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Workplace Social Skills for Young Adults with Autism Spectrum Disorder:  
A Single-Subject Community-Based Intervention

Haley Anne Thomas

A thesis submitted to the faculty of  
Brigham Young University  
in partial fulfillment of the requirement for the degree of  
Educational Specialist

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## ABSTRACT

### Workplace Social Skills for Young Adults with Autism Spectrum Disorder: A Single-Subject Community-Based Intervention

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Since socialization deficits are the primary characteristic of autism spectrum disorder, attaining and maintaining employment in adulthood can prove to be problematic. This study evaluates the effectiveness of a nine-week program designed to teach workplace social skills to young adults with autism in a community setting. Both qualitative and quantitative methods were used to analyze outcomes. Quantitative methods consisted of live observational behavioral coding. Qualitative measures used written intake and discharge reports, obtained from the program's coordinators, to analyze their perceptions of pre-intervention goals and post-intervention outcomes and remaining barriers related to social skills. Overall outcomes suggest the program does produce slight improvement in social skills for individuals with autism. Quantitative outcomes indicated specific improvements in engagement and quality of engagement when participants were in the presence of both coworkers and the public. Likewise, qualitative report comparisons indicated improvements in specific conversation skill areas. Based on this study's findings, schools and communities should encourage transition services to teach workplace social skills to young adults with autism in community-based settings. This type of learning experience may better prepare these young adults for successful future employment.

Keywords: autism, social skills, workplace, vocational skills, transition program, community-based

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## CHAPTER 1: Introduction

There are many characteristics of autism spectrum disorder (ASD), of which deficits in social communication are the most dominant (Carter, Davis, Klin, & Volkmar, 2005). Among the many common impairments within social communication, some of the most significant may be reading human emotions; using verbal and nonverbal communication; and developing, maintaining, and understanding relationships (American Psychiatric Association [APA], 2013). These difficulties may be particularly impairing for individuals who are seeking employment.

With the competitive job market in today's society, individuals with ASD have a harder time obtaining and maintaining employment because of their many social communication deficits (Müller, Schuler, Burton, & Yates, 2003; Njardvik, Matson, & Cherry, 1999). Problems arise during the interview process, even before individuals with ASD have the opportunity of securing employment (Müller et al., 2003). Other related issues arise when interacting with coworkers and supervisors, also leading to poor job reviews and even job loss (Bolman, 2008; Camarena & Sarigiani, 2009; Hagner & Cooney, 2005; Hillier et al., 2007; Müller et al., 2003; Patterson & Rafferty, 2001; Ruef & Tumbull, 2002; Smith & Belcher, 1985; Sperry & Mesibov, 2005).

Along with social communication, other characteristics that impede job performance involve executive functioning (Landa & Goldberg, 2005; Lopez, Lincoln, Ozonoff, & Lai, 2005; McEvoy, Rogers, & Pennington, 1993), which leads to poor responses in tasks requiring shifting between activities, attention, working memory, problem-solving, and organization (Barnhill, 2007; Hume & Odom, 2007; Marks, Schrader, Longaker, & Levine, 2000; Müller et al., 2003; Patterson & Rafferty, 2001). Because of these impairments, the typical experience for individuals with ASD is multiple short-term jobs (Wagner, Newman, Cameto, Garza, & Levine,

2005), lower pay, and frequent unemployment, estimated to be 50-75% (Cedurland, Hagberg, Billstedt, Gillberg, & Gillberg, 2008; Hurlbutt & Chalmers, 2004; Jennes-Coussens, Magill-Evans, & Koning, 2006; Müller et al., 2003).

To mitigate the social struggles individuals with ASD face, many social skill interventions have been created and researched. Among such, studies have indicated that the most effective strategy for teaching social skills to individuals with ASD is through a combination of direct instruction (teaching skill lessons) and peer mediated models (teaching skills through peer involvement; Kasari et al., 2012).

Although there are many social skill interventions for young adults with ASD, very few specifically address social skills in the workplace. One of the studies focused on teaching workplace social skills in a pilot study conducted in Hong Kong, but due to cultural differences and isolated work conditions, generalizability is limited (Liu et al., 2013). In the absence of research to establish evidence-based practice, some local agencies have looked for ways to teach workplace social skills to individuals with autism.

Easterseals is a non-profit organization that focuses on helping individuals with disabilities. A regional branch of this organization, referred to as Easter Seals-Goodwill Northern Rocky Mountains (ESGW) supports communities throughout Utah, Montana, and Wyoming (ESGW, 2017a). ESGW created a nine-week young adult program called Peer Connections that strives to prepare individuals with high functioning autism to gain independence through employment. This program has been operating for the past six years and is set up to specifically address the social skill deficits that make it difficult for individuals with ASD to be hired and maintain employment (ESGW, 2017b).

The Peer Connections intervention package has multiple components for improving social skills. Peer mentors are partnered with participants in volunteer work settings, and adult coaches provide weekly assessment, feedback, and opportunities for self-evaluation. With the use of peer mentors and adult coaches, the Peer Connections intervention utilizes a combination of direct instruction and peer mediated models. In addition to this, ESGW collects data about each participants' workplace skill strengths and weaknesses, both at intake and discharge from the program.

### **Study Purpose**

Although many interventions help individuals with ASD to develop appropriate social skills, very few have specifically addressed social skills in the workplace. Separate from vocational training, this study will be a contribution towards filling a gap in the literature and in practice regarding social skills intervention for workplace conditions. The purpose of the current study was to investigate the effectiveness of the Peer Connections' package consisting of supported workplace experience with peers, adult coaching, feedback, and self-evaluation in a volunteer work environment.

### **Research Questions**

In order to examine the effectiveness of the Peer Connections program intervention in teaching individuals with ASD workplace social skills, the following research questions were asked:

1. Do workplace social skills improve for participants during the Peer Connections program?
2. Which specific social skills are most affected by the program?
3. What is the extent or degree of improvement?

4. How effective is the program in helping participants interact appropriately with familiar people (e.g., coworkers)?
5. How effective is the program in helping participants interact appropriately with and unfamiliar people (e.g., public interface)?
6. Do those who come in regular contact with participants (e.g., parents, ESGW staff) recognize improvements?

## CHAPTER 2: Literature Review

Autism spectrum disorder (ASD) symptoms span a range of impairments in social communication and restricted, repetitive, or sensory behaviors. In particular, socialization deficits are one of the primary characteristics of ASD, with or without cognitive or language deficits (Carter et al., 2005). Social impairments include lack of awareness of other people's emotions; communication abnormalities that continue past early childhood; poor verbal and nonverbal communication; abnormalities in eye contact, facial expressions, body language, and use of gestures; and deficits in developing, maintaining, and understanding relationships (APA, 2013). Severity of ASD is determined by the level of impairment in social communication and the prevalence of restricted and repetitive patterns of behavior (APA, 2013; Happé & Frith, 2006; Hill, 2004).

ASD has high comorbidity with other impairments, such as intellectual disability (ID), and language impairment; these co-morbid conditions fall under severity specifiers of ASD diagnostic features (APA, 2013). When considering the comorbidity rate between ASD and ID, estimates vary due to confounding factors in existing data, such as varied sample sizes, heterogeneous demographics of participants, inconsistent assessment methods, and changes in diagnostic criteria across time. However, recent studies show that up to 68.4% of individuals with ASD do *not* have co-morbid ID (Christensen et al., 2016), although earlier studies indicated a lower rate of typical or higher cognitive abilities in individuals with ASD (Bryson, Bradley, Thompson, & Wainwright, 2008; de Bildt, Systema, Kraijer, & Minderaa, 2005; Matson & Shoemaker, 2009). Studies like Brock (2006) and Shattuck (2006) have found that as the rate of identified ASD goes up, the number of individuals diagnosed ID and ED, as a proportion of diagnoses, decreases. This proportional decrease suggests the influences of growing awareness

and changes in diagnostic labeling of ASD, where previously, individuals were being diagnosed with other disorders rather than ASD.

Rates of ASD prevalence have risen considerably in the United States in recent years (Christensen et al., 2016). This increase in prevalence has a growing impact on postsecondary services as these individuals transition from high school (Higgins, Koch, Boughfman, & Vierstra, 2007). Current data from the Autism and Developmental Disabilities Monitoring (ADDM) Network report that ASD prevalence has increased at a steady rate since the 1990's; however, the rate appears to have leveled off between 2010 and 2012, at a rate of 14.7 per 1,000 or 1 in 68 children (Christensen et al., 2016; Frieden, Jaffe, Cono, Richards, & Iademarco, 2016).

### **A New Diagnosis of ASD**

Historically, early infantile autism, Rhett's disorder, childhood disintegrative disorder, childhood autism, pervasive developmental disorder--not otherwise specified, and Asperger's disorder were considered separate diagnoses related to autism. In the new Diagnostic and Statistical Manual for Mental Disorders, Fifth Edition (DSM-5: APA, 2013), they now fall under one diagnostic category of autism spectrum disorder (ASD; APA, 2013). Individuals with ASD who do not have intellectual disability, nor any form of language disorder are generally considered to be on the *higher* end of the autism spectrum (requiring less extensive supports). Although there are less obvious impairments, these individuals still show characteristics of autism in terms of social deficits and restrictive repetitive behaviors and require some support (APA, 2013).

### **Social Deficits in ASD**

According to Elliott and Gresham (1987) and Gresham (1986), social skills are defined as specific behaviors—both verbal and nonverbal—that result in positive interpersonal and social

interactions. Examples of social skills include the exchange of reciprocal eye contact, asking questions and responding to questions, and giving and accepting compliments (Beidel, Turner, & Morris, 2000), all of which are areas of difficulty for individuals with ASD. The social deficits of individuals with ASD span multiple social interactive planes, such as deficits in interpreting verbal and nonverbal cues, social-emotional reciprocity, difficulties initiating conversation, and a lack of empathy for others in distress (Channon et al., 2001; Happé & Frith, 2006; Hill, 2004; Weiss & Harris, 2001). Additional social impairments include difficulty taking turns in a conversation and a difficulty interpreting sarcasm and metaphors (Kerbel & Grunwell, 1998; Krasny, Williams, Provencal, & Ozonoff, 2003). Such impairments make it difficult for individuals with ASD to understand the intentions and beliefs of others, in addition to having difficulty understanding and expressing their own emotions (Baron-Cohen, Leslie, & Frith, 1985). For these individuals, deficits in social skills can affect relationships with peers, family, or other adults, which in turn, limit their ability to meet normal developmental milestones that create gratifying peer and familial relations (Krasny et al., 2003).

