

Running head: EFFECTIVENESS OF A SUMMER CAMP

EXPLORING THE EFFECTIVENESS OF A BEHAVIORAL REMEDIATION
SUMMER CAMP FOR CHILDREN WITH
AUTISM SPECTRUM DISORDERS

A DISSERTATION

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Dedication

I dedicate this work to my husband and our children... to Todd Michael, the absolute love of my life, who has the unenviable joy of being married to an unofficial (for now) psychologist... to John Kalen, who spent just a little while with me on this journey but left a lasting impact... to Kenna Janae, who is so far the most fascinating creature I've ever met... and to Selah Elizabeth who joined us just in time to shake things up a bit. May the Lord guide and direct our family as we seek to faithfully serve Him.

Abstract

This study explored the effectiveness of an eight-week summer day camp that used applied behavior analysis (ABA) to decrease maladaptive behaviors and increase prosocial behaviors of children with autism spectrum disorders. Little is known about how children with autism spectrum disorders respond to ABA treatment in the camp setting. Using a multiple case study approach, behaviors were measured using direct observation techniques in a sample of 5 children ranging from 7 years, 5 months to 9 years, 1 month. Results were assessed using visual inspection of graphs and assessing trendlines of the data. Results of the study indicated that all five participants demonstrated at least two behaviors that changed in the intended direction (i.e., target behaviors decreased, replacement behaviors increased). Overall, for all five participants, 68% of behaviors changed in the intended direction. Among the behaviors that changed in the intended direction, 65% demonstrated a moderate rate of change within the eight weeks of camp. A number of possible explanations for these results, as well as for unfavorable findings, are discussed. Because this study was considered a preliminary investigation, these positive results support the need for future studies to further examine this relatively unexplored setting through replication.

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CHAPTER I

Introduction

This section briefly reviews the literature relevant to the current study and provides rationale for the study. This section also outlines the purpose of the study and indicates the significance of this study to the field of psychology.

Rationale of the study

Influenced by a significant increase within the past two decades of children receiving special education services under the disability category of autism spectrum disorders, along with recent federal legislation mandating the need for empirically-validated intervention strategies (e.g., No Child Left Behind; IDIEA 2004), there is an increased emphasis on identifying evidence-based practices for children with autism (Odom, Brown, Frey, Karasu, & Smith-Canter, 2003). Due to their impairments in communication and social interaction, children with autism are at increased risk for developing psychiatric, behavioral, and emotional disturbances (Summers, Houlding, & Reitzel, 2004). During the past thirty years, applied behavior analysis (ABA) techniques have become the predominant treatment approach for individuals with autism (Kates-McElrath & Axelrod, 2006; Kimball, 2002; Schreibman, 2000; Steege, Mace, Perry, & Longenecker, 2007), and the sophistication of these strategies has been applied to

promoting social interaction, adaptive skills, and behavioral functioning of adults and children with autism (Bregman, Zager, & Gerdtz, 2005). Intensive applied behavior analytic programming, defined as 25 to 40 hours per week of one-on-one or small group instruction has emerged as the preferred method of intervention for children with autism (Weiss & Delmolino, 2006; Steege et al.), and early studies using intensive ABA programming have demonstrated the majority of children have benefited from significant gains in overall cognitive functioning, adaptive functioning, and language. Similar results have been demonstrated in both home and center-based programs (Weiss & Delmolino).

To date, there is minimal research on the effectiveness of an applied behavior analytic approach to working with children with autism within a summer camp setting. The National Research Council (2001) has identified several characteristics of effective interventions for young children with autism, including early intervention, instructional objectives focusing on social skills, communication, adaptive living, recreation-leisure, cognitive, and academic skills, ongoing monitoring of interventions, an emphasis on the generalization of skills, and systematic and intensive (defined as 25 hours per week, 5 days per week, and *12 months per year*) one-on-one or small group instruction (Steege et al., 2007). While many children receive such services during the school year, there is a lack of services provided during the summer months, especially for children who attend public schools. Given the need for intensive instructional programming throughout the year, it seems not only appropriate, but necessary to provide children and families with services during the summer months. The purpose of this study is to investigate the

effectiveness of an eight-week behavioral remediation summer camp program based upon ABA principles, in addressing problem behavior and social skill deficits of school-aged children with autism spectrum disorders (ASD).

Research questions

This study will serve as a preliminary investigation as to whether an eight-week summer camp based upon ABA can produce significant behavioral change in children with autism. Of particular interest will be the pattern of effects within behavioral data. In particular, this study will investigate whether the summer camp program produced different levels of behavioral change for different subgroups of children with autism (e.g., level of autism, level of adaptive skills, age, and level of cognitive functioning). Additionally, the data will be analyzed to determine how behavior changed, considering the following questions: (a) Did changes occur immediately or gradually?; (b) Was there a point at which behavior improvement ceased and behavior maintenance commenced?; and (c) As children became acclimated to the camp setting, did behavioral improvement decrease? In depth analysis of the data will help to answer these questions, as well as unforeseen patterns that may have emerged.

Overview of autism spectrum disorders

According to the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition – Text Revision (*DSM-IV-TR*, 2000), the essential features of autistic disorder include markedly abnormal or impaired development in social interaction and communication and a markedly restricted repertoire

of activities and interests that are gross and sustained. Individuals with Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) exhibit social impairments similar to autism and may have fundamental deficits in communication, social interaction, emotional regulation, cognition, and interests. Some evidence suggests individuals with PDD-NOS have milder impairments and a better prognosis for outcome than individuals diagnosed with autism, such that many clinicians purport that PDD-NOS represents the mildest form of autism and represents a difference in severity rather than type (Towbin, 2005).

Together with autistic disorder and PDD-NOS, Asperger's Disorder falls into the continuum referred to as *autistic spectrum disorders* (ASDs). Asperger's is a chronic and severe developmental disorder distinguished from autism primarily on the basis of relative preservation of language and cognitive abilities in the first three years of life. Asperger's has been used to refer to individuals with varying degrees of ASD symptoms, including autism without mental retardation, higher cognitive and linguistic abilities, and more socially motivated adolescents, and adults with atypical and socially interfering circumscribed interests (Klin, McPartland, & Volkmar, 2005). As a result of the symptoms characterizing this continuum of disorders, children with ASDs display social skill deficits and problem behaviors in a wide variety of everyday settings, experience significant difficulty in adaptive functioning, and are in need of ongoing and intensive behavioral services.

Overview of applied behavioral analysis (ABA)

Applied behavior analysis (ABA), which appears to be the predominant treatment approach for individuals with autism, focuses on clinically or socially relevant behaviors in areas such as psychological and psychiatric adjustment, education, rehabilitation, business, industry, and medicine. It is an extension of experimental methods beyond the laboratory to applied settings. ABA is not a specific technique, but rather a framework from which to build a program of empirically-validated strategies to address individual needs (Steege et al., 2007). Interventions within applied behavior analysis focus on environmental factors (e.g., antecedent and consequent events) that can be used to alter behavior (Maher Choutka, Doloughty, & Zirkel, 2004). Applied behavioral strategies have been responsible for enhancing personal independence, increasing prosocial behavioral repertoires, teaching methods of self-control and relaxation (Bregman et al., 2005), increasing language, social skills, play, and academic skills, as well as decreasing some of the severe behavioral problems often associated with autism (Schreibman, 2000).

Functional behavior analysis

Although behavioral techniques overall seem to be the preferred approach in working with children with ASDs, it is evident from the literature that there is no one technique or program that is successful with every child (Maher Choutka et al., 2004; Schreibman, 2000). There have been wide variations in the success of behavioral interventions with individual children, leading researchers to agree that individualized plans based upon functional behavioral analyses are warranted and fundamental in working with children with ASDs. “Functional analysis serves as the blueprint for

identifying the behavioral interventions that are most likely to influence the antecedent and consequent factors responsible for maintaining maladaptive patterns of behavior” (Bregman et al., 2005, p. 898). Additionally, research has repeatedly demonstrated that the most effective intervention plans with children of ASDs often utilize several strategies simultaneously (Bregman et al., 2005) to maximize treatment results, behavioral maintenance, and generalization. For this reason, single-subject research designs have been the primary method used in autism research.

Summer camp programs for children with disabilities

Summer camps for children with disabilities vary widely in scope, the population served, objectives, and format. While some camps are segregated, others integrate children with and without disabilities (Blake, 1996; Goodwin & Staples, 2005). General goals of summer camps tend to include skill acquisition, building positive peer relationships, and increasing attributes such as self-esteem and self-reliance (Goodwin & Staples). While many early summer camps serving children with disabilities were pioneered by religious organizations (Blas, 2007), similarly structured camps have emerged in a variety of settings to serve a number of different purposes. Camps utilizing a behavioral approach have increased in popularity. They emphasize such principles as shaping, behavioral contracts, and token economies to enhance the camping experience. Such camps have demonstrated increased competency and role flexibility (Heckel, Hursh, & Hiers, 1977), increased self-concept (Roswal, Roswal, Harper, & Pass, 1986), and improvements in the areas of individually targeted behaviors (Baker, 1972) for children

with mental health problems, mental disabilities, and other handicaps (Baker; Heckel et al.; Roswal et al.).

A number of camps have been created to service children who would otherwise not attend camp due to difficult behavioral patterns, which often result in their exclusion from extracurricular activities and programs. Children with Attention-Deficit/Hyperactivity Disorder, Learning Disabilities, and Emotional Disabilities have been successfully integrated into summer camp settings and have demonstrated improved self-control, decreased aggression, increased empathy, improved basketball skills, increased sportsmanlike behavior, and identity formation (Byers, 1979; Goodwin & Staples, 2005; Hartlage & Park, 1967; Henley, 1999; Hupp & Reitman, 1999; Levitt, 1994; Mishna, 2005).

Baker (1972) noted several benefits of summer camp settings for children with disabilities, including the availability of highly trained college students as counselors, a small self-contained environment that enhances consistency in carrying out program procedures, natural reinforcers (e.g., nature trails, animals, plants, etc.) and time-limitation, which allows staff to maintain a high level of output. Others purport that outdoor summer programs provide various populations of children (i.e., adjudicated youth, individuals with addictions, children with cancer, adolescents with emotional disturbances, psychiatric patients, and individuals with physical disabilities) with opportunities for social benefits, personal growth, and therapy or rehabilitation (Anderson, Schleien, McAvoy, Lais, & Seligmann, 1997; Carlson & Cook, 2007; McPeake, Kennedy, Grossman, Beaulieu, 1991; Smith, Gotlieb, Gurwitch, & Botcky,

1987; Somervell & Lambie, 2009). Still others suggest outdoor programs have the advantage of novelty, which increases motivation and participation (Berman & Anton, 1988).

