reports completed by Participant 1 at time points three and four more closely resembled the social contact reports completed by peer partners in relation to talking with peers and doing activities with peers outside of school.

Participant 1 consistently reported he talked with peers in the morning and at the end of the school day 1-2 times in the previous week across all four time points. However, changes were reported in the frequency he ate lunch with peers. More specifically, during time point three (after intervention) he reported he ate lunch with peers every day, which was an increase from 1-2 times during time points one and two. At time point four he reported he ate lunch with peers 3-4 times, which again was more frequently than before the intervention began. Similarly, he reported an increase in walking to class with peers during time point three. He reported walking to class with peers more than five times, which was an increase from time points one and two. In general, the frequency in which Participant 1 engaged in social contacts with his peers during the school day was notably different than data reported by peer partners before the intervention began. However, when the peer network intervention was implemented the frequency in which he ate lunch with peers and walked to class with peers more closely resembled the social contact information reported by peer partners.

Participant 2. Participant 2 reported fairly consistent social contacts across all four time points. He never reported participating in any in-school activities or doing activities with peers outside of school. He reported talking with peers outside of school only at time point two, in

which he reported in-person contact. He reported eating lunch with peers every day across all four time points. Very little variation was reported in walking to class with peers and talking to peers in the morning, with the majority of time points indicating he participated in such interactions 1-2 times. He reported never talking to peers at the end of the school day across all four time points.

Data reported by Participant 2 was similar to data reported by peer partners only in regards to frequency of eating lunch with peers. Participant 2 reported notably less social contacts than peer partners across all other items across all time points.

Participant 3. Participant 3 reported consistently attending in-school activities across all four time points. The activities included attending a pep rally, a sports team, and volunteer activities. His reports of doing activities with peers outside of school were also fairly consistent. He reported going to the mall with a peer during time point one, and not participating in activities with peers outside of school for the subsequent time points. However, there was a notable increase in talking with peers outside of school once the intervention began. More specifically, before the intervention began (time points one and two) he reported no communication with peers outside of school and after the intervention began (time points three and four) he reported talking with peers outside of school in person and through email and phone calls. In comparison to data reported by peer partners, Participant 3's reports of in-school activities resembled that of the peer partners. Prior to intervention his communication with peers outside of school was limited and his lack of communication was in stark contrast to that of the peer partners, who all engaged in communication with peers outside of school. However, once the intervention began his levels of communication with peers outside of school increased and resembled data reported by peer partners.

Participant 3 reported fairly consistent contact with peers inside of school in relation to walking to class with peers, talking to peers in the morning before the bell rang, and talking with peers at the end of the school day. He reported never engaging in such interactions, except

during time point one when he reported walking to class with a peer and talking to a peer at the end of the school day 1-2 times. However, a notable increase was reported in eating lunch with peers. More specifically, he reported low levels of eating lunch with peers before the intervention began, but when the intervention began he reported eating lunch with peers every day. Participant 3's engagement in social contacts with peers during the school day before intervention began was notably lower than the frequency in which peer partners reported they engaged in contacts with their peers. However, after the intervention began, frequency in which Participant 3 ate lunch with peers increased and resembled the frequency in which peer partners ate lunch with their peers.

Table 5

Percentage of Peer Partners who Engaged in Social Interactions/Activities with Peers

Question	Yes	No	0 times	1-2 times	3-4 times	5 or more times
<i>Did you...</i>						
Part. in any in-school act.	82%	18%	-	-	-	-
Talk w/ P outside of school	100%	0%	-	-	-	-
Do act. w/ P outside of school	64%	36%	-	-	-	-
<i>How often did you...</i>						
Eat lunch w/ P	-	-	7%	0%	0%	93%
Walk to class w/ P	-	-	7%	0%	21%	71%
Talk w/ P in the morning	-	-	7%	14%	7%	71%
Talk w/ P at end of day	-	-	0%	0%	21%	79%

Note. Participants reported answers within the past week; part. = participate; act. = activity; w/ = with; P = peers; data were only collected at one time point.

Table 6

Results from Social Contacts Questionnaire Reported by Students with ASD

FS	Question	Time One (before baseline)	Time Two (after baseline)	Time Three (after intervention)	Time Four (after maint./ generaliz.)
1	<i>Did you...</i>				
	Part. in any in-school act.	No	No	No	No
	Talk w/ P outside of school	No	No	Yes*	Yes*
	Do act. w/ P outside of school	No	No	Yes	Yes
	<i>How often did you...</i>				
	Eat lunch w/ P	1-2 times	1-2 times	5 times*	3-4 times*
	Walk to class w/ P	0 times	3-4 times*	> 5 times*	1-2 times
	Talk w/ P in the morning	1-2 times	1-2 times	1-2 times	1-2 times
	Talk w/ P at end of day	1-2 times	1-2 times	1-2 times	1-2 times
2	<i>Did you...</i>				
	Part. in any in-school act.	No	No	No	No
	Talk w/ P outside of school	No	Yes	No	No
	Do act. w/ P outside of school	No	No	No	No
	<i>How often did you...</i>				
	Eat lunch w/ P	5 times*	5 times*	5 times*	5 times*
	Walk to class w/ P	3-4 times	1-2 times	1-2 times	1-2 times
	Talk w/ P in the morning	1-2 times	3-4 times	1-2 times	1-2 times
	Talk w/ P at end of day	0 times	0 times	0 times	0 times
3	<i>Did you...</i>				
	Part. in any in-school act.	Yes*	Yes*	Yes*	Yes*
	Talk w/ P outside of school	No	No	Yes*	Yes*
	Do act. w/ P outside of school	Yes	No	No	No
	<i>How often did you...</i>				
	Eat lunch w/ P	1-2 times	0 times	5 times*	5 times*
	Walk to class w/ P	1-2 times	0 times	0 times	0 times
	Talk w/ P in the morning	0 times	0 times	0 times	0 times
	Talk w/ P at end of day	1-2 times	0 times	0 times	0 times

Note. Participants reported answers within the past week; FS = focal student; part. = participant; act. = activity; w/ = with; P = peers; * indicates data similar to peer partners (i.e., greater than 75% of peer partners reported participating in in-school activities and talking with peers outside of school in the previous week; greater than 75% of peer partners reported eating lunch with a peer, walking to class with a peer, and talking with peer in the morning and at the end of the day 3 or more times in the previous week).

Research question 4: Do students with ASD perceive a change in the frequency they are victimized after participating in a peer network intervention? The results of the Bully

Victimization Scale (BVS) varied among participants. Table 7 includes raw BVS scores across participants.

Participant 1. Results of the BVS indicated Participant 1 perceived changes in the frequency he was victimized after the peer network intervention was implemented; however changes were minimal. For Participant 1, BVS scores slowly decreased across time, with the lowest frequency of bullying victimization reported at the end of the study. However, raw scores indicated he was in the “normal” bullying victimization category at each time point the questionnaire was administered.

Participant 2. Results of the BVS indicated Participant 2 did not perceive any changes in the frequency he was victimized after the peer network intervention was implemented. Participant 2 reported very little bullying victimization. More specifically his score of 1 during the first administration of the BVS indicated “normal” levels of bullying victimization and he reported no bullying victimization for subsequent BVS questionnaires.

Participant 3. Results of the BVS indicated Participant 3 perceived a substantial change in the frequency he was bullied after the implementation of the peer network intervention. Participant 3 reported the most bullying victimization. Before the study began, his score of 35 placed him in the “severe” category of bullying victimization. After baseline, his BVS report indicated he was still bullied at severe levels. After the intervention phase his BVS score dropped to 19, indicating “clinically significant” levels of bullying victimization. After the maintenance/generalization phase he reported the least amount of bullying victimization, and his raw score of 13 placed him in the “normal” category of bullying victimization.

Table 7

Results from Bully Victimization Scale

Participant	Time One (before baseline)	Time Two (after baseline)	Time Three (after intervention)	Time Four (after maint./ generalization)
1	12	9	3	1
2	1	0	0	0
3	35	30	19	13

Note. Numbers reported are raw scores; the BVS categorizes victims into four categories: normal (0-15), clinically significant (16-23), moderately severe (24-29), and severe (30-69).

Treatment Fidelity

An RA completed a fidelity checklist for the facilitator during each of the peer network orientations. These checklists indicated orientation was implemented with 100% accuracy. To obtain a measure of IOA the facilitator also completed the orientation checklist. Inter-observer agreement for orientation checklists was 100%. A fidelity checklist was also completed on the facilitator during each of the peer network meetings by either an RA or the facilitator. According to the checklists, peer network meetings were implemented with 100% accuracy. To ensure peer partners were properly implementing the intervention an RA or the facilitator completed a peer partner checklist during each peer network meeting. According to checklists peer partners implemented the intervention with 98% accuracy. To obtain a measure of IOA, both the facilitator and an RA completed all checklists (i.e., checklists on the facilitator and checklists on peer partners) during a minimum of 50% of peer network meetings. Inter-observer agreement for facilitator checklists was 100% and for peer partner checklists was 99%.

Inter-observer Agreement

Inter-observer agreement occurred in each phase (i.e., baseline, intervention, maintenance/generalization) and was calculated separately for each behavior (i.e., initiations to focal student, responses to focal student, initiations from focal student, responses from focal student). Inter-observer agreement was collected on a minimum of 20% of the sessions for each phase for each participant. For Participant 1, IOA was collected on a total of 7 of 23 sessions

(30%). For Participant 2, IOA was collected on a total of 7 of 26 sessions (27%). For Participant 3, IOA was collected on a total of 8 of 29 sessions (28%). The mean IOA for initiations to the focal student was 93% (range = 85% - 100%). The mean IOA for responses to the focal student was 90% (range = 75% - 100%). The mean IOA for initiations from the focal student was 95% (range = 83% - 100%). The mean IOA for responses from the focal student was 90% (range = 78% - 100%). Please refer to Table 8 for IOA scores for each participant.