Although individuals with ASD lack the innate skills and understanding of social communication, youth with autism indeed feel loneliness and report wanting more positive peer interactions (Bauminger, Shulman, & Agam, 2003; Jobe & White, 2007; Locke, Ishijima, Kasari, & London, 2010). Due to their impaired social communication skills and ability to determine the appropriate time to use those skills, adolescents with ASD are at a higher risk of peer rejection and social isolation when integrated into mainstream social settings, such as a classroom or the workplace (Bauminger et al., 2003; Chamberlain, 2001; Jones & Frederickson, 2010; Mesibov, 1984). Consequently, they also report greater loneliness than other typically developing peers (Bauminger & Kasari, 2000). As youth approach adolescence, social impairment and distress

may increase, due to greater complexity in social environments and heightened awareness of their own social disability (Schopler & Mesibov, 1983; Tantam, 2003). Additional evidence points out that social skill deficits are an underlying problem in adolescents with ASD, associated with greater academic and occupational underachievement (Howlin & Goode, 1998), making the successful transition from high school to postsecondary education or vocational settings difficult.

### **ASD in the Work Place**

In today's competitive, service-oriented job market, there are higher expectations for good social and communication skills and executive functioning than in past generations. However, when individuals with ASD seek employment, they often have a difficult time obtaining and maintaining a job due to communication and social skills deficits (Müller et al., 2003; Njardvik, Matson, & Cherry, 1999). Problems in social navigation present obstacles even before employment is secured, occurring during completion of the job application and most predominantly during the interview process (Müller et al., 2003). Post-hiring difficulties arise when interacting with coworkers—identified as having the greatest vocational impact for these individuals (Hagner & Cooney, 2005; Hillier et al., 2007; Patterson & Rafferty, 2001; Smith & Belcher, 1985). When interviewed, adults with ASD reported that communication and social problems with supervisors and coworkers were primary impediments to successful job performance (Camarena & Sarigiani, 2009; Müller et al., 2003; Ruef & Tumbull, 2002; Sperry & Mesibov, 2005), which in some cases led to job termination (Bolman, 2008; Müller et al., 2003).

Hurlbutt and Chalmers (2002, 2004) found that the obstacles in communication were contextual in nature, including difficulty understanding directions, reading facial expressions, “reading between the lines,” and understanding tone of voice. They also found that these



individuals tended to ask too many questions, had trouble with hypersensitivity to environmental stimuli (e.g., lighting, sounds, textures, tastes, smells), and behaved in what would be considered an inappropriate manner (e.g., engaging in self-stimulatory or ritualistic behaviors in attempts to reduce stress or sensory overload). Due to social deficits, individuals with ASD may not benefit from as many career development opportunities in the same way as their typical peers (e.g., part-time jobs, extracurricular activities, etc.); therefore, these individuals are less likely to gather information to help them prepare for the employment world. They also miss out on learning and practicing work skills and behaviors as a foundation for future job success, in addition to gaining self-awareness of their strengths, weaknesses, and career interests (Higgins et al., 2007).

In addition to the social impediments that individuals with ASD experience, there are also impacts on areas of cognitive functioning that can directly affect job performance, such as executive functioning (Landa & Goldberg, 2005; Lopez et al., 2005; McEvoy, Rogers, & Pennington, 1993). Impaired executive functioning results in impaired response shifting, attention, motor planning, and working memory, which are also possible causes of difficulties in task execution (Hume & Odom, 2007; Marks et al., 2000; Müller et al., 2003; Patterson & Rafferty, 2001). Whether intelligence is average or above-average, difficulties in problem-solving and organization are also prevalent in individuals with ASD (Barnhill, 2007). Further challenges arise when changes in job routines and work settings take place; acclimating to such changes often presents an obstacle for these individuals (Keel, Mesibov, & Woods, 1997). Although these challenges of executive functioning exist for individuals with ASD, studies like Hurlbutt and Chalmers (2004) have found that individuals with ASD struggle most with “the social aspect of employment but not with actual job duties” (p. 218). Therefore, although individuals with ASD may have the job skills necessary to make great contributions in the

workforce and may be able to pass a job interview, their social deficits will often create barriers for long-term employment and future career advancement (Higgins et al., 2007; Hurlbutt & Chalmers, 2004).

Additional research suggests that most individuals with ASD primarily obtain short-term rather than long-term employment (Wagner et al., 2005). It is estimated that a staggering 50–75% of adults with ASD are unemployed (Howlin, Goode, Hutton, & Rutter, 2004; Hurlbutt & Chalmers, 2002; Mawhood, Howlin, & Rutter, 2000). Likewise, adults with ASD often experience underemployment, multiple short-term jobs, challenges adjusting to new job requirements, and lower pay than their coworkers (Cedurland et al., 2008; Hurlbutt & Chalmers, 2004, Jennes-Coussens et al., 2006; and Müller et al., 2003).

Although some individuals with ASD successfully obtain postsecondary education, those individuals are not necessarily more successful in finding meaningful employment (Howlin, 2000). Because ASD has such a heterogeneous symptomatic presentation, it is also difficult to predict or provide adequate provisions for successful employment (Keel, Mesibov, & Woods, 1997). The struggle with finding employment for these individuals is that their needs are markedly different than those of individuals with other developmental disabilities (Billstedt, Gillberg, & Gillberg, 2005; and Müller et al., 2003), for which supports already exist.

There are many benefits to gaining job skills that lead to employment for individuals with ASD. Such individuals with work capabilities deserve to enjoy the same rights as those in the rest of society. Likewise, employment provides an opportunity for adults with and without disabilities to earn the wages they need to be independent and support themselves in their daily lives and interests. Not only does employment provide a foundation for personal dignity, but it has also been found to improve quality of life for individuals with ASD (Garcia-Villamizar, &

Hughes, 2007; Garcia-Villamizar, Ross, & Wehman, 2000; Garcia-Villamizar, Wehman, & Navarro, 2002) in addition to improved cognitive functioning (Persson, 2000). It is likely that as the incidence of ASD continues to rise in the United States population, more people with ASD who are transitioning to adulthood will seek out vocational rehabilitation professionals for assistance in obtaining and maintaining employment (Higgins et al., 2007).

There are also many economic benefits to full inclusion of individuals with ASD in the workplace, in addition to the humanitarian reasons. When employed, individuals with ASD and other disabilities become less reliant on government funds, creating a greater contribution to taxes and to society (Howlin, Alcock, & Burkin, 2005; Jarbrink & Knapp, 2001). The need for subsidized financial support decreases with increased employment for individuals with ASD because earned wages provide the means to pay their bills (Jarbrink et al., 2007). Additionally, employment could also provide health benefits that could cover costs for medical needs (e.g., medication and psychiatric services), further reducing the need for subsidized health insurance (Bellini, 2004; Bolman, 2008; Farrugia & Hudson, 2006; Kim, Szatmari, Bryson, Streiner, & Wilson, 2000).

### **Social Skills Intervention Models**

A wide variety of social skills interventions exist, most of which include individual programs that teach specific skills. Foundational studies have focused on developing positive behaviors (e.g., conversational strategies, eye contact and facial expression) or decreasing socially unacceptable behaviors (e.g., inappropriate mannerisms or abnormal speech intonations) (Koegel & Frea, 1993; Krantz & McClannahan, 1993; Matson, Sevin, Box, & Francis, 1993; Oke & Schreibman, 1990). Current social skills interventions can include a range of options from video-based group instruction (Plavnick, Kaid, & MacFarland, 2015), to inclusion

programs in mainstream education systems and school-based interventions (Jones & Frederickson, 2010; Kasari, Rotheram-Fuller, Gulsrud, & Locke, 2012; Whalon, Conroy, Martinez, & Werch, 2015), discrete trial teaching through child-robot interaction (Yun, Park, & Choi, 2014), or social skills training (SST: McConnell, 2002).

Using behavioral and social learning techniques, SST intervention teaches specific social skills, such as initiating conversation and maintaining eye contact (Cooper, Griffith, & Filer, 1999). SST is commonly used in group settings for children with ASD because it offers an environment where they can practice new skills in a more natural way while simultaneously encouraging social interaction with peers (Barry et al., 2003).

SST intervention models have been found to be a necessary step in teaching social skills to children with ASD (Bellini, Peters, Benner, & Hope, 2007; Rao, Beidel, & Murray, 2008; White, Keonig, & Scahill, 2007). Such interventions typically fall within two categories: direct training and peer mediated models. Direct training (or instruction) is one of the most commonly used interventions where social skills are directly taught within a group or individual setting to those with autism (Bellini et al., 2007; Kasari, et al., 2012; Rao et al., 2008; White et al., 2007). Peer mediated models focus on the indirect training provided by peers of the individual with ASD (Bellini et al., 2007; Kasari et al., 2012; Rao et al., 2008).

When comparing direct instruction with other intervention strategies, research such as Barry et al. (2003), found that some social skills (e.g., play skills and greeting skills) improved when they were directly taught; however, regardless of specific instruction, conversation skills showed smaller effects of improvement. This disparity in improvement in conversation skills indicates that certain skills may be more teachable using concrete rules and scripts, while higher level or more complex skills (e.g., maintaining a conversation) may require different approaches

to teaching (Barry et al., 2003). In their study comparing direct instruction and peer mediated interventions, Kasari et al. (2012) reported a significant difference between the effectiveness of the two. Overall, they found that peer mediated models were superior to the non-peer mediated models and that the outcomes were also consistent after follow-up (Kasari et al., 2012). Their final report indicated that a combination of direct and peer mediated intervention held the best results for both immediate and long-term social skill gains for individuals with ASD (Kasari et al., 2012).

Although a wide range of studies have focused on interventions to improve social skills for school-age children and young adults, very few have specifically addressed social skills in the workplace for young adults with ASD. To date, two studies have breached the topic of workplace social skills and autism; however, both were pilot studies. One study focuses primarily on reducing social anxiety during a summer robotics camp with a secondary focus on work-related social skills (Kaboski et al., 2015). Although the second study focuses on promoting social, communication, and emotional skills in the workplace in Hong Kong (Liu et al., 2013), the tasks were limited to isolated conditions (e.g., office cleaning and goods packaging) and differences in cultural expectations and environments should be considered when evaluating its generalizability.

### **Easterseals' History and Mission**

Easterseals is a nonprofit charity organization that offers support and resources to individuals with disabilities. Since 1907, Easterseals has been devoted to removing physical, cultural, attitudinal, and legal obstacles and offering services and opportunities to help those with disabilities live productive and meaningful lives. Easterseals offers living, occupational, educational, and recreational services to children, adults, seniors, veterans, and caregivers of

individuals with disabilities. Easterseals receives funding from donations as well as private insurers, government agencies, and fee-for-service providers. There are presently 75 local Easterseals agencies in communities nationally, with over one million people benefiting each year. Easterseals also provides training programs for physicians, therapists, and other professionals (Easterseals, 2017). To address the specific needs of adults with autism, Easterseals offers job training and many social, recreational, occupational, and living resources, such as workforce development services that assesses skills and employment goals. They also offer day programs for socialization, recreation and community involvement; independent living, supported living, group living, adult foster care, and in-home services; social and recreational programs; and health and human service organizations (Easterseals, 2017).

Easter Seals-Goodwill Northern Rocky Mountains (ESGW) is a local Easterseals site with central administrative offices in Montana. ESGW began in 1946 as the Montana Chapter of the National Society for Crippled Children and Adults; however, through a series of expansions over the years, ESGW began serving communities in Idaho, Utah, and Wyoming. In 2007, ESGW first offered services to individuals with autism by adding a play-based program for young children and families called the P.L.A.Y Project in Idaho and Montana (“Historical Highlights,” 2017). Now the program is administered by the Salt Lake City, Utah office and runs alongside another autism support program called Peer Connections.

