EVALUATING THE EFFECTIVENESS OF THE SOCIAL THINKING

INTERVENTION TO INCREASE SOCIAL RESPONSIVENESS OF ADOLESCENTS

AND YOUNG ADULTS WITH ASPERGER SYNDROME: A MIXED METHODS

APPROACH

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ABSTRACT

This mixed methods study evaluated the effectiveness of the Social Thinking intervention in teaching social cognitive skills to adolescents and young adults with Asperger Syndrome. Three adolescents boys attending high school institutions in Maui participated in this study and the results showed that the intervention had medium magnitude of effect in the participants' social cognitive skill development. In addition, parents noted that the participants improved in their social responsiveness towards their family members by the conclusion of the study. While sustaining their skills in novel environments (working as farm helpers) and with new acquaintances (co-workers) was difficult, the participants were able to use their new skills to engage successfully in their social interactions both with their families and their co-workers, which resulted in positive social experiences. Overall, the participants reported that they enjoyed their participation in the study, and the resulting positive social experiences.

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CHAPTER I

INTRODUCTION

Sam [an individual with Asperger syndrome]…had worked at the

local supermarket for four years. He was a competent bagger,

complimented by customers and cashiers alike for his quick and safe

handling of delicate items. He was never late for work, and he willingly

took on those dreaded Saturday evening shifts.

Wanting to reward Sam for his diligence, the store manager began

to encourage him to learn the cashier's role. Every time Sam got behind

the cash register, he became anxious and irritable. Interpreting Sam's

behavior as simply a lack of confidence, the manager kept encouraging

him to try again. Nevertheless, each encouragement just left Sam feeling

more panicky. He didn't want to have to deal directly with customers,

especially when they had been waiting in a long line! But he also didn't

want to make his manager mad (Bolick, 2001, p. 167).

In this situation, Sam became anxious and irritable when working in his new job

as a cashier. He was unable to respond appropriately, nor was he able to decode his

supervisor's intention to promote Sam. and to provide him with a better opportunity for

advancement. In addition, his new job required him to interact with unpredictable

customers, a situation that he had difficulty managing. He did not know how to respond

to the mental and emotional states of the customers, which caused him to feel anxious

and he panicked when he was at the cashier station. Sam didn't realize that his manager

misunderstood his feelings about his new job because of his non-verbal messages

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(seemingly anxious, irritable and panicky). He did not communicate his feelings to his manager in a manner that his manager could understand Sam's dilemma (Winner, 2007).

Individuals diagnosed with Asperger syndrome (AS) and High Functioning Autism (HFA) often experience similar dilemmas in social situations at work (Chadsey & Beyer, 2001; Higgins, Koch, Boughfman, & Viestra, 2008; Riches & Green, 2003). They lack "theory of mind" (Baron-Cohen, Leslie, & Frith, 1985); that is, they do not comprehend that other people have thoughts, viewpoints and mental states different from theirs. When they can understand only their own perspective and not others, individuals with AS are then impaired in their ability to detect the emotional states, desires, intentions and dispositions of others. They miss social cues that prompts them to adjust their behaviors accordingly during social interactions to produce positive social experiences (Baron-Cohen, 2004; Bolick, 2001; Branhill, 2007; Howlin, 1997, 2000; Travis & Sigman, 1998; Winner, 2007). Problems in negotiating social interactions often result in misunderstanding or social miscues, causing individuals with AS to feel socially incompetent. These negative social experiences result in feelings of anxiety, depression, isolation, frustration, or panic, which color their social experiences (Attwood, 2000, 1998; Baker, 2003; Beaumont & Newcombe, 2006; Chadsey & Beyer, 2001; Winner, 2005). Their social challenges occur, not only in work environments but also in school settings, community interactions with their peers, and in personal and family relationships.

Background

Asperger syndrome (AS) is one of the five categories of Autism Spectrum Disorders, a lifelong and pervasive developmental disorder (American Psychological Association, 2000). Severe and sustained impairments in communication, reciprocal

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social interaction, and restrictive, repetitive patterns of behavior, interests, and activities distinguish individuals with AS from other individuals with disabilities. They often have difficulties in peer relationships, experience social conflict, and prefer isolation to avoid the challenges of social relationships. They have difficulty with eye contact, emotional responsiveness, perspective taking or "Theory of Mind" (Attwood, 2000; Baron-Cohen, et al., 1985), empathy towards others, and cognitive and emotional flexibility. They tend to be inflexible and adhere to routines, which interferes with their ability to engage in dynamic reciprocal interactions (American Psychological Association, 2000; Ann Tryon, Mayes, Rhodes, & Waldo, 2006; Baron-Cohen, 2004; Bolick, 2001; Frith, 2004; B.S. Myles & Simpson, 2002; Wing, 1981; Winner, 2007).

Social Cognition. Impairments in perspective taking or "Theory of Mind" (Baron-Cohen, et al., 1985) are due to social cognitive deficits; these deficits are common among individuals with Autism (Baron-Cohen, et al., 1985; Beaumont & Newcombe, 2006; Bolick, 2001; Perner, Frith, Leslie, & Leekam, 1989). Social cognition is a person's "intuitive lens on how their words and personal behaviors affect the feelings of persons with whom they are communicating" (Winner, 2007, p. 27). A person with good social cognitive skills is able to identify relevant social cues (e.g. person looks away during conversation), interpret the social cues (e.g. person looks away means that they are bored), and adjust their behavior accordingly (e.g. change topic of conversation) (Baron-Cohen, 2004; Constantino & Gruber, 2009; David et al., 2008; Myles & Simpson, 2001; Winner, 2007). One's ability to identify other people's intentions and predict future behaviors are also due to good social cognitive skills (Baron-Cohen, et al., 1985).

While typically developing adolescents become more adept at learning basic social rules through observation and instruction, individuals with AS remain generally

socially unaware, lacking the ability to pick up social cues during social interactions (mindblindness) (Attwood, 1998; Baron-Cohen, et al., 1985; Myles & Simpson, 2001). They tend to make inaccurate assumptions about what others know, which often result in misunderstandings in social situations (Baron-Cohen, 2004; Bauminger, 2002; Constantino & Gruber, 2009, 2005; E. T. Higgins, 2000). Individuals with AS generally fail to share their enjoyment, interests, or achievements with others. More importantly, they have difficulty cultivating friendships and close social relationships because of their social challenges (Attwood, 2000; Goleman, 2007). Bolick (2001) illustrates these behaviors in the following scenario:

    Fourteen –year-old Matt and other students were working on a social studies worksheet at their desks. The teacher was talking with a small group of students who were planning a project. The teaching assistant was sitting at a table at the side of the room, calling out questions to a student who had missed the pop quiz in the class yesterday.

    Matt came upon a question he did not understand. He called out to the assistant, 'I need you.' The assistant, Mrs. McGonigle, held up a finger as though to say, 'Just a minute.' Matt fumed. He tore a sheet out of his notebook and wrote Mrs. McGonigle a note: 'You are MY assistant. You're supposed to be here for ME. Meet me and Dr. Bolick at 11.'

    When I [Dr. Bolick] arrived at 11, Matt was still angry. Mrs. McGonigle was appalled at Matt's 'disrespectful' behavior… (p. 49-50).

Though their impairments may often go undetected in the elementary grades because of normal academic functioning, individuals with AS often show difficulties when they are required to participate in group activities or non-academic activities such

as recess periods (Church, Alisanski, & Amanullah, 2000; Smith Myles et al., 2007; Myles & Simpson, 2002). They are often aware of their peers and peer behaviors and they tend to become overly sensitive to criticism. Individuals with AS are aware that they frequently stand out in social situations due to their "unique" presentation (Baron-Cohen, et al., 1985; Bowler, 1992; Wing, 1981). They may appear self-centered, or lacking in common sense, which can be off-putting to their peers, resulting in negative social interactions and social relationships (Attwood, 1998; Baker, 2003; Baron-Cohen, et al., 1985; Baron-Cohen, Wheelwright, & Joliffe, 1997; Beaumont & Newcombe, 2006; Bowler, 1992; Crooke, Hendrix, & Rachman, 2008; Perner, et al., 1989). Their peers tend to either avoid or bully them, which can result in retaliatory behaviors from them (Attwood, 1998; Baron-Cohen, 2004; Frith, 2004; Tantam, 2000; Wing, 1981). These negative interactions cause individuals with AS to become anxious or fearful of socializing with their peers, resulting in social isolation (Attwood, 1998; Myles & Simpson, 2002; Wing, 1981). Furthermore, unwanted social isolation can lead to anxiety and depression, and individuals with AS may carry these feelings into their adult life (Attwood, 1998; Howlin, 1997, 2000; Tantam, 2000). These difficulties result in impaired social responsiveness (Constantino & Gruber, 2009) and social integration for individuals with AS (Attwood, 1998; B.S. Myles & Simpson, 2002; Wing, 1981).

Prevalence. Individuals with AS have the cognitive abilities to successfully transition to adulthood, yet they continue to experience failures in community and vocational integration due to their social impairments (Ehlers & Gillberg, 1993; Higgins, et al., 2008; Hurblutt & Chalmers, 2004). Many service providers are concerned that an increasing number of individuals with AS who have the potential to be successful in their adult lives are becoming dependent on their families and government aid to sustain them

(Elksnin & Elksnin, 2001). Studies on prevalence rates for autism spectrum disorders (ASD) show an increase from the 1960's from four to five out of 10,000 children with ASD to one in 150 eight year old children with ASD in 2000 (Ehlers & Gillberg, 1993; Howlin, 2000; Rice, 2007). A 2002 study estimated that one third of the individuals with ASD surveyed were children with AS (Merrick, Kandel, & Morad, 2004; Rice, 2007).

Professionals working with individuals with AS expressed concerns with the possibility that transition to adulthood may be extremely challenging for them (Hurblutt, 2008; Meyer, Mundy, Vaughan van Hecke, & Durocher, 2006). In Hurblutt and Chalmers (2004) study, the participants in the study discussed their difficulties in their work life. When asked about his ability to maintain his employment, one participant reported, "It is not that we do not work hard…we are not good at dealing with people in social situations" (Hurblutt & Chalmers, 2004, p 219). Another participant reported, "The most important rule at work is to get along with others at work. I think the jobs usually are 80% social (conversation, lunch, breaks, chit-chat) and 20% work. People with autism are better the other way around!" (Hurblutt & Chalmers, 2004, p 219). These testimonials are indicative of the frustrations of many individuals with AS at work. Due to their social difficulties, they have trouble maintaining their jobs and becoming part of the social circle at work. Participants in Hurblutt and Chalmers' (2004) study also reported frequent job changes and trouble achieving financial independence, and community integration as they reached adulthood.

Data from the National Autistic Society (NAS) (Barnard, 2001) confirmed the predicament of workers with AS in Hurblutt and Chalmers' (2004) study. NAS surveyed 1200 adults with autism, and they discovered that 22% (264) had IQ's in superior to very superior range, and only 12% (32) of these individuals were employed. Such low

employment rate is worrisome to parents and professionals because individuals with AS have the potential to achieve financial independence and community integration based on their cognitive skills (Higgins, et al., 2008). Parents and professionals alike stated that individuals with AS will continue to become disheartened during their transition to adulthood unless effective services are provided to improve their opportunities to become integrated into society (Bolick, 2001; Gay, 2006; Howlin & Mawhood, 1999; Riches & Green, 2003; Romoser, 2000)

Social Skills Interventions. Various researchers studied different social skills interventions for individuals with AS in order to improve their opportunities to participate successfully in social interactions. Some of the interventions researched were Social Stories, Applied Behavior Analysis, Cognitive Behavior Therapy, Group Therapy, and Social Cognition Training (Adams, Gouvousis, VanLue, & Waldron, 2004; Attwood, 2000; Baron-Cohen, 2004; Barry et al., 2003; Bauminger, 2002; Beaumont & Sofronoff, 2008; Conroy, Boyd, Asmus, & Madera, 2007; Crooke, et al., 2008; Gonzalez-Lopez & Kamps, 1997; Marks et al., 1999; White, Keonig, & Scahill, 2007; Wieiss & Harris, 2001). Though the results of these research studies were promising in clinical settings, research on interventions to minimize the social skill deficits of individuals with AS and to improve their social experiences in their natural environments (including work settings) are limited (Bauminger, 2002; Crooke, et al., 2008; Gevers, et al., 2006; Ozonoff & Miller, 1995; Winner, 2005).

Several researchers focused on teaching individuals with AS social cognitive skills to improve their social functioning (Baron-Cohen, 2004; Bauminger, 2002; Crooke, et al., 2008; Gevers, Clifford, Mager, & Boer, 2006; Gutstein & Whitney, 2002; Mundy & Newell, 2007; Ozonoff & Miller, 1995; Winner, 2002). As reflected in the

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results of these studies, individuals with AS were able improve the quality of their responses to familiar social situations when they learned social cognitive skills. Their social interactions seemed to improve with their family members, their teachers, and their peers. They were able to gain awareness of the other person with whom they were communicating, and they maintained social relationships by responding appropriately during interactions (Baron-Cohen, 2004; Bauminger, 2002; Crooke, et al., 2008; Gevers, et al., 2006; Ozonoff & Miller, 1995; Winner, 2007). However, since a majority of the researchers conducted their studies primarily in clinical settings, they advocated for additional research in natural settings such as school and work settings in order to promote social integration and social competence.

Social Thinking. Winner (2005) developed the *Social Thinking* approach to teach social cognition skills to individuals with AS. *Social Thinking*, a term coined by Michelle Garcia Winner (2007) is a person's innate ability to become aware, to think through and apply information gathered from the social environment to respond successfully, and to achieve positive social interaction. Inefficient social cognitive functioning impairs one's ability to be socially responsive (Constantino et al., 2003; Constantino & Gruber, 2005, 2009; Higgins, 2000). Winner (2007) also stated that social cognitive deficits could lead to problems in maintaining relationships with peers and adults. In addition, individuals with social cognitive impairments have difficulty maintaining a job and developing social relationships in and outside their families. She asserted that, "Social thinking is infused into almost all parts of our home and school day" (Winner, 2005, p.1).

Hence, individuals with AS need effective interventions to help them gain skills that will promote successful social interactions during dynamic social exchanges in their

natural environments. Such skills may enable individuals with AS to become socially competent when they participate in and collaborate actively with groups, teams, and co-workers, manage community and public settings, and engage in family relationships (Gutstein & Whitney, 2002; Webb, Miller, Pierce, Strawser, & Jones 2004). Therefore, if individuals with AS can employ social cognitive skills effectively, they may be able to achieve social competence, allowing them to develop significant intimate relationships (Attwood, 2000; Gutstein & Whitney, 2002).

Purpose of the Study

This study evaluated the effectiveness of the Social Thinking approach (Winner, 2005) to teach adolescents and young adults with AS social cognitive skills. The research questions are:(a) Will instruction in Social Thinking curriculum build social cognitive skills in adolescents and young adults with AS, (b) Will such an increase result in improved social responsiveness, and (c) Will they demonstrate these skills in both familiar and novel environments?

The triangulated mixed methods research design was the most appropriate research design for this particular study (Creswell & Plano Clark, 2007). Triangulation in mixed methods research offsets or counteracts the biases of each individual research method (Qualitative and Quantitative) when investigating a phenomena. Using more than one method helped substantiate the individual results. Confirmation of research results through triangulation enhanced the validity of the results of this study (Clark & Cresswell, 2008).

In order to complete this study, this researcher conducted an intake interview to gather qualitative data prior to the intervention. Participant and parent concerns were categorized into themes and analyzed to identify the lessons that corresponded to the

social cognitive skills to be taught. Quantitative data using the Social Responsiveness

Scale (SRS) (Constantino & Gruber, 2005) were then utilized prior to the intervention

and post intervention to measure changes in each participant's social responsiveness

skills as they interacted with their parents or primary caregivers throughout the study.

In addition to the questionnaire, quantitative data were gathered using a single

subject multiple baseline research design with repeated measures to measure changes in

two categories of participant behaviors during the application of the intervention

(instruction of the Social Thinking curriculum) (Kazdin, 1982; Kennedy, 2005). Baseline

data were gathered during the first five meetings. Subsequent data collection occurred

during the thirteen sessions of the intervention phase. Generalization activities during the

last three sessions, took place at a volunteer work site. Finally, the qualitative surveys

gathered at the generalization site (worksite) sought the opinions of participants'

coworkers and supervisors regarding participant interactions with others at the worksite.

Research data were triangulated to determine which results support each other and which

ones diverge.