Table 8

Inter-observer Agreement Scores

Participant	Variable	Mean	Range
1	Initiations to focal student	92%	85% - 100%
1	Responses to focal student	90%	75% - 98%
1	Initiations from focal student	98%	95% - 100%
1	Responses from focal student	93%	83% - 100%
2	Initiations to focal student	93%	85% - 100%
2	Responses to focal student	89%	83% - 98%
2	Initiations from focal student	93%	83%-100%
2	Responses from focal student	90%	83% - 100%
3	Initiations to focal student	93%	88% - 100%
3	Responses to focal student	89%	80% - 98%
3	Initiations from focal student	94%	88% - 100%
3	Responses from focal student	87%	78% - 95%

Social Validity

Social validity data were collected to assess the importance of the outcome measures from the perspectives of key stakeholders and provide stakeholders an opportunity to evaluate the intervention. Stakeholders included students with ASD, one of their parents, peer partners, and two school staff members. Stakeholders rated statements on a five-point Likert scale how much they agreed with the statement. Response choices included: strongly disagree (1), disagree (2), neutral (3), agree (4), strongly agree (5). Open ended questions were also asked to provide stakeholders an opportunity to elaborate on their evaluation of the intervention. Results from pre and post social validity questionnaires are described in detail below.

Students with ASD. Overall, students with ASD felt it was important to have people at their school they can talk to and hang out with, which was evident by high ratings before and after the study. Participants 1 and 2 rated the intervention higher than Participant 3. Both Participants 1 and 2 reported they enjoyed participating in the peer network (rating scores = 4 and 5 respectively) and felt peer networks should be created for other students at the school (rating scores = 5 and 4 respectively). Participant 3 reported less satisfaction with the peer network (rating score = 2). In relation to students at school being nice to the participant with ASD, two of the three participants reported similar or higher ratings post intervention. Participants with ASD reported the component they liked most about the intervention was the activities and talking with friends. All three participants reported they would not change anything about the intervention.

On the post-social validity questionnaire participants with ASD and peer partners were asked to report which peer partners they consider as friends. Participant 1 listed three peer partners as friends, one of which he listed as a best friend. All five of his peer partners listed him as a friend. Participant 2 listed all three of his peer partners as friends. Two of his three peer partners listed him as a friend. Participant 3 did not list any peer partners as friends. Four of his six peer partners listed him as a friend. While Participant 3 did not list any of his peer partners as friends on the social validity report, anecdotal data indicated that he did perceive his peer partners as his friends. For example, when celebrating his birthday during a meeting he shared, “I got a hug from my best friend [peer partner] in gym class today.” (personal communication, May 5, 2014). The other five peer partners made him a birthday card in which he expressed that it was the “best birthday”. The social validity questionnaire results for participants with ASD are summarized in Table 9.

Table 9

Mean Social Validity Scores from Students with ASD

Statement	Pre	Post
1. I am excited to be a part of the peer network/Overall, I enjoyed being a part of the peer network.	4.7 (4/5/5)	3.7 (4/5/2)
2. I think it is important to have people at my school I can talk to and hang out with.	4.3 (4/5/4)	4.3 (4/5/4)
3. I like going to school.	4.7 (5/4/5)	4.3 (5/4/4)
4. Students at my school are nice to me.	3.7 (4/4/3)	3.3 (4/5/1)
5. Students at my school get bullied (e.g., teased, called names, pushed, people spread rumors). *See note below.	2.7 (3/3/2)	2.0 (2/3/1)
6. I usually eat lunch alone. *See note below.	2.0 (1/2/3)	1.0 (1/1/1)
7. I have friends at school.	4.7 (5/4/5)	3.3 (4/5/1)
8. I hang out with students from my school when we are not in school (e.g., go to the movies, go to a school club, go to a school sporting event)	3.0 (5/3/1)	3.0 (4/2/3)
9. I think peer networks should be created for other people at my school.	4.0 (4/3/5)	3.3 (4/5/1)
10. I think talking to people can be hard. *See note below.	3.3 (5/3/2)	3.3 (5/3/2)
11. I consider my peer partners in my peer network to be my friends.	-	3.3 (3/5/2)
12. I would like to keep hanging out with my peer partners.	-	3.3 (3/5/2)
13. I would be a peer group member again in the future.	-	3.7 (3/5/3)

Note. Response range = 1 – 5; *statements 5, 6, and 10 are negatively worded so it was expected that mean scores would decrease from pre to post; individual participant responses are listed in the parentheses in the following order: Participant 1, Participant 2, Participant 3.

Parents of students with ASD. All parents felt it was important for their child to make friends and have peers at school they can socialize with, which was evident by high ratings on items related to intervention goals before and after the study. Overall, parents reported positive ratings about the intervention. All parents agreed or strongly agreed that they would like their child to participate in a peer network again in the future and felt peer networks should be created for other students at the school, as well. Additionally, all parents agreed that their child enjoyed spending time with their peer partners, and Participant 1’s and Participants 3’s parents felt their children would like to continue to hang out with their peer partners (Participant’s 2 parent reported “neutral”).

Parents reported their child seemed to enjoy meeting new people and spending time with them, talking with different peers, and knowing that each day he would have someone to eat

lunch with. Participant 1 and 2's parents reported social changes for their children as a result of the intervention. Participant 1's mother noted her son "has more people at school that he is comfortable with" and Participant 2's mother mentioned her son "is even more outgoing and engaging with the general public." All parents felt the intervention was helpful. More specifically, Participant 2's mother shared the intervention helped her son meet new people and get to know them. She felt that he is now better at meeting new people. Additionally, she mentioned that it can be hard for him to find people who accept him and felt the peer network helped with acceptance. Participant 1's mother shared that she felt her son gained more social skills by participating in the peer network. In addition, Participant 3's parent simply said having a group to be a part of was helpful for her son.

With regard to what their children did not like about the intervention, Participant 3's mother reported it was difficult for her son when he did not understand what others were talking about and Participant 1's mother reported her son would have liked additional activities during the network meetings. Parents additionally shared what they would like to change about the intervention. Participant 2's and 3's parents reported they would have liked the peer network to last longer and Participant 2's mother mentioned she would like it to be implemented each school year. Participant 1's mother mentioned she would like the peer network to extend to outside of school activities. Finally, Participant 2's mother reported she would have liked more information about the peer network from the facilitator. The social validity questionnaire results for parents of participants with ASD are summarized in Table 10.

Table 10

Mean Social Validity Scores from Parents of Students with ASD

Statement	Pre	Post
1. My child is excited to be part of the peer network/Overall, my child enjoyed being a part of the peer network.	4.3	4.7
2. I am excited for my child to be a part of a peer network/Overall, I liked that my child participated in a peer network.	4.7	4.7
3. I think it is important for my child to make friends with students at his school.	4.7	4.7
4. I think it is important for my child to socialize with his peers at school.	4.7	4.7
5. I am worried that my child is bullied (e.g., called names, teased, purposively excluded, physical hurt) by his peers. *See note below.	2.7	2.3
6. My child spends time with his peers outside of school.	3.3	2.3
7. My child eats lunch alone. *See note below.	3.0	2.0
8. I think peer networks should be created for other students at my child's school.	4.3	4.3
9. My child likes going to school.	4.3	4.3
10. My child has friends at school.	4.0	4.0
11. I would like my child to be in a peer network in the future.	-	4.7
12. I felt by participating in the peer network, other students in the school were nicer to my child.	-	3.7
13. My child did new things by being a part of a peer group (e.g., talk more with peers, meet new people).	-	3.7
14. My child has made friends with the peers in his/her peer network.	-	3.7
15. My child spends time with his/her peer partners during the school day (e.g., walk to class together, eat lunch together).	-	3.3
16. My child talks with his/her peer partners outside of school (e.g., phone call, text, Facebook, email).	-	3.0
17. My child does activities with his/her peer partners outside of school.	-	2.7
18. My child likes spending time with his/her peer partners.	-	4.0
19. My child would like to keep hanging out with his/her peer partners.	-	3.7

Note. Response range = 1 - 5; *statements 5 and 7 are negatively worded so it was expected that mean scores would decrease from pre to post.

Peer partners. Overall, peer partners felt it was important to make school welcoming and comfortable for everyone, and to include in activities peers who are not as socially involved. In general, peer partners rated the intervention positively. On average, peer partners agreed that peer networks should be created for other people at their school, felt it was easy to be involved in the peer network, and would like to keep hanging out with the peers in their network.

When asked what they enjoyed most about participating in the peer network, the majority of peer partners reported meeting new people, helping other people get involved, and having fun with friends. One peer partner shared, “I just enjoyed my group and I could count on a good laugh when we have meetings.” Another peer partner mentioned, “Overall I just enjoyed the experience. I loved playing all of the group activities and talking to all of the people in the group.” Overall, peer partners felt they benefited from participating in the intervention. Some of the ways they felt they benefited included: making new friends, learning different ways to interact with people, interacting with people they typically would not interact with, gaining better social skills, and becoming more responsible. They also felt their peer partner with ASD benefited from the intervention. Some of the ways they felt their peer partner benefited included: feeling more accepted and included, making new friends, and being more talkative during class.

Peer partners reported a few things they did not like about the intervention. This included meeting in different rooms for network meetings, not consistently meeting twice a week when there was a snow day, and meeting during lunch. When asked what they would change about the intervention, peer partners mentioned: meeting on a set day of the week, meeting more often, and meeting sometime other than lunch. The social validity questionnaire results for peer partners are summarized in Table 11.

Table 11

Mean Social Validity Scores from Peer Partners

Statement	Pre	Post
1. I am excited to be a part of the peer network/Overall, I enjoyed being a part of the peer network.	4.5	4.3
2. I think it is important to make school welcoming and comfortable for everyone.	4.9	4.8
3. People at my school get bullied (e.g., teased, called names, pushed, people spread rumors). *See note below.	3.6	3.6
4. I think it is important to include students at my school in activities (e.g., eat lunch with them, work on a class project with them) who are not as socially involved.	4.6	4.5
5. I do not like it when people feel left out.	4.7	4.5
6. I go out of my way to make people feel included.	3.9	3.8
7. I think peer networks should be created for other people at my school.	4.2	4.2
8. Being involved in the peer network was easy for me.	-	4.3
9. I would like to be in a peer network again.	-	3.8
10. I would like to keep hanging out with the peers in my peer network.	-	4.2
11. I consider my peer partners to be my friends.	-	4.1
12. My views about students who need extra support have changed for the better.	-	4.2
13. I would recommend being in a peer network to my friends	-	3.9
14. I think people at my school were nicer to my peer partners after we started the network.	-	3.6

Note. Response range = 1 - 5; *statement 3 is negatively worded so it was expected that mean score would decrease from pre to post.