Peer Connections is a nine-week transition-age social skills program, designed to help young adults with disabilities gain workplace social skills and independence as a direct response to individual needs in the local disability community. What began as a mother wanting her several young adult children with autism to develop independence and poise in the workplace, later developed into a set of novel strategies for teaching workplace social skills. Next, she

refined those strategies and extended them to families of similar circumstances in the community. As needs grew and more families showed interest, she partnered with ESGW and the Utah State Office of Rehabilitation (USOR) to establish the Peer Connections program we see today. Young adults from around the state are referred through vocational rehabilitation, employment centers, and word of mouth to Peer Connections, where participation is funded by the USOR. The Peer Connections program has been offered in three urban locations within the ESGW service area. The Peer Connections program has now been running for the past six years, seeking to improve workplace social skills of individuals with high functioning autism or other social communication disorders who are transitioning to adulthood (ESGW, 2017b).

## CHAPTER 3: Methods

ESGW contacted the local university's school of education to conduct a program evaluation of Peer Connections as impartial and independent evaluators. The Institutional Review Board (IRB) approved all methods and all participants (or their legal guardians) gave written consent for participation. ESGW contacted each participant about interest in study participation after enrollment, so study participation status did not affect the participant's ability to receive the Peer Connections intervention. The study was funded by an internal mentoring grant from the university.

### **Settings**

Two Peer Connections sites were chosen for the study based on feasibility of access to researchers. One site with three locations was previously established (dinosaur museum, children's exploratory museum, and a farm location) in a museum complex located within one semi-rural area and another previously established site was a natural science aquarium within a major urban/suburban area. Participants' unpaid jobs during the intervention included giving directions to customers, answering questions and concerns, and approaching people with fun facts about museum displays and animals. Location sites in the museum complex had eight total participants in the study, divided over multiple cohorts, and the aquarium had two participants in one cohort, totaling 10 participants across groups.

### **Participants**

Participants were males and females between the ages of 15-24. Participants met inclusion criteria by being enrolled in ESGW Peer Connections and having a lifetime history of significant social difficulties (verified as meeting criteria for autism spectrum disorder). Verification was through assessments conducted by a research reliable clinician or under her



direct supervision. Three participants, however, were repeatedly not available for assessment (see Table 1). In addition to the current participants, we requested that ESGW provide us with de-identified, historical subjective social skills data from 10 previous program participants (i.e., the first available 10 historical files to contain complete data sets) to assess how representative of other Peer Connections cohorts the current participants were. Only program data were compared, as demographic data were not made available for past participants. A  $z$ -test of proportions was conducted between the 10 prior participants and 6 current participants, yielding no significant differences ( $p > .05$ ) between the two groups. This suggests that our current participants' data may reflect similar results across other participants in the program.

Table 1: Participant Demographics with an Overview of Cognitive Functioning, Autism Characteristics, and Comorbidity

Participant	Age	Gender	Race	FSIQ	Meets ASD Criteria on ADOS-2	Comorbid Diagnoses Reported
1	21	M	White	--	--	
2	21	F	Hispanic	57	Yes	Childhood Schizophrenia
3	15	M	White	101	Yes	
4	21	F	White	67	Yes	TBI
5	21	M	White	--	--	
6	23	M	Hispanic	71	Yes	
7	18	M	White	99	Yes	
8	21	M	White	58	Yes	
9	23	M	White	76	Yes	
10	19	M	White	--	--	

*Note.* FSIQ = Full Scale Intelligence Quotient; ASD = Autism Spectrum Disorder; ADOS-2 = Autism Diagnostic Observation System, Second Edition; TBI = Traumatic Brain Injury; -- = not available due to participant lack of availability for assessment.

## **Peer Connections Standard Procedures**

**Enrollment in the Peer Connections program.** Participants were referred to ESGW Peer Connections by vocational rehabilitation professionals, education centers, and transition programs for individuals with disabilities, or word of mouth in the community. Before participants were admitted into the program, their families first had a short phone conversation with a member of the ESGW team to provide basic information about the participant. They then filled out an application form, completed an extensive in-person interview with a Peer Connections staff member, and signed the initial consent documents. Lastly, participants were referred to a vocational rehabilitation (VR) counselor with the State Office of Rehabilitation, who determined final eligibility for funding, so participants did not have to pay for enrollment in the Peer Connections program.

**Peer mentorship.** Once admitted into the program, a volunteer peer mentor, roughly equivalent in age, was identified and assigned to a facility site as a volunteer, three to four hours a week with the participant. Normally the assigned peers were recruited from high schools, colleges, and extra-curricular volunteer organizations; however, the peer mentors for this study included current employees of the facility site who volunteered, but had no previous mentor training. Participants switched partnership with peer mentors each week in order to minimize peer mentor effects. The peer mentor did not perform any type of direct supervision, but facilitated conversation with participants, giving intermittent social reminders in order to simulate a more real-world work environment and promote social development. Peer mentors were also required to complete a Weekly Feedback form to guide progress with ongoing goals for their assigned participant. No formal training was offered to peers before the intervention.

**ESGW preliminary assessment.** The Easter Seals-Goodwill team created a preliminary assessment that included spending eight hours getting to know the participant's strengths and challenges, which were described in an Employability Assessment Report. This assessment encompassed a participant self-report, a parent report, and a staff report of existing abilities. Following assessment, facility assignment was determined according to relative level of existing social skills. Individuals with more developed social interaction skills prior to intervention were assigned to a single museum site where a higher volume of people visited, one of several museum sites, including a nature museum, and outdoor experience museum, and indoor children's museum, or a science museum. Some participants rotated assignments among the other museum sites. To protect participant confidentiality, sites were de-identified in the results.

**ESGW ongoing assessment.** Each week of the nine-week program, participants and peer mentors were required to complete a weekly feedback form on the participants' session, and site facilitators completed a staff feedback form detailing observations and goals. Site facilitators met with each partnership (participant and peer mentor) to review goals, successes, and challenges, and as a team, they set goals for the following week. The site facilitator then sent a copy of the staff feedback form to the participant for review.

**Program wrap-up.** An end-of-program meeting was scheduled after all nine program sessions had been completed. The Peer Connections Coordinator completed a Program Summary Report for the family containing a summary of the participants' time in the program, a list of goals and outcomes, skills improved and barriers to work on, as well as a brief summary of the participant's work tolerance and a list of recommendations for future work settings. The intervention team then met to review the report and discuss the effect of the program and recommendations for the participant's next steps.

## Measures

**ESGW assessment and summary reports.** As part of the Peer Connections intake and before the interventions were implemented, participants underwent extensive preliminary assessments for the Employability Assessment Report. The report was used to generate baseline data and compared with an ESGW's End-of-Program Summary Report. These data were collected from both current participants and the most recently available 10 participants who completed the program with full datasets (a recent computer loss made some recent participants' records unavailable).

**Autism assessment.** Because the program was originally created to benefit individuals with autism spectrum disorder (ASD) and broadened to include individuals with other social communication difficulties similar to ASD, autism symptoms and level of social communication were verified using in-person evaluation, parent report, and self-report questionnaires. Evaluation included the Autism Diagnostic Observation Schedule-Second Edition (ADOS-2) by or under the direct supervision of a research reliable clinician.

***Autism Diagnostic Observation Schedule-Second Edition.*** The Autism Diagnostic Observation Schedule-Second Edition (ADOS-2: Lord, Rutter, Di Lavore, Risi, Gotham, & Bishop, 2012) is a semi-structured, standardized assessment of communication, social interaction, play/imaginative use of materials, and restricted and repetitive behaviors for individuals who have been referred evaluation of ASD symptoms. The ADOS-2 is considered the gold standard of autism assessment (Kanne, Randolph, & Farmer, 2008; McCrimmon & Rostad, 2014). There are five assessment modules in the ADOS-2, differing by language level and age. Standard ADOS-2 activities provide contexts in which social interactions, social communication, and other symptoms are likely to appear and include both unstructured and

structured situations. The ADOS-2 is a 40- to 60-minute in-person observational assessment that must be administered and interpreted by a certified clinician who has met the requirements of reliable administration. It includes prompts such as telling a story from a picture or book and interview questions about school, work, emotions, and relationships. The ADOS-2 is designed to provide opportunities for an examiner to observe behaviors and insights that are directly relevant to the diagnosis of ASD and results are used to inform medical diagnoses, special education classification, or treatment planning (Lord, et al., 2012; Lord, Luyster, Gotham, & Guthrie, 2012). Reliability and validity are found to be acceptable (Lord, et al., 2012). For the purpose of this study, Modules 3 and 4 (fluent speech) of the ADOS-2 were used.

**Cognitive assessment.** Cognitive ability was also verified using the *Wechsler Adult Intelligence Scales-Fourth Edition* (WAIS-IV: Wechsler, 2007), the *Wechsler Intelligence Scales for Children-Fifth Edition* (WISC-V: Wechsler, 2014) or the *Stanford-Binet Intelligence Scales, Fifth Edition* (Roid, 2003). These assessments were administered by qualified graduate students under the supervision of a licensed psychologist.

**Direct observation.** Research assistants coded social interactions in 10-second intervals using partial interval recording methods. Live coding was employed in a public setting with the participant in clear view, but the coder was not known to the participant. If target behaviors were observed at any point during the 10-second interval, they were recorded according to a hierarchy described below. Social behavioral samples were taken in 20-minute blocks during each participant's shift (see Appendix A). Coders switched coding targets after completing each 20-minute block (multiple targets were present at each session). Minimal disruption in the public setting was a very high priority, so no audible signals or other time markers were used

during live coding. Although they alternated targets every 20-minutes, coding assignments were sequential, not simultaneous.

***Training and reliability of coders.*** Coders were primarily undergraduate and graduate students studying psychology or school psychology. Coders were trained using videotaped social interactions in community settings until they were consistently reliable with group consensus on behavioral codes over 80% of the time, for 3 or more consecutive observations. Reliability checks were held periodically throughout the study to monitor coders' reliability. Any coder with less than 80% reliability during the reliability check repeated the check and did not continue coding until reliability again exceeded 80%. Each coder completed at least one interim reliability check after initially achieving reliability. Average reliability across the nine research observers was 93% overall.

***Time spent socially engaged.*** Social engagement is the most basic element of social skills. If an individual is not socially engaged, there is no opportunity for social skills to be practiced. Tracking social engagement allowed us to see whether each participant's percent of engagement increased, decreased, or remained the same over the course of the program, allowing us to interpret whether the program influences the amount of social engagement for the participant. Studies that implemented similar live coding from observations, such as Frankel, Gorospe, Chang, and Sugar (2011), have indicated this is an appropriate and accurate method of measuring social skills. Coders tracked time spent engaged to determine the proportion of time each participant was socially engaged within the 20-minute block. Definitions of social engagement and solitary behavior are defined in Table 2. Solitary behavior (S) was the lowest on the hierarchy of social behaviors coded, so was superseded by any observed social engagement during the 10-second interval using a partial interval recording method. If, for

example, an individual was solitary for 8 of the 10 seconds, but became engaged for 2 seconds, the interval was coded as having Engaged (E) social behavior present.