Definitions

The following terms used in the course of this research are defined accordingly:

Asperger Syndrome. The American Psychological Association (APA) defines

Asperger syndrome (AS) as one of the five categories of Autism spectrum disorders.

Individuals with AS have average to above average IQ, but they have lifelong sustained

impairments in reciprocal social interaction, communication and restricted, repetitive

patterns of behavior, interests and activities (American Psychological Association, 2000;

Ann Tryon, Mayes, Rhodes, & Waldo, 2006; Barnhill, 2007; Baron-Cohen, 2004;

Ghaziuddin & Mountain-Kimchi, 2004; Koegel, 2007; National Institute of Neurological Disorders, 2005).

Autism Spectrum Disorders (ASD). ASD is a lifelong disorder with severe and pervasive delays in development manifested in qualitative impairments in these three areas:

1) Reciprocal social interaction - impairments in multiple nonverbal behaviors to regulate social interactions, failure to develop peer relationships appropriate to developmental level, lack of spontaneous seeking to share enjoyment, interests, or achievement with other people, lack of social or emotional reciprocity.

2) Communication - noticeable impairments in initiating or sustaining a conversation with others; stereotyped and repetitive use of language or idiosyncratic language, lack of social imitative play.

3) Restrictive, repetitive and stereotypic patterns of behavior, interests, and activities - an encompassing preoccupation of particular interests, inflexible routines or rituals, stereotyped and repetitive motor mannerism" *(Diagnostic and Statistical Manual of Mental Disorders,4th ed.,* pp. 70–71 Washington, DC: American Psychiatric Association, 1994).

Social Awareness. An awareness of one's social environment wherein one picks up verbal and nonverbal cues from others. The awareness ranges from instantaneously sensing another person's emotional signals to sensing their thoughts, feelings or intentions (Constantino & Gruber, 2009; Goleman, 2007).

Social Cognition. One's ability to interpret social cues and understand the social context of a situation defines social cognition. Social cognition skills enable one to take

another person's perspective during the social interaction. These skills allow an

individual to identify relevant social information from the social environment, process the

information, and make close approximations of appropriate responses to social situations

(Bazerman & Tenbrunsel, 1998; Crooke, et al., 2008; Gevers, et al., 2006; Herrman, Call,

Hernandez-Lloreda, Hare, & Tomasello, 2007; Higgins, 2000; Winner, 2005).

Oftentimes, the information a person gathers allows him or her to handle difficult

interpersonal situations in effective ways (Baron-Cohen, Leslie, & Frith, 1985; Crooke, et

al., 2008; de Bildt, et al., 2005; Ozonoff, Pennington, & Roger, 1991; Winner, 2005).

     Social Interaction or Social Exchange. Any nonverbal or verbal behavior that is

generated by one communication partner (such as a peer, supervisor or co-worker) to

another partner during a mutual or shared activity is considered a social interaction or a

social exchange (Crooke, et al., 2008)

     Social Responsiveness. A person who is socially responsive demonstrates an

ability to be sensitive to social/interpersonal cues, to recognize and respond to those

interpersonal cues with socially appropriate and acceptable behaviors. The skills required

to be socially responsive are generally considered discrete social skills (Constantino &

Gruber, 2009; Freitag, 1970).

     Social Skills. Skills that an individual utilizes during social situations to interact

successfully with others to promote communication, positive peer, and group interaction are

social skills (Attwood, 2000; Freedman & Silverman, 2008). These skills are necessary to

help each individual maintain positive social relationships with their peers, family and

community (Baker, 2003; Church, et al., 2000). Good social skills enable a person to engage

with others in the social realm and become socially competent (Church, et al., 2000;

Goleman, 2007; Marks, et al., 1999; Myles & Simpson, 2001).

Social Thinking. Social thinking is an approach to teach the 'why' behind socialization, understanding the underlying social cognitive knowledge required when navigating reciprocal social interactions. This approach addresses discrete social skills that promote positive social experiences by 'listening with eyes and brain' to interpret social cues and social messages (Crooke, et al., 2008; Winner, 2005).

Summary

Essentially, individuals with AS have challenges that cause them anxiety, frustration and heartache as they participate in social relationships with their peers (Attwood, 2000). They want to interact with others and develop healthy relationships. However, they are unable to engage in social interactions effectively and their inability to relate socially cause devastating effects on their mental health, mood, and self-esteem (Attwood, 2000, 1998; Branhill, 2007; Hurblutt & Chalmers, 2004; Tantam, 2000;Winner, 2007). They can become discouraged, dissatisfied, or anxious, and they may become unpleasant or uncooperative as a result. They often end up losing their jobs or relationships because of their social persona (Barnhill, 2007; Bradshaw, 2005; Muller, Schuler, Burton, & Yates, 2003; Riches & Green, 2003).

Nonetheless, individuals with AS possess average to above average cognitive abilities and pre-occupations or special interests in things that can lead them to successful careers later in life. They can choose careers in astronomy, mathematics, chemistry, computer science, or engineering that can accommodate their limitations in reciprocal social interactions. Success in these careers can foster occupational success (Gay, 2006; Howlin, 2000; Wing, 1981). This potential for success in adulthood calls for ways to improve the opportunities of individuals with AS to integrate into society and to develop and maintain healthy relationships that will ultimately lead to social integration (Stodden

& Boone, 1987). Thus, researchers are focusing on developing interventions that target social cognitive skill development to expand opportunities for individuals with AS to achieve emotional, financial, and social successes. In so doing, more individuals with AS will become more fully integrated into their social circles and will hopefully become productive individuals in their society.

CHAPTER II

LITERATURE REVIEW

Social Skills of Individuals with Asperger Syndrome

Asperger syndrome (AS) is one of the five categories of the Autism Spectrum Disorders (American Psychological Association, 2000). Individuals with AS have normal cognitive and language development, and normal adaptive and self-help skills that set them apart from other individuals with Autism (American Psychological Association, 2000; Barnhill, 2007b; Haq & Le Couteur, 2004; Myles & Simpson, 2002; National Institute of Neurological Disorders, 2005). They appear to show minimal difficulties in pre-school or elementary school because they have average or above average IQ, resulting in academic performance equal to most typical students. Often, they do not seem to require specialized instruction in school to maintain their academic performance (Adreon & Stella, 2001; Attwood, 2000, 1998; Church, et al., 2000; K. K. Higgins, et al., 2008). Despite their high IQ, they have difficulty integrating socially (Attwood, 1998; American Psychological Association, 2000; Baker, 2003; Barnhill, 2001; Blacher, 2008; Myles & Simpson, 2002; Muller, Schuler, & Yates, 2008; National Institute of Neurological Disorders, 2005; Roe, 1999, Rubin & Lennon, 2004; Travis & Sigman, 1998; Winner, 2005).

Social Cognition

Individuals with AS have impaired social cognitive skills. They tend to experience 'mind-blindness' (Baron-Cohen, et al., 1985; Goleman, 2007), an inability to intuitively interpret other people's thoughts or perspective. They tend to have problems recognizing, understanding, and responding to social information, and predicting intentions of others (Baron-Cohen, 2004; Bazerman & Tenbrunsel, 1998; Golan, Baron-

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Cohen, & Golan, 2008; Goleman, 2007; Higgins, 2000; Mundy & Newell, 2007).

Difficulties in social cognition can result in limited and superficial relationships, lack of

friendships and intimate relationships for individuals with AS (Baron-Cohen, 2004;

Bauminger, 2002; Bradshaw, 2005; Choi & Nieminen, 2008a, 2008; Higgins, et al.,

2008; Muller, et al., 2008; Riches & Green, 2003; Roe, 1999; Tse, Strulovitch, Tagalakis,

Meng, & Fombonne, 2007; Winner, 2005).

Formal instruction is necessary to teach individuals with AS social cognitive

skills. Their difficulties in identifying and understanding hidden or unspoken messages

in social interactions (Baron-Cohen, et al., 1997; Crooke, et al., 2008; Goleman, 2007;

Winner, 2007) warrants direct instruction, modeling, and guided practice to teach them

how to identify and read relevant social cues in social situations. They require systematic

instruction on how to cognitively respond to social interactions and modify their

behaviors to respond accordingly, thereby becoming more effective communicators

(Bauminger, 2002; Gutstein & Whitney, 2002; Winner, 2005). After instruction, they

can make approximations of responses appropriate for the social situations during

dynamic social interactions. They can engage in shared play activities, collaborate with

others, share enjoyment or interests of others, and even in other people's achievements

(Ozonoff, Pennington, & Roger, 1991; Rusch, DeStefano, Chadsey-Rusch, Phelps, &

Symanski, 1992). Otherwise, individuals with AS often make multiple social mistakes

which others may perceive as deliberate and malicious. Consequently, other people may

regard them as individuals with behavioral problems (Barnhill, 2007; Howlin, 2000;

Jennes-Coussens, Magill-Evans, & Koning, 2006; Rusch, et al., 1992; Szatmari, 1989).

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Social Skills in Employment Settings

Adolescent and adults with AS also have trouble in employment settings. In these settings, there are social situations integral to the work environment which are not usually associated with actual job duties (Chadsey & Beyer, 2001). Types of social situations in the workplace include orientation periods in new jobs, interacting with co-workers and supervisors during non-work hours such as breaks, lunch periods, before and after work activities, and work parties (Elksinin & Elksinin, 2001; Hurblutt & Chalmers, 2004). Usually, workers are required to navigate these social events in the workplace. Generally, people have learned certain occupational social skills through observation, pretend play and embedded instruction through their school years. These skills help them integrate into their work social environment successfully, and achieve social competence (Branhill, 2007; Chadsey & Beyer, 2001; Howlin, 2000; Hurblutt & Chalmers, 2004). These skills allow co-workers to interact effectively, avoid socially awkward situations, and prevent socially unacceptable behaviors (Branhill, 2007; Howlin, 1997; Hurblutt & Chalmers, 2004; Nesbitt, 2000).

Unfortunately, as reported in Hurblutt and Chalmers' (2004) study, adults with AS are often unable to meet the demands of their work social environment. Their co-workers frequently shun them because of negative perceptions about individuals with AS. People often perceive their manner as cold or disrespectful (Chadsey & Beyer, 2001; Higgins, 2000; Higgins, Koch, Boughfman, & Viestra, 2008; Howlin & Mawhood, 1999; Hurblutt & Chalmers, 2004; Muller, Schuler, & Yates, 2008). Their lack of social competence leads to their inability to achieve a level of occupational adjustment and emotional growth that promotes success in the work environment (Black & Ornelles, 2001; Higgins, et al., 2008; Howlin & Mawhood, 1999; Hurblutt & Chalmers, 2004;

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Riches & Green, 2003; Roe, 1999; Rusch, et al., 1992). Moreover, frequent occupational failures affect their desire to seek out other employment. Instead, individuals with AS may choose to remain unemployed and stay financially dependent on their family members or on government subsidies (Bradshaw, 2005; de Bildt, et al., 2005; Hurblutt & Chalmers, 2004; Järbrink, et al., 2007; Jennes-Coussens, et al., 2006; Kober & Eggleton, 2005; Nesbitt, 2000; Riches & Green, 2003).

Some of the research literature report that individuals with AS who learned social cognitive, self-management and adaptive skills were able to improve their ability to retain their jobs (Hoisch, Karen, & Franzini, 1992; Howlin, Alcock, & Burkin, 2005; Kober & Eggleton, 2005; Luftig & Muthert, 2005; Petrovski & Gleeson, 1997; Riches & Green, 2003; Stephens, Collins, & Dodder, 2005). Individuals with AS felt accepted in their community when they achieved financial success by maintaining their employment (Garcia-Villamisar, Wehman, & Navarro, 2002). More importantly, the positive effects of maintaining employment to individuals are (a) increased social interactions, (b) friendships, and (c) financial independence. When individuals with AS maintained steady employment, they were able to achieve social integration in the workplace. Socially competent individuals with AS became accepted in their preferred social circles (Black & Ornelles, 2001; Bradshaw, 2005; Branhill, 2007; Cook, 2005; Elksinin & Elksinin, 2001; Garcia-Villamisar, et al., 2002; Higgins, et al., 2008; Howlin, 2000; Howlin, et al., 2005; Hurblutt & Chalmers, 2004; Järbrink, et al., 2007; Nesbitt, 2000; Petrovski & Gleeson, 1997; Suomi, Ruble, & Dalrymple, 1993).

Social Skills Intervention Studies

Several studies on social skills intervention with individuals with AS were evaluated. The strategies that were pertinent to this research are: (a) Social stories

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(Adams, Gouvousis, VanLue, & Waldron, 2004; Ali & Frederickson, 2006; Gray, et al., 1993; Sansosti & Powell-Smith, 2006), (b) Social skills groups (Baker, 2003; Bauminger, 2007; Ruble, Willis, & Mclaughlin Crabtree, 2008; Tse, Strulovitch, Tagalakis, Meng, & Fombonne, 2007; White, Keonig, & Scahill, 2007), and (c) Social cognitive skills training (Bauminger, 2002, 2007b; Crooke, Hendrix, & Rachman, 2008; Gevers, Clifford, Mager, & Boer, 2006; Ozonoff & Miller, 1995; Seeman, 2003). Researchers reported positive outcomes in their results, but they indicated that a combination of strategies seemed more effective when addressing a variety of social issues (Chadsey & Beyer, 2001;Riches & Green, 2003; Rusch, et al., 1992). Majority of studies in social skill instruction were single case designs as this method offered a means to integrate research and practice (Ali & Frederickson, 2006; Branhill, 2007; Freedman & Silverman, 2008; Scattone, 2007). These interventions helped individuals with AS gain social skills that promoted social acceptance among their peers. Consequently, the participants of these studies were more willing to participate in social interaction, and expressed a feeling of well-being (Chadsey & Beyer, 2001; Fogel, 1993; Gutstein & Whitney, 2002; Rusch, DeStefano, Chadsey-Rusch, Phelps, & Symanski, 1992; Sommers, 1984; Tse, et al., 2007).

Ultimately, interventions that can provide positive outcomes are important tools for service providers to facilitate the development of social skill building in individuals with AS (Barnhill, et al., 2002; Chadsey & Beyer, 2001; Freedman & Silverman, 2008; Rusch, et al., 1992). Many researchers recommended that additional studies on adults with AS examine the long term effects of social skills instruction, and determine maintenance the social skills they learned (Baker, 2003; Garcia-Villamisar, et al., 2002;

Howlin, et al., 2004; Howlin & Yates, 1999; Kamens, et al., 2004; Ochs, Kremer-Sadlik, Sirota, & Solomon, 2004).

Social Cognition Studies

The works of Bauminger (2002), Crooke and colleagues (2008), Gevers and colleagues (2006), and Ozonoff and Miller (1995) reported overall increases in social problem solving and perspective taking skills during instruction. Their collective work targeted social cognitive skills instruction, and their results showed potential for individuals with AS to gain social cognitive skills while they are engaged in social interactions with familiar situations and familiar communication partners such as families, siblings family friends and others. Their research showed promise in teaching social cognitive skills to students with AS. Classroom and home locations were popular locations to implement the interventions; these were usually in contexts where the students with social cognitive deficits could practice their skills (Bauminger, 2002; Crooke, et al., 2008; Gevers, et al., 2006; Ozonoff & Miller, 1995).

Ozonoff and Miller (1995) pioneered the search for interventions to help individuals with AS. They taught their participants conversation skills with underlying social cognitive tasks such as social problem solving, and perspective taking skills. They saw improvement in the participants' conversation and perspective taking skills. However, the researchers found no treatment effects on social cognitive skills. They postulated that their choice of measurement (Social Skills Rating Scales) might not be sensitive to social cognitive skills (Sally Ozonoff & Miller, 1995).

Bauminger (2002) followed up Ozonoff and Millers' (1995) research by evaluating other interventions for social cognitive deficits. Fifteen students with High Functioning Autism (HFA) learned social problem solving, emotional recognition, and

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social interaction skills over a period of seven months, with their teachers and parents as facilitators in generalization activities. The participants showed improvement in their ability to read social cues and make social interpretations while engaged in socially related activities with familiar individuals (parents, teachers, peers). They also showed effective problem solving skills by reading social-emotional cues accurately. Like Ozonoff and Miller's (1995) study, Bauminger (2002) found that individuals with HFA were able to benefit from social cognitive instruction (Bauminger, 2002).