School personnel. Two school staff members completed post social validity questionnaires in regards to Participants 1 and 3; one school staff member completed a post social validity questionnaire for Participant 2. School staff members strongly agreed that it was important for the students with ASD to make friends with other students at school and socialize with their peers. Overall, school staff members rated the intervention positively. Staff members agreed or strongly agreed that peer networks should be created for other students at the school and they would like the participants with ASD to participate in a peer network again in the future. Staff members additionally perceived that by participating in the peer network other students in the school were nicer to participants with ASD and participants with ASD did new things. Staff members agreed or strongly agreed that the participants with ASD enjoyed

spending time with their peer partners and would like to keep hanging out with their peer partners.

When asked what has changed for participants with ASD, one staff member reported, “He [Participant 1] seems much more confident and social in his interactions with adults. He is able to carry on a conversation much more fluidly than before.” Staff members additionally reported students with ASD were more confident and happier overall, and just had a more positive attitude. Staff members also reported changes in peer partners including, being more empathic and kind, and willing to engage with students who struggle socially. The social validity questionnaire results for school staff members are summarized in Table 12.

Table 12

Mean Social Validity Scores from School Personnel

Statement	Post
1. Overall, I think the student enjoyed being a part of the peer network.	4.8
2. Overall, I think it was a good idea for the student to participate in a peer network.	4.8
3. I think it is important for this student to make friends with other students at school.	5.0
4. I think it is important for this student to socialize with his peers at school.	5.0
5. I am worried that this student is bullied (e.g., called names, teased, purposively excluded, physical hurt) by his peers. *See note below.	3.0
6. This student spends time with his peers outside of school.	3.0
7. This student eats lunch alone. *See note below.	2.4
8. I think peer networks should be created for other students at the school.	4.6
9. This student likes going to school.	4.2
10. This student has friends at school.	3.4
11. I would like this student to be in a peer network in the future.	4.8
12. I felt by participating in the peer network, other students in the school were nicer to this student.	4.2
13. This student did new things by being a part of a peer group (e.g., meet new people; talk more with peers).	4.2
14. This student has made friends with the peers in his peer network.	3.8
15. This student spends time with his peer partners during the school day (e.g., walk to class together, eat lunch together).	3.6
16. This student talks with his peer partners outside of school (e.g., phone, Facebook)	3.0
17. This student does activities with his/her peer partners outside of school.	2.8
18. This student likes spending time with his peer partners.	4.6
19. This student would like to keep hanging out with his/her peer partners.	4.6

Note. Response range = 1 – 5; *statements 5 and 7 are negatively worded so a lower score actually indicates a better outcome

Summary

In summary, results indicated peer network interventions were an effective intervention at increasing the social interactions of all participants with ASD. Further, mean total social interaction during generalization was higher than mean total social interaction during baseline for all three participants with ASD. In regards to the exploratory research aims, results indicated frequency of social contacts increased and frequency of bullying victimization decreased for Participants 1 and 3 once the intervention was being implemented. Treatment fidelity data indicated the peer network interventions were implemented with high fidelity by both the facilitator and peer partners for all three participants with ASD. Further, IOA results indicated strong reliability among coders with mean IOA ranging from 90% - 95% across social interaction dependent variables. Finally, social validity results indicated all stakeholders felt the outcome variables were socially important and almost all stakeholders were satisfied with the outcomes of the peer network intervention.

Chapter 5

Discussion

This study explored the efficacy of a peer network intervention implemented with three high school students with ASD. Results indicated the implementation of the peer network intervention resulted in increases in initiations and responses to and from participants with ASD and provide preliminary support for the use of peer networks as an intervention to increase social contacts among students with ASD and their peers and reduce rates of bullying victimization. There is currently a dearth of empirical research assessing the effects of peer-mediated interventions for adolescents with ASD. The primary research aim was to evaluate the effectiveness of peer networks as an intervention to increase social interactions among students with ASD and their peers. The secondary research aims were to examine if social contacts increased and bullying victimization decreased after the implementation of the peer network intervention.

This chapter, organized by research aim, will examine the results positioned in the context of prior research findings and the implications for practice. First, the primary research aim, social interactions, will be discussed, including a summary of the results and how the results of this study relate to and extend the existing research literature on peer network interventions implemented with adolescents with ASD. Next, social contacts and bullying victimization (secondary research aims) will be discussed, including a summary of the results and the relationship between these factors and social interactions. Finally, the limitations of the study, directions for future research, and implications for practice will be examined.

Primary Research Aim: Social Interactions

Social interactions were assessed by observing the initiations and responses made by students with ASD to their peers and the initiations and responses made by peers to students with ASD. Findings demonstrated that the implementation of peer network interventions resulted in increased social interactions for all three participants. The increases in social interaction were substantial, as indicated by comparing levels of social interaction across all participants and conditions. The social interactions of students with ASD increased substantially from baseline to intervention and were found to approximate those of two randomly selected high school students. Research indicates when peers perceive students with disabilities as competent, they are more likely to interact with them, thus it is important that the social interactions of students with ASD increased to levels similar to their peers (Siperstein, Parker, Bardon, & Widaman, 2007). These findings support the use of peer network interventions to increase social interactions among a highly understudied population.

Increases in mean total social interaction were observed for all participants from baseline to intervention, and maintenance/generalization phases. This is notable as difficulties in generalization for students with ASD across settings and people are well documented in the literature (Fein, Tinder, & Waterhouse, 1979; Koegel & Koegel, 1988) and previous peer network studies have found variable results in terms of generalization. For example, Koegel et al. (2013) and Hochman et al. (in press) found increases in social interaction were limited only to the days when the network was meeting, with the exception of one participant in Hochman et al. (in press) who demonstrated higher rates of social interaction on non-meeting days compared to baseline. In the current study substantial decreases were observed from intervention to generalization in regards to initiations to and from the student with ASD. However, generalization data, in regards to initiations to and from students with ASD, did not differ greatly from the rate of initiations to and from the two randomly selected students who were observed in the cafeteria. Given that initiations were defined in this study as questions or a five second delay in interaction, it may be that asking questions in casual conversations is less common among

high school students. Further, during the intervention and maintenance phases, students participated in weekly meetings and played games which typically included questions. This likely influenced the higher frequency of initiations during intervention and maintenance phases. Lower initiations during generalization may also indicate a more continuous conversation with fewer than five second delays in interaction. For instance, if students were engaging in a continuous conversation without any five second delays all comments would have been coded as responses. Thus it would be expected that initiations would decrease and responses would increase based on the coding scheme.

The findings of this study indicate peer networks are an effective intervention to increase social interactions of a highly understudied population, and bring two additional issues to the forefront: what are the best ways to measure social outcomes and what components of an intervention package are needed to provide the most optimal social outcomes for students with ASD. In this study direct observation was used to measure the frequency of initiations and responses from students with ASD to their peers and vice versa. However, there were obstacles to operationally defining initiations and responses in a natural way that could be replicated and reliably observed. Additional information is needed on how to measure the significance of improvements on direct observation protocols and assessments to practical outcomes in real life situations. In other words, do increases in initiations and responses and improvements on assessments from pre to post intervention result in positive peer relationships? Questions related to measurement will further be discussed in the latter part of this chapter.

The second issue of discussion is what components of an intervention package are needed to provide the most optimal social outcomes for students with ASD that can be feasibly implemented within secondary settings. Social skills instruction was not provided as part of the intervention for this study, yet social interactions greatly increased and the feedback from the social validity questionnaires completed by multiple stakeholders reflected that these social interactions were positive. This is similar to the findings of previous peer network intervention

studies. For example, Gardner et al. (2014) and Hochman et al. (in press) found substantial increases in social interactions and social engagement during their peer network intervention and they only provided training to peer partners. Similarly, Koegel et al. (2012, 2013) implemented peer networks in the form of school clubs and did not provide any social skills instruction to students with ASD or training to peer partners and found increased levels of engagement and frequency of social interactions during the intervention. Since explicit social skills instruction was not provided in the current study nor in previous peer network studies, as Hochman and colleagues (in press) have implied, limited peer interactions may not be due to social deficits, rather they may be due to limited opportunities to interact with peers. Providing opportunities in an environment that promotes positive social interactions, where a facilitator is present and peers are carefully selected and trained, may be enough to encourage positive social interactions without the need of direct, explicit social skills instruction. This is promising as the social validity results from this study and previous peer network studies (Gardner et al., 2014; Hochman et al., in press; Koegel et al., 2013) indicate that peer networks are a feasible intervention easily implemented within the context of the school day. However, it is important to note that all three of the participants in this study had previously participated in a peer group. Peer groups provide natural opportunities for observational learning and students may have acquired social skills in such groups. It is unknown if the participants in this study received direct social skills instruction prior to participating in the peer network intervention.

Students with ASD present with a range of skill and performance deficits and each intervention package will need to be tailored to meet the individual needs of the student. However, it may be that high school students with ASD have already been exposed to targeted social skill instruction during early intervention, but have had limited opportunities to practice such skills in an environment where their social attempts are welcomed and positively reinforced. Therefore, peer network interventions provide an opportunity for them to draw upon their social skills, practice some of the techniques they have been taught in previous therapies or

adopted through observational learning, and refine their social skills as they observe the social interactions of their peer partners in group meetings within a natural setting. For some students who have not yet acquired the necessary social skills to effectively engage in conversations with their peers, the combination of social skills instruction and peer mediated interventions may be a powerful treatment package to help them successfully engage in social interactions with their peers. An example of such a treatment package was implemented by Schmidt and Stichter (2012) who implemented both a social skills group (Social Competence Intervention for Adolescents [SCI-A]; Stichter et al., 2010) and then subsequently implemented two types of peer mediated interventions to enhance the generalization of the skills learned in the SCI-A group.