Several recent studies in the prevention research have advocated for the effectiveness of multifaceted treatment packages for children who exhibit high levels of aggression, disruptive behavior, noncompliance, hyperactivity, and poor social skills (August, Egan, Realmuto, & Hektner, 2003; August, Realmuto, Hektner, & Bloomquist, 2001; Realmuto, August, & Egan, 2004). Children with early-onset aggressive behavior are at risk for later development of conduct problems and antisocial behavior. In an effort to identify interventions that may potentially reduce the risk faced by aggressive children, August and colleagues (2001) developed the Early Risers program, which included a six-week summer program (August et al., 2001). The authors found an overall efficacy with aggressive elementary school-aged children, who made significant gains in academic achievement and classroom behavior. Of particular interest here are the effects gained from the six-week summer component that targeted many of the behavioral and social skill deficits frequently observed in disruptive children. This program utilized a highly structured behavioral-modification program, which consisted of a point system to help students self-regulate behavior throughout the day. Realmuto, August, and Egan (2004) found a significant positive correlation between attendance in the six-week summer program and social competence at year three when they controlled for global adaptive functioning (GAF) of parents, child intelligence, and socioeconomic status (SES). These were particularly important findings as previous studies had demonstrated

children from low-SES homes tended to lose academic and behavioral skills during the summer months, whereas their high-SES counterparts generally continued to make gains. This indicates SES might be a factor simply influencing attendance rates, which in turn seemed to influence outcomes (Realmuto et al., 2004).

Outdoor camp experiences have been given a number of different names within the literature, including wilderness camping, adventure-based programs, wilderness therapy, and adventure therapy (Anderson et al., 1997; Asher, Huffaker, & McNally, 1994; Durr, 2009; Somervell & Lambie, 2009). Similar types of programs utilizing games and activities to produce intentional change in an outdoor setting will be referred to here globally as outdoor experiential programs. Such programs are based on experiential learning theory, which suggests learning occurs most effectively through direct and intentional learning experiences (Garst, Scheider, & Baker, 2001; Levine, 1994), and a variety of positive outcomes have been documented in the literature, such as improved self-esteem, higher self-concept, trust, group cooperation, skill development, health effects, social attitudes, improved behavior, reduced recidivism, decreased emotional problems, changes in locus of control, decreased stereotypes, and reduced trait anxiety (Anderson et al., 1997).

Due to the difficulty of investigations of outdoor experiential programs, some of the early research has been criticized because of its seemingly less rigorous methodology (Durr, 2009). Consistent demonstration of positive outcomes, however, including increases in self-esteem (Garst et al., 2001; Levitt, 1994; Mishna, 2005), increases in self-awareness, increases in self-assertion, increases in acceptance of others (Berman &

Anton, 1988), improved social and school attitudes and behaviors, decreases in pathological symptoms, enhanced patient-staff relations, improved quality and quantity of social interactions (Levitt, 1994), improved relationships with peers and adults, greater ability to assume responsibility, and better coordination and physical skills (Mishna, 2005), the scope of research in this area has been generally accepted among professionals (Durr, 2009; Levitt, 1994).

Summer camp programs for children with autism

Few summer camps or outdoor experiential programs designed specifically for children with autism spectrum disorders have been cited in the research. Brookman and colleagues (2003) investigated a comprehensive summer camp program for children with autism that utilized applied behavior analysis and positive behavior support. The program targeted social skill acquisition through an inclusive setting with typically developing peers. Campers with autism ranging from age four to ten were supported by paraprofessional aides in addition to regular summer camp staff during this day camp which lasted one to three weeks, depending on the camper. Campers with autism were given individualized social and behavioral goals, which were developed through functional assessment. Though the authors did not present formal data, they found children with autism were able to successfully participate in the program with the help of paraprofessional aides. It was reported both typically developing campers and traditional camp staff benefitted from this inclusive program (Brookman et al., 2003).

Another camp serviced children with autism for three weeks and provided a one-to-one staff-child ratio. Structured training and classes, applied behavioral techniques,

and objective measurement of child progress were components of the camp reported by Hung and Thelander (1978) who found each child improved 15% or more in at least one area of treatment during the camp, which addressed self-help skills, language training, generalization of language, and reduction of undesirable behaviors (Hung & Thelander). Similarly, Hung (1977) utilized a three-week summer camp with four children with autism who were able to adequately demonstrate “curiosity” questioning in the classroom through the use of a token reinforcement system. None of the children were able to generalize skills across settings.

A manualized summer camp (i.e., all children received the same treatment) for high-functioning children with autism spectrum disorders was investigated in 2008 by Lopata and colleagues. The camp targeted social skills, face-emotion regulation, range of interests, and interpretation of non-literal language. Campers all received the same manualized treatment, though half of the campers were assigned to a response-cost point system, while the other half received non-conditional performance feedback. Though social improvements were reported by parents and staff on objective measures, no significant difference was found between treatment conditions (Lopata, Thomeer, Volker, Nida, & Lee, 2008).

Lastly, Camp Horizons boasted an 85% camper return rate for youth with developmental disabilities. The camp, which focused on natural human philosophy (i.e., put people first, recognize gifts and talents, recognize and meet changing needs, and involve parents) and successful daily routine for every camper (e.g., health and fitness, excitement and fun, opportunities for friendship, opportunities to explore and have new

experiences, opportunities for learning skills and practicing them, and opportunities for vocational training) was assessed by an outside evaluator to determine if the camp accomplished its overall mission. Through analysis of written materials, archived videotapes of camp activities, and an on-site visit, it was found the camp's stated mission did successfully translate into visible summer camp functions (Wetzel, McNaboe, & McNaboe, 1995).

Significance of the present study

The breadth of research on summer camp programs and outdoor experiential programs seems to indicate utilizing an outdoor environment in an attempt to create intentional change has produced consistent positive outcomes for children from various population groups. To date, however, there is minimal research on summer camp programs specifically designed for children with autism spectrum disorders and the existing research often has been purely qualitative in nature. The current study is a preliminary investigation, combining quantitative and qualitative results, which explored the effects of an applied behavior analytic remediation program for children with ASDs in a summer camp environment.

Purpose of the study

The purpose of the current study is to explore the effectiveness of a behavioral remediation program for children with autism spectrum disorders within the setting of an eight-week summer camp. More specifically, to what extent can behavior change occur within an eight-week time period? Can a behavioral remediation program for children

with autism spectrum disorders produce behavioral improvement (e.g., decreases in problem behavior and/or increases in prosocial behavior) within a summer camp setting? To examine these questions, 28 children with ASDs, whose parents were involved in a parent support group, were randomly selected through a lottery system to participate in an eight-week summer camp at the Isanogel Center in Muncie, Indiana, a mid-Western mid-sized city. The Isanogel Center offers summer residential camp programs and recreational activities for adults and children with disabilities to help them become more independent, productive citizens, with the goal of providing services to help meet the needs of people with disabilities in East Central Indiana.

Overview of the study

The 28 campers were divided into four different groups of seven to nine children, based upon various demographic and categorical variables, including level of autism, problem behavior targeted for intervention, and age. Throughout the eight weeks, an instructional team of three teachers worked with each group. The four units of seven to nine children were kept physically separated the majority of the day. The children, within their own units, were exposed to *individual learning modules*, in which they could succeed without the help of others; *unit participation learning modules*, in which they could only succeed with the help and cooperation of their peers; and *group activity learning modules*, in which the emphasis was on working within a larger group competitively. In addition, each child had two individualized academic tutoring sessions daily with an individual tutor. The program was based largely on principles of applied behavior analysis, which placed heavy emphasis on the extinction of maladaptive

behavior (that interferes with learning) and the development of new behaviors through the use of positive reinforcement. Positive reinforcers used were (a) exaggerated physical gestures of approval and affection from the teachers and tutors, (b) frequent verbal praise from the teachers and tutors, (c) the right to engage in highly desired activities and to earn special rewards used in conjunction with, (d) the token economy system of accumulated reward (for development of future orientation), and (e) public ceremonial awards. Great emphasis also was placed on establishing a strong, working, and trusting relationship between each teacher and child. Negative reinforcers used when misbehavior occurred consisted of the removal of social attention (i.e., planned ignoring) and withdrawal from desired activities (i.e., time-out). In the event a child's behavior posed a safety risk to self, other children, or staff, all staff members were trained in therapeutic crisis intervention. Safety holds were used only to protect children and staff from potential injury, and all staff were trained in proper restraint techniques.

For the purpose of the current study, five children with ASDs, who exhibited problem behaviors and social skill deficits, were selected from among the 28 campers. Only five were selected because they will be presented in a thorough case study format. An individualized behavioral and academic plan for the camping experience, based on an intensive study of the child's previous school and social behavior, was created for each child in the study. Research has consistently found interventions resulting from functional behavior assessment information are more likely to produce reduction in problem behavior. "Functional assessment is the process of identifying the variables that reliably predict and maintain problem behaviors" (Horner, Carr, Strain, Todd, & Reed,

2002, p. 425). The individual plans were developed by a team of professionals working at the camp, including a Board Certified Behavior Analyst (BCBA), five graduate students (three at the doctoral level), and an autism day camp project administrator, who was a licensed psychologist. An A-B single-subject design was used to measure behavior change throughout the eight-week camp.

Research design

Single-subject research designs are commonly used for educational research and, in particular, are utilized in research with autism spectrum disorders (ASD) (Odom et al., 2003). Behavioral observation is typically used to assess outcome, as a major emphasis is placed on targeting individual child skills (Brookman-Fraze, Stahmer, Baker-Ericzen, & Tsai, 2006). Additionally, single-subject designs allow for functional behavior assessments, which would be impractical with group experimental designs (Horner et al., 2002). The major pitfall of all single-subject research regards external validity. Single-subject studies are weak when it comes to generalizability, and thus, must rely on replication (Fraenkel & Wallen, 2000). Through this process, the body of single-subject research in the area of autism has contributed significantly to our current knowledge of this disorder (Odom et al., 2003). The current study is viewed as a preliminary investigation and, given significant findings, would necessitate replication studies in the future.