In 2006, Gevers and colleagues (2006) tested their intervention on 18 students diagnosed with Pervasive Developmental Disorders (PDD).   The participants received instruction in perspective-taking skills over a period of 21 weekly sessions and used these skills to make acquaintances with other participants. Parents facilitated the interaction monthly by engaging their children in games and story-telling activities. The researchers reported that participants showed improvement in perspective taking skills and that they were able to generalize these skills to their interactions with their parents during the monthly activities. The results of this study confirmed the findings of other researchers and they added to the literature on social cognition research (Gevers, et al., 2006).

With knowledge gained from previous research, Crooke and her colleagues (2008), evaluated the efficacy of the Social Thinking intervention with six students diagnosed with AS/ HFA. The participants learned how to use their observation skills to solve social problems, identify behaviors appropriate for each situation, and to minimize engaging in behaviors that were inappropriate for particular situations. They also learned to understand that they could predict their communication partners' social-emotional state by looking and interpreting what they saw. They were able to engage in more group activities and social interactions, showing improvement in their ability to solve problems

and communicate effectively. Their study confirmed that the Social Thinking intervention is effective in teaching individuals with AS to engage in dynamic social interaction in clinical setting (Crooke, et al., 2008).

Limitations of the Studies

Ozonoff and Miller (1995), Bauminger (2002), Gevers, et al., (2006) and Crooke, et al., (2008), all agreed that their research results were limited in their generalizability because of a small sample size, lack of controlled studies, short intervention time frames, studies limited to clinical or school locations and other confounding variables such as familiarity with communication partners and maturation. They recommended further research on the durability of the changes their participants exhibited during their research.

Thus, social cognition training is the only intervention that seems to show promise for adolescents and young adults with AS in improving their social experiences in clinical settings (Sommers, 1984; Winner, 2005). To date, there are still no interventions that address their difficulties during dynamic social exchanges. Since real-time interactions change rapidly during the course of the interaction, individuals with AS are unable to respond quickly Thus, they would benefit from formal instruction in social cognitive skills during their adolescent years in order to prepare them for a successful transition to post-school environments (Branhill, 2007; Howlin, 2000; Stodden & Boone, 1987). Furthermore, there were no studies found that addressed occupational social cognitive skills (Bauminger, 2002; Crooke, et al., 2008; Gevers, et al., 2006; Ozonoff & Miller, 1995). Studies in developing occupational social skills are necessary to improve the occupational experiences of individuals with AS.

Summary

Individuals with AS face a variety of personal, social and employment challenges that prevent them from achieving emotional health, social success and financial independence. Several research studies have focused on developing interventions for individuals with AS to improve their social skills and perspective taking skills to bring about positive social experiences. While the research results are promising, many studies have small sample sizes and the studies were implemented in clinical settings. Majority of researchers recommended additional studies focusing on social interventions that build social cognitive skills for individuals with AS. Thus, this study sought to add to the body of knowledge that can lead to the promotion of effective interventions for individuals with AS.

CHAPTER III

METHODS

Research Questions

This study evaluated the effectiveness of the Social Thinking Intervention in teaching social cognition skills to individuals with AS. The questions this study sought to answer were:

1. Does the instruction of the Social Thinking curriculum result in social cognitive skills development among adolescents and young adults with AS?

2. Will the development of social cognitive skills increase social responsiveness of adolescents and young adults with AS while engaged in reciprocal social interaction in familiar environments?

3. Will adolescents and young adults with AS maintain their social cognitive skills in novel environments?

Research Design

This mixed methods research study was a sequential exploratory design, with quantitative priority. Qualitative data were gathered prior to the implementation of the intervention. The results guided the selection of the dependent variables of the quantitative portion of the research. The data gathered from qualitative and quantitative results were triangulated (Tashakkori & Teddlie, 2002) to determine if one set of data corroborated the other (Triangulation design). This design aided in validating the results of the research data, and minimized some of the threats to validity that may have influenced the results of the study (Creswell & Plano Clark, 2007). Consequently, collecting quantitative and qualitative data brought together the strengths of both forms of

research to corroborate results of the social thinking intervention and its influence on social responsiveness on individuals with AS.

Participants

Five secondary and post-secondary adolescents and young adults of different cultural backgrounds between the ages of 13 and 21 volunteered to participate in this study. The following agencies distributed the flyers provided to recruit participants: Public middle and high schools on Maui, Autism Bridges of Maui, Special Parent Information Network in Hawaii, Pacific Basin Rehabilitation Research, and Training Center at University of Hawai'i at Mānoa, Learning Disabilities Association, Maui Chapter, and through various service providers on Maui. Table 1 (see Appendix A) summarizes the demographics of the participants in this study. Three participant data (Participants A, B and D) were included in the study; two participant data (Participants C and E) had missing sessions to preclude accurate interpretation of data.

Participant A is a 16-year old young man of Asian descent. He is currently a ninth grade student at a public Maui High School. His cognitive level is above average as determined by his academic performance. A clinical psychologist diagnosed him with Asperger Syndrome two years ago. He currently works part time on the weekends. He spends some of his time with a group of his peers who likes to draw and watch Japanese cartoons. Often, he spends time alone, even at home.

Participant B is a 14-year old boy of Caucasian descent. He is currently an eighth grader at a private school in Maui. A clinical psychologist determined that he has average cognitive skills, and he was diagnosed with Asperger syndrome, learning disability, auditory issues, and writing difficulties when he was in elementary. He does not participate in social activities in school or after school.

Participant D is 14-year old boy of Native Hawaiian descent. He is currently an eighth grader at a public intermediate school on Maui. A clinical psychologist indicated that he has average cognitive skills, and he was diagnosed with Asperger Syndrome in elementary grades. A Skills Trainer assists him in school to modify his academic work, and to navigate the community. He enjoys unusual video games (such as wrestling crocodiles). He prefers games that generated a lot of activity and noise, and ones that are simpler to play. He receives assistance from a skills trainer daily.

Settings

The study occurred in two settings. The first setting was a community center in Maui that was easily accessible to all participants. The second setting was at a farm managed by a non-profit organization on Maui.

Setting 1. The community center was the first site utilized during the summer and afterschool sessions to gather baseline data and to conduct the instruction of social cognitive skills. This particular location was ideal for the study because it was easily accessible to the participants and it was available for the study. The room was approximately 60 x34 feet, with a 10x5 foot kitchen attached. The facility can accommodate up to fifty people. The location has a fenced-in basketball court, a large park used for community baseball games, and barbeque facilities. It is isolated from traffic. The location has safe places for participants to utilize whenever they needed any breaks from the activities. Metal folding chairs were available for participants and observers to use. Instructions, daily schedule, and directions were posted in room, or they were written on the blackboard. A video camera captured the sessions for later viewing and data collection.

Figure 1. *Photo of Setting 1, the community center*

Setting 2. The community farm located on the eastside of Maui was the site for generalization activities. The farm was new to the participants, which served as a novel environment. The farm is approximately 12 acres and it is part of a sustainability project for individuals with disabilities.

Figure 2. *Photo of Setting 2, community farm on Maui.*

The participants' primary job duties were to: assist the team to clear the assigned agricultural area, assist other co-workers to set up an irrigation system, and plant and care for the plants. The participants worked as volunteers at the farm for 90 minutes once a week since a paid position would have required them to longer. These jobs duties were within the skill level of the participants, minimizing the lack of skill as a factor that may interfere with their work performance and their participation in socialization activities in the work place. Data collection at the work site also occurred while the participants were working.

Dependent Variable

The dependent variable in this study was social cognition (or social perspective taking) skills. Social cognition skills are necessary during social exchanges to enable individuals to pick up social cues from communication partners, interpret their possible meanings, and make approximations of appropriate responses in the interaction (Winner, 2007). However, the social thinking curriculum teaches a variety of social cognitive skills to different age and skill levels. Therefore, lessons were prepared based on the specific social cognitive skills needed that were identified from the intake interview. These lessons addressed the identified themes.

The targeted social cognition skills were *Thinking of others,* coded as TOO, and *Working as part of a group,* coded as WAPG. These two skills enable individuals to recognize their own behaviors during social interactions as well as how their behaviors influenced others. Once they determine how others were reacting to their behaviors, they could then modify their behaviors to enter and stay in a social group of their choice. Table 2 provides descriptions of these two social cognitive skills.

Table 2. *Dependent Variable: Behaviors Associated with Social Cognition Skills*

'Thinking of others' and 'Working as part of a group'.

Social Cognitive Skills	Associated Behaviors	Descriptions
Thinking of others (coded TOO)	Reading people's emotional state accurately	Keeping thoughts to themselves that may be hurtful and potentially offensive to others and making approximations of other people's intentions and feelings.
	Asking others questions	Demonstrate interest in the other person and their interests and experiences.
	Maintain back and forth of conversation	Demonstrate appropriate conversation turns by waiting one's turn when talking with others and refraining from talking over the conversation partners.
Working as part of a group (Coded WAPG)	Keeping your Body in the group	The whole body is focused (eyes, ears, shoulders, torso, arms, and legs) on others in the group.
	Attend to the speaker or group activity with your eyes	Use eyes to show attention, interest in others, and to identify non-verbal messages from group members regarding their state of mind and interests.
	Monitor topic of conversations and keep comments on topic.	Maintain conversation topics in order to engage in conversation with others.
	Appropriately share thoughts.	Do not blurt out answers, questions, or comments during interactions.

Independent Variable

The independent variable, the *Social Think*ing curriculum, was the intervention

applied during the study. Lessons were implemented (see Appendix A, Table 3) to teach

'Thinking *about you'* and *'Working as part of a group'* social cognitive skills during

group sessions that occurred in Setting 1. Sessions occurred twice a week for eight

consecutive weeks 60 minutes each session, resulting in 13 sessions. The thirteen lessons

introduced the Social Thinking vocabulary and individual social cognitive skills (Winner,

2000, 2007). Each session followed the same format. The participants were allocated the

first ten minutes of the session for arrival and parent and participant questions. The

following 45 minutes included implementation of social cognitive lessons, modeling,

role-playing opportunities, guided practice sessions and independent practice sessions.

Feedback to participants and parents, and departure activities occupied the remaining five

minutes of the sessions. Reinforcement activities were integrated into the lessons to

show the participants the benefit of staying engaged and maintaining one's interest in

participating in group activities. Winner's (2005) book entitled "Think Social. A Social

Thinking Curriculum for School-Aged Students" was our resource for the lessons. A

detailed list of each lesson implemented in the study is included in Appendix A, Table 3.

Generalization Measures

Participants volunteered for three Saturdays at the community farm on Maui.

They worked as farmhands for 90 minutes each session. Observers did not provide any

direct social instruction or feedback on behaviors during the activity.

Instruments

Social Responsiveness Scale (see Appendix B, Form 1)**.** Parents or primary

caretakers filled out the Social Responsiveness Scale (SRS) questionnaire (Constantino &

Gruber, 2009) for pre- and post-intervention measures of each participant. This

assessment is a standardized, 65-item questionnaire that queries about a person's ability

to "engage in emotionally appropriate reciprocal social interactions" (Constantino, et al.,

2003). It uses a Likert scale response format, producing a scale that is sensitive and

reliable across a wide range of symptom severity. It measures areas of social

responsiveness functioning in five subscales. These subscales are social awareness

(AWA), social cognition (COG), social communication (COM), social motivation

(MOT), and mannerism characteristic of autism (MAN). Items in the questionnaire vary

in intensity, asking about mildly abnormal attributions or behaviors to severely abnormal

behaviors. Some s social cognitive items included questions about the individual's

ability to recognize when others take advantage of them, they take thinks too literally,

understand the meaning of other people's tone of voice and facial expressions, and

pretend without losing touch with reality (Constantino & Gruber, 2009).

 SRS was sensitive to changes in social cognition and social responsiveness skills.

It identified deficits in reciprocal social behaviors in naturalistic social settings such as

the home or community for the participants. Norm tables were used for all SRS scales by

gender and raters (teacher and parent). The questionnaire was hand-scored and computer

scored by the researcher to ensure accuracy of results.

Social Responsiveness Scale Psychometric Properties. Constantino and

Gruber (2003) reported that there is strong agreement between mothers and fathers who

filled out the SRS when assessing their child's social competencies. Furthermore, Chronbach's alpha Normative male and female parent ratings (n=512) are .94 and .93 respectively. These data show consistency of the items in the questionnaire. For male and female, the values are .97 and .96 respectively. In clinical ratings, the alpha value is .97. Based on the alpha values, the SRS is a reliable instrument to measure social cognitive skills and social responsiveness.

Interrater agreement (Retest r) with a sample size N=62 show agreement among different observers. The data show parent-parent comparisons as .91 with raw score standard deviation of 46.0 ± 13.8. Mother-teacher comparisons resulted in Retest r value of .82, with raw score standard deviation of 38.8 ± 16.5, and Father-Teacher comparison resulted in .75 Retest r value, with a standard deviation of 43.9 ± 22.0. Based on the data provided, the SRS questionnaire is valid and reliable (Constantino & Gruber, 2009).

Parent Consent Form (see Appendix B, Form 2). The Institutional Review Board of the University of Hawai'i at Mānoa approved the proposed study and Parent Consent Forms. Parents and participants reviewed the consent form and the parents signed the form prior to participation in the study.

Intake Form (see Appendix B, Form 3). Parents or legal guardians of the selected participants completed a questionnaire to provide additional information about their child. Information requested included the participant's age, grade, which clinician diagnosed the participant and the diagnosis, and their participation (if any) in school and afterschool programs.

Data Collection Sheet (see Appendix B, Form 4). Observers used a partial 5-minute interval observation form for each 45-minute meeting to collect data during

baseline and intervention stages in the classroom. Observers used the same data

collection form once a week at the job site for the duration of the generalization phase.

Participant Satisfaction Survey Form (see Appendix B, Form 5). At the end of

the volunteer work-experience, the participant filled out a confidential survey form to

provide feedback about their experience at the volunteer worksite.

Supervisor Satisfaction Survey Form (see Appendix B, Form 6). All

participants worked at the same site, and had one supervisor. At the end of the work

period, their supervisor filled out a confidential survey form and provided information

about their impressions of the participant's social interactions at the worksite.

Co-worker Satisfaction Survey Form (see Appendix B, Form 7). At the end of

the work period, co-workers also filled out a confidential survey form that provided them

an opportunity to share comments about their experiences with the participants.

Procedures

Intake – Preliminary Phase. Parents or legal guardians of the selected

participants completed the written consent prior to their child's participation in the study,

and information about the purpose of the research. Participants were asked to take part in the

research during the interviews. The parents or primary caretakers of each participant

completed the Intake questionnaire to provide background information about their son or

daughter. The parent or caretaker of the participant also completed the SRS

Questionnaire prior to the start of the study.

Each parent and participant also participated in preliminary interviews to discuss

their concerns about their child's social skills and social life. They responded to three

basic questions during the interview. The questions asked were:

1. What are your concerns about how your child interacts with his/her peers and the adults with whom he/she interacts?

2. What would you and your child like to gain by participating in this study?

3. What would you and your child like to see change by participating in this study?

The interviews yielded themes that aided in selecting particular lessons in the social thinking curriculum.

Baseline Phase. This phase occurred over a period of five sessions, due to the participant expectations that they were going to learn new skills to facilitate social interaction. The participants were unable to tolerate a longer baseline session; attrition was imminent if instruction was delayed longer.

 Baseline data were collected for the first social cognitive skill, for '*Thinking of others*' (TOO) during the first five sessions. Two observers collected data by viewing recorded sessions. The first observer was this researcher, and the second observer was a special education teacher trained in collecting observation data. During baseline conditions, each participant was engaged in unstructured group activities or games for 30 minutes each session. The participants had the choice to interact with others in the room. Activities included board games, puzzles, a basketball game, and other high interest group activities. Adults moved in and out of the room as participants arrived and the activities were unstructured. Observers collected data in 5-minute intervals during the group activities. No social skills facilitation or instruction occurred during baseline conditions.

For the second social cognitive, '*Working as part of a group* (WAPG), baseline data were collected during the first twelve sessions. During sessions six through thirteen, the participants were being taught TOO skills exclusively. WAPG skills were observed but instruction was not initiated. Observers collected data in 5-minute intervals for each session.

Intervention Phase. For eight consecutive weeks, this researcher implemented lessons (see Table twice a week for a total 13 intervention sessions. The length of time was chosen based on Daki and Savage's (2010) research on Solution-Focused Brief Therapy (SFBT), wherein they recommended an average of six weekly therapy sessions. They indicated that SFBT is efficacious in addressing academic and emotional difficulties of individuals with disabilities (Daki & Savage, 2010). Instruction in TOO and WAPG social cognitive skills took place to yield any changes (if any) in social cognition skills. Instruction of TOO skills occurred on session six through eighteen, and instruction of WAPG skills occurred on the thirteenth session through the eighteenth session. Data collection occurred during the 45-minute lesson.