***Initiations and responses.*** In addition to observations about frequency of engagement, the type of interaction observed was also coded. Coders tracked the participant's time spent initiating (I) and responding (R), in order to see how often each participant was initiating and/or responding within the 20-minute block. Social initiation and response definitions are included in Table 2. Collection of data on initiating and responding behaviors allowed us to interpret the overall nature and quality of each social interaction beyond simple engagement.

***Quality of interactions.*** Quality of interactions was explored using all the information provided by the behavioral codes. Interactions characterized by extended duration of initiating (without responding) was ranked as the lowest quality of interaction, with Solitary (or no interaction) being the only social behavioral code of lower quality. Next were interactions characterized solely by responding (passively nodding or just listening). The highest quality of interaction was determined to be reciprocal social interaction, defined as the presence of both I (initiation) and R (response) behaviors within the same 10-second interaction. Engagement consisting of both initiating and responding behaviors was defined as the highest quality of social engagement because it most closely resembles the natural give-and-take of typical conversation, and is the type of interaction likely to be desired from employees who interact with the public.

Data on quality of engagement allowed us to see whether it increased, decreased, or remained the same over the course of the program, allowing us to interpret whether the program negatively or positively affected participants' engagement quality. Tracking the quality of engagement also provided information as to how effective the program is in improving individuals' interactions with the public, their coworkers, and their supervisors. This method of

Table 2

## Social Engagement Definitions and Hierarchy, Lowest to Highest

Behavior	Observation Code	Operationalized Definition of Observed Behavior
<i>Behavior Codes</i>		
Solitary	S	Participant is alone, with no attention to other individuals within a radius of approximately three feet, and no mutual eye gaze with others.
Engaged	E	Participant and another individual engage in direct social behavior, being within approximately three feet of the other person with body oriented toward them (e.g., offering objects, conversing, and other activities with a turn-taking structure).
Social Initiation	I	Participant gestures toward or says something to someone in the room or in any way adds to the conversation or activity with another person.
Social Response	R	Participant replies to someone with a gesture (e.g., head nod), makes eye contact, or verbally responds in a conversation (e.g., answering a question).
Initiation & Response	IR	Highest quality of engagement representing the appropriate give-and-take of a reciprocal conversation.
<i>Social Partners</i>		
Peer Mentor	P	Any social engagement with the assigned peer mentor.
Other Participant or Site Facilitator	O	Any social engagement with another participant* or the site facilitator.
Child	C	Any social engagement with a visiting child.
Adult	A	Any social engagement with a visiting adult.

*Note.* \*On some occasions, participants were in groups of two with one peer mentor.



defining and tracking engagement quality is unique to this study and may substantially add to interpretation of the program's effectiveness as opposed to tracking rates of engagement alone.

***Interactions with the public or coworkers.*** To further characterize each social interaction, coders tracked whether social interactions occurred with adults (A), children (C), peer mentors (P), and/or site facilitators or other participants (O) to see who social partners were. A hierarchy of social codes are summarized in Table 2. For the purpose of simplifying interpretation and relating social interactions to a work setting, adults and children were referred to as *the public*. Peer mentors, other participants, or the site facilitator were referred to as *coworkers*. This information allowed us to make inferences as to what type of person the participants were most comfortable interacting with. It was expected that participants would begin the program primarily engaging with coworkers (peer mentors and site facilitators) because of their level of comfort and familiarity with people they had already met or who were designated as helpers. Near the end of the nine-week program, we expected that participant interactions with the public (children and adults) would increase, providing us with information as to how effective the program is in helping participants interact with unfamiliar people.

### **Generalization Probes**

Generalization probes were planned to determine if any effects observed were sustained across time and settings. After completion of the program, all participants were invited to a similar public interface setting to be observed again. Three participants responded and a date was set. Unfortunately, two of the three participants could not make it on that date, leaving only one participant available. The activity took place on the campus of the university, specifically in the student center (student union), where the participant was instructed to run an informational

booth (accompanied by a student researcher as her peer mentor). Data from only one participant were not sufficient for interpretation, so is not reported.

## **Analysis**

**Quantitative analysis.** This study used a multiple single-subject design to track effects of change before, after, and throughout the program. The quantitative analysis consisted of plotting trends in observational data completed by researchers.

**Observational data.** Behavioral codes (E, S, I, R, A, C, and/or O) were tallied up for each observation within five-minute segments of every 20-minute block. A second coder checked for the reliability of data input according to the original coding sheet and made corrections if necessary (double-entry of data). Percentage of time spent engaged (E) and percentages of intervals containing the various levels of quality engagement (I/R, just I or just R, engagement with adults, peer mentors, or children), was calculated for each week and charted across the total weeks observed for each participant. Slope and effect sizes across the nine weeks of participation data were also analyzed to determine effects of change over time in the program. Researchers have found slope and effect size useful in single-case designs in analyzing the overall impact of an intervention (Manolov, Solanas, & Leiva, 2010; Swaminathan, Rogers, Horner, Sugai, & Smolkowski, 2014).

**Qualitative analysis of ESGW reported data.** The Employability Assessment Reports written at intake and the Participant Summary Reports written at outtake by the ESGW program coordinators were collected for 10 de-identified past participants and 6 current participants. Two researchers separately read each pre-and post-intervention report and agreed upon qualitative categories based on similar themes found across reports. The pre-report categories included areas of pre-intervention strengths (i.e., good work ethic; cooperative; friendly; ambitious; and

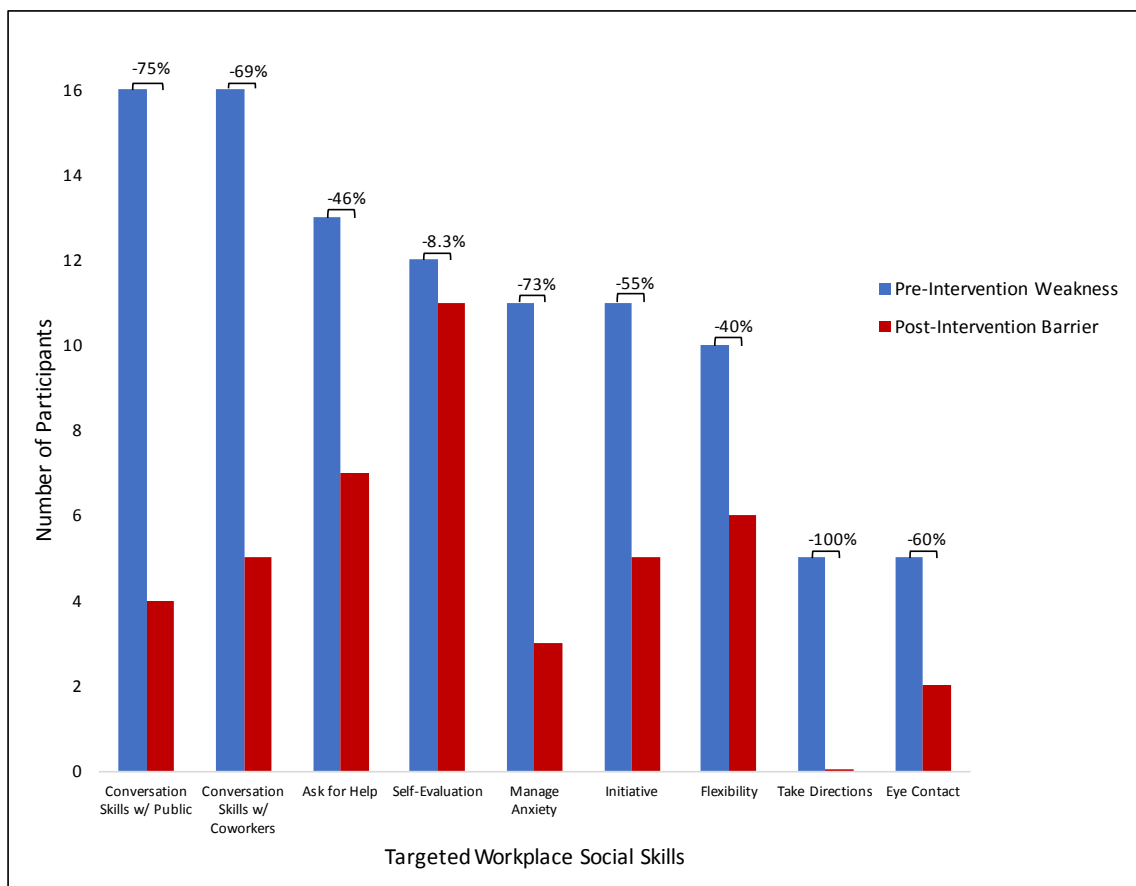
quick learner) and pre-intervention weaknesses (i.e., poor conversation skills with the public; poor conversation skills with coworkers; low eye contact; poor anxiety management; low ability to take directions; low ability to ask for help; low ability to initiate; low flexibility; and low ability to self-evaluate appropriately). The post-intervention report categories included main outcomes related to the pre-intervention inventory of weaknesses—conversation skills with the public; conversation skills with coworkers; eye contact; anxiety management; ability to take directions; ability to ask for help; ability to initiate; flexibility; and ability to self-evaluate appropriately. Additionally, the post-intervention summary identified remaining barriers not changed by the intervention for some participants—in these same categories. Each of the 16 participants' pre-intervention areas of strengths, areas of pre-intervention weaknesses, main outcomes, and remaining barriers was plotted and compared to determine areas of improvement or remaining weaknesses following intervention across all participants.

## CHAPTER 4: Results

### **Qualitative Analysis of ESGW Data**

Skills that showed 50–100% improvement across participants over the course of the intervention included skills related to taking directions, conversation skills with the public, anxiety management, conversation skills with coworkers, eye contact, and showing initiative. Although only five participants struggled with taking directions prior to intervention, all five participants improved in this area (100% improved). Conversation skills with the public and conversation skills with coworkers were targeted social skills that all 16 participants struggled with prior to the program intervention; however, these were also the areas that showed greatest improvement, with only four and five continuing to struggle after the program (75% showing improved with the public and 69% showing improvement with co-workers). Eleven participants struggled with managing anxiety prior to the program and only three continued to struggle after the program, 73% improved. Five participants had weaknesses with making appropriate eye contact prior to the program and two continued to struggle after the program (60% improved). Likewise, 11 participants have pre-intervention weaknesses with showing initiative, yet five continued to struggle in this area after the program (55% showing improvement).

Skills showing improvement for fewer than 50% of participants included asking for help, flexibility, and self-evaluation. Thirteen participants had a pre-intervention weakness with asking for help, and seven participants continued to have this weakness after the program (46% improvement). Flexibility was an area that 10 participants had a pre-intervention weakness in, and 6 continued to struggle in this area (40% improved). Additionally, 12 participants struggled with self-evaluation prior to the program, and 11 continued to struggle in this area, indicating an area of least improvement across participants at 8.3%.