Though a treatment package may be beneficial, they can be costly and require substantial amounts of time to prepare and implement. However, key elements of peer network interventions lend themselves to the high school setting and require minimal preparation and time to implement. Further, they can be implemented by any adult, including paraprofessionals, general and special education teachers, extracurricular teachers, related service providers, and counselors (Carter et al., 2013). While an adult facilitator was present for all peer network meetings, the intervention itself was primarily mediated by peers. More specifically, in the present study after the first five min of the meeting the students engaged in a game and for the remaining 25 min the facilitator decreased her involvement while the students talked and participated in a shared activity. This decreased support strategy highlights that minimal resources are needed for this intervention to be effective. As the prevalence of ASD continues to rise and younger, larger cohorts of students with ASD are beginning to enter secondary school environments (Blumberg et al., 2013), high school teachers need interventions requiring limited time and planning.

Teachers are increasingly expected to increase their workload and expand their responsibilities, as financial resources continue to be reduced in public schools. Research indicates teachers feel with limited time and multiple roles and responsibilities they cannot

adequately provide students with ASD the support they need (Hedges et al., 2014). Many of these students are educated in general education settings for 80% or more of their school day (National Center for Educational Statistics, 2012). Because some students with ASD perform average to above average on academic tasks, they may not qualify for special education services, or may receive limited consultation services, regardless of the significant social and/or behavioral challenges they may experience (Lukasik, 2012). Therefore, targeted supports cannot be the sole responsibility of the special education teacher. Peer network interventions, which by definition are implemented during non-academic times, are implemented in natural environments that do not compete with the academic demands presented at the secondary level. They appear to be a feasible intervention as evidenced by the social validity data of the participants and school personnel in this study.

The use of peers as intervention agents during peer network interventions provides many benefits for students with ASD as well as for the peers. For example, peers provide an abundance of resources to help promote the social interactions of students with ASD, as well as encourage positive peer relationships. High school students also are more knowledgeable than adults on appropriate social interactions for adolescents and are more aware of current social events. In addition, when adolescents have limited prior contact with students with ASD they may be reluctant to spend time with the student and/or hold inaccurate views about the student (Campbell et al., 2011). By using peers as intervention agents it not only provides an opportunity for the student with ASD to increase social interactions, but provides an opportunity for students without ASD to get to know their peers with ASD, which may not have occurred without the intervention. Further, as evidenced by the social validity data from peer partners, peers benefit from participating in peer networks in a variety of ways including making new friends, learning different ways to interact with people, and becoming more responsible.

There is a critical need for broad based interventions that are non-intensive, yet provide practical and important outcomes. Peer network interventions are an example of one such

intervention. Based on the flexibility of the components, peer network interventions can be implemented with students with ASD with a range of support needs. Interventions aimed at increasing social outcomes for high school students with ASD are needed. Limited social interactions during baseline observations highlight the need for targeted interventions to promote social interactions among high school students with ASD. While lunch is a highly social context, the participants in this study engaged in infrequent social interactions with peers during lunch. Research consistently documents the importance of positive peer relationships on the lives of children and adolescents (Rubin et al., 2009) and children and adolescents with ASD are no exception.

Secondary Research Aims: Social Contacts and Bullying Victimization

Social contacts and bullying victimization were assessed using a social contacts questionnaire and the Reynold's Bullying Victimization Scale (Reynolds, 2003) administered at four different time points. In regard to social contacts, results indicated that during and after the peer network interventions were implemented social contacts increased for Participant 1 (in relation to talking with peers outside of school, doing activities with peers outside of school, and eating lunch with peers) and Participant 3 (in relation to talking with peers outside of school and eating lunch with peers).

For participants with ASD, results from this study indicate that routine, predictable times appear to be the settings most likely to see increases in social contacts compared to transition periods. Participants with ASD rarely engaged in social interactions with their peers during transitions between classes and before and after school, even after the implementation of the peer network intervention. While hallway transitions are a common social setting for most high school students, it may not be the most appropriate setting to encourage increased social contacts for students with ASD. For students with ASD, changes in routines are often challenging (APA, 2013), especially navigating noisy and chaotic high school hallways. Further, given their often rule governed nature, students with ASD may feel pressured to get to class on time in fear of

being tardy. Therefore, increasing social interactions during such transitions may be particularly difficult for students with ASD. Further, talking with peers before and after school will likely depend on how students are transported to and from school and what time they arrive at school, and therefore, may not be an indicator of social inclusion.

Additionally, increasing engagement in in-school activities may be heavily dependent on participation in school clubs and sports, as the majority of peer partners who participated in such activities reported the activities they engaged in were sport or club related events. Arranging opportunities and encouraging students with ASD to participate in school clubs and sports is important, especially given that research suggests adolescent students with ASD rarely participate in organized group activities (Wagner et al., 2004). Further, engagement in talking with and doing activities with peers outside of school might have a direct relationship with participating in school sports and clubs. Naturally, students who are involved in sports and clubs will see their teammates and club members outside of school at practice, games, and meetings. Educators have suggested non-competitive sports, such as swimming and cross country, are optimal activities to facilitate social engagement among students with ASD and their peers (Sreckovic, Garwood, Able, & Schultz, 2013). Participant 3 was on the track team and consistently reported he participated in in-school activities throughout the study.

Not only did social contacts increase, but results from this study indicated that positive peer relationships were formed and bullying victimization decreased for some participants. More specifically, bullying victimization decreased for Participants 1 and 3, with substantial decreases noted for Participant 3 who went from the highest category (severe) of bullying victimization prior to the intervention to the lowest category (normal) of bullying victimization after the intervention. In addition, reciprocal friendships were formed for Participants 1 and 2. While Participant 3 did not report any peer partners as friends, anecdotal data indicated that he did feel some of his peer partners were his friends and almost all of his peer partners reported him as a friend. Recent research implementing peer network interventions with adolescent

students with ASD with more support needs have also found reciprocal friendships formed at the conclusion of the intervention (Gardner et al., 2014; Hochman et al., in press). Very few studies have evaluated the effects of social interventions on the friendship formation of students with ASD and no studies to date have measured the effects of an intervention on bullying victimization rates specifically among students with ASD. Research indicates adolescent students with ASD have significantly fewer reciprocal friendships than their typically developing peers (Petrina et al., 2014) and are frequently subjected to bullying victimization (Sreckovic et al., 2014); thus, identifying and implementing interventions to increase friendships and reduce bullying victimization is vital.

Relationship between primary and secondary research aims. In this study the three dependent variables (social interaction, social contacts, and bullying victimization) were studied independently; however, they are closely related and linked together, as illustrated in the Reciprocal Effects Peer Interaction Model (REPIM; Humphrey & Symes, 2011), the conceptual model used to guide this study. In brief, the REPIM posits that reduced quality and frequency of peer interactions leads to limited social networks, friendships, and peer support, which ultimately results in increased bullying victimization and social rejection (Humphrey & Symes, 2011). The inverse relationship suggests increased social interactions leads to friendship development, which ultimately results in decreased bullying victimization. Given that this study did not examine the functional relation between the implementation of the peer network intervention and increases in social contacts, decreases in bullying victimization, and the formation of reciprocal friendships, limited conclusions can be drawn regarding such constructs. However, the inverse relationship of the REPIM model is tentatively explored below.

The overall goal of social interventions is to help individuals with ASD engage in positive social interactions and form positive relationships with others. In this study social interactions increased between students with ASD and their peers and reciprocal friendships were formed for two of the participants. The relationship between increased social interactions

and contacts, and friendship formation is well documented. While friendship formation is dependent on many variables, friendships are more likely to form when two people expect that they will be able to see each other on a frequent basis and will have ongoing interactions (Fehr, 2009). Peer network interventions, therefore, provided the ideal intervention for friendship formation as students were aware that they would interact with each other once or twice a week during network meetings. Further, friendships are more likely to form when two people share similar characteristics and interests (Fehr, 2009). In this peer network intervention study, one role of the facilitator was to highlight the similarities among group members, including their interests and the classes they were currently taking. Throughout the network meetings students had the opportunity to get to know each other and participate in a shared activity they all enjoyed, further promoting friendship development.

The link between social interactions and friendship formation is well developed, as is the link between friendships and bullying victimization. For example, research indicates students with ASD who have higher levels of social support from peers and have positive peer relationships report lower levels of bullying victimization (Hebron & Humphrey, 2013; Humphrey & Symes, 2010). On the contrary, students with ASD who have fewer friends have been reported to experience more bullying victimization (Cappadocia et al., 2012). Therefore, the positive peer relationships formed in the current study between participants with ASD and their peer partners could have had an effect on the reduction of bullying victimization rates. Further, research suggests when peers are in close proximity to the victim they can serve as defenders of the victim, which can help curtail the bullying (O'Connell, Pepler, & Craig, 1999). As indicated by results from this study, Participants 1 and 3 reported increased social contacts with their peers within and beyond the context of the school day, after the implementation of the intervention, suggesting more frequent proximity between those students with ASD and their peers, although a causal relationship cannot be drawn.

In conclusion, peer network interventions are a feasible intervention that can be used to increase social interactions between students with ASD and their peers. Findings from this study provide preliminary support that the implementation of a peer network intervention may result in reciprocal friendships between students with ASD and their peers and may reduce rates of bullying victimization among students with ASD. Although the results of this study are promising they must be considered within the limitations of this study, which are described next.

Limitations

Several limitations exist for this study warranting acknowledgement and discussion. This study included a small sample size and therefore the extent to which these findings can generalize to other students with ASD is limited. In addition, the peer network intervention contains a number of components that could have influenced the increase in social interactions. It is unknown which component (i.e., approaching the peer partners, the peer partner training, introducing the peer partners and the student with ASD, weekly meetings) made the most contribution to increases in social interactions.