Table 3. *Independent Variable: Social Thinking Lessons.*

Session	Title of Lesson	General Lesson Description
1	Introduction to Social Thinking	Participants were taught the concept of Social Thinking by introducing the idea that individuals have feelings about the people in a group and what they do affect others as well. They were introduced to the idea of 'Thinking with your eyes'; that is, what they see when they look at others represent what they are thinking about.
2	Thinking about you and Just Me	The participants were taught that what they do affect how other people think about them in group activities. They participated in a game wherein they took turns playing the role of a 'Just me' person and 'Thinking about you' person. The 'Just me' person does everything they want without considering other people's desires and wishes, and they end up playing alone. The 'Thinking about you' person participates in selecting a game, and taking turns during a game, and in refraining from making hurtful comments during a game that may make their friends feel bad about playing.
3	Thinking with your eyes and brain	Participants learned to identify and read other peoples' emotions and intentions by making 'smart guesses' or approximations of those emotions and intentions. Modelled to them how to read cues and clues.

Table 3 (continued). *Independent Variable: Social Thinking Lessons During Intervention*

Phase.

Session	Title of Lesson	General Lesson Description
4	Thinking with your eyes and brain	Lesson covered "What we see gives clues to what others are thinking and responding with 'expected' behaviors.". They were provided with definitions of 'expected and unexpected' behaviors in typical situations.
5	Reading facial expressions	Lesson covered learning what facial expressions mean using mirroring activities, charades and and play-acting their perception of others people's feelings.
6	Reading body language	Lesson covered h how to identify and understand meanings of body language through role play, mirroring, guessing others' thoughts through body language.
7	Thinking of others	During this lesson, pictures of individuals doing an activity were utilized to identify critical cues and interpret meaning of body language in social situations and social cues. They explored rules of social interactions. Volunteers role-played social situations, and the participants observed, guessed social cues and confirmed the perception of the observer with the individual playing the role in the role-play. Modeling sessions and practice sessions on how to read other people's plans was provided to the participants.

Table 3 (continued). *Independent Variable: Social Thinking Lessons During Intervention*

Phase.

Session	Title of Lesson	General Lesson Description
7	Thinking of others	During this lesson, pictures of individuals doing an activity were utilized to identify critical cues and interpret meaning of body language in social situations and social cues. They explored rules of social interactions. Volunteers role-played social situations, and the participants observed, guessed social cues and confirmed the perception of the observer with the individual playing the role in the role-play. Modeling sessions and practice sessions on how to read other people's plans was provided to the participants.
8	Thinking of others, Problem Solving	Participants in this lesson participated in the discussion about big problems, small problems, and possible solutions to the problems. Scenarios were presented for participants to practice and solve problem solving activities. Problem solving exercises using a 2- second commercial format, role play sittuations, and group collaboration.
9	Working as part of a group	Participants learned the rules of group work. They participated in a group activity and collaboration by planning and building structures using tools provided by leader. They practiced how to ask for help, how to appropriately share ideas, to collaborate and, to give and receive compliments. They were also provided with activities to practice people's intentions.

Table 3 (continued). *Independent Variable: Social Thinking Lessons During Intervention Phase.*

Session	Title of Lesson	General Lesson Description
10	Working as part of a grroup	Participants went to the bookstore to practice group collaboration when completing an assigned task. They were given tasks at the bookstore to find items that may or may not be in the store. They were required to problem solve as a group, and to ask for help appropriately from the store clerk or customer service representative. The groups debriefed at the end of the activity.
11	Working as part of a group	Participants practiced group collaboration, and problem solving by making smart guesses about how other people feel through hints and nonverbal cues. They played "Guess what I am" to practice on asking appropriate questions, making smart guesses, picking up verbal hints and non-verbal cues, and turntaking skills. They acknowledged mistakes and laughed at themselves.
12	Working as a part of a group	Participants met for breakfast at a restaurant to practice conversation skills, conversation turns, askign questions to show interest, staying on topic and maintaining conversation. They also practiced keeping comments appropriate to avoid hurting another person in the group.They also worked on group consensus and problem solving.

Table 3 (continued). *Independent Variable: Social Thinking Lessons During Intervention*

Phase.

Session	Title of Lesson	General Lesson Description
13	Working as a part of a group	Participants debriefed about breakfast activity, what mistakes they made and how to correct them, and how to pick up social cues in a different location. They played the game "Guess What I Am", to practice asking quesions, pick up verbal and nonverbal clues to guess who they are, and to monitor turntaking during a group activity.

Generalization Phase. The participants worked as volunteer farm hands at a 12-acre community farm in Maui for three sessions, 19 through 21. This generalization activity addressed the research question "Will adolescents and young adults with AS maintain their social cognitive skills in novel environments?" The participants worked at the job site for 90 minutes once a week for three weeks. The observers collected data during the last 45 minutes of work activities each session. At the end of three weeks, the participants' supervisor and co-workers filled out a Satisfaction Survey to share their perceptions about their interactions with the participants and the performance of the participants at the job site.

The participants also shared their comments at the end of the last session by filling out their Satisfaction Survey. They also verbally expressed how they felt about the work activities and the experience.

RESULTS

The results of this mixed method research confirmed the effectiveness of the Social Thinking intervention in teaching adolescents and young adults with AS social cognitive skills as well as improved their social responsiveness to others in social situations. Analysis of the qualitative data gathered prior to the implementation of the intervention provided preliminary information on social cognitive skills that were relevant to the participants.

Quantitative data gathered were analyzed and their significance was assessed. Quantitative data consisted of observational data and the SRS questionnaire to measure behavior changes and skill performance of two the social cognitive skills, TOO and WAPG. Both the observation data and the SRS data showed overall improvements in the social cognitive skills of the participants during their interactions with familiar peers and family members.

However, generalization data show otherwise; that is, the participants showed decreasing skills, trending towards the baseline. Nonetheless, the skill levels of the participants were still higher than the baseline phase, despite the downward trend in improvements and generalization of skills in novel environments.

Data Analysis, Intake Interview

Both parents and participants were took part in the structured intake interview prior to initiation of the study. Participants and their parents responded to questions posed during the Intake Interview independently. The questions were posed to the parent

and participant together, but they responded independently. Themes were generated from the results of the intake interviews.

The themes gathered during the intake interview were:

a. Bullying - All participants interviewed revealed that they have been victims of bullies in their schools since their elementary school years. Often, others made fun of them, avoided them, or called them weird or odd. One participant reported that he suffered multiple injuries as well humiliations in the hands of the bullies. He reported:

> "I don't know why they pick on me. I just want to be their friend, but they call me weird and get me in trouble. I don't understand why they are so mean to me."

b. Social Isolation – All participants also reported that they frequently played alone. They expressed their frustrations about their lack of friends and their social isolation. They stated that they would like to have friends, but they did not know how. They tried to make friends, but their peers did not want to spend time with them to play, converse or just 'hang out'. Another participant stated:

> "I have a friend who plays with me sometimes, but he doesn't really hang out with me. I like playing with monkey games on my Gameboy. I don't understand why they don't want to play my game. It's fun."

c. Group participation - Participants expressed that they want to be accepted and be part of a social group. They also stated that they did not understand how to

initiate and manage social relationships at school. They spent their time mostly with their families and siblings. Another participant reported:

> "I don't understand girls. They come and talk to me and they like me, but I don't know how to talk to them so I don't say anything. I will answer their questions when they ask me a question. I don't want to be rude if I don't answer."

d. Personal Well-being - Parents also expressed their concerns of their child's wellbeing. For instance, Participant D was under constant adult supervision in school because others would pick on him, and he would retaliate by hitting the other person when he became angry. Participant B generally avoided most social interaction and works alone most of the time. Participant A has a history of depressive moods, and he is often withdrawn, moody, and angry. The parents of all the participants were afraid for their child's emotional and mental health, as well the physical safety of their children due to their disability.

The results of the intake interview led to the selection of two social cognitive skills '*Thinking of you*' and '*Working as part of a group*'. The Social Thinking intervention has numerous lessons that address several of social cognitive skills (Winner, 2005), targeting specific skills addressed the challenges identified by the parents and the participants during the interviews. The social cognitive skill '*Thinking of you*' (coded TOO) may improve each participant's ability to take into account other people's emotions, desires, viewpoints, and the intentions of others during social interaction. Their ability to make smart guesses on the emotional and mental state of others will

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influence their responses during social interaction. The second cognitive skill, '*Working as part of a group*' (coded WAPG) may teach the participants how to show their interest to join the group through their body language and their shared interest with the group members. The two social cognitive skills address issues on social isolation, being a part of a group, and personal well-being. Furthermore, their ability to guess other's plans may help them differentiate between friend and foe more readily, thus minimizing possible bullying situations. Thus, improvements (if any) of TOO and WAPG skills may suggest that the Social Thinking intervention can be effective in teaching adolescents and young adults with AS social cognitive skills.

Observational Data

This researcher and a second observer recorded baseline, intervention, and generalization data through real time data gathering, and while viewing the recorded sessions. They collected data during the 21 sessions of the research study. Recorded sessions were reviewed to establish consistency in data collection. Observers used the time-sampling interval recording method to mark the presence (or absence) of target behaviors during the last minute observation period of the 5-minute interval. The data were graphed for Visual analysis using the Split-middle technique for Trend Analysis. The data collected on Participant A, B, and D's performance during each phase were plotted on a graph for visual analysis using the Split-middle technique for Trend Analysis. The graph represented the trend of the data, the magnitude of behavior change, and the latency of change prior to the application of the intervention (see Appendix A, Figures 1, 2 and 3). Participant C and E continued to participate in the sessions, but the data gathered on their behaviors were excluded in this analysis due to limited baseline

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data (attended only two baseline sessions) which were inadequate to show patterns of stability in baseline behaviors. Participant C also missed three more sessions during the intervention sessions due to illness and other commitments. Participant D missed four additional sessions because the family was going on vacation.

Within-phase patterns were inspected to determine trend and latency of behavior change in baseline, intervention and generalization phases. Furthermore, between-phase patterns were estimated by examining the mean and level changes from one phase to the next. Variability of data was scrutinized to determine magnitude of behavior change upon the application of the intervention (Kazdin, 1982). The results are summarized in the visual analysis of the observational data at the conclusion of this section.

Visual Analysis, Participant A Graphs. In order to gain insight into the results of the data, two graphs were generated to facilitate visual analysis (see Figure 1) of each graph. By comparing the two graphs, any changes in Participant A's behaviors during intervention were identified, and trend lines on the graphs were drawn.

Figure 3. *Participant A TOO and WAPG graphs.*
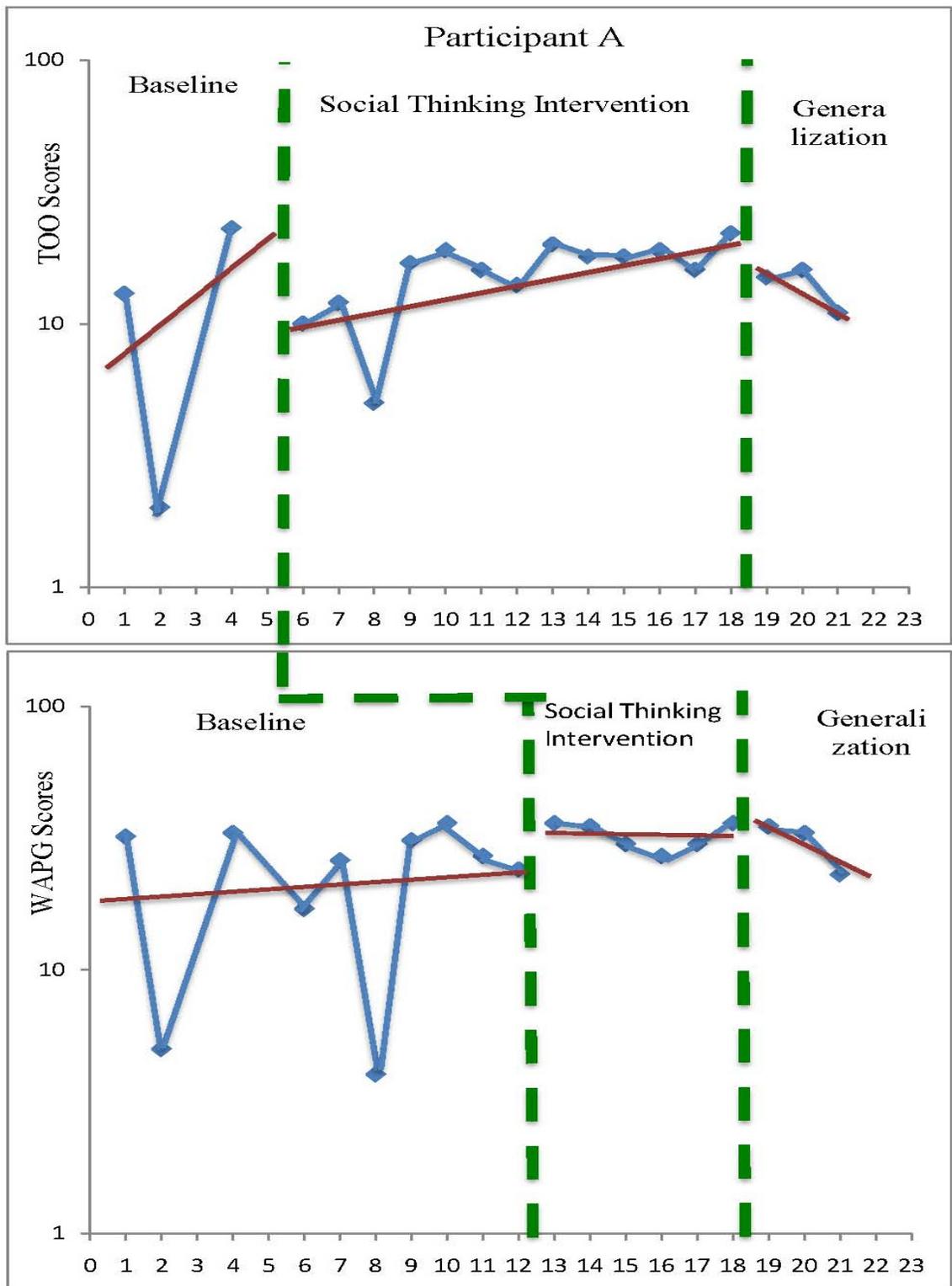
Participant A attended 19 out of 21 sessions during the study. He missed two

sessions during baseline phase because he was reluctant to return to the group. He stated

that he felt his social skills were above the skills of the other members of the group, and

he was uncertain if he could learn anything from the intervention. However, Participant

A opted to stay because he wanted to honor his commitment to participate in the study.

The lessons he missed were examined and noted to have been repeated during the

intervention, so his data is deemed relevant to this study.

   Trend and magnitude. Within-phase baseline pattern for Participant A's TOO

graph showed a positive slope indicating a celeration line with an upward trend with

medium magnitude. The data show high variability (range of 21 points) during the TOO

baseline. In contrast, WAPG Within-phase baseline shows a positive slope with low

magnitude. Though the WAPG baseline shows medium variability (range of 17 points).

Nonetheless, the baseline shows stability over time.

    Within-phase patterns of Participant A's TOO graph during the intervention stage

revealed that the data had an upward trend with medium magnitude. The scores have

medium variability (range = 12), which show stability in the scores during this phase. In

addition, examination of WAPG Within-phase patterns during the intervention stage

revealed the celeration line has a descelerating trend with low magnituede. Nonetheless,

decrease in scores are minimal as indicated by the low magnitude of change. The scores

have low variability (range of 9 points), which may indicate that Participant A

demonstrates WAPG behaviors consistently among his peers.

   Within-phase patterns during the generalization stage were also examined both

TOO and WAPG social cognitive skills. The graph displayed medium magnitude

downward trends for both skills with medium variability. The data seem descelerate with medium magnitude during generalization activities.

Latency of change. Between-phase patterns were assessed by comparing the last datum of one phase to the first datum of another phase (baseline to intervention and intervention to generalization) to evaluate changes (if any) in performance after the intervention was applied (Kennedy, 2005). The TOO graph presents a 13 point drop (23 to 10), which may indicate a functional relationship TOO behavior change and the application of the intervention. While there is an overlap of data values between the baseline and intervention phases, the overall graph indicates an upward trend, which is also as important in determining functional relationships between behavior change and the intervention.