*Figure 1.* Number of participants with pre- and post-intervention skill deficits. Improvement is indicated by a decreased number of participants who continued to struggle with the targeted workplace social skill. Data labels at the top of each bar indicates the percent of improvement for that social skill across participants.

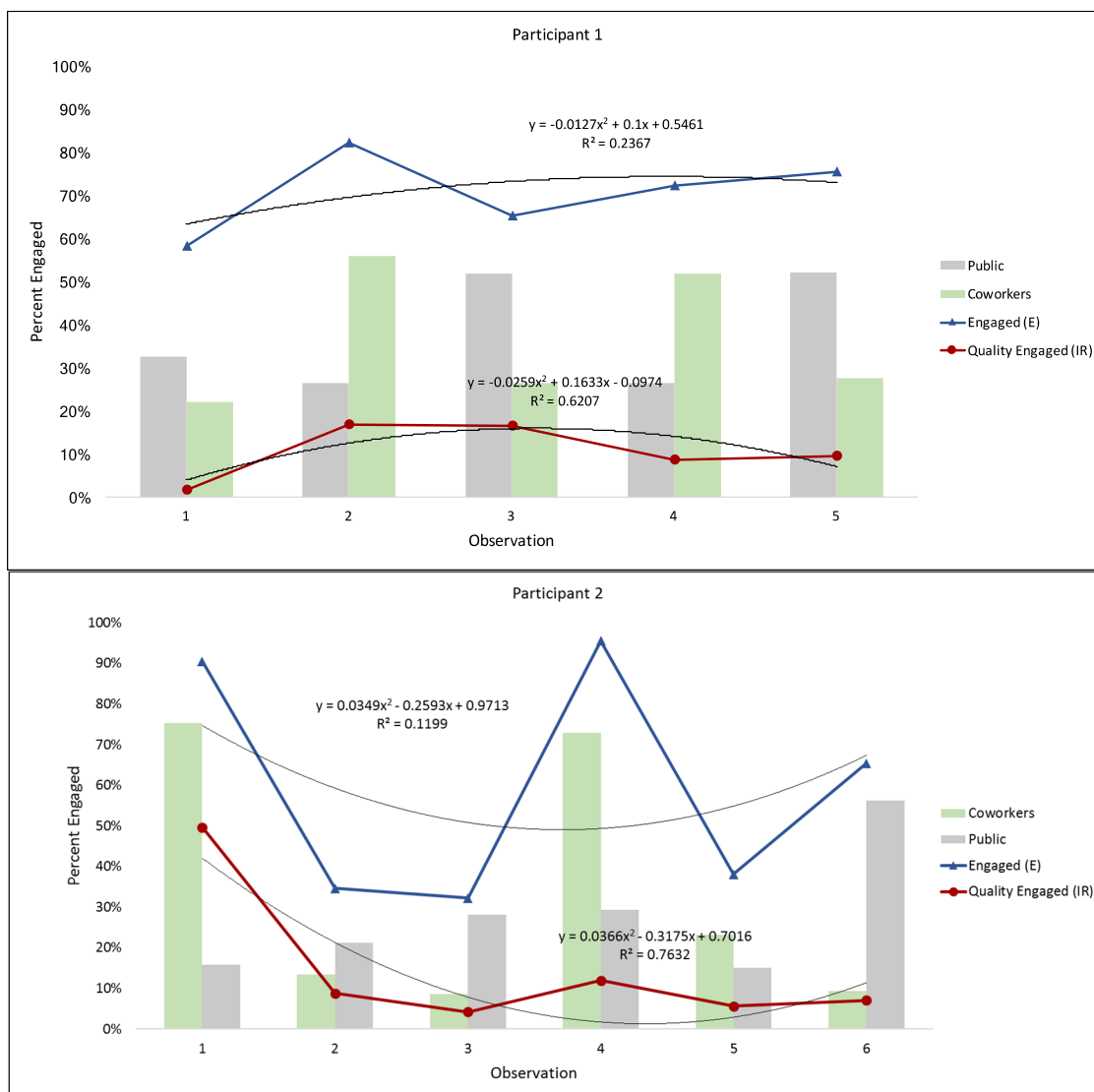
## Observational Data

Participants were observed for 5-7 weeks, typically beginning in the second or third week (once consent was obtained) and concluding in the ninth week of intervention. Figures 4, 5, 6, and 7 show individual trends throughout the intervention for each participant. Since ESGW assigned participants to locations according to social skill level assessed during intake, figures also appear in order of location (i.e., various museum or aquarium sites A, B, C, and D).

Participants 1-8 were located at museums A, B, and C, while participants 9 and 10 were assigned to museum D.

**Museum Site A.** Both participant 1 and 2 volunteered at museum site A. Unlike participant 2, participant 1 showed increases in both level of engagement and quality of engagement, suggesting that he improved over the course of the program. Trends in engagement followed increases in engagement with coworkers and were much higher than quality of engagement (e.g., 80% vs 17%), suggesting that his interactions with his coworkers tended to be one-sided; however, engagement and quality of engagement remained steady whether participant 1 was engaged with the public or his coworkers, implying that engagement and quality of engagement remained the same no matter who he interacted with.

Participant 2 had greater variability in engagement across the six observations. The trend of engagement appears to follow the percent of engagement with coworkers except for the last observation, where public engagement was higher. This suggests that participant 2 has little trouble engaging with the public or coworkers. Participant 2's conversational style was to repeatedly ask questions of conversational partners, which was technically within the definition of I/R, turn taking in both initiating and responding. This behavior became less prevalent over time but increased again in observation 4 after a week's absence.



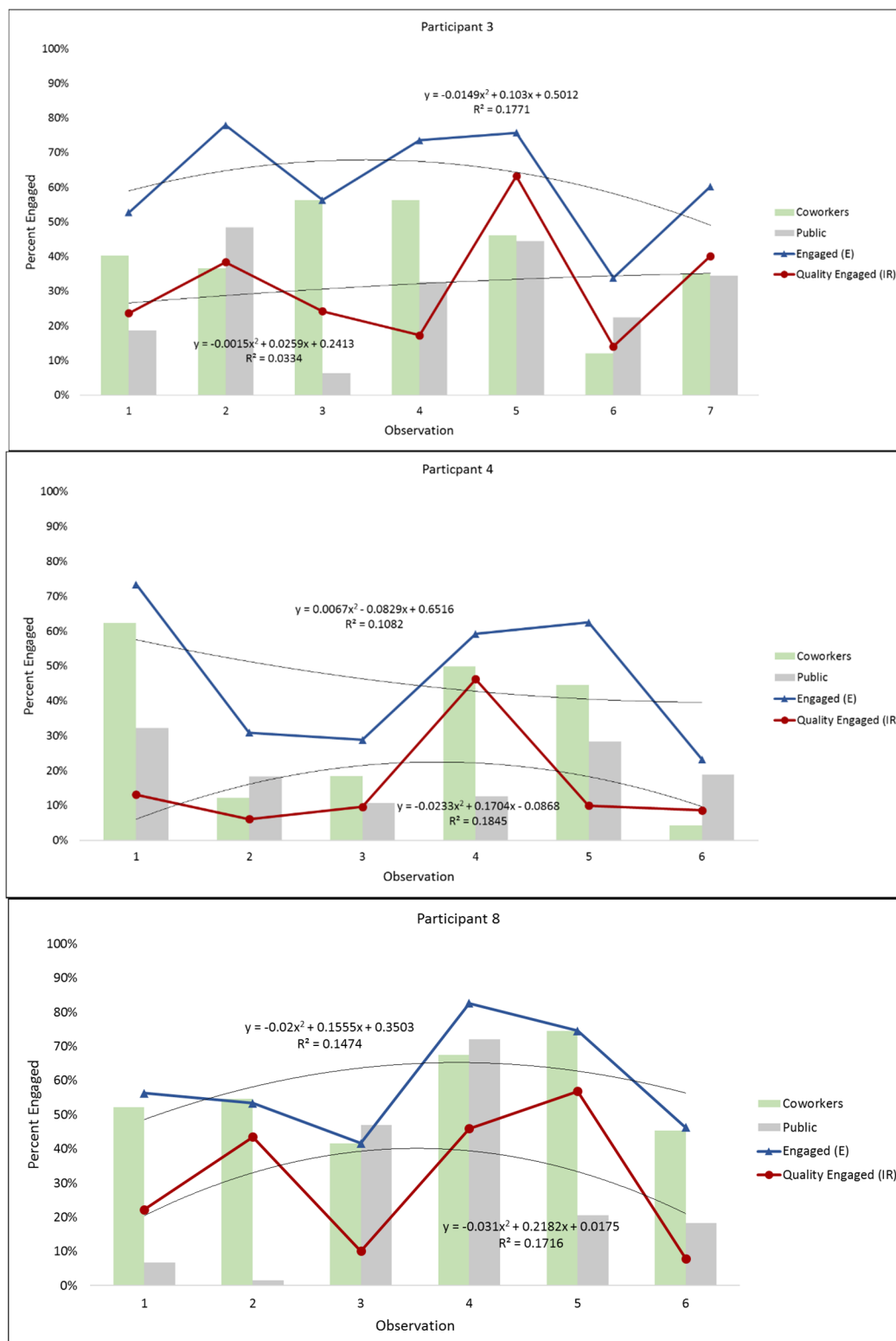
*Figure 2.* Museum Site A. Observational coding of participant 1 and 2, including percent of engagement and quality of engagement (both initiating and responding) with slope ( $m$ ) and effect size ( $R^2$ ), and engagement with peer mentor and the public. Observations were at least one week apart.

**Museum Site B.** Participants 3, 4, and 8 were grouped based on existing social strengths and assigned to museum site B. Trends in engagement for participants 4 and 8 mirror their percent of engagement with coworkers. This may indicate that their interactions with coworkers are either somewhat one-sided or they depend on their coworkers to initiate interactions. On the other hand, engagement for participant 3 mirrors his percentage of engagement with the public.

This suggests that he spent most of his interaction time with the public. Although participant 3's interactions with the public tended to be one-sided, trends in quality of engagement appear to follow closely with his percent of public engagement in the majority of observations.

Participants 3 and 8 followed similar trends across observations with quality of engagement between 10 and 40%. Both portray a large spike during observation 5, and dramatically drop during observation 6. It is important to note that participants 3 and 8 were in separate cohorts that volunteered at the museum during different times of the year, so no single event or other environmental factor is likely to be responsible for the abrupt change. Similar trends are also seen with participant 4, but with the spike occurring on observation 4 and dropping off during observation 5. The trends in percent of engagement with coworkers were also elevated compared to engagement with the public. These similar trends in quality for participants 3, 4, and 8 may suggest that either the participant felt more comfortable with his/her peer mentor and could carry on a more typical back and forth conversation (as seen with participants 4 and 8), or the increased engagement with both the public and peer mentor lead to increased quality conversations (as seen with participant 3). Attendance figures at the sites were Not made available, so relative opportunities for conversation with visitors (public) were not able to be determined.