Research hypotheses and potential implications of the study

It is expected that children involved in the study benefitted from the behavioral remediation program in a summer camp setting, and that, specifically, they demonstrated significant gains in the form of decreased problem behavior and increased prosocial behavior. Data will be analyzed primarily through visual inspection. Demonstrating the effectiveness of this eight-week summer camp will provide preliminary evidence for future program models to service children with ASDs throughout the summer months and will extend the literature through exploration of this unresearched setting. Success of this summer program may lead researchers, clinicians, educators, and families to develop systematic summer camp programs for children with ASDs. The benefits of such programs may ultimately help children with ASDs to maintain behavioral gains made throughout the academic school year, maximizing school-based treatment effects. Additionally, the summer camp, a novel environment, would provide an optimal setting for the generalization of previously learned skills.

Limitations of the present study

The major weaknesses of this study include its small subject size, lack of a control group, and thus limited generalization. As previously mentioned, single-subject designs are common within the field of autism, making this a common limitation in studies of this nature. Without a control group of participants who are not exposed to the intervention, it is difficult to determine whether or not the intervention itself affected changes in participants or whether they were affected by some other outside factor. In addition, due to the small number of participants, the conclusions of this study do not have significant

external validity, meaning, the results cannot – by themselves – be generalized to other populations. As with other studies in the area of autism, this study will require replication in order to attain external validity.

Similarly, studies utilizing in-vivo data collection run the risk of observation error. In other words, data collectors have only one chance to collect accurate data and some error is expected. Though measures were taken to ensure the most accurate data possible (i.e., training and practice), there is too much room for error to rule it out completely, making this a weakness as compared to studies conducted in controlled laboratory settings or those in which interactions can be video-recorded for later review.

CHAPTER II

Review of the literature

This chapter reviews the literature relevant to the current study. Specifically, the history of autism, the diagnosis of autism spectrum disorders, treatment for individuals with autism, the history of applied behavior analysis, behavioral treatment for children with autism, structured behavioral interventions, naturalistic behavioral interventions, and specific behavioral intervention techniques are reviewed. Summer camps for children with disabilities and programs for children with autism also are investigated.

History of Autism

Historically, the diagnosis of autism has undergone significant changes, transformations, and clarifications. Today, it is arguably the best empirically-based diagnostic category among the complex psychiatric and developmental disorders within the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition – Text Revision (DSM-IV-TR)* (Volkmar & Klin, 2005), though it has taken decades for clinicians and researchers to reach a broad, general consensus. Research has confirmed the usefulness of current diagnostic approaches, the availability of a shared clinical concept, and the utility of a common language for differential diagnosis, providing a means for clear communication regarding this spectrum of disorders (Buitelaar, Van der

Gaag, Klin, & Volkmar, 1999; Magnusson & Saemundsen, 2001; Sponheim, 1996; Sponheim & Skjeldal, 1998; Volkmar & Klin, 2005).

Leo Kanner first described what today would be termed the syndrome of childhood autism. In his seminal work, Kanner (1943) described 11 children with “autistic disturbances of affective contact,” and while various aspects have been refined or refuted by further research, his early conclusions have stood the test of time. His work primarily stemmed from developmental theory, in particular, that of Gessell, who demonstrated normally developing children exhibit marked interest in social interaction from early in life. Kanner suggested children with autistic symptoms were born without the predisposition to psychologically metabolize the social world and were lacking the typical affective drive and motivation for social interaction. He first used the term autism, which originated from Bleuler’s (1911/1951) description of idiosyncratic, self-centered thinking, to express this autonomous quality in the children he observed (Volkmar & Klin, 2005).

Kanner observed additional deficits in these children, including profound disturbances in communication. Several of the children with whom he worked were mute, while others exhibited echolalia, literalness, and difficulty acquiring the use of the first person, personal pronoun when referring to oneself. Another common feature among his patients was their atypical responses to the inanimate environment. They were often overly sensitive to sounds or to small changes in daily routine (Volkmar & Klin, 2005).

A controversial issue in early autism research was the role parents were thought to play in contributing to the onset of this disorder. Kanner observed that there were often poor relations between parents and their children with autism. He believed autism was congenital, but many researchers of the time theorized that potential psychological factors may have caused or at least contributed to this disorder. During the 1960s, however, it was established that parenting style played no role in the pathogenesis of autism. Research found the interactional problems exhibited by individuals with autism originated from the side of the child and not the parents (Mundy, Sigman, Ungerer, & Sherman, 1986), and additionally that the disorder was found in families from all social classes (Wing, 1980). Furthermore, relatively recent neurological studies have examined the dysfunction in autistic brain systems and biological factors, which seem to convey a vulnerability to autism (Volkmar, Lord, Bailey, Schultz, & Klin, 2004; Rutter, 1999). Despite this general acceptance today, many parents have suffered pain and guilt in having been blamed for this devastating disorder (Volkmar & Klin, 2005).

Autistic disorder has been found to be associated with various medical, developmental, and psychiatric conditions. Research has suggested that having any type of serious disability, such as autism, increases the risk for other comorbid problems (Fombonne, 2005). For example, approximately 25% of individuals with autism develop a seizure disorder (Rutter, 1970; Volkmar & Nelson, 1990). Decades of research also have shown many individuals with autism fall within the mentally retarded range on developmentally appropriate standardized tests (Rutter, Bailey, Bolton, & Le Couter, 1994), and this classification shows stability over time (Lockyer & Rutter, 1969, 1970).

Kanner originally believed autistic children were not mentally retarded, but rather exhibited poor motivational factors affecting performance on such measures. He found these children were quite adept on some parts of IQ tests, particularly subtests that tested rote memory and copying. Subsequent research has supported Kanner's findings to some extent; demonstrating children with autism have unusually variable cognitive abilities. These children often exhibit nonverbal abilities on intelligence tests that are significantly superior to more verbally-based abilities (Klin, Saulnier, Tsatsanis, & Volkmar, 2005). A broad range of IQ scores has been demonstrated among children with autism spectrum disorders (Bailey, Palferman, Heavey, & Le Couteur, 1998). Children with autism also can be differentiated from children with severe language disorders based upon distinct patterns of behavioral and cognitive development (Bartak, Rutter, & Cox, 1977; Volkmar & Klin, 2005).

The field of autism has unearthed a number of important discoveries since Kanner first embarked on his theories regarding the patterns of behaviors comprising autism. The field of research has elaborated upon his findings to the extent that our current understanding of autism is more clearly and consistently defined than ever before. Researchers today are investigating sophisticated areas within the field that continue to broaden our knowledge of this disorder and their findings have eliminated many misconceptions and inaccurate conclusions about children and adults with autism and their families.

Diagnosis of Autism Spectrum Disorders

A fundamental purpose of classification systems is to enhance communication among professionals (Rutter, 2002), which is an essential element to achieving reliability and validity of findings from research in a given area. Classification ultimately helps guide intervention planning for individuals and evaluates the efficacy of interventions for groups of individuals with shared problems (Cantwell, 1996). Any system that is to be effective in achieving this purpose must be clear, broadly accepted, easy to use, and relatively stable. Additionally, diagnostic classification systems should provide for differentiation between similar and overlapping disorders (Rutter, 1996), must be applicable to an array of demographic variables (e.g., both sexes, different ages, different developmental levels, and different ethnic, social, and geographical backgrounds), and should be logically consistent and comprehensive (Rutter & Gould, 1985). Achieving such a broad range of goals presents a difficult task, and such has been the case in developing diagnostic criteria for autistic disorder (Volkmar & Schwab-Stone, 1996). The diagnostic process depends on a body of scientific knowledge and is enriched when there is a common diagnostic language among professionals in a given field (Volkmar & Klin, 2005).

The American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition – Text Revision (*DSM-IV-TR*, 2000) is one of two major diagnostic systems that are generally accepted as achieving the primary goals of comprehensive classification (Volkmar & Klin, 2005). According to the *DSM-IV-TR* (2000), the essential features of Autistic Disorder include markedly abnormal or impaired

development in social interaction and communication and a markedly restricted repertoire of activities and interests that are gross and sustained. Such deficits, often observed in several areas, must occur prior to age three. There may be marked deficits in nonverbal communication (e.g., eye-to-eye gaze, body postures and gestures, facial expression), a failure to develop appropriate peer relationships, a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people, a lack of social or emotional reciprocity (e.g., preference of solitary activities, involving others in activities merely as tools or “mechanical” aids), and impaired awareness of others. Individuals with autistic disorder exhibit deficits in communication that affect both verbal and nonverbal skills and may involve a delay in or total lack of spoken language. Individuals who do speak are often unable to initiate or sustain a conversation with others or use a stereotyped and repetitive repertoire of speech. Speech may include abnormal pitch, intonation, rate, rhythm, or stress, resulting in a monotonous tone of voice, speech that is inappropriate to the context, or a question-like rise at the end of statements. There is typically a lack of spontaneous, varied play or social imitative play appropriate to the developmental level (*DSM-IV-TR*, 2000).

A restricted, repetitive, and stereotyped pattern of behavior, interests, and activities is often observed in individuals with Autistic Disorder. These individuals display a markedly restricted range of interests and are often preoccupied with one narrow interest (e.g., trains, dinosaurs, or music). They often exhibit an inflexible adherence to specific routines or rituals that are seemingly nonfunctional. Individuals with Autistic Disorder may display repetitive motor mannerisms (e.g., hand or finger

flapping or twisting, or complex whole-body movements) or a persistent preoccupation with parts of objects (e.g., buttons or parts of the body). Abnormalities of posture, such as walking on tiptoe or odd hand movements and body postures may be present (*DSM-IV-TR*, 2000).

Currently, autism falls within the category of Pervasive Developmental Disorders (PDD) in the *DSM-IV-TR* (2000). These disorders are characterized by severe and pervasive deficits in reciprocal social interaction, communication, or the presence of stereotyped behavior, interests, and activities. Disorders in this category include, Autistic Disorder, Rett's Disorder, Childhood Disintegrative Disorder, Pervasive Developmental Disorder (Not Otherwise Specified), and Asperger's Disorder. The impairments that define these conditions are markedly deviant relative to the individual's mental age or developmental level and are usually evident within the first few years of life (*DSM-IV-TR*, 2000).