When between-phase patterns of WAPG graph were analyzed, a level change of 12 points (24 to 36) occurred between baseline and intervention phases.   In addition, the direction of the trendlines from baseline to intervention changed when the intervention was applied. The level and trendline direction changes illustrate that the intervention had an effect on the WAPG behavior scores, suggesting that there is a functional relationship between the behavior change and the intervention

Therefore, both the analysis of within-Phase and between-Phase Patterns of the TOO and WAPG graphs during baseline and intervention phases show a functional relationship between the Participant A's behavior change (increase in TOO and WAPG skills) and the application of the intervention. The baseline for both TOO and WAPG show high variability, which could be attributed to Participant A's impatience in learning

social skills that he finds useful in social interaction. If the baseline sessions were extended for longer periods, Participant A was likely to stop his participation in the study.

Functional relationship between Participant A's behavior changes and the implementation of the intervention was noted in the level changes on both TOO and WAPG data between baseline and intervention. Participant A's TOO intervention data prior to the introduction of WAPG intervention showed more variability when compared to the data when both TOO and WAPG were implemented. These behavior changes indicate a stronger relationship between behavior change and intervention when the social cognitive skills are being used in activities that show the utility of the skills he learned. Nonetheless, his generalization data are highly variable and declining, which may be due his difficulty in applying the skills he learned in a new setting, the farm.

Descriptive Statistics of Observational Data, Participant A. The results of the Split-Middle Trend Analysis were compared with the mean changesgenerated by PASW Statistics 18 (formerly SPSS). Data were manually inputted and descriptive analysis was generated to obtain the means for both TOO and WAPG. Table 4 and Table 5 details the descriptive statistics gathered.

Table 4. *Descriptive Statistics on Participant A's Data on 'Thinking of others' (TOO) behavior.*

	N	Range	Minimum	Maximum	Mean	Std. Deviation
BaselineTOO	3	21.00	2.00	23.00	12.67	10.50
InterventionTOO	13	17.00	5.00	22.00	15.85	4.62
GeneralizationTOO	3	5.00	11.00	16.00	14.00	2.64

The results of the statistical analysis show that the means increased in the TOO graph from baseline phase (12.67 ±10.50) to intervention phase (15.85 ±4.62) by three points. Both data sets show medium variability of scores (ranges are 21 and 17 respectively). The change in means indicate a slight improvement of TOO cognitive skills. In comparison, generalization mean dropped by one point to 14 ±4.52, with low variability in scores (range of 5). While the mean score dropped one point, Participant A seemed to maintain most of the TOO skills gained during the intervention.

The statistical data were compared to the visual analysis of the graphs plotted (Figure 1). It appears that the data showed results similar to the visual analysis. The changes in the TOO means reflect an upward trend from baseline and intervention phases, and a decelerating trend during the generalization phase.

Meanwhile, WAPG descriptive statistics indicate a baseline mean of 21.50 ± 12.38. High variability (range = 32 points) during the baseline phase is noted, though the trend shows stability of behaviors during the phase. When baseline and intervention means (32.33 ± 3.83), were compared, a 20-point increase between phases was calculated. Based on the visual inspection, application of the intervention showed a noticeable increase in Participant A's WAPG behaviors, confirming the results of the visual analysis that there is a functional relationship between the intervention and behavior change.

Table 5. *Descriptive Statistics on Participant A's Data on 'Working as part of a group'*

(WAPG) behavior.

	N	Range	Minimum	Maximum	Mean	Std. Deviation
BaselineWAPG	10	32.00	4.00	36.00	21.50	12.38
InterventionWAPG	6	9.00	27.00	36.00	32.33	3.83
GeneralizationWAPG	3	12.00	23.00	35.00	30.33	6.43

Lastly, the generalization WAPG mean is 30.33 (standard deviation $= \pm 6.43$),

which shows a slight decrease in mean, but the two point decrease still denotes a higher

mean than the baseline mean (21.50). The drop in mean may suggest a decrease in

WAPG skills, but it also indicates that Participant A was able to maintain most of the

social cognitive skills he learned during the intervention phase. Accordingly, these

results concur with the visual analysis results, using the Split-Half method of trend

estimation.

Visual Analysis, Participant B's graphs. TOO and WAPG graphs for

Participant B's data were also visually examined using the Split-half trend estimation to

identify within-phase and between-phase patterns and reveal the effects of the

intervention during the study.

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Figure 4. *Participant B TOO and WAPG Total Raw Scores Graph.*
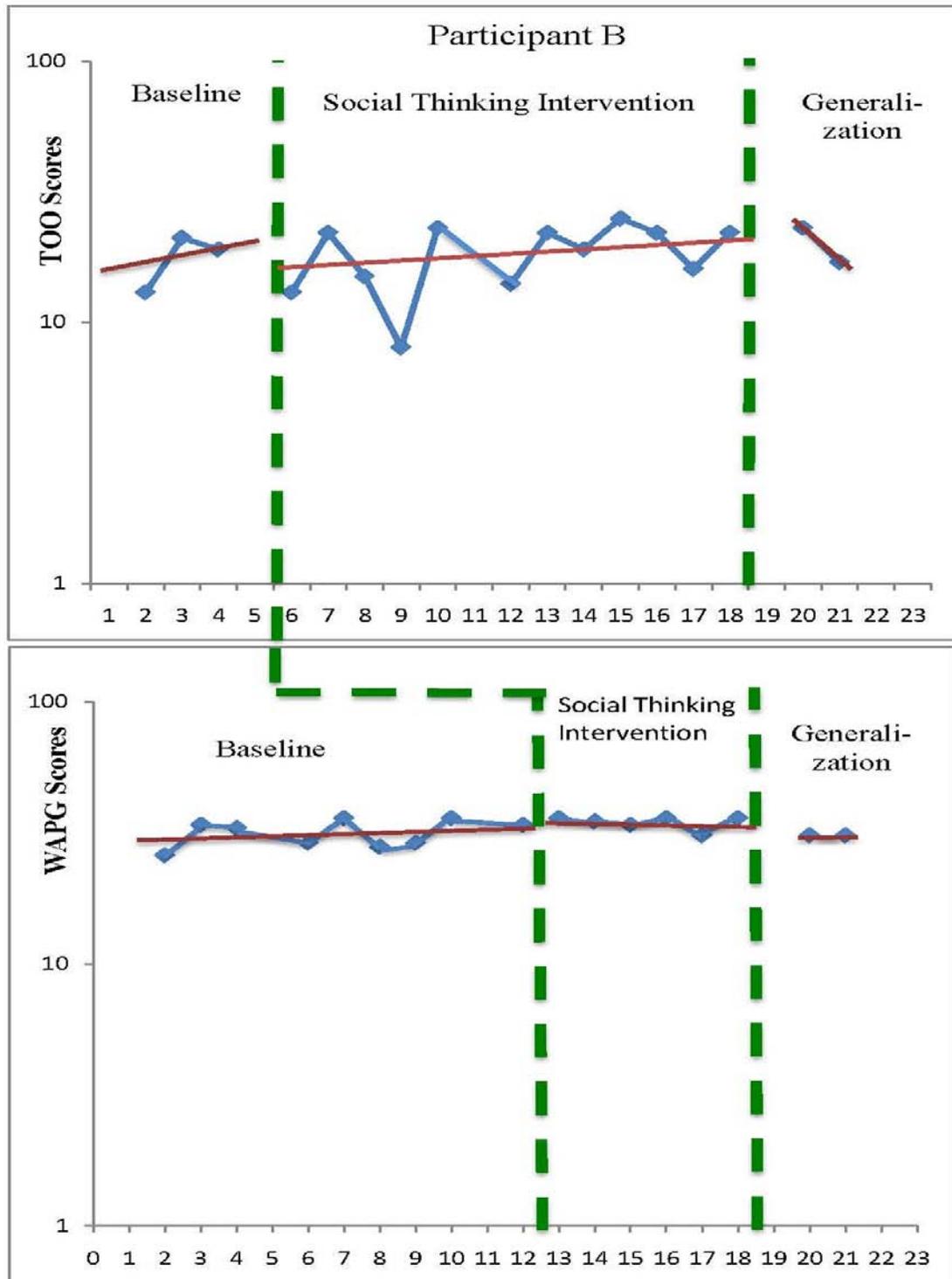
Participant B missed four sessions during the study. He missed two sessions during the baseline phase, one session during the intervention phase, and one session during the generalization phase. He missed the sessions due to family commitments that his parents chose not to change. The lessons he missed were duplicated during the course of the intervention, and his data were also deemed relevant.

Trend and magnitude. Participant B's TOO within-phase baseline pattern shows a slope trending upwards with medium magnitude of strength and low variability (range of 8 points). Moreover, WAPG within-phase baseline shows an upward trend with low magnitude, and the scores show low variability (range of 10 points). This celeration line is increasing, and the WAPG baseline is stable.

Within-phase intervention patterns for both TOO and WAPG graphs were also analyzed . The TOO intervention trendline demonstrates a positive slope, which seems to indicate that the scores are accelerating with a medium magnitude of strength. The scores have medium variability (range = 17), pointing to stability in intervention scores. Likewise, WAPG within-phase intervention patterns were assessed and found that the trendline has a downward trend (negative slope) with low magnitude of strength. The trendline indicates minimal change in Participant B's WAPG skills.

Latency of Change. Visual analysis of TOO between-phase patterns between baseline to intervention show a four-point level (19-13) level change, reflecting a rapid change in Participant B's TOO behaviors when the intervention was first introduced. An accelerating trendline on the TOO graph (starting at 13 and ending at 22), signifying an increase in TOO skills. While there is 90% overlap in the quantitative values between

the baseline and intervention phases, there was positive directionality of the overlap. This can imply gain in social cognitive skill '*Thinking of others*.'

Moreover, between-phase patterns analysis for the WAPG graph also made evident an overall upward trend (positive slope) with medium magnitude. There is a four point level change between the baseline and intervention phases from 34 to 36 and a change in directionality of the data during the intervention phase. The acceleration trendline and the level change presupposes that the intervention also had an effect on Participant B's WAPG behavior scores. These level changes and change in direction of the celeration line between phases suggest a functional relationship between WAPG behavior changes and the application of the Social Thinking intervention.

Therefore, analysis of within-phase and between-phase patterns of the TOO and WAPG graphs during baseline and intervention phases show functional relationships between Participant B's behavior change (increase in TOO and WAPG skills) and application of the intervention.

Descriptive statistics of observational data, Participant B. Measures of central tendencies (Means) of TOO (see Table 6) and WAPG (see Table 7) were evaluated during baseline, intervention and generalization stages to gather information about the overall trend of the observational data.

Table 6. *Descriptive Statistics on Participant B's Data on 'Thinking of others' (TOO)*

behavior.

	N	Range	Minimum	Maximum	Mean	Std. Deviation
BaselineTOO	3	8.00	13.00	21.00	17.67	4.16
InterventionTOO	13	11.00	14.00	25.00	20.69	3. 20
GeneralizationTOO	2	6.00	17.00	23.00	20.00	4.24

Participant B's TOO (see Table 6) baseline phase mean is 17.67±4.16, with low

variability (range = 8), which shows stability in the baseline scores. The intervention

phase mean is 20.69 ±3.20, and it shows medium variability (range = 11). Lastly, the

generalization phase mean is 20.00 ± 4.24 with low variability. The intervention and

generalization phase measures of central tendencies shows stability since there minimal

point change between phases.

Table 7. *Descriptive Statistics on Participant B's Data on 'Working as part of a group'*

(WAPG) behavior.

	N	Range	Minimum	Maximum	Mean	Std. Deviation
BaselineWAPG	9	39.00	0.00	39.00	28.78	11.54
InterventionWAPG	6	5.00	31.00	36.00	34.67	1.97
GeneralizationWAPG	2	0.00	31.00	31.00	31.00	0.00

WAPG descriptive statistics results (see Table 7) revealed that the baseline

WAPG mean is 28.78 ±11.54, with a high degree of variability in the data (range = 39).

The intervention mean (34.67 ±1.97) , however, shows a 6- point increase, with low

variability (range = 5), which illustrates stability in the data. Lastly, the generalization

phase mean is 31.00 points indicating both scores have no variability. Nonetheless,

overall trend of the means across the phases demonstrate a positive trend. Thus,

Participant B's TOO and WAPG mean scores across phases also concurs with the visual

analysis of the observation data. Participant B's TOO skills improved after the social

thinking intervention was applied.

Visual Analysis, Participant D's graphs. Participant D's TOO and WAPG

graphs were visually analyzed (Figure 3), and the results are presented in this section.

Figure5. *Participant D TOO and WAPG Total Raw Scores Graph.*
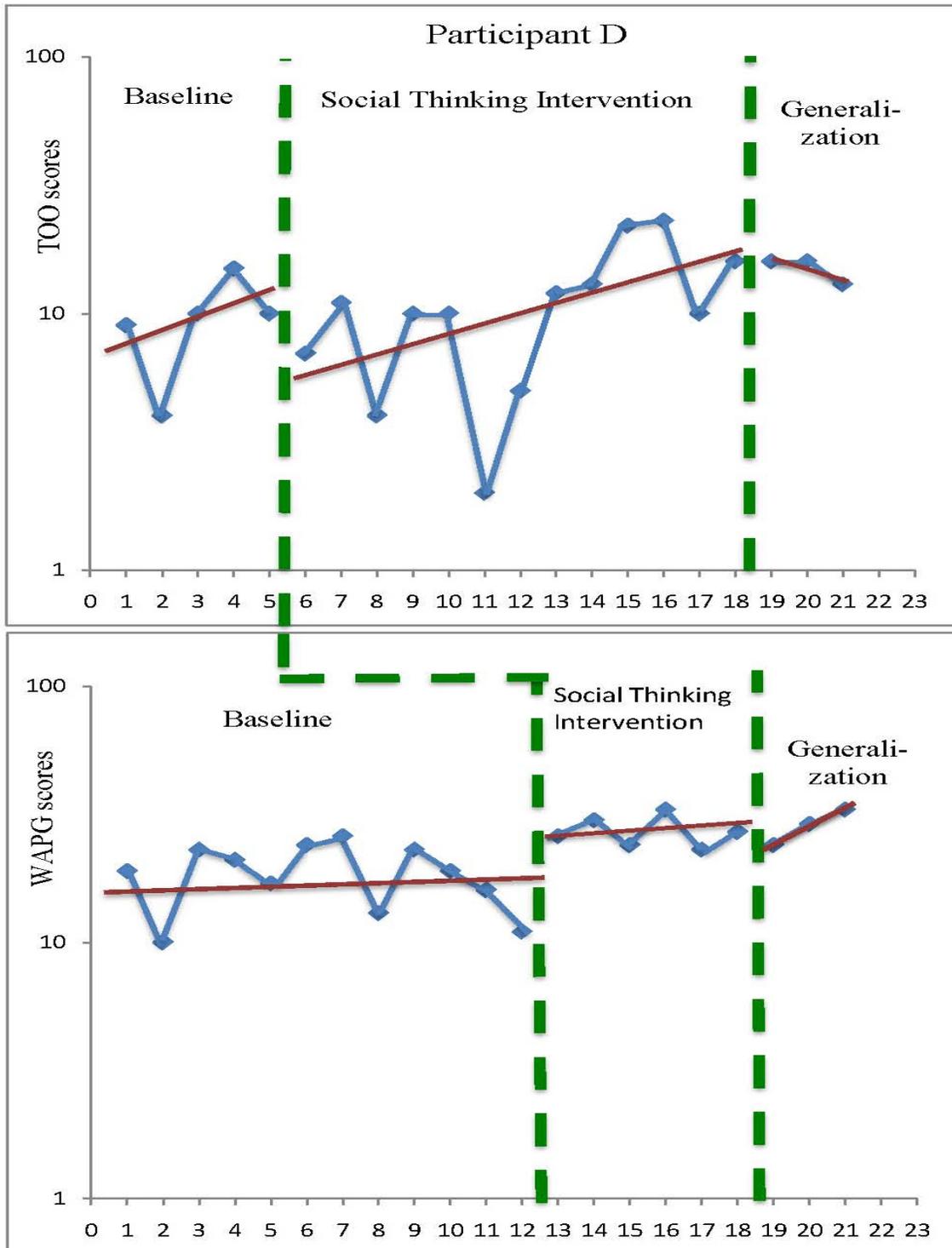
Trend and magnitude.   The results from the Split-Middle Trendline Estimation on Participant D's TOO graph within-phase baseline patterns show an accelerating trend with medium magnitude of change. The data also demonstrate medium variability (10 point range), indicating moderate scatter in the data points around the mean. In contrast, the WAPG Within-phase baseline patterns showa flat trendline.with medium variability in the data (range = 14).