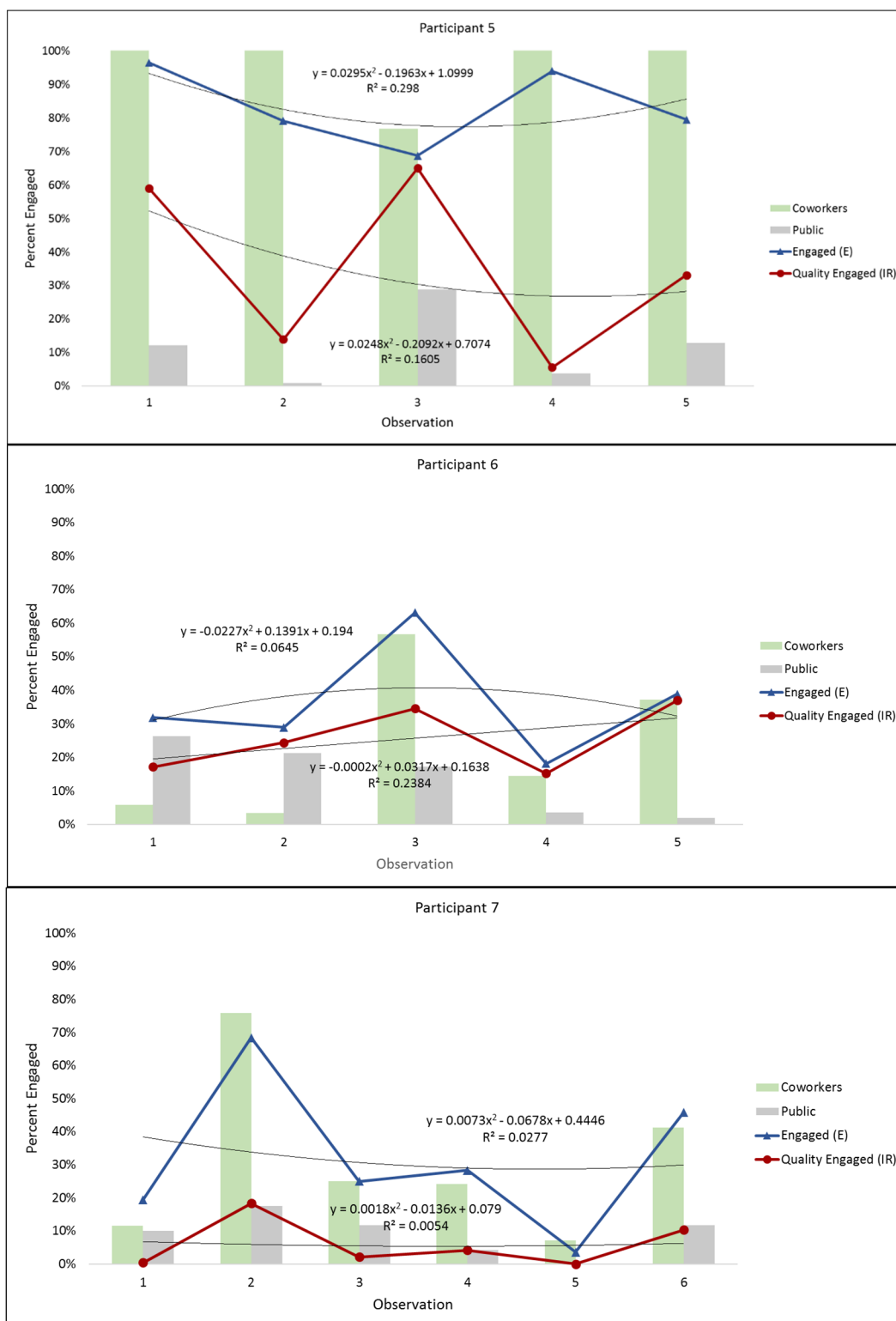


*Figure 3.* Museum Site B. Observational coding of participant 3, 4 and 8, including percent of engagement and quality of engagement (both initiating and responding) with slope ( $m$ ) and effect size ( $R^2$ ), and engagement with peer mentor and the public. Observations were at least one week apart.

**Museum Site C.** Participants 5, 6, and 7 were grouped based on museum site C. Trends in engagement for all three participants followed their percent of engagement with coworkers. As engagement with coworkers rises and falls, so do their percent of overall engagement. This again suggests that interactions with coworkers are either one-sided or they depend on their coworkers to initiate interactions. Trends in quality of engagement, however, appear to either mirror the participants' engagement with their coworkers or the public.

Participant 5's trends in quality of engagement suggest better quality occurred with a combination of increased public interaction and reduced peer interaction. On the other hand, participant 6 appears to follow the opposite trend, indicating greater social engagement with his coworkers leads to greater quality of engagement. It is unclear whether participant 7's quality of engagement is affected by engagement with coworkers or by the public; however, it could be argued that an increase of both engagements with coworkers and the public leads to greater quality of engagement for participant 7.

The setting for participants 5, 6, and 7 may have had some effect on their engagement with the public. Because museum site C was in an outdoor setting, families enjoyed activities primarily during the day when the weather was warmer. The shifts the participants were working were in the early evening hours, which resulted in fewer visitors to museum site C during the participants' time there. The museum site C setting was chosen by ESGW for these three participants based on their beginning levels of social skills, which were not as advanced as the other participants.

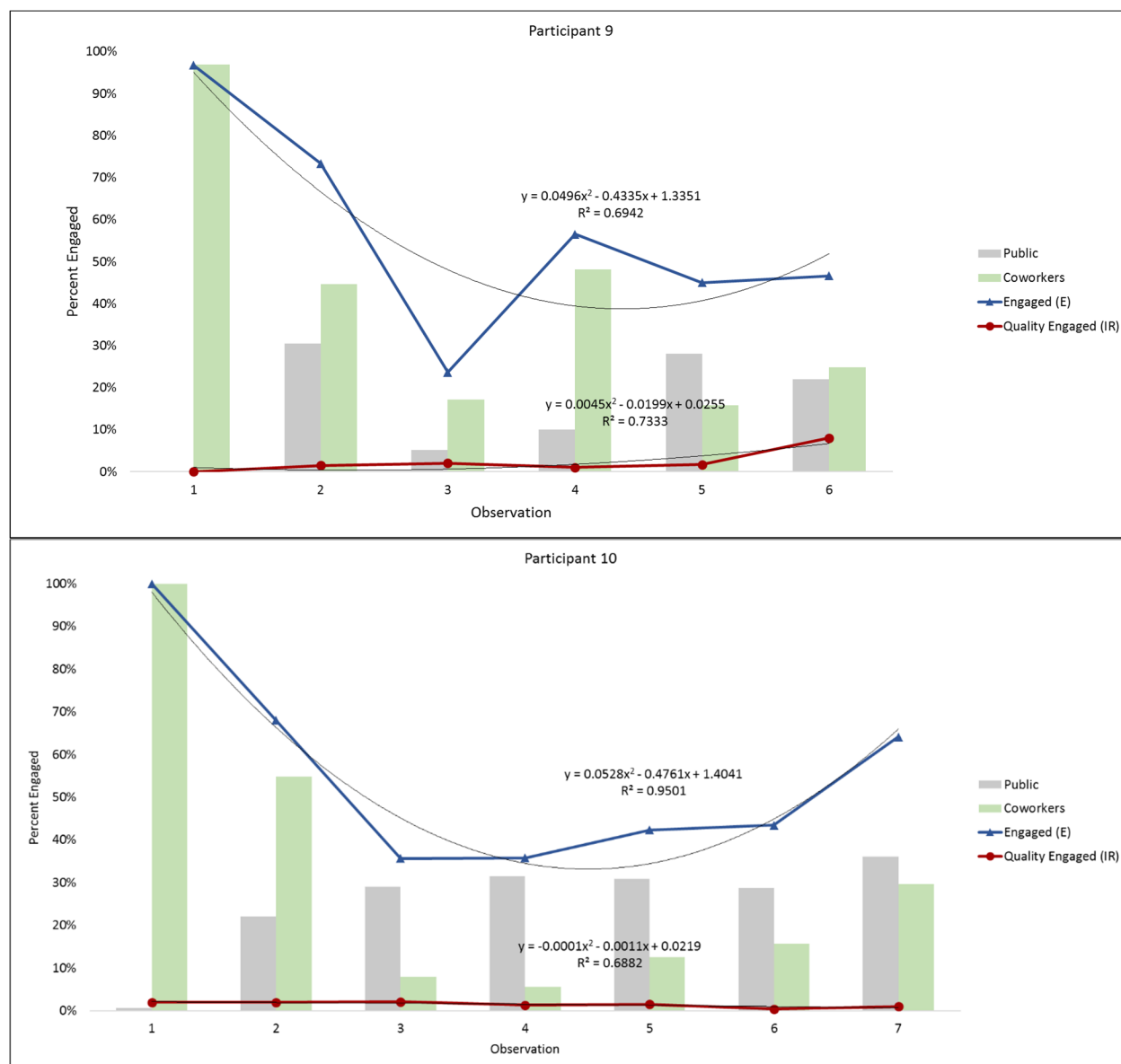


*Figure 4.* Museum Site C. Observational coding of participant 5, 6 and 7, including percent of engagement and quality of engagement (both initiating and responding) with slope ( $m$ ) and effect size ( $R^2$ ), and engagement with peer mentor and the public. Observations were at least one week apart.

**Museum Site D observations.** Both participant 9 and 10 began the program with high engagement, yet low quality of engagement. Reasons for this may be due to the atmosphere within the first two days where participants underwent job orientation where they primarily listened and responded during tours of the facility and instruction on facts about the animals; therefore, opportunities for initiating may have been limited and possibly unwelcome.

Subsequent observations for participant 9 and 10 show a decrease in overall engagement that closely mirrors their percent of engagement with coworkers. Based on these trends, it is estimated that both participant 9 and 10 relied greatly on their peer mentors or site facilitators to initiate social interactions, causing the engagement trends to follow closely. Although this may have been the case, participant 9 improved in the quality of engagement with more level engagement with coworkers and the public near the last observation. The improved quality may suggest that participant 9 began feeling more comfortable approaching the public or coworkers and carrying on a more natural conversation. On the other hand, quality of engagement for participant 10 remained close to zero percent, suggesting little development in the skill of carrying on a back-and-forth conversation. Engagement with the public also remained level for participant 10, suggesting possible struggles to approach visitors, but also possible difficulty maintaining the conversation after sharing information about the animal displays.

Outside of these observations, it is also important to note that there may have been some site effects on engagement levels at museum site D, because of the higher foot traffic and a more overwhelming sensory environment. Other effects may have also stemmed from being assigned peers who were museum site D employees new to the intervention, who had separate work-related responsibilities of their own. These peer mentors had not received any peer mentor training before the intervention began.



*Figure 5.* Museum Site D. Observational coding of participant 9 and 10, including percent of engagement and quality of engagement (both initiating and responding) with slope ( $m$ ) and effect size ( $R^2$ ), and engagement with peer mentor and the public. Observations were at least one week apart.