There are several measurement issues that pose possible limitations. The direct observation measure used to gather social interaction data posed several challenges. First, data did not include a measure of social interaction quality. Therefore, what is known is the frequency of social interactions, not the quality of such interactions. Appropriate social interactions can be difficult to discern in adolescents, as often behavior viewed by adults as inappropriate is quite typical and appropriate to the average adolescent. However, it would have been useful to understand if the social interactions were balanced, if students with ASD were flexible in topic changes, and contributed on-topic comments and questions. Next, how initiations and responses were operationally defined resulted in lower levels of increases in initiations and greater levels of increases in responses. Initiations were coded as any question or five second delay in social interaction and responses included continuations. Therefore, if a continuous conversation occurs it is expected that more continuations will occur, resulting in

increased responses, and hopeful that the conversation is continuous without any delays, resulting in fewer initiations. Therefore, the significant decrease in initiations to and from students with ASD during generalization may indicate students were asking fewer questions and engaging in more continuations, and the conversation was more continuous with fewer five second delays. Last, bullying victimization and social contact data were collected via self-report. Self-report data relies on students' own perceptions of bullying experiences and social contacts, which may be inaccurate and may result in over or under-reporting. However, it is important to intervene if a student feels they are being victimized, regardless if their perceptions are accurate or overestimated (Twyman et al., 2010), as the negative effects of bullying victimization will likely occur if the student perceives s/he is being victimized regardless if s/he is accurate. The same is true for limited social interactions/friendships. Further, during adolescence students gain more autonomy and adults are not present as often, and therefore may not be aware of the social relationships of their students/children.

There was individual variability within the data requiring further exploration. Activities and games chosen by the students during the network meetings likely influenced the frequency of initiations, as some games directly involved asking questions. Further, frequency of social interactions could have been influenced by pre-exposure to the games. For example, an outlier was observed in initiations from Participant 1 to his peers during intervention at data point 10. During this session the students chose to play Heads Up©, a game Participant 1 was not familiar with and had difficulty understanding. While intervals in which he initiated to peers decreased to 0.0%, intervals in which peers made initiations to him increased to 57.5%. Similarly, an outlier was observed during intervention at data point 27 for Participant 3. During that session Participant 3 wanted to “get to know his peers better” and requested that instead of playing a game they just talk. Initiations from Participant 3 to his peers increased to 42.5%, and initiations to Participant 3 from his peers decreased to 10.0%. Individual variability was also noted in the social validity data. While peer partners, parents of participants with ASD, and school staff rated

the intervention favorably, only two of the three participants with ASD rated the intervention favorably. As Wolf (1978) outlined, several variables may impact the results of social validity data leading to a lack of correspondence between participant-reported data and observer-obtained data. In the current study, Participant 3 was visibly upset the day he completed the post social validity form, stating that gym class that day was very loud and chaotic (personal communication, June 3, 2014). It is possible that his experience during gym class with his peers could have influenced his social validity ratings.

Similarly, there is variability in the generalization data. There are several possibilities to explain why social interactions decreased post-intervention in the present study. For example, the peer network intervention only lasted approximately five weeks before generalization probes began. That may not have been enough time for the students to develop a strong relationship. Additionally, peer partners were selected for many reasons, including that they were well-liked by peers. Therefore the peer partners likely had a group of friends outside of the peer network and on non-meeting days may have wanted to engage and “catch up” with their other friends. Further, the intervention was slightly different for Participant 2 given that he participated in the peer partner training, which could have impacted generalization of social interactions. More research is needed on how to extend the effects of peer networks to non-meeting days.

Finally, given the method of data collection, a functional relationship could not be determined between the implementation of the peer network intervention and the frequency of bullying victimization and social contacts. While data indicated promising results for Participants 1 and 3 in regards to decreasing bullying victimization and increasing social contacts, the data collected is exploratory and needs to be considered within such a context.

Future Research

The results of this study provide a better understanding of the efficacy of peer-mediated interventions for increasing social interactions between high school students with and without ASD and present several areas of future inquiry. First, future research is needed to examine what

components of peer network interventions are essential to implement resulting in practical outcomes. As resources continue to be limited for public schools and educators are given more roles and responsibilities it is important to determine what components are essential and what components can be optional to make the intervention as feasible as possible.

Second, results from this study provide support that peer networks are efficacious at increasing social interactions between students with ASD and their peers and provide preliminary support for increasing social contacts and reducing rates of bullying victimization. Future research is needed to examine in what other settings peer networks can be implemented beyond the K-12 school setting. For example, post-secondary employment and education attendance are extremely low among young adults with ASD (Shattuck et al., 2012). Implementing peer networks in such environments may increase sustainability in employment and post-secondary education settings, as well as increase overall quality of life of young adults. Further, peer networks implemented in community settings, such as a peer network built around a book club, may help increase community engagement and inclusion of individuals with ASD.

Third, next steps also include evaluation of the long-term effects of participating in a peer network intervention. For example, when reciprocal friendships are formed between students with ASD and their peer partners, what is the longevity of these friendships and what do these friendships look like? Are students spending time together and communicating outside of school or are their social interactions limited to the school setting? If it is the latter, are students with ASD still satisfied with their friendships or do they desire friendships more similar to their peers without ASD? Future research is also needed to examine the direct effects of peer network interventions on the psychological well-being of individuals with ASD, as research has identified the negative consequences of not having positive peer relationships, including loneliness (Parker & Asher, 1993), internalizing and externalizing behavior problems (Ladd, 2006), and increased risk of offending behavior (Allen et al., 2008). Similarly, future research should also explore the long-term effects of participating in peer network interventions from the perspective of peer

partners. For example, does participating in a peer network intervention change the way peer partners treat and interact with other peers at their school?

Fourth, further research is needed on identifying additional components of peer network interventions to aid in generalization of social interactions across settings. For example, future research should expand on this study by comparing different lengths of the intervention phase (e.g., 5 weeks vs. 10 weeks) to better understand the effects of the length of the intervention phase on generalization of social interactions. Additionally, future research is needed to examine how parents can become more involved in the intervention and if parent involvement results in greater generalization of social interaction and social contacts outside of school.

Fifth, future inquiry is needed to compare the social outcome results of peer network interventions and social skills group interventions. Results of this study and previous peer network studies provide support that a minimally intensive intervention can result in great social outcome gains. However, it is unknown if the participants in this study and previous peer network studies received direct social skills instruction prior to participating in the peer network intervention. Therefore, larger scale treatment comparison research is needed to compare the social outcomes of students who participate in a peer network only intervention and a social skills group only intervention. Similarly, more research is needed on how to best measure social outcomes. Recently the National Institutes of Health released a Request for Applications to generate sensitive and reliable objective measures of social impairment in ASD clinical trials (RFA-MH-15-800). Measures are needed that can be reliably employed while capturing the significance of these social impairments in real life situations. Further, more research is needed to examine if the social skills students demonstrate in clinical settings, such as making eye contact and identifying the perspective of others, translate to meaningful social outcomes in real life situations.

Finally, while this study provides preliminary support for the use of peer networks to reduce rates of bullying victimization, intervention research related to bullying victimization

among students with ASD is still in its infancy and future inquiry is needed. Future research should replicate this study and recruit students with ASD who only score high rates of victimization, using a standardized measure for students with ASD, such as the recently developed Self-report of Peer Victimization survey (Adams et al., 2014). Further, future research should examine the effects of implementing a greater number of peer network interventions at one school site on the overall school climate and rates of bullying victimization among the whole student population. Future research should also use more rigorous research designs to test the efficacy of peer networks as an intervention to reduce rates of bullying victimization, either by use of group designs using pre-post measures or using direct observation within the context of a single case design study. Finally, future research is needed to explore if peer networks can be used as a preventative intervention to prevent bullying victimization for students with ASD who present risks of being victimized. For example, one participant in this study reported no changes in bullying victimization and he reported low levels of bullying victimization. However, this student reported he was severely victimized in middle school and presented risks of being victimized in high school, such as limited social involvement with peers within and beyond the context of the school day. More research is needed to examine if the implementation of peer network interventions reduces students' risk of being victimized.

Implications for Practice

Creating opportunities for students with ASD to develop positive peer relationships is challenging work within the context of secondary school environments, especially for students with ASD educated in general education settings. These students often receive minimal intervention support from special education personnel and often do not want to disclose their autism diagnosis or be singled out from their peers. This may create very little opportunity to intervene and help promote positive peer relationships. Peer network interventions provide one avenue to help these students develop positive peer relationships and increase social interactions. Peer network interventions can be implemented by any adult in the school (e.g., guidance

counselors, paraprofessionals, club sponsors, general and special educators), during any non-instructional time, and require very little preparation. Therefore, peer networks are a feasible and practical intervention. Educators are encouraged to develop and implement such interventions for students with ASD in their classes who engage in limited social interactions and social contacts with their peers. Given the documented negative consequences of limited social interactions and positive peer relationships, implementing such interventions is vital. It is important to note, however, that while reciprocal friendships were formed in this study, the context and longevity of those friendships are unknown. Therefore, when implementing peer networks with students with ASD it is important to explain to parents/caregivers and students with ASD that while social interactions and contacts may increase and friendships may form, the context of those friendships may or may not persist beyond the period of the peer network intervention, and may or may not be similar to their peers without ASD.

While this study only provides preliminary support for the use of peer network interventions as an intervention to reduce rates of bullying victimization among students with ASD, it is the only intervention to date that has investigated the direct effects of an intervention specifically on rates of bullying victimization of students with ASD. School personnel are encouraged to consider befriending interventions, such as peer network interventions, as an intervention or prevention to reduce or prevent bullying victimization of students with ASD. Bullying has recently become an important legal matter. In brief, both Section 504 of the Rehabilitation Act of 1973 and IDEA (2004) protect students with disabilities who are subjected to bullying victimization. Schools are required to properly investigate bullying incidents and intervene or they may lose federal funding (Maag & Katsiyannis, 2012). Given the high stakes of not intervening, both in relation to the negative consequences the school may face and the student with ASD may experience, school personnel are highly encouraged to take proactive steps to prevent and reduce bullying victimization among these students.

Conclusion

This study expands on previous peer-mediated instruction/intervention studies and provides a greater understanding of the effects of peer network interventions implemented with high school students with ASD without ID. Findings from this study support the use of peer network interventions to increase social interactions between students with ASD and their peers and provide preliminary support for the use of peer network interventions to increase social contacts and reduce rates of bullying victimization among students with ASD. The results of this study validate the use of peer network interventions with students with ASD and provide a first step for future research efforts exploring the use of peer network interventions to increase social contacts and reduce rates of bullying victimization among students with ASD.