TOO within-phase intervention patterns displayed a rapidly accelerating trend, and the data reveal high variability; (21 point range); nonetheless, the last six points in the intervention phase displays low variability. The celeration line shows a steady increase in TOO behaviors throughout the intervention phase, an indication of an increase in TOO social cognitive skills during the intervention. Additionally, WAPG within-phase intervention patterns revealed that the intervention display an accelerating trend with low magnitude. Furthermore, the data show low variability (range = 7), possibly displaying stability in the data.

Lastly, TOO within-phase generalization pattern revealed deceleration trend with low magnitude and low variability, indicating a stable pattern in the data. Meanwhile, WAPG Within-phase generalization pattern reveals a an accelerating trendline with with medium magnitude.

Latency of change. Examination of the between-phase patterns of Participant D's baseline and intervention TOO and WAPG phases suggest that a change in behaviors occurred when the intervention was applied.   TOO patterns revealed level change, (10 to 7) between the baseline and intervention phases, showing a rapid change in behaviors after the introduction of the intervention. Such rapid change in behaviors indicate that the

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intervention may have contributed to the change in Participant D's behaviors. The graph also showed some overlap in data between the baseline and intervention data values, but this overlap does not minimize the importance of the rapid change demonstrated by the change in levels, as well as the increasing trendline. This can be evidence that Participant D gained the social cognitive skill,'*Thinking of others*', while participating in the study. In addition, WAPG between-phase patterns also reveal a 17-point level change from the baseline to intervention phases. Again, the intervention seem to influence a rapid change in Participant D's behaviors once the it was applied.

Descriptive statistics of observational data, Participant D. Results of the Split-half Method of Trend Estimation were compared with measures of central tendencies (Means) of Participant D's data. Details of the descriptive statistics for TOO (see Table 8) and WAPG (see Table 9) are included.

Table 8. *Descriptive Statistics on Participant D's Data on 'Thinking of others' (TOO) behavior.*

	N	Range	Minimum	Maximum	Mean	Std. Deviation
BaselineTOO	5	11.00	4.00	15.00	9.60	3.91
InterventionTOO	13	21.00	2.00	23.00	11.15	6.32
GeneralizationTOO	3	3.00	13.00	16.00	15.00	1.73

The TOO baseline phase mean is 9.6 ±3.91, and the data have medium variability around the mean (11 points). The intervention phase mean increased to 11.15 ±6.32, with highly variable scores, as noted in the 21 point range. Furthermore, generalization phase shows an additional increase in the mean to 15 ±1.73, with low variability in the data based on the small range of scores (range = 3.00).

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Table 9. *Descriptive Statistics on Participant D's Data on 'Working as part of a group'*

(WAPG) behavior.

	N	Range	Minimum	Maximum	Mean	Std. Deviation
BaselineWAPG	12	16.00	10.00	26.00	18.50	5.23
InterventionWAPG	6	10.00	23.00	33.00	27.17	3.76
GeneralizationWAPG	3	9.00	24.00	33.00	28.67	4.51

Descriptive statistics illustrate that Participant D's WAPG baseline phase mean is

18.50 ±5.23 with medium variability (range = 16). The intervention mean (27.17 ±3.76)

revealed an increase of about ten points, with medium variability (range = 10).

Furthermore, the generalization phase shows further increase in the mean (28.67) with

low variabilty (range= 9 points). TOO and WAPG mean increases from baseline to

intervention phases may imply that Participant D gained TOO and WAPG social

cognitive skills from the Social Thinking intervention, and he was able to apply these

skills when he was in a new environment.

In summary, level changes in both TOO scores and WAPG scores show

functional relationship between Participant D's behavior change and the application of

the intervention. Participant D required longer period to show stability in baseline

behaviors, which can be attributed to unpredictable events that occur prior to arriving in

setting 1 which are beyond this researcher's control. The data seem to show more

stability in his behaviors when both skills were being taught. Improvements in group

participation during generalization were also noticeable with medium acceleration of

behavior change.

Social Responsiveness

In addition, utilizing the SRS questionnaire was necessary to measure any increases in social responsiveness of the participants when engaged in reciprocal social interactions in familiar environments. The parents/caretakers filled out the pre and post intervention questionnaires to measure social responsiveness changes. The results of the SRS Questionnaire data show improvements in the participants' social responsiveness after the intervention was implemented. Moreover, the data were inputted manually into PASW Statistics 18 and descriptive analysis was conducted to study the mean changes of the scores. The participants showed improvements in their social cognitive skills and social responsiveness based on the mean scores changes. In addition, the effect of cultural background on social cognition and social responsiveness revealed no significant correlation among the three factors.

Social Responsiveness Scale T- scores. Two participants' data were excluded due to due to missing instrumentation sessions. The scores of the three participants (A, B, and D) reflected decreases in T-scores (see Table 10),. Since Social Responsiveness scores from the SRS are indicative of social impairments, decreases (if any) in scores would indicate improvements in their skills. The pre-intervention scores "equalized" the effects, ensuring that errors were minimized in the study.

Table 10. *Social Responsiveness Scale Pre and Post Intervention T-Scores*

Participants	Social Cognition Subscale T-scores		Social Responsiveness T-scores	
	Pre	Post	Pre	Post
A	85	79	97	86
B	94	81	87	83
D	105	68	104	67

Social Cognition and Social Responsiveness scores were gathered pre and post intervention for Participants A, B and D. Social Cognitive Subscale and Social Responsiveness raw scores T-scores were converted to T-scores using the T-Score Norms for Males: Parent Ratings table provided by the Constantino and Gruber (2009). They also report that individuals who score between 60T to 75T experience mild to moderate interference in everyday social interactions due to deficiencies in reciprocal social behaviors. Individuals who score in this range are often described as "odd", "weird", "having difficulty relating to others", "quirky", "very nerdy" or "socially inept", and they experience mild autistic symptomatology. Individuals with diagnosis of AS, HFA or Pervasive Developmental Disorders, Not Otherwise Specified (PDD-NOS) often score at this range (Constantino & Gruber, 2009). Meanwhile, individuals who score from 76T or higher experience severe interference in everyday social interactions, or they are considered severely impaired in reciprocal social interaction. Individuals that score in this range have ASD diagnosis or severe cases of PDD-NOS. They are often described

with behaviors that are "very inappropriate, "considerable or extreme difficulty relating
to others", or "doesn't get it" when engaged in social interaction with their peers or other
adults. Improvements in social responsiveness skills were reflected by lower T-scores.

Figure 6. *Pre and Post Intervention T-Scores, Social Cognition and Social*
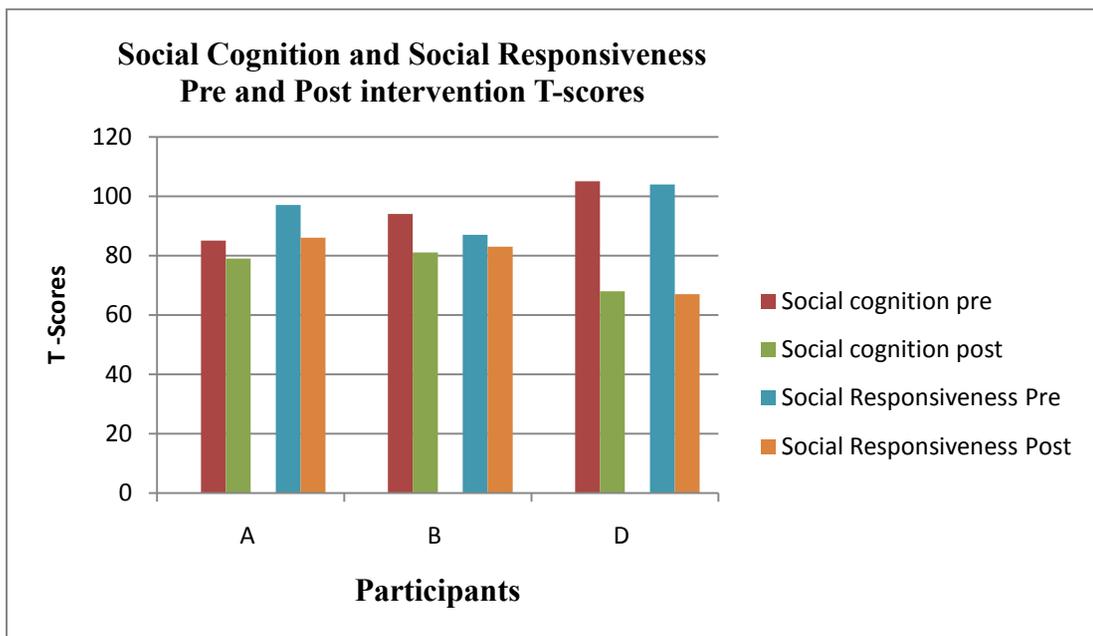
Responsiveness

Based on the bar graph (see Figure 6), all three participants improved on both
their social cognition skills and social responsiveness skills. Of the three participants,
Participant D had the largest change (lower by 37 points) in both his social cognition
subscale score and his overall social responsiveness score. Participant A's social
cognition T-score was lower by six and his overall social responsiveness score was lower
by 11. Participant B also lowered his social cognition T-score by 13 points and his social
responsiveness T-score by 4 points. It appears that the participants made progress when
they had the opportunity to learn social cognition skills utilizing the Social Thinking
Intervention.

Correlation Studies

     Correlation between social cognition, and social responsiveness. .While social cognition skills prior to the intervention (COGpre) were equally correlated with all other items in the questionnaire to social responsiveness (TOTALpre) ($r = .47$), post-intervention measures show strong correlations between COGpost and TOTALScorepost ($r = .98$) after the intervention was implemented in the study (see Table 11).. In addition, the changes in participant behaviors while interacting with their families at home were significantly correlated ($p = .046$) between social cognition (COGchng) and social responsiveness (Totscorechng).

     Based on the results of the correlation study, improvements in social cognition skills affected one's social responsiveness to others. Participants seem more self-confident when they were interacting with others during social exchanges because they were aware of what others were thinking and feeling. Consequently, they were able to respond appropriately during those instances when they were able to guess accurately. Participants asked appropriate questions and allowed opportunities for their social partners to respond. They participated in social conversations successfully. Participant A's parents reported that he child finally joined the family for dinner at the dinner table and participated in dinner conversation. Participant B joined the school play after his participation in this research. Participant D continued to volunteer at the farm as a farmhand, and he frequently interacts with customers and workers. Thus, analysis of correlation between Social Cognition (COG) subscales reflected changes in overall social responsiveness.

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Table 11. *Correlation between Social Cognition and Social Responsiveness.*

		COG pre	TotalSco pre	COG post	TotalSco post	COG chng	Totscore chng
COGpre	Pearson Correlation	1					
	Sig. (2-tailed)						
TotalScopre	Pearson Correlation	.47	1				
	Sig. (2-tailed)	.69					
COGpost	Pearson Correlation	**-.74**	.25	1			
	Sig. (2-tailed)	.47	.84				
TotalScopost	Pearson Correlation	-.57	.46	**.96**	1		
	Sig. (2-tailed)	.62	.70	.14			
COGchng	Pearson Correlation	**.95**	.18	**-.91**	**-.79**	1	
	Sig. (2-tailed)	.19	.88	.28	.42		
Totscorechng	Pearson Correlation	**.93**	.11	**-.93**	-.83	**.997**[*]	1
	Sig. (2-tailed)	.24	.94	.23	.38	**.046**	

*. Correlation is significant at the 0.05 level (2-tailed)., N=3

Correlation between cultural background, social cognition and social responsiveness. Constantino and Gruber (200) reported that culture did not appear to have a significant effect on social responsiveness or social cognition scores. Yet, correlation statistics conducted on the raw scores of all three participants indicate that culture influenced social cognition and social responsiveness scores. Research published

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by Dyches and colleagues (2004) suggest that differences in the cultural beliefs of families affect their perception of the disability and their interaction with the child with ASD. Positive appraisal of their child's ASD diagnosis would result in parents regarding their child with ASD as a blessing, and they respond to the child by "being a good mother" (Dyches, Wilder, Sudweeks, Obiakor, & Algozzine, 2004, p. 219). Native Hawaiian, Native American, African American, and some young Latin families apparently have positive regard for their child with ASD despite the disability, and they would treat their child as 'normal' and valued members of the community (Mandell & Novak, 2005). Other cultures may regard disability as a punishment for prior sins, and such negative appraisal stresses the family system, thereby affecting the social interaction within the families. Furthermore, social, cultural and family environment all affect an individual's ability to perceive social cues and interpret the information to respond socially (Dyches, et al, 2004; Mandell & Novak, 2005).

Correlation between cultural background and social cognition subscale scores. Correlation studies between cultural background and social cognition subscales were studied using the Pearson product-moment correlation coefficient (r) values (see Table 12) were evaluated. Codes assigned for each cultural background were Native Hawaiian is 3, Caucasian is 2, Hispanic is 1 and Asian is 0.

Table 12. *Correlation between Cultural Background and Social Cognition Subscale*

Scores.

		CulturalBackground	COGpre	COGpost
CulturalBackground	Pearson Correlation	1		
	Sig. (2-tailed)			
COGpre	Pearson Correlation	**.97**	1	
	Sig. (2-tailed)	.16		
COGpost	Pearson Correlation	**-.64**	-.82	1
	Sig. (2-tailed)	.55	.39	

Statistically significant to .05, N = 3

Correlation statistics show direct correlation between Social Cognitive Skills

(preintervention) and Cultural background (r = .97). This correlation suggests that

culture affects Participant D (Native Hawaiian) scored highest in impairments in social

responsiveness. Though the value is not statistically significant (p = .16), the correlation

is pertinent in this study as it suggests that social cognition is influenced by culture. In

contrast, Social Cognitive Skills post intervention and Cultural background are negatively

correlated (r = -.64). This indicates that Participant D, who is of Native Hawaiian

descent benefitted most from the social cognitive instructions, resulting in improved

Social Cognitive skills compared to the other participants (Asian, and Caucasian).

Participant A, who is of Asian descent seemed to have benefited the least. However,

Participant A and Participant B both have Caucasian parents a It appears that other

factors such as environmental influences may account for the differences in their results.

Nonetheless, correlation statistics show a positive trend indicating that the Native

Hawaiian culture may have an effect the development of social cognition in Participant

D. This statistical value is not statistically significant to .05, (p= 55), given that the

sample size of this research is small (N = 3) and the results do not necessarily generalize

to the population.

Correlation between cultural background and social responsiveness scores.

In addition, Social Responsiveness scores also correlated with participants' Cultural

Background (see Table 13).

Table 13. *Correlation between Cultural Background and Social Responsiveness.*

		CulturalBackground	TOTALpre	TOTALpost
CulturalBackground	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	3		
TOTALpre	Pearson Correlation	.24	1	
	Sig. (2-tailed)	.85		
	N	3	3	
TOTALpost	Pearson Correlation	**-.84**	**-.72**	1
	Sig. (2-tailed)	.37	.48	
	N	3	3	3

As illustrated in Table 12, there is a negative correlation between Cultural

Background and Total Social Responsiveness Post-intervention (r = -.84), but these data

are not statistically significant at .05 level (p = .37 to .48). There is a negative correlation

between post-intervention Social Responsiveness Scores and Social Cognitive Scores. It

appears the intervention was more effective for Native Hawaiians (coded 3) and

Caucasians (coded 2) than Asians (coded 0). Again, because of a small sample size, the

correlation value may not be relevant when considering the effect of cultural background

on social cognition among the general population.

Sustainability of Skills

The participants' ability to sustain the skills learned during the intervention was evaluated by introducing them to a novel environment (Setting 2). They worked at the farm as volunteer farm hands for three sessions and they worked with other volunteers working in the field. They also interacted with one supervisor while working and during breaktimes. Data were gathered using Supervisor and Co-worker surveys while they were working with others in this novel environment. No instruction or redirection was provided during this activity.

The results of the data show that all three participants were unable to maintain their TOO social cognitive skill. During the work activity, they had difficulty thinking of others and picking up cues while they were interacting with their co-workers. However, the data do not reflect the limited opportunities that the participants engaged in reciprocal social interaction while working. They were obligated to listen to instructions and completed assigned tasks independently for majority of their work sessions. Thus, the data collected during the work sessions may not truly reflect the participants' abilities to sustain the social cognitive skills they learned during the intervention sessions.

Supervisor and Co-worker Surveys. Three co-workers and one supervisor were provided with the Supervisor and Co-worker surveys during the third session at the farm. They provided their impressions of the participants at the farm. The responder themes were the following:

a. "We didn't know how to help them because they never worked in this job."

b. "They (participants) don't ask questions even when they don't know what to do".