Rett's disorder, or Rett syndrome as it is sometimes called, is a progressive X-chromosome-linked neurodevelopmental disorder that almost exclusively affects females. The characteristic pattern of this disorder includes cognitive and functional stagnation with subsequent deterioration that profoundly impairs postnatal brain growth and development. It is the second most common cause of mental retardation among females, second only to Down Syndrome. First described by Austrian physician, Andreas Rett, one of the most prominent symptoms of the disorder includes stereotypic hand movements (e.g., hand patting, waving, and involuntary movements including alternate opening and closing of fingers, twisting of the wrists and arms, or nonspecific circulating

hand-mouth movements). Parents generally report normal physical and mental development for the first 6 to 8 months of life, followed by a slowing or cessation of the acquisition of developmental milestones, particularly skills requiring balance. By age three, children with Rett's Disorder demonstrate a rapid deterioration of behavior, including the loss of acquired speech, voluntary grasping, and the purposeful use of hands. They begin to demonstrate limited interpersonal contact, deceleration of head growth, jerky movements of the trunk and limbs, a stiff-legged, broad-based gait with somewhat short steps and swaying movements of the shoulders when walking (Van Acker, Loncola, & Van Acker, 2005).

In the early 1900s, Theodore Heller reported on six children who had exhibited severe developmental regression following a period of apparently normal development for the first two years of life. Initially termed, *dementia infantilis*, these children demonstrated a marked loss of skills in more than one of the following areas: social interaction, communication, and restricted patterns of interest or behavior. The onset of this disorder, which has since been termed Childhood Disintegrative Disorder (CDD), ranges from fairly abrupt (days to weeks) to relatively gradual (weeks to months). CDD resembles autism in its behavioral and clinical manifestations. While some children regain speech, it often does not return to previous levels of communicative ability and is marked by sparsity of communicative acts, limited expressive vocabulary, and impaired pragmatic skills. Atypical responses such as stereotyped behaviors, problems with transitions and change, and nonspecific overactivity are often observed (Volkmar, Koenig, & State, 2005).

Individuals with Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) exhibit social impairments similar to autism and may have, in addition, fundamental deficits in communication, social interaction, emotional regulation, cognition, and interests. Based upon clinical presentation and developmental history, these symptoms arise during the first few years of life but do not meet criteria for the other PDDs. In essence, PDD-NOS is not actually a clinical entity, but rather is used as a label under unfavorable diagnostic conditions. That is, it is to be used under circumstances in which information is inadequate or as a last resort when the developmental history is unreliable. Some evidence suggests individuals with PDD-NOS have milder impairments and a better prognosis for outcome than individuals diagnosed with autism (Gillberg, 1991), though it is unclear whether this assertion holds true when individuals are matched on nonverbal IQ and language ability. A prevailing view, however, purports PDD-NOS represents the mildest form of autism and represents a difference in severity rather than type. Individuals with PDD-NOS are relatively higher functioning, but not qualitatively distinct (Towbin, 2005).

Together with Autistic Disorder and PDD-NOS, Asperger's Disorder falls into a continuum referred to as *autistic spectrum disorders* (ASDs), a term which also is used in school settings to classify children whose disabilities fall within this subset of pervasive developmental disorders. Asperger's is a chronic and severe developmental disorder distinguished from autism primarily on the basis of relative preservation of language and cognitive abilities in the first three years of life. Asperger's has been used to refer to individuals with varying degrees of ASD symptoms, including autism without mental

retardation, higher cognitive and linguistic abilities, and more socially motivated adolescents and adults with atypical and socially interfering circumscribed interests. Conceptually, Asperger's has provided a bridge between severe autism and "normalcy," representing a continuum of social function. The disorder was originally reported by Hans Asperger (1906 – 1980), an Austrian pediatrician, who described a group of school-aged children who had difficulty integrating into social groups, despite seemingly normal cognitive and verbal skills. Specifically, he noted impairment in nonverbal communication, idiosyncratic verbal communication, circumscribed interests, intellectualization of affect, clumsiness, poor body awareness, and conduct problems. Currently, the *DSM-IV-TR* (2000) differentiates autistic disorder from Asperger's based upon the age of onset of the disorder.

Studies before the official establishment of diagnostic criteria for Asperger's in the *DSM-IV*, however, adopted different definitions, which yielded different comparison groups and complicated research (Klin et al., 2005). This issue, in fact, of differing definitions throughout the history of research on autism spectrum disorders, has applied to all sub-categories and has made comparison among studies difficult. Historically, researchers also have used the term high functioning autism (HFA) synonymously with Asperger's, though it is not recognized as a diagnostic category but rather refers to people who meet criteria for Autistic Disorder and demonstrate higher than average cognitive abilities. There is some debate as to whether or not HFA should be a distinct diagnostic category based upon a possibly unique developmental course (Klin, McPartland, & Volkmar, 2005).

Features that are observed in autism are often observed in other disorders, leading to confusion and misconceptions in diagnosis. Additionally, changes in diagnostic criteria throughout the history of research in the field of autism have resulted in differing perspectives of the diagnosis throughout the past several decades (Volkmar & Klin, 2005). Until recently, there was a lack of objective measures for clinicians and researchers to use to define autism or autism spectrum disorders. As a result, different criteria were often used for including children under the diagnostic label of autism. The introduction of the Autism Diagnostic Interview – Revised (ADI-R) and the Autism Diagnostic Observation Schedule (ADOS), which are now seen as gold standard methods for achieving reliable diagnoses, has allowed for a consensus in both clinical and research communities about how to define autism and related disorders (Tager-Flusberg, 2004).

Early investigators, for example, incorrectly assumed continuity between autism and schizophrenia. During the 1950s, children who were entirely mute were thought to experience complex mental phenomena such as hallucinations and delusions. As many children with autism exhibit little or no spoken language, some clinicians speculated autism was the earliest form of schizophrenia (Bender, 1946). Research in the 1970s began to demonstrate that these two conditions were disparate in terms of onset patterns, course, and family genetics (Kolvin, 1971). However, the first and second editions of the Diagnostic and Statistical Manuals used the term *childhood schizophrenia* to describe autistic children. These and other diagnostic issues made early research on autism difficult to interpret because it was unclear exactly what was being studied. In light of

more current research, the third edition of the *DSM* included Autism as an official diagnostic category (Volkmar & Klin, 2005).

Additional confusion has ensued in regard to comorbidity among autism and various disorders including obsessive-compulsive disorder, stereotyped movement disorder, and Tourette's disorder. While phenomena suggestive of obsessions or compulsions are observed in individuals with autism (Rumsey, Rapoport, & Sceery, 1985), such symptoms vary considerably across samples (Brasic et al., 1995). Comorbid obsessive-compulsive disorder and autism can exist; however, in general, it seems that the ritualistic phenomena among individuals with autism and typical obsessions and compulsions cannot be equated (Baron-Cohen, 1989). Similarly, stereotyped motor movements and mannerisms are common in autism but do not qualify for an additional diagnosis of stereotyped movement disorder. Children with Tourette's disorder exhibit persistent motor and vocal tics (Leckman, Peterson, Pauls, & Cohen, 1997; Nelson & Pribor, 1993). Differentiating between tics and stereotyped motor mannerisms observed in autism can be quite difficult; however, preliminary research has suggested a possible association between the two disorders (Volkmar & Klin, 2005).

Affective and attentional issues are often observed in individuals with autism (Charman, 1998). Affective symptoms include affective lability, inappropriate affective responses, anxiety, and depression. Some researchers have suggested adolescents with Asperger's are at particularly high risk for depression (Klin, Volkmar, & Sparrow, 2000) due to higher cognitive abilities and an awareness of their difficulties. Bipolar disorders among individuals with autism also have been reported (Lainhart & Folstein, 1994;

Steingard & Biederman, 1987). Given the frequent association of autism and mental retardation, as well as the characteristic difficulties in social interaction and communication, individuals with autism frequently exhibit difficulty initiating and sustaining attention. Currently, there is much debate as to whether or not attentional difficulties warrant an additional diagnosis of Attention-Deficit/Hyperactivity Disorder or rather represent an aspect of the autistic condition and developmental level (Iacoboni, 2000; Volkmar & Klin, 2005). These and other such issues in classification and differential diagnosis muddy the water, so to speak, when it comes to a comparison of research findings in the field of autism.

Despite the confusion and conflicting opinions within the field over the years, today's criteria for Pervasive Developmental Disorders are widely accepted and utilized, making the comparison of research findings within the past 10 years more appropriate and acceptable. All Pervasive Developmental Disorders share common threads, which include pervasive and severe deficits in social interaction, communication, stereotyped behavior, and restricted interests and activities, which are markedly deviant from the individual's age and developmental level. Diagnostic criteria further differentiate between Autistic Disorder, Rett's Disorder, Childhood Disintegrative Disorder, Pervasive Developmental Disorder (Not Otherwise Specified), and Asperger's Disorder.

Treatment for Individuals with Autism

Because of the behavioral, social, and cognitive deficits associated with autism, early intervention and continued treatment protocols are necessary for individuals with autism. Treatment for children with autism has taken a variety of forms, and currently

there is an increased emphasis on identifying evidence-based treatment for children with autism. This need is influenced by two factors. First, within the past decade, there has been a significant increase in children identified as having autism who require early intervention and special education services (Odom et al., 2003). The U.S. Department of Education (2001) reported a 500% increase from the 1991-1992 to the 1998-1999 school years in the number of school-aged children with autism receiving special education services. While there is much debate as to the cause of this influx of diagnoses of autism (Fombonne, 2001), the result is the same. This dramatic increase places a substantial need for school districts, teachers, and families to identify educational practices that are effective. Second, the field of education, in conjunction with recent federal legislation, is placing greater emphasis on the use of evidence-based practices (Odom et al., 2003).

Due to their impairments in communication and social interaction, children with autism are at increased risk for developing problem behaviors, which can adversely affect their ability to participate in the least restrictive educational environments and opportunities for social inclusion. As these children develop and mature physically, their increasing size and strength may heighten safety concerns and make the physical management of behavior problems more difficult. Psychosocial stressors such as changes in schools or teachers and the increased emphasis on interpersonal relationships can multiply and intensify with age, putting children with autism at particular risk of developing psychiatric, behavioral, and emotional disturbance. In light of these factors, the ongoing demand for behavioral services throughout the lifespan is evident for individuals with autism (Summers, Houlding, & Reitzel, 2004).