## CHAPTER 5: Discussion

An intervention program including peer support, adult coaching, same-day feedback, and self-evaluation in a real work environment may positively increase social skills to better prepare individuals with ASD to obtain and keep competitive employment. The Peer Connections' vocational setting and peer mentors offer a unique approach to social skills intervention that may more accurately mirror a realistic work environment with coworkers than direct instruction approaches held in classrooms or clinics.

Post-intervention improvements in social skills were shown through qualitative reports from ESGW coordinators and site facilitators and on-site behavioral coding conducted by impartial observers. A combination of the two data sources suggest that the majority of participants improved in some social skills throughout the intervention; however, the degree of improvement was smaller in participants who had higher levels of pre-existing social skills.

Specific social skill gains varied somewhat by individual. Trends in observational data indicate that increased interactions with the public improved the overall quality of social interactions for many of the participants. This may suggest that social skills improve when individuals are working outside the comforts of familiarity and must continually adjust to new social partners. Although this may be the case, each participant had opportunities to interact with the public at varying rates after the first week of orientation; therefore, it is hard to know whether greater social interaction with coworkers, as opposed to the public, was by choice or if this was because fewer visitors were nearby. Additionally, site effects and peer effects (overwhelming sensory environment and lack of peer mentor training and experience) may have also influenced the quality of the intervention program for some individuals and likewise the outcomes within the observational data.

Within the qualitative reports, taking directions, anxiety management, and eye contact are areas that showed the most improvement. These are skills that may have been more readily acquired because they entail following a list of concrete rules (e.g., breathing strategies when anxious or remembering to look people in the eye). The fact that self-evaluation and flexibility showed the least improvement supports the notion that these are skills requiring more abstract thought and an ability to self-reflect, both of which are barriers for individuals with ASD (Barry et al., 2003; Higgins et al., 2007). Although these are important social skills in the workplace, they are also key diagnostic indicators, suggesting that they are characteristics that would require extensive therapy in coping strategies if they are to change, more than skills to be acquired with practice.

Overall findings suggest that those participants with higher autism traits prior to the intervention showed greater improvement throughout the coding observations. Likewise, those who entered the intervention with fewer deficits showed less improvement; however, it appears they still benefited from the intervention.

### **Limitations**

Completing recruitment in a timely manner after the intervention began proved to be an obstacle. Communication issues that often arise in community-based research were present between ESGW and the study team, and data collection was often delayed until participant consent was obtained, up to three weeks into the program. Because initial contact with participants was during their first week in the program, collecting baseline data was not an option. This limited the ability to get objective data regarding participant abilities before the intervention began.

It is possible that initially, the observation data collection may have included some effects caused by reactivity to the presence of the researchers; however, observations continued for several weeks, and observers reported that participants appeared to forget about being observed. Early data points may have been affected somewhat, with more genuine levels of social interaction seen in later weeks.

Limitations in the study due to inconsistent communication, participant transportation (i.e., struggles finding consistent transportation to museum sites), and follow-through with participants (e.g., contacting participants after the study for generalization purposes) are illustrative of some of the challenges inherent in working with individuals and the daily challenges of a disability. Because the autism population is so diverse, prediction of how well this study will generalize across future program participants is unclear.

Finally, logistical difficulties arose during this study that prevented final observational data collection for some participants. This suggests that trends in those participants' engagement and quality of engagement could have potentially stabilized or improved up through the ninth week but were not recorded.

### **Program Recommendations**

Suggestions were compiled as a reference for future implementation, the first of which has to do with program length. Although observations were not recorded for each of the nine weeks, there was great variability across several participant observations. Additionally, several participant engagement and quality of engagement performance data appeared to lack consistent positive or negative trends, which may suggest that the length of the program is not sufficient for consistent change to occur. Four of the 10 participants were showing slight increasing trends in quality of interactions beginning within the last three weeks of intervention and may have



showed more consistent increases if the intervention had been longer in duration. Other social skills program for the same population (e.g., evidence-based social skills programs like PEERS® for Young Adults) run for at least once a week for 14-weeks (Gantman, Kapp, Orenski, & Laugeson, 2012). This suggests that the Peer Connections program could benefit from extending its length five more weeks in addition to the established nine.

The program may also benefit from peer mentor training. Since participants were paired up with current employees at museum sites A, B, C, and D who volunteered to be peer mentors, many of them appeared inattentive and did not always adequately facilitate engagement. Inconsistent peer engagement among participants may have also had an effect on observational data outcomes and trends. Studies like Laushey and Heflin (2000) found that offering typical peer training before social engagement significantly improved appropriate social interactions for the individuals with autism. This may also prove to be true for improving workplace social skills.

In addition to peer training, consistency across pre-intervention weaknesses and post-intervention strengths, along with follow-up to collect data regarding employment after participation in the program would add to the interpretation of program effectiveness. Only the pre-intervention weaknesses and post-intervention strengths that aligned were included in this study; however, more data could have been gathered with more consistency across reports. More consistent reports could also assist in creating intermediate actions and interventions. Follow-up to gather data about job acquisition after completing the program would also indicate how well participants were being prepared throughout the program for workplace interactions.

In addition to the recommendations for the Peer Connections program, we are optimistic that this study may add to a growing body of research on social skills and vocational skill

development intervention to improve the quality of life for individuals with ASD. More research to create an evidence base for helping individuals with ASD to find and keep meaningful and fulfilling jobs is needed.

## **Conclusions**

The ESGW Peer Connections program fills an important gap in social skills interventions for transition age youth and young adults with autism. The training model of assessment, goal setting, peer mentoring, and self-evaluation resulted in multiple sources of evidence showing some improvement in social engagement and quality of engagement for many participants. Participants with higher levels of conversation and social skills did not show the same magnitude of improvement, perhaps because of a different setting (less mentoring, more supervision) or because of their pre-existing skill sets. Benefits from the program (experience in a work setting with supervision) may still be possible, however. It is recommended that the program extend beyond the current nine-week session to at least 14-weeks or longer (similar to other social skills intervention programs) to show stability and generalization of gains. If this model of vocational social skills intervention becomes more widespread, it could have the potential of increased work involvement and satisfaction for individuals with autism.

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## APPENDIX A: Observational Coding Sheet

Participant ID (not real name) \_\_\_\_\_ Date \_\_\_\_\_ Location \_\_\_\_\_

Coder Name \_\_\_\_\_

Special Notes \_\_\_\_\_

Start Time:	0:0 – 0:10	:11 - :20	:21 - :30	:31 - :40	:41 - :50	:51 - :60	Notes
0:00 – 1:00							
1:01 – 2:00							
2:01 – 3:00							
3:01 – 4:00							
4:01 – 5:00							
5:01 – 6:00							
6:01 – 7:00							
7:01 – 8:00							
8:01 – 9:00							
9:01 – 10:00							
10:01 – 11:00							
11:01 – 12:00							
12:01 – 13:00							
13:01 – 14:00							
14:01-15:00							
15:01 – 16:00							
16:01 – 17:00							
17:01 – 18:00							
18:01 – 19:00							
19:01 – 20:00							

S = Solitary = no face or body orientation to anyone else, no one within 3 feet, no activity or conversation occurring between at least 2 people

E = Engaged with another = face or body oriented and within 3 feet, some activity or conversation occurring between at least 2 people

I = initiated social contact = gestured or said something to someone in the room

R = Responded to social contact = replied with a gesture, eye contact, or conversation

A = Engaged with adult

C = Engaged with child or adolescent

P = Engaged with Peer Mentor

O = Engaged with other participant, or the Site Facilitator

N/O = No opportunity for social interaction – no one is around.

## APPENDIX B: ESGW Employability Assessment Report

**Employability Assessment Report****Student Name:****Date of Report:****Description of the Student:****Reason for Referral:****Assessment Tools Used:**

- PEERS Application
  - References from Parent and School Counselor
- Student Self-Report:
  - Learning Channels Worksheet
  - Interest Interview Worksheet
  - Transition Questionnaire
  - Sensory Preference Checklist
  - Assessment Statements for Student
- Parent Report:
  - Transition Questionnaire
  - Assessment Statement for Parent

- Student Interview
  - Role Playing
  - Problem Solving Worksheet
- Observation in a work setting

**Educational Plans/Needs and Work History:**

**Motivational Factors:**

**Social Assessment:**

**Transportation Assessment:**

**Time Management Assessment:**

**Interest Assessment:**

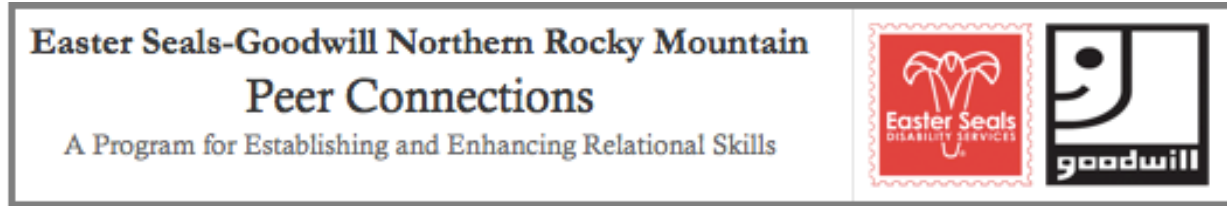
**Parent Report:**

**Job Site Observation Summary:**

**Recommendations for PEERS:**

**Life Skills Restoration Needs:**

APPENDIX C: ESGW Program Summary Report



**Program Summary Report**

**Student Name:**

**Date of Report:**

**Program Summary:**

**Outcomes:**

**Improving Skills:**

**Barriers to work:**

**Accommodations and Strategies that Work:**

**Recommendations:**

## APPENDIX D: Consent Forms

## Adult Peer Consent

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### Introduction

This research study is being conducted by Terisa P. Gabrielsen, PhD in school psychology, and Haley A. Thomas, graduate student in school psychology, at Brigham Young University (BYU) to evaluate how well the Easter Seals Goodwill Northern Rocky Mountains Peer Connections program improves workplace social skills for individuals with high functioning autism spectrum disorder (ASD). You were invited to participate because you are currently a peer in the Easter Seals Peer Connections program.

### Procedures

If you agree to participate in this research study, the following will occur:

- We will ask for access to copies of the feedback and observations that you will be filling out for the Peer Connections program.
- A student from BYU will observe your assigned student and the other students in the program each time you do peer volunteer work.
- You will not have to do anything outside of the regular peer requirements for the Peer Connections program.

### Risks/Discomforts

There are no risks by participating in this study.

### Benefits

There will be no direct benefits to you for participating. It is hoped, however, that through your participation, researchers may learn about whether or not peer support, adult coaching, feedback, and self-evaluation in a real work environment positively increase social skills in the workplace for individuals with ASD and whether these skills are retained and generalizable in different work settings.

### Confidentiality

We will not use any personal information about you, other than age and gender. Additionally, the research data will be kept in a secure location and only the researcher will have access to the data. At the conclusion of the study, the data will be kept in a safe location with Easter Seals.

### Compensation

There will be no compensation for participation in this project.