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c. "When I told (participant B) what to do, he did not ask for help, but he needed help more than one time"

d. "He (Participant D) did not complain even when he had a hard time"

e. "They were pretty cool and funny. They like to hang out and joke around."

Overall, the supervisor and co-workers were satisfied with the results of the work social-interaction activities. They invited the participants back to volunteer at the site.

Participant Surveys. The participants also responded to the Participant survey. The themes that were notable from the survey are:

a. "I (Participant D) really liked working here. The people were nice"

b. "The people (workers) were really nice. They helped me."

c. "I (Participant A) don't ask questions. I wait for someone to tell me what to do."

d. They "were fun to talk to."

e. "I (Participant B) liked doing a good job."

Based on the results of the surveys, the supervisors and the co-workers were able to work with the participants despite the difficulties they faced. The participants were able to interact with their co-workers and supervisors successfully and their experience was a positive social and work experience. It appears that the participants demonstrated their social cognitive skills appropriately, which enabled them to interact successfully with their co-workers and supervisor at the worksite.

Reliability Measures

Two volunteer observers/data collectors participated in two training sessions prior to the initiation of the study for reliability measures. One observer was a Special Education

teacher and the second was a skills trainer, and both were trained in data collection. The sessions addressed the following:

1) Duties and responsibilities as observers in the study. The observers were trained in collecting and recording the data accurately. They were trained to follow directives of the researcher during the study to ensure integrity of data collection.

2) Observer etiquette (Tawney & Gast, 1984) - this included appropriate observer conduct, how to interact with the participants and study personnel, and how to handle the participants.

3) Practice sessions to identify target behaviors and how to collect data with two observers to ensure accurate data collection. These sessions occurred two weeks prior to data collection and periodically during the study to verify the accuracy of observers' data collection. The observers were provided time for questions and clarification.

4) Data protocol submission and storage – observers submitted all data sheets to the researcher for storage.

5) Confidentiality requirements and personal responsibility – Observers were briefed that any and all information gathered in the study, as well as the identity of the participants were confidential and not to be revealed to anyone other the researcher. In addition, interaction outside the study (if any) was limited to greetings initiated by the participant.

Interobserver agreement activities took place to determine reliability of observers' scoring for each interval across all behaviors. A minimum of 80%

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Interobserver Agreement score among observers establishes consistency of observations, which can predict reliability and variation of data collected. Inconsistencies in recording target behaviors would cause observer bias, resulting in unreliable data. Initial discussion and two practice sessions to collect data occurred prior to initiating the interobserver agreement sessions.

Three raters, this researcher, a teacher volunteer and a skills trainer, coded data independently during three sessions (baseline, intervention and generalization phases). The definitions of the behaviors described in Table 2 were utilized during the sessions. Coding occurred throughout the 45 minutes sessions. Data collected by the observers were evaluated to determine agreement between observers using Point-by-Point agreement (Kazdin, 1982) as the reliability measure. The formula used is:

$$\text{Point-by-Point Agreement} = \frac{A}{A+D} \times 100$$

Where A = agreement for the session

D = disagreements for the session

The observers took data on each of behavior listed in Table 2. Reliability of coding data for each category varied. The reliability of the data for *Thinking of other'* is 83%, and for *Working as part of a group* is 85%. Observers discussed all disagreements until they reached consensus.

Since acceptable scores for reliability with inter-observer agreement are within 80% to 90%, both scores are within acceptable percentages for Interobserver Agreement reliability. Hence, data collectors were reliable in collecting data throughout the sessions.

Social Validity

Social validity was measured using Subjective Evaluation method (Kazdin, 1982) to validate the effects of the intervention on the participants. The participants' caretakers provided feedback on the participant's social interactions by filling out the SRS questionnaires during Pre and post intervention sessions. In addition, the Social Comparison method (Kazdin, 1982) was also used to obtain post-training ratings from participant co-workers and supervisors to provide information regarding the social skills of the participants in the work setting.

The results of the Subjective Evaluation method of Social Validity using the SRS indicated that the intervention showed Social Validity by the overall improvements reported by the ratings from the participant parent/caretaker. All three participants showed improvement in their social responsiveness with their family members and their peers. Participant A was more inclined to ask appropriate questions, and he joined his family during dinner for the first time. Participant B's involvement in a school play occurred after this research study was completed. Participant D continues to have challenges, but he has improved in responding to others in social activities. He has continued his volunteer work at the farm. As a group, they showed cooperation and collaboration skills while\ working on tasks assigned to the group.

The results of the social comparison in the generalization setting (co-worker and supervisor responses to the survey provided at the end of the volunteer job activities) were reviewed. The survey results showed positive responses on the participants' performance in the work setting. Sample responses include the following: "They were pretty cool and funny." "They like to hang out and joke around." In conjunction, the

observational data results show that the participants were able to maintain the improvements on their socialization skills using social cognitive skills they gained from the intervention.

Overall, results from the Subjective Evaluation method and Social comparison indicate that this research is socially valid. The study yielded positive results in the observational data and the SRS questionnaire, indicating that the participants gained social cognitive skills *Thinking of others* and *Working as part of a group.* Furthermore, they were able to maintain some of the skills they learned, though they started to deteriorate without additional instruction. This implies that continued instruction and review of social cognitive skills may strengthen skill acquisition and maintenance. Lastly, some skills generalized to novel situations successfully.

CHAPTER V

DISCUSSION

Individuals with Asperger Syndrome continue to struggle with their difficulties in social interactions and developing social relationships (Attwood, 2000; Myles, Trautman, & Schelvan, 2004). Their inability to understand other people's perspectives (mindblindness) hampers their ability to effectively interact with others and achieve social acceptance of their peers (Baron-Cohen, et al., 1985; Winner, 2007). As noted in the literature, individuals with AS frequently experienced social isolation, being bullied, anxiety, depression and related mental health illnesses that compromise their quality of life (Gutstein & Whitney, 2002; Howlin, 2000; Klin et al., 2007; Ozonoff, South, & Miller, 2000). Therefore, it is necessary to develop and implement effective social cognitive skills that will mitigate these social difficulties. Social Thinking has shown promise in teaching individuals with AS social cognitive skills to help them navigate their social world (Winner, 2005). Thus, the primary purpose of this study was to evaluate the effectiveness of Social Thinking in teaching social cognitive skills to young adults and adolescents with AS.

This research study attempted to answer three questions in order to evaluate the effectiveness of Social Thinking in teaching social cognitive skills to adolescents and young adults with AS. The first question addressed social cognitive skill development among adolescents and young adults with AS. Using the results of parent and participant intake interviews prior to the study, two social cognitive skills were chosen to measure the effectiveness of the Social Thinking intervention. These skills were: (a) *Thinking of others* (coded TOO), and (b) *Working as part of a group (*coded WAPG).

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Upon examining the results of this single- subject multiple baseline research design with repeated measures, it appears that all three participants gained social cognitive skills TOO and WAPG from the intervention.   In addition, visual analysis of the graphs showed that teaching just the TOO skills (first six weeks of the intervention) showed improvement of TOO skills and instruction of both TOO and WAPG skills strengthened the social cognitive skills of the participants throughout the rest of the study. In particular, the participants improved in identifying emotional cues from others through visual cues and making approximations of appropriate response, asked appropriate questions to solicit information about other people's interests during a conversation and maintain group participation, and they improved participation in conversations by monitoring conversation turns.

The second research question entailed measuring increases in the participant's social responsiveness in reciprocal social interactions within familiar environments after the Social Thinking intervention was applied. The Social Responsiveness Scale (SRS) questionnaire measured changes in social responsiveness and decreases in the score corresponded to increases in social responsiveness. Parents responded to the SRS questionnaire pre and post intervention to minimize error in the measurements. The results of the questionnaire revealed improvements in participants' social responsiveness. Apparently, when the participants had the opportunity to learn social cognitive skills using the Social Thinking intervention, they were more socially responsive towards their family members and familiar people with whom they interacted socially.

Finally, generalization of the social cognitive skills gained was measured when participants' engaged in a novel environment, the volunteer work at a Farm in Paia,

Maui. They worked as farmhands for three sessions. Observational data and qualitative surveys were gathered to assess the participants' progress. Observation data showed that all three participants were able to use their '*Thinking of others'* and '*Working as a group'* *social* cognitive skills at the worksite. However, their '*Thinking of others'* skills deteriorated over time, which may be due to limited opportunities for reciprocal social interaction during work activities. Nonetheless, two out of three participants (Participants B and D) were able to maintain their '*Working as part of a group'* skills while they were working. On the other hand, Participant A's social cognitive skills TOO and WAPG deteriorated over the last three weeks in the novel environment.

Culture also influenced the results of this study. Based on correlation studies, culture had an impact on gains in social cognition skills and social responsiveness. Participant D who was Native Hawaiian demonstrated more gains than other participants in the study did. Improvements may be due to the differences of how parents perceive the diagnosis of their child with AS. Mandell and Novak (2005) stated that Native Hawaiian families, American Indian families, and African American mothers are less likely to perceive negative impact of having a child with ASD compared to Caucasian mothers. In addition, cultures with strong religious and spiritual beliefs are more accepting of their children's limitations (Tincani, Travers & Boutut, 2009). Dyches et al. (2004) also reported that families utilizing extended family support were more likely to impact on how the child with ASD functions within the family system. They further stated that nuclear families were likely to be more stressed and were likely to seek more professional services to improve the academic functioning of their child with ASD,

instead of their social functioning (Dyches, et al., 2004; Tincani, Travers, & Boutot, 2010).

The results of the qualitative surveys from the farm supervisors and co-workers were also examined to gain perspective of the impressions made by the participants on others. The supervisor and co-workers were concerned with the participants' competence to do the work because of their inexperience. They noted that the participants were able to take part in positive social interaction such as small talk, making jokes, and they helped develop a positive atmosphere at the work site during the work activities and during their break times. Furthermore, the participants reported that they enjoyed the opportunity to work and to work with others at the farm. They indicated that they would like to work in other environments as well because of their positive experience at the farm. It appears that while data collection does not reflect generalization of their skills at the worksite, the perception of their co-workers and their supervisor were positive. The participants were able to foster positive work interactions while they were at the farm.

Reliability and validity measures were established to ensure that the data collection was consistent and the results of the research were trustworthy. Inter-observer agreement using Point-by-Point agreement yielded 83% reliability for TOO and 85% reliability for WAPG. Therefore, since the scores are above 80%, the results of this study are considered reliable. Furthermore, the Subjective Evaluation method of Social Validity and Social Comparison methods were used to measure social validity. The results of the SRS questionnaire as well as the results of the qualitative surveys at the farm revealed improvements in the social functioning of the participants in both familiar and novel environments.

Incidental Findings:

During the course of the research, parents reported that the participants applied their skills at home. Participant A's mother reported that he joined the family at the dinner table after the group learned and practiced conversation skills during mealtimes. Several parents also reported that the participants were practicing their observation skills and conversation skills at home. In addition, the participants developed group cohesiveness despite differences in their social interaction abilities. Prior to the intervention sessions, the participants were unaware that other members of the group may be interested in activities they may choose, which may encourage group interaction. As the sessions continued, the participants trusted each other, and they were willing to try new and challenging activities in front of the other members of the group. They were considerate towards other participants, ensuring that everyone had the opportunity to participate. The participants experienced shared laughter, group collaboration, and social acceptance in the group. The participants were willing to stay in the study because of the positive social experiences that occurred throughout the course of the study.

Limitations of the Study

A small sample size (n=3) presents as the first limitation in this research study, limiting the generalizability of the results to the general population. Exclusion of two participants created a smaller sample size. Additionally, there was limited access to individuals with AS, despite recruitment efforts (contacted state and local agencies, as well as private practitioners). Families were unwilling to volunteer their child to participate because of logistics (who will take them to and from the research site, summer

schedule, vacation plans, etc). Some parents were unfamiliar with the intervention and they were unwilling to try a new intervention for their child.

Participant pool composition is also a limitation of this study, as the participants may not represent the AS population on Maui. In addition, there were three boys and no girls, so gender bias is difficult to ascertain. .No exact count of the individuals with AS exists on Maui, because they is no central reporting agency gathers and provides this information. Besides, AS diagnosis can occur at any age because academic skills are not as impaired as social functioning and referral for public services may not occur early (like Participant A).

Moreover, this researcher delivered the intervention exclusively, which is also a limitation of this study. Personal involvement in the research can influence the delivery of the intervention based on skill level of the facilitator. Furthermore, decisions on how to deliver the material, how to direct the participants, and how to set up activities for the participants can influence the results of the data. Finally, data collection can be biased while viewing the recorded sessions, affecting the results of this study. What this researcher remembers during the lessons may have coloured how the behaviors were evaluated and how the data were noted.

The length of time of the study was also a limitation. The short baseline and generalization phases may account for high variability in the data. While longer periods may show stability in the data, participants' desires to gain social cognitive skills and improve their social lives were more compelling in selecting a shorter baseline phase. Treatment effects may also be difficult to measure because of the short time the intervention was administered, and greater treatment effects may be seen with more

instruction time. Generalization sessions were short as well because the participants were eager to utilize their skills in other settings and develop relationships with those in their normal social circles (such as school and community settings).

Furthermore, confounding variables were limitations to this study. These variables included subject variables (e.g., mood changes, health status, gender, culture, and socio-economic background) and situation variables (e.g. time of day, level of activity, hunger, relationship issues). These variables are difficult to control and the effects on the results of the study are difficult to ascertain.

. Finally, subjective reports from parents, participants, supervisors, and co-workers were evaluating the performance of the participants while filling out the SRS Questionnaire. Nonetheless, the results of the observation data are consistent with the results of the SRS, a standardized assessment, which is still an important finding.

Recommendations for Future Research

This study confirms that the Social Thinking intervention may be effective in teaching social cognitive skills to adolescents and young adults with AS and improve their social responsiveness to social situations. Pre and post-intervention differences showed significant improvements in the participants' social responsiveness. Correlational studies of SRS also shows that improvements in Social Cognition skills also showed improvements in social responsiveness. Since Social Thinking purports to promote understanding the "why" in social exchanges, developing social cognitive skills can enable one to engage in social situations with more positive results.

In addition, several factors influenced the positive results in this study. SRS is a sensitive instrument to measure social cognitive skills. Changes in social cognitive skills

improves social responsiveness significantly. Also, one instructor implemented the

Social Thinking lessons during the intervention sessions in one location to maintain

fidelity of the intervention. In so doing, extrenuous factors that may have affected the

study were minimized. Finally, multiple modeling, role-play activities, practice sessions

and question and sessions were incorporated into the intervention to promote the

participants' learning.

Nonetheless, Researchers need to address the following valuable issues for future

research:

1) Replication studies on the effectiveness of this intervention with
   gender, age differences, and of those with diverse cultural
   background.

2) Investigate factors affecting sustainability of social responsiveness
   skills in familiar and novel settings.

3) Additional research studies outside clinical settings to evaluate the
   effectiveness of Social Thinking intervention in real-life settings and
   social interactions in real time.

4) Research on Family-centered interventions and its effect on
   sustainability of skills.

5) Further research on interventions to increase social responsiveness for
   individuals with AS.

Summary

The findings of this research confirm that the Social Thinking intervention is

effective in teaching social cognitive skills to adolescents and young adults with AS.

When they learn social cognitive skills, specifically by thinking about others while participating in group activities, they become more socially responsive and may have greater likelihood for positive social experiences. They are able to engage in dynamic social interactions and foster positive social experiences which can result in improvements in their personal and emotional well-being. In addition, these improvements in their functioning will encourage them to increase their social opportunities so that they can gain social acceptance in the future. The results of this study add to the current body of research addressing social cognitive skills and the Social Thinking strategy.

Further research is critical in exploring strategies that will improve durability of the changes in social cognitive skills for individuals with AS. They are able to gain social cognitive skills through instruction, and they are able to utilize these skills with their families as indicated by studies conducted by Ozonoff and Miller (1995) and Crooke and her colleagues (2008). However, these authors also indicate that the participants in their studies were unable to apply their social cognitive skills in new situations. Studies in sustainability and application of new skills are necessary to help individuals with AS engage in dynamic social exchanges successfully, an area of great difficulty for them. When they are able to utilize their social cognitive skills in dynamic social exchanges, their challenges in reciprocal social interaction will likely be alleviated. They may be able to form meaningful social and personal relationships with their families, their peers and their community.

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APPENDIX A

FORMS

Form 1. *Social Responsiveness Scale Page 1*

Form 2. *Parent Consent Form*.