The application of behavioral techniques has a rich, though relatively short history within the field of autism. Psychodynamic therapy was standard in the treatment of individuals with autism prior to the mid-1960s but was hugely unsuccessful with this population (Schreibman & Ingersoll, 2005). The emergence of applied behavior analysis (ABA) and subsequent research in this field (Lovaas, 1977; Lovaas, Berberich, Perloff, & Schaeffer, 1966; Lovaas, Freitag, Gold, & Kassorla, 1965; Lovaas, Koegel, Simmons, & Long, 1973) has led to extremely effective interventions for individuals with autism. “Applied behavior analysis grew out of the field of the experimental analysis of behavior, in which the general laws of learning derived from work with animal populations were applied to socially significant behaviors” (Schreibman & Ingersoll, 2005, p. 882).

Due to increased prevalence rates of autism spectrum disorders, along with current legislation mandating the use of evidence-based interventions for children with this disorder, there is a greater need than ever before to determine effective interventions in the field of autism. And, while there are a wide variety of treatments in existence today, many are not yet supported by research. The unique impairments in social interaction and communication, which characterize children with autism, combined often times with cognitive deficits, require treatments geared specifically for this population. Out of this great need has grown the field of applied behavior analysis, which has emerged as the leading method for treating children with autism.

History of Applied Behavior Analysis

Applied behavior analysis (ABA) originated in the mid-20th century, with historical roots tracing back to the work of Pavlov, Watson, Thorndike, and Skinner,

whose early contributions of classical and operant conditioning were applied to the study of human behavior. Basic principles of ABA were derived primarily from learning theory and the experimental analysis of behavior with nonhuman organisms (Sundel & Sundel, 2005). Ivan P. Pavlov, a Russian physiologist, is best known for the concept of *classical conditioning*. Classical conditioning is concerned with environmental stimuli that evoke reflex responses. Pavlov's research with animals suggested that one form of learning occurs through a process in which new stimuli gain the power to elicit respondent behavior. This concept of conditioning, at the time, was extended to explain virtually all learning, including language acquisition, broad general knowledge, and the development of maladaptive or deviant behavior. Continued research in this area has since shown that conditioning is a more complex process than originally thought, and that its application was overextended because it could not explain all forms of learning, in particular, voluntary behavior. Nonetheless, Pavlov's contributions expanded the field. In particular, his rigorous and systematic investigation of learning under well-controlled conditions helped foster more elaborate studies and greatly helped to advance a scientific approach to the study of behavior (Sundel & Sundel).

While Pavlov was conducting his experiments, Edward L. Thorndike was investigating a different type of learning. He was primarily concerned with the development of new behaviors by evaluating the impact of different consequences. From his work, primarily with cats, Thorndike formulated laws or principles of behavior. Perhaps the most significant of these was his Law of Effect (Kazdin, 2001). The Law of Effect stated that an association is strengthened if it is followed by a "satisfying state of

affairs,” and if it is followed by an “annoying state of affairs” it will be weakened (Hergenhahn, Taflinger, & Hyde, 2001). Rewards, for example, provided as consequences for specific behavior, increased learning of the behavior.

B. F. Skinner, influenced by the work of Pavlov and Thorndike, continued to explore the impact of various consequences on the behavior of laboratory animals. Skinner noted that many behaviors are displayed spontaneously and are controlled primarily by their subsequent consequences. Referring to such responses as operant behaviors, he suggested they are strengthened or weakened as a function of the events that follow them. Skinner asserted that most responses performed in everyday life are operant behaviors, and he termed the process of learning them *operant conditioning*. Skinner’s goal was to identify the variables that influenced behavior through careful and intensive study of one or two subjects at a time. Thus, he focused on overt behavior, the assessment of the frequency of behavior over time, and the study of one or a few organisms at a time (Kazdin, 2001). In doing so, Skinner paved the way for the general process of applied behavior analysis that is used today.

In the early 1900s, John B. Watson, an American psychologist, introduced the school of behaviorism. Controversial at the time, Watson desired a discipline that focused solely on the prediction and control of overt behavior, as opposed to the traditional process of using introspection to study mental phenomena. Watson contended that the traditional method of study was neither objective nor scientific. Watson was a radical behaviorist who completely denied the existence of the mind. He felt that cognitive events had no place in a rigorous, scientific discipline. His views were radical

and did not gain immediate popularity; rather their acceptance grew over time. Few psychologists, then or now, take such an extreme position as Watson. Many have agreed that observable behavior should constitute the primary subject matter of psychology, but also have upheld the importance of internal cognitive or physiological events in the analyses of behavior, as long as internal events can be validated in the study of the overt behavior (Hergenhahn et al., 2001). By synthesizing his research with that of others in the field, Watson argued for a new behaviorist approach in psychology (Kazdin, 2001).

These major and influential scientists all shaped the field of applied behavior analysis as it exists today. Applied behavior analysis (ABA) focuses on clinically and socially relevant behaviors in areas such as psychological and psychiatric disorders, education, rehabilitation, business, industry, sports, and medicine. It is an extension of experimental methods beyond the laboratory to applied settings. ABA is not a specific technique, but rather a framework with which to build a program of empirically-validated strategies to address individual needs (Steege et al., 2007). Interventions within applied behavior analysis focus on environmental factors (e.g., antecedent and consequent events) that can be used to alter behavior (Maher Choutka et al., 2004). Cognitive processes and concepts do not generally play a prominent role in the interventions that are used in applied settings, such as schools, day-care centers, homes, hospitals, nursing homes, business and industry, the military, and society at large. A variety of techniques derived from operant conditioning are used within treatment or intervention planning (Kazdin, 2001).

Behavioral Treatment for Children with Autism

During the past three decades, applied behavior analysis techniques have become the predominant treatment approach for individuals with autism (Kates-McElrath & Axelrod, 2006; Kimball, 2002; Schreibman, 2000; Steege, Mace, Perry, & Longenecker, 2007). The sophistication of these strategies has been applied to promote social interaction, adaptive skills, and the behavioral functioning of adults and children with autism. They have been responsible for enhancing personal independence, increasing prosocial behavioral repertoires, teaching methods of self-control and relaxation (Bregman et al., 2005), increasing language skills, social skills, play, and academic skills, as well as decreasing some of the severe behavioral problems often associated with the disorder (Schreibman, 2000).

Intensive applied behavior analytic programming, often defined as 40 hours per week of one-on-one instruction, has been cited in multiple research studies to demonstrate significant benefits (Anderson, Avery, DiPietro, Edward, & Christian, 1987; Fenske, Zalenski, Krantz, & McClannahan, 1985; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Lovaas, 1987). While some studies report dramatic increases in educational and intellectual functioning with this type of intensive behavioral programming (Lovaas, 1987; McEachin, Smith, & Lovaas, 1993; Perry, Cohen, & DeCarlo, 1995), others report slightly lower improvements with less intensive programming (i.e., 20 – 25 hours per week) (Birnbrauer & Leach, 1993; Anderson et al., 1987; Harris et al., 1991). Most of the children who have received this intervention have benefited from significant gains in IQ scores, adaptive functioning, and language

(Anderson et al., 1987; Harris et al., 1991), and similar results have been demonstrated in both home (Lovaas, 1987; McEachin et al., 1993; Perry et al., 1995) and center-based programs (Birnbrauer & Leach; Anderson et al., 1987; Harris et al., 1991; Weiss & Delmolino, 2006).

Children with autism spectrum disorders (ASDs) are characterized by marked and pervasive deficits in language, communication, and varying forms of social interaction (*DSM-IV-TR*, 2000). Despite these common characteristics, individuals differ significantly in the presentation of behavioral deficits and excesses. Over the past 30 years, behavioral interventions have been the most widely researched and supported treatment techniques for use with this population (Bregman et al., 2005). A broad range of strategies ranging from highly structured and adult-directed to naturalistic and child-centered have been studied in an attempt to determine the most effective and practical interventions to use with children with ASDs in applied settings (Schreibman & Ingersoll, 2005). While behavioral techniques overall seem to be the preferred approach in working with children with ASDs, it is evident from the literature that there is no one technique or program that is successful with every child (Maher Choutka et. al., 2004; Schreibman, 2000). There have been wide variations in the success of behavioral interventions with individual children, such that individualized plans based upon sound functional behavioral analyses seem warranted and fundamental in working with children with ASDs. “Functional analysis serves as the blueprint for identifying the behavioral interventions that are most likely to influence the antecedent and consequent factors responsible for maintaining maladaptive patterns of behavior” (Bergman et. al., 2005, p.

898). Additionally, research has repeatedly demonstrated that the most effective intervention plans with children of ASDs often utilize several strategies simultaneously (Bregman et al., 2005) to maximize treatment results, behavioral maintenance, and generalization. Lovaas and his colleagues (1965/1966) were the first to develop a comprehensive treatment package of behavioral interventions that addressed a wide range of behaviors in children with autism (Lovaas et al., 1966; Lovaas et al., 1965; Schreibman, 2000; Schreibman & Ingersoll, 2005).

The application of behavior analysis must consider the context of the environment and the individual characteristics of the child. The overall purpose of intervention tends to fall into one of three categories: to increase (accelerate) a particular behavior, to decrease (decelerate) a behavior, or to both accelerate certain behaviors, while decelerating others (Wolery, Barton, & Hine, 2005). This process involves five general steps. First, the behavior(s) targeted for change must be defined in measurable and observable terms that eliminate ambiguity. Second, the behavior is measured directly (Schoen, 2003). Measurement of behavior is an ongoing process that is integral to ABA programs. “Assessment *before* intervention involves identification of the unique behaviors, needs, and characteristics of the individual, evaluation of the environment (including resources of caregivers and staff), and description of the complex interactions between the individual and his or her environment” (Steege et al., 2007, p. 93). Third, individualized intervention plans and procedures are designed around this assessment of behavior. Systematic procedures are followed such that successful modification of the behavior can be replicated. Fourth, ongoing data during intervention is recorded and

usually displayed in some type of graphic form (Schoen), which is used to monitor progress. Frequent analysis of the data allows the intervention team to evaluate the effectiveness of interventions, and when necessary, to modify or adapt the program to enhance success or to withdraw intervention components that are no longer needed (Steege et al.). And finally, the interventionist analyzes the results to determine that the intervention accounted for the change in behavior (Schoen).

Applied behavior analysis, in particular intensive treatment of 25 to 40 hours of one-on-one instruction, has emerged as the preferred treatment for children with autism spectrum disorders. Behavioral interventions address the unique set of deficits in social interaction and communication, which are characteristic of this disorder, and functional behavioral analysis has been identified as a critical step to determining effective individualized interventions. A variety of behavioral techniques or strategies have been successful with children with autism, ranging from structured to naturalistic interventions.