### Participation

Participation in this research study is voluntary. You have the right to withdraw at any time or refuse to participate entirely without jeopardy to your participation in the Easter Seal's Peer Connection program or any other penalty.

**Questions about the Research**

Please direct any further questions about the study to Haley Thomas at [haleythomas@byu.edu](mailto:haleythomas@byu.edu) or (808) 351-7830 or Terisa Gabrielsen at [terisa\\_gabrielsen@byu.edu](mailto:terisa_gabrielsen@byu.edu).

**Questions about Your Rights as Research Participants**

If you have questions regarding your rights as a research participant contact IRB Administrator at (801) 422-1461; A-285 ASB, Brigham Young University, Provo, UT 84602; [irb@byu.edu](mailto:irb@byu.edu).

**Statement of Consent**

I have read, understood, and received a copy of the above consent and desire of my own free will to participate in this study.

Name (Printed): \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

I give my permission for BYU researchers (Terisa Gabrielsen and Haley Thomas) to access data collected by Easter Seals Goodwill Rocky Mountains about my participation in the Peer Connections Program.

Parent Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

# Parental Participant Permission

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## Introduction

This research study is being conducted by Terisa P. Gabrielsen, PhD in school psychology, and Haley A. Thomas, graduate student in school psychology, at Brigham Young University (BYU) to evaluate how well the Easter Seals Goodwill Northern Rocky Mountains Peer Connections program improves workplace social skills for individuals with high functioning autism spectrum disorder (ASD). Your child was invited to participate because he or she is currently in the Easter Seals Peer Connections program.

## Procedures

If you agree to let your child participate in this research study, the following will occur:

- A student from BYU will observe your child's volunteer work time and take basic notes on social interactions.
- We will ask for your permission to analyze questionnaires, notes, and feedback given by Easter Seals as part of your child's participation in Peer Connections.
- Outside of regular Easter Seal's assessments, you will be asked to evaluate your child's social behavior so that we can track his/her social skill gains or losses. The questionnaires will take around twenty (20) minutes each time and are administered online. Questions include a rating of 1 to 4 that best describes your child's behavior, such as, "Avoids eye contact or has unusual eye contact" or "Is able to imitate others' actions."
- We may ask that the online questionnaires be completed three or more times over the course of the nine-week program.
- The questionnaire will be accessible online and can be taken at a time that is convenient for you.
- Your child will be administered an IQ test (about 2 hours) and an autism assessment (about 1 hour) at BYU at some point during the study.
- After your child has completed Peer Connections, he or she will be invited to participate in a similar activity (such as staffing a booth at a BYU location) to evaluate generalization of skills learned in Peer Connections (about 1 hours).
- Your total time commitment will be about 5 hours.

## Risks

There is a risk of loss of privacy, which the researcher will reduce by not using any real names or other identifiers in the written report. The researcher will also keep all data in a locked office in a secure location. Only the researcher will have access to the data. At the end of the study, data will be given to East Seals. Additionally, there may be some discomfort caused by the length of tests or some of the questions. Your child may answer only those questions that he/she wants to, or your child may stop the entire process at any time without affecting his/her standing in the program.

## Confidentiality

The research data will be kept in a secure location and only the researcher will have access to the data. At the conclusion of the study, all identifying information will be removed and the data will be kept in a safe location with Easter Seals.



**Benefits**

There are no direct benefits for your child's participation in this project. It is hoped, however, that through your child's participation researchers may learn about whether or not peer support, adult coaching, feedback, and self-evaluation in a real work environment positively increase social skills in the workplace for individuals with ASD.

**Compensation**

There will be no compensation for participation in this project.

**Questions about the Research**

Please direct any further questions about the study to Haley Thomas at [haleythomas@byu.edu](mailto:haleythomas@byu.edu) or (808) 351-7830 or Terisa Gabrielsen at [terisa\\_gabrielsen@byu.edu](mailto:terisa_gabrielsen@byu.edu).

Questions about your child's rights as a study participant or to submit comment or complaints about the study should be directed to the IRB Administrator, Brigham Young University, A-285 ASB, Provo, UT 84602. Call (801) 422-1461 or send emails to [irb@byu.edu](mailto:irb@byu.edu).

You have been given a copy of this consent form to keep.

**Participation**

Participation in this research study is voluntary. You are free to decline to have your child participate in this research study. You may withdraw you child's participation at any point without any form of penalty to you or your child.

Child's Name: \_\_\_\_\_

Parent Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

I give my permission for BYU researchers (Terisa Gabrielsen and Haley Thomas) to access data collected by Easter Seals Goodwill Rocky Mountains about my child's participation in the Peer Connections Program.

Parent Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

# Adult Participant Consent

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## Introduction

This research study is being conducted by Terisa P. Gabrielsen, PhD in school psychology, and Haley A. Thomas, graduate student in school psychology, at Brigham Young University (BYU) to evaluate how well the Easter Seals Goodwill Northern Rocky Mountains Peer Connections program improves workplace social skills for individuals with high functioning autism spectrum disorder (ASD). You were invited to participate because you are currently in the Easter Seals Peer Connections program.

## Procedures

If you agree to participate in this research study, the following will occur:

- A student from BYU will observe your volunteer work time and take basic notes on social interactions.
- We will ask for your permission to analyze questionnaires, notes, and feedback given by Easter Seals as part of your participation in Peer Connections.
- Outside of regular Easter Seal's assessments, you will be asked to evaluate your own social behavior so that we can track your social skill gains or losses. The questionnaire will take about twenty (20) minutes each time and is administered online. Questions include a rating of 1 to 4 that best describes your own behavior, such as, "I am usually aware of how others are feeling" or "I am overly sensitive to certain sounds, textures, or smells."
- The questionnaire will be accessible online and taken at a time and location convenient for you.
- We may ask that the online questionnaire be completed two or more times over the course of the nine-week program.
- You will be administered an IQ test (about 2 hours) and an autism assessment (about 1 hour) at BYU at some point during the study.
- After you have completed Peer Connections, you will be invited to participate in a similar activity (such as staffing a booth at a BYU location to answer questions about Thanksgiving Point or the Living Planet Aquarium, whichever location you have experience with) to evaluate generalization of skills learned in Peer Connections (about 1 hour).
- Total time commitment will be 5-6 hours.

## Risks/Discomforts

We do not anticipate any risks for participating other than those encountered in daily life. Although the risk is low, you may be slightly uncomfortable sitting in the chair while being assessed; however, this wouldn't be any different than the other assessments during your participation in the Peer Connections program.

You will be given the option to ask the experimenter to clarify any confusion if you have any.

## Benefits

There will be no direct benefits to you. It is hoped, however, that through your participation researchers may learn about whether or not peer support, adult coaching, feedback, and self-evaluation in a real work environment positively increase social skills in the workplace for individuals with ASD.

**Confidentiality**

Data in the experiment will not be linked to any identifying information regarding the identity of the participants. Additionally, the research data will be kept in a secure location and only the researcher will have access to the data. At the conclusion of the study, any identifying information will be removed and the data will be kept in a safe location with Easter Seals.

**Compensation**

There will be no compensation for participation in this study.

**Participation**

Participation in this research study is voluntary. You have the right to withdraw at any time or refuse to participate entirely without jeopardy to your participation in the Easter Seal's Peer Connection program or any other penalty.

**Questions about the Research**

Please direct any further questions about the study to Haley Thomas at [haleythomas@byu.edu](mailto:haleythomas@byu.edu) or (808) 351-7830 or Terisa Gabrielsen at [terisa\\_gabrielsen@byu.edu](mailto:terisa_gabrielsen@byu.edu).

**Questions about Your Rights as Research Participants**

If you have questions regarding your rights as a research participant contact IRB Administrator at (801) 422-1461; A-285 ASB, Brigham Young University, Provo, UT 84602; [irb@byu.edu](mailto:irb@byu.edu).

**Statement of Consent**

I have read, understood, and received a copy of the above consent and desire of my own free will to participate in this study.

Name (Printed): \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

I give my permission for BYU researchers (Terisa Gabrielsen and Haley Thomas) to access data collected by Easter Seals Goodwill Rocky Mountains about my participation in the Peer Connections Program.

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Youth Participant Assent (15-17 years old)

### **What is this study about?**

This research study is being conducted by Terisa P. Gabrielsen, PhD in school psychology, and Haley A. Thomas, graduate student in school psychology, at Brigham Young University (BYU) to see how the Easter Seals Goodwill Northern Rocky Mountains Peer Connections program improves workplace social skills. You were invited to participate because you are currently in the Easter Seals Peer Connections program.

### **What am I being asked to do?**

If you agree to be in this research study, the following will occur:

- A student from BYU will observe you and the other students in the program each time you do your volunteer work.
- We may also ask you to take a few tests at the beginning of the program. One of the tests lasts about 90-120 minutes. The other one is about 60 minutes. If you do these the same day, it will take about 3-4 hours. You can do them on different days if you wish.
- Don't worry, they aren't hard tests, most people enjoy them, and you will be able to ask for clarifying questions if you need to.
- We will ask for your permission to look at questionnaires, notes, and feedback given by Easter Seals as part of your participation in Peer Connections.
- You will also be asked to do a short activity on BYU's campus after you finish with Peer Connections. You will be at a table or booth with other people who have been to Peer Connections, answering questions about the places you worked at either Thanksgiving Point or the Living Planet Aquarium. This is not a formal talk. You will just be answering questions that people may ask as they walk past your table or booth. This may take about 1 hour.
- Total time commitment will be 5-6 hours.

### **What are the benefits to me for taking part in the study?**

Taking part in this research study may not help you directly, but it might help us learn how to help other people like you to have better social skills in their future jobs.

### **Can anything bad happen if I am in this study?**

We think there are a few risks to you by being in the study, such as some kids might become bored or worried because of some of the questions we ask. You don't have to answer any of the questions you don't want to answer. If you become upset, let us know and we will have a staff member you are comfortable with or a parent, if they are available, help you with those feelings.

### **Who will know that I am in the study?**

We won't tell anybody that you are in this study and everything you tell us and do will be private. Your parent will know that you are in the study, but we won't tell them anything you said or did. When we tell other people or write articles about what we learned in the study, we won't include your name or anyone else's who took part in the study.

**Do I have to be in the study?**

No, you don't. The choice is up to you. No one will get angry or upset if you don't want to do this. You can change your mind anytime if you decide you don't want to be in the study anymore.

**What if I have questions?**

If you have questions at any time, you can ask us and you can talk to your parents about the study. We will give you a copy of this form to keep. If you want to ask us questions about the study, contact Haley Thomas at [haleythomas@byu.edu](mailto:haleythomas@byu.edu) or (808) 351-7830 or Terisa Gabrielsen at [terisa\\_gabrielsen@byu.edu](mailto:terisa_gabrielsen@byu.edu).

You will not receive any form of compensation for being in this research study.

If you want to be in this study, please sign and print your name.

Name (Printed): \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

I give my permission for BYU researchers (Terisa Gabrielsen and Haley Thomas) to access data collected by Easter Seals Goodwill Rocky Mountains about my participation in the Peer Connections Program.

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_