APPENDIX A: DESCRIPTIVE RESULTS OF BULLYING VICTIMIZATION PREVALENCE STUDIES

Authors and Location	Participant Characteristics (N, gender, age)	Participant diagnosis	Informant/Time Frame Summary of Findings
Little, 2002 (United States)	411; 82% male; 18% female 4-17 years old	75.4% AS; 15.3 % NLD; 9.2% AS and NLD	Parents/Past Year Total Victimized: 94% Bullied: 75% Peer and Sibling Assaults: 73% Gang Attacks: 10% Peer Shunning (ages 7-14): Never invited to a birthday party: 33% Picked last for teams: 31% Sat alone at lunch: 11%
106 Wainscot et al., 2008 (United Kingdom)	57; 96.5% male; 3.5% female 11-18 years old	53% HFA/AS; 5% DYS; 42% No disability	Student/NR HFA/AS: 90% victimized at all; 87% victimized at least once a week No HFA/AS: 56% bullied at all; 48% bullied at least once a week
Carter, 2009 (Long Island, New York)	34; 88% male; 12% female 5-21 years old	100% AS	Parent/Past Year Total Victimized: 64.7% Hit by peers: 47.1% Attacked by peers: 8.8% Picked on: 44.1% Hurt in private parts 8.8% Scared by peers: 50% Peer Shunning (ages 7-14): Never invited to a birthday party: 11.8%

			Picked last for teams: 5.9% Sat alone at lunch: 2.9%
van Roekel, Scholte, & Didden, 2010 (Netherlands)	230; 90% male, 10% female 12-19 years old	18% ASD; 66% PDD-NOS; 16% AS; 17% of students additionally had ADHD	Parent, teacher, and self-report/ weekly and monthly Victimized more than once a month: Teacher-report: 30% Peer-report: 7% Self-report: 17% Victimized more than once a week: Teacher-report: 18% Peer-report: 0.4% Self-report: 10%
Twyman et al., 2010 (United States)	Total: 294 ASD sample: 32; 78% male, 21% female) 8-17 years old	11% ASD; 12% LD; 34% AD/HD; 8% IBD; 2% ED; 1% I/ED; 7% cystic fibrosis; 25% Control	Self-report/Past month Victimized: ASD group: 29% (which was three to four times the odds of victimization compared to the no diagnosis group, but the same as the AD/HD group) Ostracized: ASD group: 42.9% (higher than any other group)
Kowalski & Fedina, 2011 (United States)	42; 57% male; 43% female 10-20 years old	100% AS and ADHD	Parent and self-report/Previous two months Traditional Victimization: Self-report: 57% (19% several times a week) Parent-report: 70.2% Cyber Bullied: Self-report: 21.4% Parent-report: 15% (12% reported they did not know)
Blake et al.,	Total: 13,516	11% ASD	Parent report/Current or past school year

2012 (United States)	ASD sample: 1,438		Total students with ASD victimized: Elementary school: 25.9% Middle school: 31% High school: 28.5%
Cappadocia, et al., 2012 (92% Canadian 8% US)	192; 85% male; 15% female 5-21 years old	54% AS; 14% HFA; 13% PDD-NOS; 19% Autism	Parent report/past month Total victimized: 77% bullied within last 4 weeks (11% bullied once; 23% bullied 2-3 times; 13% bullied once per week; 30% bullied two or more times per week)
Chen & Schwartz, 2012 (Washington State)	33; 91% male, 9% female (25 included in analysis) 8-13 years old	100% ASD	Parent, teacher, and self-report/ Current school year Total victimized: Self-report: 28% Parent-report: 36% Teacher-report: 12%
Rowley et al., 2012 (United Kingdom)	100; 88% male, 12 % female (analysis conducted on 89) Control: 80 10-12 years old	45% childhood autism; 55% other ASDs Control: 54% ID; 13% LaD; 16% HKD; 18% ONDC	Parent, teacher, and self-report/ Past six months Parent report of victimization: ASD group = 33% Control group = 15.2% Teacher report of victimization: ASD group = 11.6% Control group = 9.5%

			Self-report of victimization: ASD group: 41.5%
Sterzing et al., 2012 (United States)	900 7 th - 12 th grade	100% ASD Control: data reported on students with LD, ID, and speech/lang. impairment	Parent report/Past year ASD group: 46.3% LD group: 48.8% ID group: 56.7% Speech/lang. group: 47.0%
Storch et al., 2012 (United States)	60; 80% male; 20% female 11-14 years old	65% Autism; 18.3% AS; 16.7% PDD-NOS (all participants also had an anxiety disorder)	Self-report/Past week Frequency of peer victimization one standard deviation above the mean from a large sample of typically developing youth: Overt: 0% Relational: 6.7% Reputational: 15%
Zablotsky et al., 2013 (United States)	1,221; 82% male; 18% female (analysis conducted on 1,103) 6-15 years old	40% Autistic disorder; 24% AS; 36% Other ASDs	Parent report/Past month 38.0% had been victimized in the last month (28% experienced frequent bullying) Prevalence of victimization by diagnosis: 59% AS 27% Autism 36% Other ASD
Hebron & Humphrey, 2013 (England)	Sample included teachers and parents of children with ASD 5-15 years old	100% of students had ASD	Parent and teacher report/NR Total victimization: Teacher-report: 65.4% of students victimized

	Teachers: 722 Parents: 119		Parent-report: 77.7% of children victimized
Kloosterman, et al., 2013 (Canada)	70; 100% male 11-18 years old	34% HFA; 31% LD and/or ADHD 34% no disability	Self-report/Last couple months Physical (HFA group) 29.2% Verbal (HFA group) Called names, made fun of, teased: 41.7%; bullied about race: 12.5%; bullied about religion: 16.7%; sexual victimization: 29.2% Relational (HFA group) Excluded: 45.8%; told lies or spread rumors: 33.3% Cyber (HFA group) Bullied using computer/email/or picture's: 12.5%; bullied using mobile phone: 0%
Bitsika & Sharpley, 2014 (Queensland, Australia)	48; 100% male 7-12 years old	25% ASD; 68.8% AS; 4.2% PDD-NOS	Self-report and parent report/NR Self-report: Bullied at all: 81.3% Bullied each day: 41.7% Parent-report: Bullied at all: 83.3% Bullied each day: 39.6%

Note. AS = Asperger syndrome; ASD = autism spectrum disorder; BD = externalizing behavior disorder; DYS = dyslexia; PDD-NOS = pervasive developmental disorder not otherwise specified; NR = not reported; HKD = hyperkinetic disorder; IBD = internalizing behavior disorder; ID = intellectual disability; I/EBD = internalizing and externalizing behavior disorders; LaD = language disorder; ONDC = other neurodevelopmental conditions; this table is adapted from Sreckovic et al., (2014), p. 1167-1170.

APPENDIX B: DESCRIPTIVE RESULTS OF REVIEWED PEER NETWORK INTERVENTION STUDIES

	Haring & Breen (1992)	*Koegel et al. (2012)	*Koegel et al. (2013)	*Gardner et al. (2014)	*Hochman et al. (in press)
Characteristics of participants with ASD (N, gender, age, diagnosis)	1 male; 13 years old; autism	3 males; 11-14 years old; ASD	6 males, 1 female; 14-16 years old; ASD	2 males; 14 and 18 years old; ASD and ID; ASD, ADHD, and oppositional defiant disorder	4 males; 15-17 years old; autism and ID
Number of peers per student with disabilities	4-5	NR	7-24	3	1-3
Research design	Multiple baseline across participants	Repeated measures multiple baseline across participants (2 reversals for one participant)	Repeated measures multiple baseline across participants	ABAB and ABA withdrawal and multiple baseline across participants	Multiple baseline across participants
Intervention implemented by peers	Initiated interactions, prompted, modeled, and reinforced appropriate behavior	Participated in a club formed around student with ASD's perseverative interest	Participated in a club formed around student with ASD's preferred interest	Participated in a shared activity with FS and other PP, socially engage with FS and other PP, help each other make new friends, encourage each other to become involved in in-school and after-school activities, support FS's social goal	Initiated conversation, prompted interactions, planned and participated in activities, modeled appropriate social skills

Desired social outcomes	Social interaction, appropriate social responding, extend social interactions	Time engaged with typical peers, rate of initiations to typical peers	Time engaged with typical peers, rate of initiations to typical peers	Social interaction, social engagement, social goal, support behaviors directed toward FS by PP or facilitator, quality of interaction, proximity to peers and adults	Social interaction, social engagement, social goal, support behaviors directed toward FS by facilitator, proximity to peers and adults
Results	Frequency of social interactions and appropriate social behavior increased for student; after intervention 89% of PP rated FS as a friend and 11% rated focal students as a best friend	Level of engagement and frequency of initiations made to typical peers increased for all students; anecdotal data indicated friendships were formed for one participant	Level of engagement and frequency of initiations made to typical peers increased for all students; about half of students with ASD reported they made friends	Social engagement, peer interactions, and proximity to peers increased for both FS once intervention was in place; increases in using social goal were observed for both FS; quality of interaction was medium for one FS and low for the other; almost all PP and FS considered one another to be friends	Social engagement, peer interactions, demonstration of social goal, and proximity to peers increased for all FS once intervention was in place; all PP and FS considered each other as friends

Note. ID = Intellectual Disability; ADHD = attention deficit/hyperactivity disorder; PP = peer partners; FS = focal students; NR = not reported; * indicates study met high quality standards as outlined by the National Professional Development Center on ASD (Wong et al., 2014).