Structured versus Naturalistic Behavioral Interventions

Different behavioral approaches to working with children with ASDs exist and range from highly structured to those which are initiated within the naturally occurring daily interactions of the child. While there is much debate as to which of these approaches is superior, each presents advantages and limitations in working with this broad population of children and are often dependent on the specific behavior targeted for intervention. Structured behavioral interventions include several basic characteristics: (a) The learning environment is highly structured; (b) target behaviors are broken down into

discrete subskills that are taught successively; (c) teaching episodes are initiated by the adult; (d) teaching materials are varied within a task and are selected by the adult; (e) explicit prompting is used to elicit the child's production of the target response; (f) reinforcers are usually unrelated to the target response; and (g) reinforcement is given only for correct responding or successive approximations (Delprato, 2001).

Discrete trial training, which is perhaps the most common and highly structured behavioral technique, has demonstrated accelerated skill acquisition (Miranda-Linne & Melin, 1992), impressive gains in children with otherwise poor prognoses (Lovaas, 1987), and general success in teaching children a variety of prosocial behaviors (Baer, Peterson, & Sherman, 1967; Lovaas et al., 1966; Metz, 1965; Schroeder & Baer, 1972). Discrete trial training consists of repetitive practice and a highly structured form of trial presentation (e.g., a concise and consistent instruction or question, the child's response, and a specific consequence) (Schreibman, 2000). Despite its success, highly structured approaches have been criticized in a number of areas. The adult-directed nature of the instruction and the use of tight stimulus control have been shown to compromise the spontaneous use of the behavior (Carr, 1981), a fundamental goal of intervention planning for children with ASDs. In addition, the generalization of the behavior to other settings and people is limited by the highly structured environment and use of artificial reinforcers (Spradlin & Siegel, 1982). And finally, such an environment is not characteristic of natural adult-child interactions (Schreibman, Kaneko, & Koegel, 1991). The generalization and maintenance of treatment effects cannot be expected to passively occur with treatment. More extensive generalization and better maintenance of treatment

effects, for example, has been demonstrated when parents, siblings, and peers are trained to be major treatment providers for children with autism (Schreibman, 2000).

Highly structured, adult-initiated interventions, such as discrete trial training, have been demonstrated to produce many positive outcomes for children with autism, including skill acquisition and behavioral gains. While the repetitive nature of such interventions along with specific consequences have been successful with this population in some areas, critics point out the lack of generalization and unnatural environment of this intervention strategy.

Naturalistic and child-centered approaches have emerged in an attempt to address some of the shortcomings of highly structured techniques. Some examples of a naturalistic approach include incidental teaching, mand-model, time-delay, milieu teaching, interrupted behavior chains, and the natural language paradigm/pivotal response training. These approaches are quite opposite from structured behavioral interventions though they share common components: (a) the learning environment is loosely structured; (b) teaching occurs within ongoing interactions between the child and adult; (c) the teaching episode is initiated by the child by indicating interest in an item or activity; (d) teaching materials are selected by the child and varied often; (e) explicit prompting is used to elicit the child's production of the target response; (f) the child's response and the reinforcer are directly related; and (g) reinforcement is provided for attempts to respond (Delprato, 2001). Proponents of the naturalistic approach to working with children with ASDs have found that, as opposed to more structured techniques, naturalistic interventions increase the maintenance and the generalization of learned

behaviors and promote spontaneous responses (Charlop-Christy & Carpenter, 2000; Delprato, 2001). Additionally, parents who are taught to use naturalistic strategies report more positive parent-child interactions in the home setting than those who are taught to use highly structured approaches (Schreibman et al., 1991). In contrast to highly structured approaches, which have reported improvements in intellectual functioning, it has yet to be determined whether naturalistic approaches can yield such results. The two approaches are difficult to compare in that regard, as naturalistic approaches are generally geared toward developing functional skills, while highly structured programs often focus on cognitive or academic skills (McGee, Daly, & Jacobs, 1994).

Naturalistic interventions have been found to mimic the natural learning environment of daily living activities. For this reason, proponents surmise that their utility outweighs that of more structured approaches. They also have been said to generate more positive child-parent interactions when used in the home. Generally designed to foster functional skills, however, there is minimal evidence to support their success in developing intellectual functioning or academic skills.

Specific behavioral interventions

Behavioral interventions can be divided into several broad categories: antecedent interventions, consequence-based interventions, and skill acquisition. Antecedent interventions, or stimulus-based procedures, are concerned with preventing the occurrence of problem behaviors rather than responding reactively by altering consequences. Such procedures are implemented before a target behavior occurs and can be further subdivided into those that are implemented immediately before a target

behavior occurs and those that are implemented relatively distant in time to the target behavior. A number of remote antecedent interventions may be helpful in reducing the problem behaviors exhibited by children with autism. Environmental changes designed to reduce visual distractions, for example, may help children with autism to increase on-task behavior (Duker & Rasing, 1989). Early intervention services are becoming increasingly popular as they have the potential to reduce the likelihood of problem behaviors arising later in life (Anderson & Romanczyk, 1999). Simple exposure to typically developing peers as an early intervention technique has been reported to significantly lower rates of aberrant behavior, such as stereotypy (Lanquetot, 1989; McGee, Paradis, & Feldman, 1993), though the addition of intensive behavioral treatment was necessary to maintain behavior change (Bregman et al., 2005). Adherence to a predictable daily schedule of events has shown to reduce disruptive behavior of individuals with severe developmental disabilities (Flannery & Horner, 1994). Evidence suggests that antecedent exercise can reduce self-stimulatory behavior among children with autism (R. L. Koegel & Koegel, 1989) and aggressive behavior and stereotypy among adults with autism and mental retardation. Such benefits over time may contribute to improved health and lead to increased skill development from increased task engagement (Allison, Basile, & MacDonald, 1991; Elliott, Dobbin, Rose, & Soper, 1994).

A number of immediate antecedent events and situations have been identified in the literature as influencing the frequency and severity of behavioral problems. Factors within a teaching situation, such as student choice of activities, variation in teaching

lessons, task difficulty, and dispersal of mastered tasks with novel tasks have been found to influence the prevalence of behavioral difficulties (Dyer, Dunlap, & Winterling, 1990; Munk & Repp, 1994; Weber & Thorpe, 1992). A general finding in the research among antecedent interventions was the benefit of conducting a functional analysis of antecedent variables (Taylor, Ekdahl, Romanczyk, & Miller, 1994). Such analyses aid in the identification of specific antecedent variables that may precipitate problem behaviors (Bregman et al., 2005).

Consequence-based interventions focus on altering events or applying systematic procedures after a target behavior has occurred. Such techniques include interruption and redirection, reinforcement-based interventions, extinction procedures, noncontingent reinforcement, and punishment procedures. Interventions using interruption and redirection often include physical prevention of a target behavior and redirection to another activity. The interruption piece frequently eliminates sensory feedback obtained from certain repetitive aberrant behaviors and can be as direct as simply blocking the problem behavior. A reinforcer, simply defined, is any situation or event that follows a particular behavior and increases the likelihood that the behavior will recur in the future. The goal then of reinforcement-based interventions is to systematically reinforce desired behaviors and reduce or eliminate reinforcement associated with undesirable behaviors. Such interventions are only successful if the reinforcer(s) are powerful enough to significantly motivate the individual to perform certain behaviors. Identifying reinforcers for children with autism can be especially difficult, though a number of comprehensive guides to behavioral assessment are available. Such assessments include interviews and

observation techniques for identifying potential reinforcers. Reinforcement programs have been found to increase skill development and decrease behavioral problems (Bregman et al., 2005). *Differential reinforcement* procedures encompass a variety of reinforcement-based interventions that are designed to provide reinforcement when children use a skill being taught and not provide reinforcement when the skill is not used (Odom et al., 2003). The main categories of differential reinforcement currently include Differential Reinforcement of Other Behavior (DRO), Differential Reinforcement of Incompatible Behavior (DRI), Differential Reinforcement of Alternative Behavior (DRA), and Differential Reinforcement of Low Rates of Responding (DRL) (Bregman et al.). Each presents specific strengths and limitations and should be selected according to the specific goals of intervention, variables affecting the target behavior, and the ability level of the individual.

Extinction procedures operate on the premise that the removal of reinforcers that previously maintained a behavior function to reduce the occurrence of the behavior. The goal of extinction is to systematically extinguish previously reinforced problematic behaviors. This procedure, however, can be time consuming and difficult to implement and may result in transient behavior problems before the target behavior is finally extinguished. That is, the target behavior may increase in frequency, intensity, or severity or competing problematic behaviors may emerge during this process. Extinction by itself does not teach alternative behaviors and thus may be used most effectively in combination with other interventions. Extinction has been successfully applied to various factors maintaining maladaptive or problematic behavior, including attention from others,

escape from demands, or sensory reinforcement. *Noncontingent reinforcement*, though rarely used, may be useful in some circumstances. This procedure involves the provision of reinforcement on a fixed schedule or routine, despite the occurrence of problem behaviors. Inherently, there are a number of difficulties with this intervention. First, it may unintentionally reinforce problem behaviors that may require additional intervention at a later time. Second, it may be difficult to convince parents or educators to use this technique as the temptation to stop the reinforcement in the midst of problem behavior and to apply other techniques such as punishment can be compelling. Third, this intervention alone does not teach alternative behaviors. In spite of these limitations, noncontingent reinforcement may be beneficial under certain circumstances, is relatively easy to implement, and can result in rapid behavior change. When attention from adults is a maintaining factor for problematic behavior, for example, the provision of systematic noncontingent attention may lead to increases in positive adult-child interactions, resulting in a decrease in attempts to gain adult attention through problem behavior. When noncontingent reinforcement is used, it should begin with a very dense schedule of reinforcement and gradually be faded to a leaner schedule as problem behaviors decrease (Bregman et al., 2005).