DISSERTATION RESEARCH PARENT CONSENT FORM

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The primary purpose of this study will be to evaluate the effectiveness of the Social Thinking intervention (Winner, 2005) in teaching adolescents and young adults with AS and Autism social cognitive skills and be socially responsive during dynamic social exchanges in novel environments. Your child will be observed and videotaped while participating in this study for the period of thirteen (13) weeks. Researchers will analyze the videotapes to determine if the Social Thinking intervention teaches you social cognitive skills over the eight (8) weeks of instruction. Only the researchers will review the videotape and audiotape recordings and observations of you to ensure accurate and reliable data collection practices.

During the intake process, information about your child's age, grade, diagnosis, school and afterschool programs, occupational interests, previous participation in social skills group training, and your social functioning. You will fill out the Social Responsiveness Scale (SRS) survey at the beginning and at the end of the study. The survey will take approximately 15 minutes to complete.

Your child's participation is voluntary. You may choose to stop your child's participation at any time without prejudice or penalty.

Your child might learn social cognitive skills that might improve the quality of your social interactions with peers, co-workers, and supervisors. Your child might learn skills that promote positive social experiences, and increase your opportunities to develop meaningful social relationships with your peers, and transfer those skills in novel environments, such as jobsites or community settings. Possible risks to your child's participation are possible loss of privacy, and possible anxiety and confusion during baseline and semi-structured activities.

Research records will be kept in a locked file in the investigator's home office for the duration of the study. All personal information will be destroyed upon completion of the research project. In addition, all personal information will be kept confidential to the extent allowed by law. Agencies with research oversight, such as the UH Committee on Human Studies, have the authority to review research records.

You are welcome to contact me at anytime of any questions or concerns about this study. You can reach me via phone at (808)280-4657, or via email at SocialThinking808@gmail.com.

Form 3 (continued). *Parent Consent Form, page 2.*

Research Participation Consent:

I have read and understood the information above. My questions about project procedures and other matters have been answered to my satisfaction. I know that I can withdraw my child's participation at any time without consequence.

*I agree to participate in this project. I understand that by agreeing for my child to participate, I have not given up any legal rights and that the researchers and the institutions they represent are still responsible for upholding all laws that apply. **I understand that if my child is injured in the course of this research procedure, I alone may be responsible for the costs of treating my child's injuries.***

_____   _____   _____
Name of the Participant   Age   Date

_____   _____ ____ _____
Parent Signature of the Participant   Print Name   Date

Videotape and Audiotape Release:

I agree to allow video and audio recordings made of my child for the above project for purposes of accurate and reliable data collection.

_____   _____   _____
Name of the Participant   Age   Date

_____   _____ ____ _____
Parent Signature of the Participant   Print Name   Date

Declining Participation:

I do not wish my child to participate in this project.

_____   _____   _____
Name of the Participant   Age   Date

_____   _____ ____ _____
Parent Signature of the Participant   Print Name   Date

(If you do not receive satisfactory answers to your questions or have comments or complaints about your treatment in this study, contact: Committee on Human Studies, 1960 East-West Road, B-104, Honolulu, HI 96822. Phone: (808)956-5007. Email: uhirb@hawaii.edu).

cc: participant   Dissertation Research Consent Form 12/29/09

Form 3. *Intake Form.*

<div align="center">Dissertation Research Intake Form</div>

Participant Name:

_____

Birth date: _____ Grade: _____

School: _____

School Address: _____

School Phone Number: _____

Diagnosis: _____

Diagnosed by:

          _____Pediatrician

          _____Clinical Psychologist

          _____Psychiatrist

          _____School Psychologist

          _____IEP Team

After School Programs: _____

When Started: _____

When Completed _____

Type of Afterschool Program: _____

Occupational Interests: _____

Other Relevant Information:

Form 4. *Data Collection Sheet.*

Participant Name: _____

Date: _____   Time: _____

Recorder: _____

Behaviors	Elapsed Time											
Heading: Thinking of others	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**
1. Keeps thoughts to themselves that may be hurtful or potentially offensive to others (reading people's emotional state accurately)												
2. Asks others questions that demonstrate an interest in the other person and their interests and experiences (listening skills)												
3. Demonstrates appropriate conversational turns (maintains back and forth of conversation) (listening)												
Heading: Working as part of a group	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**
1. Keeps their body in the group (listening)												
2. Attends to the speaker or group activity with their eyes (listening)												
3. Monitors the topic of conversation and keeps their comments on topic (figuring out what other people mean and making smart guesses))												
4.Individual appropriately shares their thoughts (doesn't blurt out answers/questions/ comments)- (figuring out what other people mean and making smart guesses)												

Form 5. *Participant Satisfaction Survey Form.*

Participant Satisfaction Survey
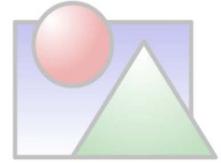
Catherine Acosta Taylor
P.O. Box 11383
Lahaina, Maui
Hawaii
96761
Phone: 808-280-4657
cathyvoc@aol.com

Date:

School Name:
Address:
State/Province:
Zip/Postal Code:

Respondent's Name:
Position:
Phone:

What were your primary responsibilities as a student volunteer in your agency placement?	What types of successes did you have on the job?
What were your initial impressions of the agency when you started?	How were your relationships like with your co-workers and your supervisors?
What types of challenges did you have that interfered with your performance of assigned tasks?	What challenges did you experience while working as a volunteer?
What types of assistance did you require to improve your experience on the job?	Any thoughts you would like to share with our research team to improve this experience?

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Form 6. *Supervisor Satisfaction Survey Form.*

Supervisor Satisfaction Survey

Catherine Acosta Taylor
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Lahaina, Maui
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Phone: 808-280-4657
cathyvoc@aol.com

Date:

School Name:

Address:

State/Province:

Zip/Postal Code:

Respondent's
Name:

Position:

Phone:

What were the student's primary responsibilities in your agency?	**What types of successes did you observe he/she had on the job?**
What were your initial impressions about the student as a volunteer worker?	**How were his/her relationships with his/her co-workers?**
What types of challenges did you notice he/she had that interfered with his/her performance of assigned tasks?	**What were his/her challenges while interacting with his/her co-workers and his supervisors?**
What types of assistance did he require to improve his job performance?	**Any thoughts you would like to share with our research team to improve this experience?**

Form 7. *Co-Worker Satisfaction Survey Form.*

Co-Worker Satisfaction Survey

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Phone: 808-280-4657
cathyvoc@aol.com

Date:

School Name:
Address:
State/Province:
Zip/Postal Code:

Respondent's
Name:
Position:
Phone:

What were the student's primary responsibilities in your agency?	What types of successes did you observe he/she had on the job?
What were your initial impressions about the student as a volunteer worker?	How were his/her relationships with you and/or his/her co-workers?
What types of challenges did you notice he/she had that interfered with his/her performance of assigned tasks?	What were his/her challenges while interacting with his/her co-workers and his supervisors?
What types of assistance did he require to improve his job performance?	Any thoughts you would like to share with our research team to improve this experience?

Table 1. *Participant Demographics*

Participant	Age	Sex	Cultural Background	Diagnosis	Professional Diagnosed	Age Diagnosed
A	16	Male	Asian	Asperger Disorder	Clinical Psych	Middle School
B	14	Male	Caucasian	Asperger Syndrome with learning difficulties and auditory issues with writing difficulties.	Clinical Psych	Elementary
C	14	Female	Hispanic	Asperger Disorder	Clinical Psych	Elementary
D	14	Male	Native Hawaiian	Asperger Disorder	Clinical Psych	Elementary
E	19	Male	Native Hawaiian	High Functioning Autism	Clinical Psych	Elementary

Data Table 1. *Descriptive Statistics, Social Responsiveness Scale Raw Scores, Pre and Post Intervention.*

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Stat	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
AWApre	5	9.00	7.00	16.00	12.40	3.36	11.30	-1.17	.91	2.03	2.00
COGpre	5	20.00	11.00	31.00	22.00	7.45	55.50	-.557	.91	.71	2.00
COMpre	5	27.00	18.00	45.00	36.80	10.99	120.70	-1.79	.91	3.35	2.00
MOTpre	5	12.00	10.00	22.00	18.40	5.13	26.30	-1..50	.91	1.69	2.00
ANpre	5	23.00	10.00	33.00	19.60	10.60	112.30	.61	.91	-2.76	2.00
TOTALpre	5	90.00	56.00	146.00	109.20	34.27	1174.70	-.94	.91	1.12	2.00
AWApost	5	6.00	7.00	13.00	11.00	2.34	5.50	-1.74	.91	3.32	2.00
COGpost	5	12.00	8.00	20.00	15.40	4.77	22.80	-1.01	.91	.70	2.00
COMpost	5	23.00	18.00	41.00	31.60	10.45	109.30	-.60	.91	-2.47	2.00
MOTpost	5	10.00	10.00	20.00	14.80	4.55	20.70	-.26	.91	-2.63	2.00
MANpost	5	14.00	6.00	20.00	13.20	5.17	26.70	-.19	.91	.52	2.00
TOTALpost	5	60.00	49.00	109.00	86.00	25.84	668.00	-.86	.91	-1.39	2.00

Data Table 2. *SRS Total Raw Scores and Subscales Scores Pre-Intervention*

Partcpnt	AWApre	COGpre	COMpre	MOTpre	MANpre	TotalScpre
A	14	22	44	22	29	131
B	13	26	37	22	12	110
D	16	31	45	21	33	146

Data Table 3. *SRS Total Raw Scores and Subscale Scores Post-Intervention.*

Partcpnt	AWApst	COGpst	COMpst	MOTpst	MANpst	TotalScpst
A	12	19	41	17	20	109
B	12	20	40	17	14	103
D	11	14	23	10	11	69

Data Table 4. *Participant A Raw Data 'Thinking of others' (TOO).*

Participant A	Baseline					Intervention TOO													Generalization		
Behaviors	7-Jun	10-Jun	14-Jun	17-Jun	21-Jun	28-Jun	1-Jul	8-Jul	12-Jul	15-Jul	19-Jul	22-Jul	29-Jul	4-Aug	7-Aug	11-Aug	14-Aug	19-Aug	4-Sep	11-Sep	18-Sep
TOO Totals	13	2	0	23	0	10	12	5	17	19	16	14	20	18	18	19	16	22	15	16	11
Keeps thoughts to themselves that may be hurtful or potentially offensive to others	5	2	A	8	A	4	2	1	5	9	7	0	8	8	8	8	5	9	5	9	5
Asks others questions that demonstrate an interest in other persons and their interests and experiences	3	0	A	6	A	1	4	0	4	4	2	9	3	3	3	4	5	4	5	2	3
Demonstrates appropriate conversation turns	5	0	A	9	A	5	6	4	8	6	7	5	9	7	7	7	6	9	5	5	3

A = Absent

Data Table 5. *Participant A Raw Data 'Working as part of a group' (WAPG).*

Participant A / Behaviors	Baseline												Intervention WAPG						Generali-zation		
	7-Jun	10-Jun	14-Jun	17-Jun	21-Jun	28-Jun	1-Jul	8-Jul	12-Jul	15-Jul	19-Jul	22-Jul	29-Jul	4-Aug	7-Aug	11-Aug	14-Aug	19-Aug	4-Sep	11-Sep	18-Sep
WAPG Totals	32	5	0	33	0	17	26	4	31	36	27	24	36	35	30	27	30	36	35	33	23
Keeps their body in the group	9	2	A	9	A	6	9	0	9	9	6	8	9	9	8	4	9	9	9	9	7
Attends to the Speaker or group activity with their eyes	9	2	A	8	A	3	6	0	7	9	7	8	9	9	8	8	8	9	9	9	6
Monitors the topic of conversation and keeps their comments on topic	9	1	A	7	A	5	8	1	9	9	8	5	9	9	8	9	9	9	9	8	5
Appropriately shares their thoughts	5	0	A	9	A	3	3	3	6	9	6	3	9	8	6	6	4	9	8	7	5

A = Absent

Data Table 6. *Participant B Data 'Thinking of others' (TOO)*

Participant B / Behaviors	Baseline					Intervention TOO													Generalization		
	7-Jun	10-Jun	14-Jun	17-Jun	21-Jun	28-Jun	1-Jul	8-Jul	12-Jul	15-Jul	19-Jul	22-Jul	29-Jul	4-Aug	7-Aug	11-Aug	14-Aug	19-Aug	4-Sep	11-Sep	18-Sep
TOO Totals	0	13	21	19	0	14	22	19	25	22	16	22	22	19	25	22	22	19	0	23	17
Keeps thoughts to themselves that may be hurtful or potentially offensive to others	A	5	6	9	A	6	9	8	9	8	5	9	9	8	9	8	9	8	A	9	8
Asks others questions that demonstrate an interest in other persons and their interests and experiences	A	6	6	1	A	1	5	3	8	6	5	4	5	3	8	6	5	3	A	6	3
Demonstrates appropriate conversation turns	A	2	9	9	A	7	8	8	8	8	6	9	8	8	8	8	8	8	A	8	6

A = Absent

Data Table 7. *Participant B Data 'Working as part of a group' (WAPG).*

Participant B	Baseline													Intervention WAPG					Generalization		
Behaviors	**7-Jun**	**10-Jun**	**14-Jun**	**17-Jun**	**21-Jul**	**28-Jun**	**1-Jul**	**8-Jul**	**12-Jul**	**15-Jul**	**19-Jul**	**22-Jul**	**29-Jul**	**4-Aug**	**7-Aug**	**11-Aug**	**14-Aug**	**19-Aug**	**4-Sep**	**11-Sep**	**18-Sep**
WAPG Totals	0	26	34	33	0	29	36	28	29	36	0	34	36	35	34	36	31	36	0	31	31
Keeps their body in the group	A	8	9	9	A	8	9	8	8	9	A	9	9	9	9	9	9	9	A	9	9
Attends to the Speaker or group activity with their eyes	A	6	9	7	A	7	9	5	8	9	A	9	9	9	9	9	8	9	A	9	9
Monitors the topic of conversation and keeps their comments on topic	A	5	9	9	A	7	9	7	9	9	A	9	9	9	8	9	9	9	A	6	7
Appropriately shares their thoughts	A	7	7	8	A	7	9	8	4	9	A	7	9	8	8	9	5	9	A	7	6

A = Absent

Data Table 8. *Participant D Data'Thinking of others' (TOO).*

Participant D	Baseline					Intervention TOO													Generali- zation		
Behaviors	7-Jun	10-Jun	14-Jun	17-Jun	21-Jun	28-Jun	1-Jul	8-Jul	12-Jul	15-Jul	19-Jul	22-Jul	29-Jul	4-Aug	7-Aug	11-Aug	14-Aug	19-Aug	4-Sep	11-Sep	18-Sep
TOO Score Totals	9	4	10	15	10	7	11	4	10	10	2	5	12	13	22	23	10	16	16	16	13
Keeps thoughts to themselves that may be hurtful or potentially offensive to others	5	3	3	7	4	3	5	1	4	3	0	1	6	6	9	8	2	8	8	10	7
Asks others questions that demonstrate an interest in other persons and their interests and experiences	1	0	0	1	2	0	0	0	2	2	1	0	1	2	6	7	2	2	5	3	3
Demonstrates appropriate conversation turns	3	1	7	7	4	4	6	3	4	5	1	4	5	5	7	8	6	6	3	3	3

Data Table 9. *Participant D Data 'Working as part of a group'. (WAPG)*

Participant D / Behaviors	Baseline												Intervention WAPG						Generalization		
	7-Jun	10-Jun	14-Jun	17-Jun	21-Jun	28-Jun	1-Jul	8-Jul	12-Jul	15-Jul	19-Jul	22-Jul	29-Jul	4-Aug	7-Aug	11-Aug	14-Aug	19-Aug	4-Sep	11-Sep	18-Sep
WAPG Total	19	10	23	21	17	24	26	13	23	19	16	11	26	30	24	33	23	27	24	29	33
Keeps their body in the group	8	4	8	3	7	7	9	7	6	8	8	2	7	9	6	8	7	7	8	9	9
Attends to the Speaker or group activity with their eyes	6	4	6	6	3	7	7	2	6	4	5	3	6	8	6	8	5	7	8	7	9
Monitors the topic of conversation and keeps their comments on topic	4	1	6	7	5	5	8	3	6	4	2	4	8	7	5	9	5	7	5	7	7
Appropriately shares their thoughts	1	1	3	5	2	5	2	1	5	3	1	2	5	6	7	8	6	6	3	6	8