APPENDIX C: QUALITY COMPONENTS OF REVIEWED PEER NETWORK INTERVENTION STUDIES

	Haring & Breen (1992)	Koegel et al. (2012)	Koegel et al. (2013)	Gardner et al. (2014)	Hochman et al. (in press)
Method for selecting students with disabilities	Teacher nomination as having few appropriate interactions with peers, no consistent friends, and in need of social skills training	Teacher or counselor nomination as being verbal and conversational, but socially isolated	School psychologists nominated students as having difficulties socializing appropriately with peers during lunch	Special educators identified students who had ASD, were receiving special education services, and had reliable communication system comprised of at least 10 words	Special education case manager nominated students who would benefit from intervention, and had social goal in IEP or exhibited difficulties with age-appropriate social skills
Method for selecting peer partners	Had a class or shared an on-campus job with FS, similar interests or hobbies as FS, had previous contact with FS, or FS expressed an interest in the student	New clubs were advertised via flyer and teacher announcements; any student was allowed to participate	New clubs were advertised via flyer and teacher announcements; any student was allowed to participate	Facilitators and advisory teachers recommended at least two peers who did not have ASD, demonstrated appropriate social skills, and would get along with FS; other students expressed interest and were invited	For two FS facilitators invited peers who were dependable, had existing social groups, and shared the same lunch period as FS; for the other two FS facilitators invited peers who had previous experience with FS or had been seen interacting with FS
Method of training peers and content	Verbal explanation, group discussion;	Training was not provided	Training was not provided	Verbal explanation, group discussion;	Verbal explanation, group discussion,

taught	training focused on strategies for initiating contact, establishing eye contact, physical proximity, how to include FS in activities			PP and FS participated in an orientation meeting to familiarize students with their roles; the social goal for each FS was introduced either indirectly or directly	modeling; PP and FS participated in an orientation meeting to familiarize students with their roles; the social goal and strategies for addressing the goal for each FS was introduced
Opportunities for social interaction	Transitions between classes and lunch	During lunch clubs	During lunch clubs (1 time per week)	During advisory period (1-2 times per week for 30-40 min)	During lunch (1 time per week for 30 min)
On-going support	Support provided to PP and FS during weekly meetings; facilitator assessed group's satisfaction, discussed interactions, discussed skill strategies needed for intervention, role played strategies, problem solved, reinforcement provided; FS received SS	Club facilitator was responsible for preparing and bringing materials, and assisting in games (e.g., reading trivia questions)	Club facilitator was responsible for bringing materials (e.g., Frisbee for Frisbee club; snacks), preparing materials (e.g., questions and videos for movie trivia club), and getting each club meeting started (e.g., throwing the basketball during intramural basketball club)	Provided to FS and PP during weekly meetings; facilitator encouraged students to attend meetings, offered suggestions on how to connect outside of group, reminded students of next meeting, supported students in planning activities, and used social facilitation strategies as needed	Provided to FS and PP during weekly meetings; facilitator used social facilitator strategies as needed; shared upcoming school events with students to attend outside of weekly meetings, reminded students of next meeting

	instruction twice a week for 15 min				
Data collection methods	Direct observation; PP journals; anecdotal data collected (method NR)	Direct observation; IOA data collected	Direct observation; social validity survey; generalization data collected; IOA data collected	Direct observation; social validity survey; treatment fidelity collected; IOA data collected	Direct observation; social validity survey; treatment fidelity collected; generalization data collected; IOA data collected

Note. IOA = inter-observer agreement; FS = focal students; PP = peer partner; SS = social skills

APPENDIX D: SOCIAL CONTACTS QUESTIONNAIRE

1. In the past week, did you participate in any in-school activities (e.g., pep rally or assembly, sports teams, clubs, volunteer activities)? _____

If you did, please list them here.

2. In the past week, how often did you do the following:

<i>Eat lunch with another student</i>	Never	1-2 times	3-4 times	Everyday
<i>Walk to class with another student</i>	Never	1-2 times	3-4 times	More than 5 times
<i>Talk with another student in the morning before the bell rang</i>	Never	1-2 times	3-4 times	Everyday
<i>Talk with another student at the end of the day when the bell rang</i>	Never	1-2 times	3-4 times	Everyday

3. In the past week, did you talk with any students outside of school? _____

If yes, what types of contact did you have? Check all that apply.

- Email, online chat, Facebook, Instagram, or other social media, or text message
- Phone call
- In-person interaction
- Other (describe) _____

Please list the names of the students you had contact with here.

4. In the past week, did you do any activities with your classmates outside of school (e.g., go to the movies, mall, library, go to another classmate's house, play computer games with a classmate)? _____

If you did, please list the activities you did here.

Please list the names of the students you had contact with here.

APPENDIX E: SOCIAL VALIDITY PRE-INTERVENTION FORM FOR STUDENTS WITH
ASD

Thank you for participating in the peer network! We want to know your thoughts about the project before it begins. Please read each of the following statements and **circle** the answer that best reflects your views. This information will help us improve the project experience for future students.

1. I am excited to be a part of the peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2. I think it is important to have people at my school I can talk to and hang out with.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3. I like going to school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. Students at my school are nice to me.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5. Students at my school get bullied (e.g., teased, called names, pushed, people spread rumors).	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. I usually eat lunch alone.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7. I have friends at school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8. I hang out with students from my school when we are not in school (e.g., go to the movies, go to a school club, go to a school sporting event)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
9. I think peer networks should be created for other people at my school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. I think talking to people can be hard.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

11. Has anyone ever called you names, teased you, said mean things to you, or physical hurt you or tried to hurt you?

YES

NO

12. If yes, where did it happen (e.g., between what classes, during what class)?

13. Are you ever worried that someone may try to hurt you either by physically hurting you or calling you names?

YES

NO

14. If yes, where are you most worried it could happen?

Social Validity Post-intervention Form for Students with ASD

Thank you for participating in the peer network! We want to know your thoughts about the project. Please read each of the following statements and **circle** the answer that best reflects your views. This information will help us improve the project experience for future students.

1. Overall, I enjoyed being a part of the peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2. I think it is important to have people at my school I can talk to and hang out with.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3. I like going to school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. Students at my school are nice to me.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5. Students at my school get bullied (e.g., teased, called names, pushed, people spread rumors).	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. I usually eat lunch alone.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7. I have friends at school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8. I hang out with students from my school when we are not in school (e.g., go to the movies, go to a school club, go to a school sporting event)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
9. I think peer networks should be created for other people at my school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. I think talking to people can be hard.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11. I consider my peer partners in my peer network to be my friends.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
12. I would like to keep hanging out with my peer partners.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
13. I would be a peer group member again in the future.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

14. Are you ever worried that someone may try to hurt you either by physically hurting you or calling you names?

YES

NO

15. If yes, where are you most worried it could happen?

16. What did you enjoy most about participating in the peer network?

17. What were some of the favorite activities you did with your peers during the last two months?

18. What would you change about the peer network?

19. Do you think you benefited from being in the peer network? If yes, how?

20. Do you think your peer partner benefitted from being in the peer network? If yes, how?

21. Please list the names of the peer partners in your peer network that you consider as friends:

22. Would you like your contact information to be a part of a peer network directory? If so please list your information below:

Parents' names:

Phone number:

Email address:

Social Validity Pre-intervention Form for Parents/Caregivers of Children with ASD

We are excited that your child is participating in the peer network! We want to know your thoughts about the project before it begins. Please read each of the following statements and **circle** the answer that best reflects your views. This information will help us improve the project experience for future students.

1. My child is excited to be part of the peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2. I am excited for my child to a part of a peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3. I think it is important for my child to make friends with peers at his/her school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. I think it is important for my child to socialize with his/her peers at school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5. I am worried that my child is bullied (e.g., called names, teased, purposively excluded, physical hurt) by his peers.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. My child spends time with his peers outside of school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7. My child eats lunch alone.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8. I think peer networks should be created for other students at my child's school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
9. My child likes going to school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. My child has friends at school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

11. Why would you like your child to participate in the peer network?

Social Validity Post-intervention Form for Parents/Caregivers of Children with ASD

Thank you for your support throughout the peer network! We want to know your thoughts about the project. Please read each of the following statements and **circle** the answer that best reflects your views. This information will help us improve the project experience for future students.

1. Overall, my child enjoyed being a part of the peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2. Overall, I liked that my child participated in a peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3. I think it is important for my child to make friends with students at his school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. I think it is important for my child to socialize with his peers at school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5. I am worried that my child is bullied (e.g., called names, teased, purposively excluded, physical hurt) by his peers.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. My child spends time with his peers outside of school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7. My child eats lunch alone.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8. I think peer networks should be created for other students at my child's school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
9. My child likes going to school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. My child has friends at school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11. I would like my child to be in a peer network in the future.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
12. I felt by participating in the peer network, other students in the school were nicer to my child.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
13. My child did new things by being a part of a peer group (e.g., talk more with peers, meet new people).	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
14. My child has made friends with the peers in his/her peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
15. My child spends time with his/her peer partners during the school day (e.g., walk to class together, eat lunch together).	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
16. My child talks with his/her peer partners outside of school (e.g., phone call, text, facebook, email).	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
17. My child does activities with his/her peer partners outside of school. Example:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

18. My child likes spending time with his/her peer partners.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
19. My child would like to keep hanging out with his/her peer partners.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

20. What did your child seem to enjoy most about being in a peer network?

21. What did your child not like about participating in the peer network?

22. What (if anything) has changed for your child as a result of being a peer group member?

23. What suggestions do you have to make the peer group project more beneficial for your child?

24. What was helpful about the intervention for you and your child?

Social Validity Pre-intervention Form for Peer Partners

Thank you for participating in the peer network! We want to know your thoughts about the project before it begins. Please read each of the following statements and **circle** the answer that best reflects your views. This information will help us improve the project experience for future students.

1. I am excited to be a part of the peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2. I think it is important to make school welcoming and comfortable for everyone.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3. People at my school get bullied (e.g., teased, called names, pushed, people spread rumors).	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. I think it is important to include students who are not as socially involved at my school in activities (e.g., eat lunch with them, work on a class project with them).	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5. I don't like it when people feel left out.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. I go out of my way to make people feel included.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7. I think peer networks should be created for other people at my school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

8. What questions/concerns do you have about being involved in the group?

9. Why would you like to participate in the peer network?

Social Validity Post-intervention Form for Peer Partners

Thank you for participating in the peer network! We want to know your thoughts about the project. Please read each of the following statements and **circle** the answer that best reflects your views. This information will help us improve the project experience for future students.