One of the most controversial issues in the behavioral literature is the use of punishment. Some clinicians and ethicists state that punishment should never be used, while others suggest that it may be appropriate in the short-term treatment of serious behavioral disturbances or when used in conjunction with other reinforcement procedures, education, or skill development training (T. Smith, 1990). Defined in

behavioral terms, punishment is any consequent event or stimulus that decreases the future rate and/or probability of a behavior. As with reinforcement, a stimulus that is punishing can vary greatly between individuals, and punishers seem to be more effective if they are systematically varied over time. Mild punishers such as verbal reprimands, overcorrection, timeout, water mist, performance of undesired activities, and mild electric shock have been used successfully to decrease aggressive behavior, self-injury, screaming, ingestion of medication, and pica (i.e., the craving or ingestion of nonfood items) (Bregman et al., 2005).

Skill acquisition techniques emphasize the development of alternative positive behavioral skills or replacement behaviors that compete with problem behaviors. Skill acquisition programs generally target the following main categories: communication and language skills, self-management skills, and social skills, and treatment packages often address all three areas (Bregman et al., 2005). As deficits in communication and language skills characterize children with ASDs, interventions to increase functional communication represent one of the fastest growing areas in the field of behavioral treatment.

Functional communication training (FCT) involves teaching a communicative response as an alternative to maladaptive behavior. Many problem behaviors, such as self-injury and aggression, serve a communicative function by expressing desires (e.g., for objects, activities, attention), representing a form of protest, or serving as a means of escaping task demands (Bregman et al., 2005, p. 910).

FCT emphasizes the importance of conducting a functional analysis of the target behavior and teaching functionally equivalent communicative behavior that is effective and efficient. Both verbal and nonverbal communication skills have been taught to help children with ASDs request assistance, point to a desired toy or activity, express frustration, and request breaks (Durand & Carr, 1987). The research has shown that as children's communication skills improve, disruptive behaviors decline, even though these behaviors are often not directly targeted for intervention (Koegel, Koegel, Hurley, & Frea, 1992). FCT alone is not an appropriate treatment for maladaptive behaviors motivated by automatic or sensory reinforcement, but when combined with other behavioral techniques, FCT and related interventions are effective in expanding the functional communication skills of children with ASDs in a variety of settings (Bregman et al., 2005).

Self-management procedures offer many benefits for children with ASDs, including increased independence, better generalization outside the treatment setting, and greater success in addressing several problem behaviors simultaneously. These behavioral strategies allow individuals to take responsibility for monitoring their own behavior and administering contingent rewards and consequences. For individuals with autism, self-management programs often make use of pictorial or written schedules, task analyses, wrist-mounted counting devices, and other assistive aids. With the use of these aids, children can learn to perform complex tasks, master new behaviors, and decrease disruptive behavior. In conjunction with parent training, parents have been able to successfully teach their children to follow schedules, leading to increased social

engagement and decreases in disruptive behavior. Self-management procedures have been used to improve daily living skills and to ultimately foster personal independence (Bregman et al., 2005).

Skill acquisition in the form of social skills training addresses a fundamental need for children with ASDs, given their difficulties with social interaction and social reciprocity. Expanding their range of adaptive social skills can hugely impact the behavioral functioning of this population. Varying techniques of direct social skill training have been used to target specific skills such as initiating social interactions with peers, demonstrating appropriate work behavior, responding appropriately to social initiatives and task requests from others, reducing verbal perseveration and inappropriate facial expressions, and employing joint attention (Bregman et al., 2005).

Antecedent interventions, which are sometimes viewed as a more proactive approach, include those techniques that precede a target behavior. Examples would include daily visual schedules, changes to the environment, exercise, student choice, variation in lessons, and variations in task difficulty. They help clinicians to prevent problem behaviors and increase the likelihood of increases in prosocial behaviors. Consequence-based interventions, on the other hand, are implemented after the occurrence of a target behavior, with the intended goal of altering future demonstration of the behavior. Such techniques as interruption, redirection, differential reinforcement, extinction, and punishment fall into this category, each with their strengths and weaknesses in the modification of behavior for children with autism. Lastly, skill acquisition emphasizes the development of adaptive and prosocial behaviors, which are

integral in building a useful and appropriate repertoire of socially meaningful behavior for children with autism spectrum disorders. Functional communication systems, social skills training, and self-management procedures teach children with autism to become more independent in their daily activities of living.

There are a multitude of behavioral interventions, which have been discussed in the literature and found to demonstrate successful outcomes for children with autism. Antecedent interventions, concerned with preventing problematic behavior, are implemented before a target behavior and range from environmental changes to daily schedules to preventative exercise. Consequence-based interventions, on the other hand, are administered after a target behavior has occurred and attempt to increase or decrease the future probability of the behavior. Lastly, skill acquisition techniques are often used in combination with antecedent or consequence-based strategies with the goal of teaching alternative behaviors. Such treatments often address communication and language, self-management, and social skills.

Summer camp programs for children with disabilities

Summer camps for children with disabilities began in the late 1800's and expanded in the 1930s and 40s (Blas, 2007; Carlson & Cook, 2007; Fletcher & Hinkle, 2002). Summer camps for children with disabilities tend to fall into one of three general categories: (1) camps that are inclusive, integrating children with and without disabilities, (2) camps that are segregated to provide children with disabilities specialized programming to accommodate for their unique challenges, and (3) camps that are specifically designed to meet the medical and social needs of children who would

otherwise be excluded from camp settings (Blake, 1996; Goodwin & Staples, 2005). The primary goals of summer camps are to provide youth with recreationally-based experiences with other youth, to develop related skills, to provide opportunities to build positive peer relationships, and to encourage positive attributes, such as self-reliance and self-esteem (Goodwin & Staples).

Some early summer camp programs for children with disabilities were pioneered by religious organizations, such as the Tikvah Program at Camp Ramah in New England, which began in 1970. This program has serviced children and adolescents with Down Syndrome, autism, neurological impairments, developmental delays, and other rare disorders and now operates at a variety of locations. The Tikvah campers range from age 13 to 18 and participate in the overnight camp for eight weeks. Younger campers have minimal input into their daily programming, which includes predictable, structured activities. The typical schedule of this camp includes wake up, prayer services, breakfast, clean-up, whole-group and small group activities, swimming, lunch, rest time, singing, dancing, sports, prevocational training, arts and crafts, dinner, and camp-wide evening activities. Blas (2007) asserts that the predictability of the camp schedule is essential in making the camp successful for campers who are dependent upon such routines. Parents of Tikvah campers are sent weekly e-mail updates throughout the camp and the camp director is available 24 hours a day by cell phone and computer to consult with parents (Blas).

Many camp programs utilize a behavioral approach in which the strategies of shaping, behavioral contracts, and token economies guide the camping experience. One

such camp was considered a residential short-term camp for children with behavioral problems (Rawson, 1973). The camp, offered at the Englishton Park Academic and Remediation Center, which is affiliated with Hanover College, originated in the summer of 1970. The initial program consisted of two 10-day sessions, each for different age groups, with the goals of significantly altering specific behavior patterns that caused the child problems in relating to others, improving the child's academic skills and attitudes, and providing modeling through reinforcing relationships with teachers and therapists. A system based on behavior modification, consisting of extinction of maladaptive behavior and reinforcement of socially appropriate behavior, was applied to the camping experience. Campers were provided with individualized "behavior prescriptions" based upon intensive case studies. Positive reinforcements included verbal praise, physical gestures of affection and approval, award of candy pellets, award of gummed stars on name badges which could be traded for candy, soft drinks, or ice cream, fancy certificates of merit given in public ceremonies, and participation in highly coveted activities. Children were negatively reinforced for inappropriate behaviors through complete ignoring and withdrawal from coveted activities for brief time periods. The camp day consisted of individual learning modules, cooperative learning modules, and competitive learning modules, addressing a wide range of daily skills. Rawson (1973/1978) concluded that 1) the short-term, highly structured camp setting was markedly effective in addressing specific problem behaviors in children with poor social adjustment, 2) behavior modification techniques could be adapted for a camp setting and offered treatment integrity, 3) significant gains in academic attitudes and skills could be accomplished in conjunction with behavioral gains, 4) behavior modification does not

necessarily lead to blind compliance with authority, 5) separating the child from the home environment offers advantages, 6) follow-up work is essential to maintain and increase behavioral gains, and 7) children's enjoyment of camp life and activities increases motivation for treatment (Rawson, 1973).

In analyzing the camp over an 8-year span, Rawson (1978) reported significant improvements in campers' self-concept, academic skill attainment, interpersonal skills, mastery of academic content, and attitude toward school and teachers. He attributed part of this success to the high degree of environmental control that is possible through a summer camp setting, along with the natural appeal the environment has for children. He described it as a unique opportunity to combine attractive activities with therapeutic goals, while controlling the child's environment. Subsequently, in 1991, Rawson and McIntosh demonstrated significant gains in self-esteem utilizing a similar camp program for children with severe behavior problems.

Another camp using behavioral strategies was created by researchers in South Carolina (Heckel et al., 1977). Campers consisted of 37 males and 5 females ranging from age 8 to 15, who were referred from local mental health agencies. Campers were separated into six groups, based on age and sex, for the seven-week camp. Camp counselors were reportedly trained extensively in behavior modification systems and the premise of token economies. Heckel and colleagues (1977) attempted to produce verbal behavioral change in the campers by providing positive reinforcement for such verbal behavior as initiating interactions, seeking information, giving information, seeking opinions, giving opinions, and elaborating. Heckel and colleagues found significant

increases in group responses and summarizing information, along with decreases in environmental responding and therapist-directed responses. In other areas assessed, they found no significant changes. The authors surmised from their findings that the camp setting supported the ability of group members to make decisions, which is a sign of increased competency and role flexibility. It also appeared to lessen the participants' need for leader-directed interventions (Heckel et al.).

Roswal and colleagues (1986) utilized a summer camp setting to investigate the effect of a positive reinforcement program versus an elementary school math program on the self-concept of handicapped and non-handicapped students. Self-concept, a construct that is fostered through group interaction, can have lasting effects on childhood development (Roswal et al., 1986). Results of this study indicated that a positive reinforcement-based camp did have significant effects on children's self-concept, as compared to a traditional summer math program. Both handicapped and non-handicapped peers experienced significant gains in self-concept through this summer camp positive reinforcement program (Roswal et al.).