1. Overall, I enjoyed being a part of the peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2. I think it is important to make school welcoming and comfortable for everyone.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3. People at my school get bullied (e.g., teased, called names, pushed, people spread rumors).	¹²³ Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. I think it is important to include students at my school in activities (e.g., eat lunch with them, work on a class project with them) who are not as socially involved.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5. I do not like it when people feel left out.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. I go out of my way to make people feel included.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7. I think peer networks should be created for other people at my school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8. Being involved in the peer network was easy for me.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
9. I would like to be in a peer network again.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. I would like to keep hanging out with the peers in my peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11. I consider my peer partners to be my friends.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
12. My views about students who need extra support have changed for the better.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
13. I would recommend being in a peer network to my friends	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
14. I think people at my school were nicer to my peer partners after we started the network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

12. What did you enjoy most about participating in the peer network?

13. What were some of the favorite activities you did with your peers during the last two months?

14. What did you not like about participating in the peer network?

15. What would you change about the peer network?

16. Do you think you benefitted from begin in the peer network? If yes, how?

17. Do you think your peer partner benefitted from begin in the peer network? If yes, how?

18. Please list the names of the peer partners in your peer network that you consider as friends:

19. Would you like your contact information to be a part of a peer network directory? If so please list your information below:

Parents' names:

Phone number:

Email address:

Social Validity Post-intervention Form for School Personnel

Thank you for your support throughout the peer network! We want to know your thoughts about the project. Please read each of the following statements and **circle** the answer that best reflects your views. This information will help us improve the project experience for future students.

1. Overall, I think the student enjoyed being a part of the peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2. Overall, I think it was a good idea for the student to participate in a peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3. I think it is important for this student to make friends with other students at his school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4. I think it is important for this student to socialize with his peers at school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5. I am worried that this student is bullied (e.g., called names, teased, purposively excluded, physical hurt) by his peers.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6. This student spends time with his peers outside of school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
7. This student eats lunch alone.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8. I think peer networks should be created for other students at the school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
9. This student likes going to school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. This student has friends at school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11. I would like this student to be in a peer network in the future.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
12. I felt by participating in the peer network, other students in the school were nicer to this student.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
13. This student did new things by being a part of a peer group (e.g., talk more with peers, meet new people).	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
14. This student has made friends with the peers in his peer network.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
15. This student spends time with his peer partners during the school day (e.g., walk to class together, eat lunch together).	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
16. This student talks with his peer partners outside of school (e.g., phone call, text, facebook, email).	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
17. This student does activities with his/her peer partners outside of school.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Example: _____					
18. This student likes spending time with his peer partners.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
19. This student would like to keep hanging out with his/her peer partners.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

20. What (if anything) have you noticed has changed for this student as a result of being in a peer network?

21. What (if anything) do you think has changed for the peer partners that worked with this student as a result of being in a peer network?

22. Do you have any suggestions to make the peer network more beneficial for the students?

APPENDIX F: TREATMENT FIDELITY CHECKLISTS

Orientation Treatment Fidelity checklist

Item	Y/N
Did the facilitator ask students to introduce themselves?	
Did the facilitator describe what a PN is ?	
Did the facilitator describe what a PN looks like ?	
Did the facilitator share the goals of the PN? (why it should be created)	
Did the students participate in a reflection on something they are good at and something they aren't that great at?	
Did the facilitator discuss areas students with disabilities may have difficulty with?	
Did the facilitator ask students for ideas of how they can help increase social interactions?	
Did the facilitator talk about the " social customs " and provide students with strategies and/or ask students about how they could teach the social customs to students?	
Did the facilitator ask what the students see as their role in the PSN?	
Did the facilitator discuss what to do in a bullying situation (Say "stop", walk away, tell an adult)?	
Did the facilitator discuss the benefits of being in a PN?	
Did the facilitator discuss confidentiality ?	
Did the facilitator provide a preview of what the weekly PN meetings would look like?	
Did the facilitator answer questions from students?	

Weekly Meeting Treatment Fidelity Checklist for the Facilitator

Item	Y/N
Did the facilitator informally assess group satisfaction ?	
Did the facilitator/students discuss the previous week's interactions ?	
Did the facilitator/students discuss times and locations for the next week's interactions ?	
Did the facilitator/students discuss opportunities for the peer network to interact outside of school (e.g., club meetings, sporting events)?	
Did the facilitator allow time for casual social interactions ?	
If casual social interactions were not occurring independently, did the facilitator prompt for discussion ?	(Y/N/NA)
Did the facilitator remind students when the next meeting will be?	

Weekly Meeting Treatment Fidelity Checklist for Peer Partners

Who attended the meeting?

Put a check if the student did the following (if N/A write N/A):

<p>1. The peer was polite and treated focal student with respect (e.g., not talking down to, not condescending).</p>	<p><input type="checkbox"/> Student A <input type="checkbox"/> Student B <input type="checkbox"/> Student C <input type="checkbox"/> Student D <input type="checkbox"/> Student E</p>
<p>2. The peer responded to focal student's initiations (when applicable).</p>	<p><input type="checkbox"/> Student A <input type="checkbox"/> Student B <input type="checkbox"/> Student C <input type="checkbox"/> Student D <input type="checkbox"/> Student E</p>
<p>3. The peer sat in proximity to the focal student (i.e., close enough to have a conversation).</p>	<p><input type="checkbox"/> Student A <input type="checkbox"/> Student B <input type="checkbox"/> Student C <input type="checkbox"/> Student D <input type="checkbox"/> Student E</p>
<p>4. The peer made initiations or prompted focal student to join in the conversation (e.g., if the group is talking about a movie and a peer partner says to the focal student, "have you ever seen that movie?")</p>	<p><input type="checkbox"/> Student A <input type="checkbox"/> Student B <input type="checkbox"/> Student C <input type="checkbox"/> Student D <input type="checkbox"/> Student E</p>

APPENDIX G: DIRECT OBSERVATION CODING FORM

Student Code: _____
 Class: _____
 Date: _____
 Start Time: _____

Primary observer: _____
 IOA observer: _____
 PN Meeting: Yes NO
 Number of PP beginning _____ end _____
 Number of OP beginning _____ end _____

Interval and Time			Observe from 00:00 - 00:15 and record during that interval; observe from 00:15 – 00:30 and record during that interval...(partial interval recording)					
			RESPONSES			INITIATIONS		
Int.	End Time	NO Social Interaction with FS	Did Focus RESPOND?	Did Peer Partner RESPOND?	Did Other Peer RESPOND?	Did Focus INITIATE?	Did Peer Partner INITIATE?	Did Other Peer INITIATE?
1	00:15		___ PP ___ OP			___ PP ___ OP		
2	00:30		___ PP ___ OP			___ PP ___ OP		
3	00:45		___ PP ___ OP			___ PP ___ OP		
4	1:00		___ PP ___ OP			___ PP ___ OP		
5	1:15		___ PP ___ OP			___ PP ___ OP		
6	1:30		___ PP ___ OP			___ PP ___ OP		
7	1:45		___ PP ___ OP			___ PP ___ OP		
8	2:00		___ PP ___ OP			___ PP ___ OP		

Interval and Time			Observe from 00:00 - 00:15 and record during that interval; observe from 00:15 – 00:30 and record during that interval...(partial interval recording)					
			RESPONSES			INITIATIONS		
Int.	End Time	NO Social Interaction with FS	Did Focus RESPOND?	Did Peer Partner RESPOND?	Did Other Peer RESPOND?	Did Focus INITIATE?	Did Peer Partner INITIATE?	Did Other Peer INITIATE?
9	2:15		___ PP ___ OP			___ PP ___ OP		
10	2:30		___ PP ___ OP			___ PP ___ OP		
11	2:45		___ PP ___ OP			___ PP ___ OP		
12	3:00		___ PP ___ OP			___ PP ___ OP		
13	3:15		___ PP ___ OP			___ PP ___ OP		
14	3:30		___ PP ___ OP			___ PP ___ OP		
15	3:45		___ PP ___ OP			___ PP ___ OP		
16	4:00		___ PP ___ OP			___ PP ___ OP		
17	4:15		___ PP ___ OP			___ PP ___ OP		
18	4:30		___ PP ___ OP			___ PP ___ OP		
19	4:45		___ PP ___ OP			___ PP ___ OP		
20	5:00		___ PP ___ OP			___ PP ___ OP		

Interval and Time			Observe from 00:00 - 00:15 and record during that interval; observe from 00:15 – 00:30 and record during that interval...(partial interval recording)					
			RESPONSES			INITIATIONS		
Int.	End Time	NO Social Interaction with FS	Did Focus RESPOND?	Did Peer Partner RESPOND?	Did Other Peer RESPOND?	Did Focus INITIATE?	Did Peer Partner INITIATE?	Did Other Peer INITIATE?
21	5:15		___ PP ___ OP			___ PP ___ OP		
22	5:30		___ PP ___ OP			___ PP ___ OP		
23	5:45		___ PP ___ OP			___ PP ___ OP		
24	6:00		___ PP ___ OP			___ PP ___ OP		
25	6:15		___ PP ___ OP			___ PP ___ OP		
26	6:30		___ PP ___ OP			___ PP ___ OP		
27	6:45		___ PP ___ OP			___ PP ___ OP		
28	7:00		___ PP ___ OP			___ PP ___ OP		
29	7:15		___ PP ___ OP			___ PP ___ OP		
30	7:30		___ PP ___ OP			___ PP ___ OP		
31	7:45		___ PP ___ OP			___ PP ___ OP		
32	8:00		___ PP ___ OP			___ PP ___ OP		

Interval and Time			Observe from 00:00 - 00:15 and record during that interval; observe from 00:15 – 00:30 and record during that interval...(partial interval recording)					
			RESPONSES			INITIATIONS		
Int.	End Time	NO Social Interaction with FS	Did Focus RESPOND?	Did Peer Partner RESPOND?	Did Other Peer RESPOND?	Did Focus INITIATE?	Did Peer Partner INITIATE?	Did Other Peer INITIATE?
33	8:15		___ PP ___ OP			___ PP ___ OP		
34	8:30		___ PP ___ OP			___ PP ___ OP		
35	8:45		___ PP ___ OP			___ PP ___ OP		
36	9:00		___ PP ___ OP			___ PP ___ OP		
37	9:15		___ PP ___ OP			___ PP ___ OP		
38	9:30		___ PP ___ OP			___ PP ___ OP		
39	9:45		___ PP ___ OP			___ PP ___ OP		
40	10:00		___ PP ___ OP			___ PP ___ OP		

Session Totals:

Responses FROM FS to PP ___ to OP ___ TOTAL: ___	Initiations FROM FS to PP ___ to OP ___ TOTAL: ___
Responses TO FS from PP ___ from OP ___ TOTAL: ___	Initiations TO FS from PP ___ from OP ___ TOTAL: ___

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