Baker (1972) made several interesting observations regarding therapeutic camp settings for children with disabilities. He purported that camp settings are more beneficial than other residential settings designed to service children with mental disabilities due to the following factors: camp settings are rarely hindered by policies that typically govern larger organizations, talented college students are often available and willing to work at camps during the summer months, outdoor camps can utilize natural reinforcers in the environment (e.g., nature trails, animals, plants, weather, etc.), small

self-contained environments increase program adherence and consistency, and summer camps are time-limited, allowing staff to maintain a high level of output. Camp Freedom, for example, was started in 1969 and was based upon behavior modification techniques designed to serve children with mental disabilities. Twenty-five children aged 5 to 15 attended this camp in which programming was reportedly designed to focus on individualized target behaviors based upon pre-camp screening. Fifteen children comprised the control group, who participated in pre- and post-testing without attending the camp. Camp Freedom utilized such principles as shaping, antecedent control, consequent control, positive reinforcement, token economies, the Premack principle, punishment, and differential reinforcement in an effort to provide “a learning milieu in which task-oriented behavior is more likely to occur.” The author found participants who attended this camp demonstrated significant progress in predetermined target areas compared to those in the control group, based upon parent or teacher reports, specific behavioral incidents, or changes in parent questionnaires, child tests, or videotaped behaviors (Baker, 1972).

For many children with behavioral symptoms such as impulsivity, inattention, aggression, social deficits, and low motivation, all symptoms associated with Attention Deficit-Hyperactivity Disorder (ADHD), summer camp can bring a number of problems if it is an option at all. To address such concerns, Camp Friendship was created to help children with ADHD-related symptoms develop social skills. Camp Friendship was a 5-week camp in which campers attended camp for five days a week from 9 a.m. until 4 p.m. Some children in the program were reported to have mild autistic features or

Asperger's Disorder but were functioning at a high level, according to the author. The camp utilized a high counselor to camper ratio of 1:4, to ensure campers received individual attention necessary to meet their needs. Henley (1999) reported aggressive or impulsive behavior, related to hyperactivity and social anxiety, was transformed into socially constructive forms of self-regulation at Camp Friendship. He noted parents reported changes in their child's ability to control impulsivity, inhibit aggressive reactions, and to empathize with the needs of others (Henley). Other similar camp settings for children with ADHD symptomology have been shown to improve basketball skills, increase sportsmanlike behavior, and increase interest in basketball (Hupp & Reitman, 1999).

Children with learning disabilities may be less likely to participate in summer camp programs, as they exhibit difficult behavioral patterns which often result in educational failure, lack of perceived competence, and peer rejection (Mishna, 2005). To address the psychosocial needs of children and adolescents with learning disabilities, a three-week camp was created in Toronto, Canada, with the goal of enhancing campers' social competence, self-confidence, and self-esteem. The camp utilized therapeutic and recreational outdoor activities to meet its goals through group-centered methods, such as swimming, canoeing, sports, crafts, and adventure-based learning opportunities. The author found a number of general principles aided in the campers' successful experience, including preparing children and adolescents for camp, carefully determining groups, listening to and validating each camper's experiences while working to develop effective

skills, contracting with children and adolescents about what was expected during the camp program, and exploring factors that contribute to problem behaviors (Mishna).

Wilderness camping has been used in treatment of children with emotional disturbances and mental disabilities (Hartlage & Park, 1967), with the extension of learning into the summer months as a primary goal (Byers, 1979). Other goals include fostering normal behavior patterns, emotions, and attitudes through camping in natural environments (Levitt, 1994). Such camps have been implemented in a variety of different formats and have encompassed a large number of settings (Byers; Levitt). They have been approached from a number of vantage points, some of which value the inclusive element of combining children who are emotionally disabled with typically developing peers. Others take a more segregated approach, each with advantages and disadvantages. Proponents of inclusive camp settings argue this approach avoids labeling and provides appropriate peer modeling. Additionally, such settings allow children with disabilities to engage in generalization of skills with typically developing peers. Critics of this approach contend inclusive programs may simply provide children with emotional disabilities, who have consistently struggled to function adequately in traditional settings, yet another environment in which they are likely to fail, comparatively speaking. They may view inclusive camp programs as a place where they are once again viewed as “different” by other children (Byers). Furthermore, Goodwin & Staples (2005) found that adolescents with disabilities who participated in a segregated camp were eager to connect with other adolescents with disabilities, something they rarely experienced in their home communities. The experience appeared to help these adolescents form

identities in which they better understood themselves and their own disabilities (Goodwin & Staples).

Several recent studies in prevention research have advocated the effectiveness of multifaceted treatment packages for children who exhibit high levels of aggression, disruptive behavior, noncompliance, hyperactivity, poor social skills, and peer rejection (August et al., 2003; August et al., 2001; Realmuto et al., 2004). Children with early-onset aggressive behavior are at risk for later development of conduct problems and antisocial behavior. In an effort to identify interventions that may potentially reduce the risk faced by aggressive children, August and colleagues (2001) developed the Early Risers program. The Early Risers program was designed to deflect children from the developmental pathway to antisocial behavior and to enhance protective variables by affecting positive change in the following domains: academic competence, behavioral self-regulation, social competence, and parent investment in child. This multicomponent intervention program includes two complementary components: CORE and FLEX. The CORE component includes a six-week summer program, a biweekly family program, and a monitoring and mentoring school engagement program, while the FLEX component offers individually tailored risk-adjusted intervention support, brief interventions, and community mental health options (August et al., 2001).

Overall, the 3-year Early Risers program has demonstrated effectiveness with aggressive elementary school-aged children, who made significant gains in academic achievement and classroom behavior. Of particular interest were the effects gained from the six-week summer component, which targeted many of the behavioral and social skill

deficits frequently observed in disruptive children and utilized a highly structured behavioral-modification program (point system) to help students self-regulate behavior throughout the day. Using a goodness-of-fit model, Realmuto and colleagues (2004), sought to identify specific participant characteristics that affected participation in intervention components. They divided child participants into two groups based upon parents' global adaptive functioning (GAF). In contrast to the family program component, they achieved extremely high participation rates from both parent GAF groups, with approximately three-fourths of the children attending a minimum of 75% of the summer sessions over a 3-year period. Among parents with lower GAF scores, the protective factors of higher child IQ and higher socioeconomic status (SES) were associated with higher levels of attendance in the summer program. Among parents with higher GAF scores, single-parent families had lower attendance rates than two-parent families. When they controlled for these participation factors and baseline social competence, they found a significant positive relation between attendance in the six-week summer program and social competence at year three. These were particularly important findings as previous studies had demonstrated children from low-SES homes tend to lose academic and behavioral skills during the summer months, while their high-SES counterparts generally continue to make gains.

A number of terms have been used to describe outdoor experiential treatments (Somervell & Lambie, 2009). They are commonly referred to as wilderness camping, adventure-based programs, wilderness therapy, or adventure therapy and have increased in popularity over the past several decades (Anderson et al., 1997; Asher et al., 1994;

Durr, 2009). For the purpose of this review, all similar types of programs will be referred to by the generic description of outdoor experiential programs. Outdoor experiential programs use games and outdoor activities as means to produce intentional change. They are based on experiential learning theory, which purports learning occurs most effectively through direct and intentional interaction with learning experiences (Garst et al., 2001; Levine, 1994). Such programs aim to produce social benefits, personal growth, and therapy or rehabilitation for the populations they serve, which range from adjudicated youth, individuals struggling with addictions, children with cancer, adolescents with emotional disturbances, psychiatric patients, and individuals with physical disabilities (Anderson et al., 1997; Carlson & Cook; McPeake et al., 1991; Smith et al., 1987; Somervell & Lambie). A variety of positive effects have been documented in the literature, including improved self-esteem, self-concept, trust, group cooperation, skill development, health effects, social attitudes, and behavior. Additionally, outdoor experiential programs have been shown to reduce recidivism, reduce emotional problems, produce changes in locus of control, decrease stereotypes, and reduce trait anxiety (Anderson et al., 1997).

Traditional outdoor experiential programs generally consist of outdoor activities that may include cooperative games, problem-solving activities, trust exercises, group initiatives, and high-adventure activities such as ropes courses, rock climbing and rappelling, or extended time alone in the wilderness. The basic premise rests upon creating and participating in activities that have metaphoric connection to everyday life challenges, and an integral component of outdoor experiential programs is the processing

and debriefing sessions that help participants to transfer learning from the outdoor environment to their daily lives (Anderson et al., 1997; Carlson & Cook, 2007; Levine, 1994). Accomplishing tasks that appear difficult or even impossible, which are inherent in the outdoor environment, increases one's sense of competence, mastery, and self-esteem (Anderson et al.). "Using the natural environment to introduce challenges, outdoor adventure programs provide opportunities for participants to discover that many of their perceived limitations are self-imposed," (Herbert, 1998). Learning activities that are incorporated into outdoor experiential programs help participants to develop insights, new skills, and new ways of looking at one's self and one's world (Carlson & Cook).

Proponents of outdoor experiential programs believe that they provide life-changing experiences which cannot be created in any other setting (Berman & Anton, 1988). In outdoor experiential program approaches, nature is seen as an objective learning environment which demands that participants adapt to the atmosphere. Additionally, outdoor programs have the advantage of a novel setting in which motivation and participation are often increased (Berman & Anton).

One of the earliest outdoor experiential programs was Outward Bound, which was originally created as a survival training school for British military during World War II. Dr. Kurt Hahn, utilizing his philosophy as an educator, developed a program in which "attitudinal preparation and experiential learning" were emphasized (Berman & Anton, 1988). The intent was for participants to gradually master physical and psychological skills. Hahn proposed students learn best when immersed in situations that force them to discover and build their own personal capacities (Berman & Anton; Carlson & Cook,

2007). He attempted to create situations that would strain the adolescents' resources, while providing opportunities for personal growth in positive directions (McPeake et al., 1991). Outward Bound's success prompted similar programs for other purposes. Hahn and David Baden-Powell, founder of the Boy Scouts, made similar observations that "physically and emotionally demanding group experiences, outdoors, were particularly effective in bringing about positive characterological change (participants became more resilient, confident, socially responsible, etc.)," (Clark, Marmol, Cooley, & Gathercoal, 2004). Significant decreases in recidivism for male participants are among the positive outcomes reported through Outward Bound (Berman & Anton).

Early research from outdoor experiential programs of varying types, while sometimes less rigorous in methodology, has consistently demonstrated positive outcomes and has been generally accepted among professionals (Durr, 2009; Levitt, 1994). Positive outcomes have included increased self-esteem (Garst et al., 2001; Levitt; Mishna, 2005), increased self-awareness, increased self-assertion, increased acceptance of others (Berman & Anton, 1988), improved social and school attitudes and behaviors, decreased pathological symptoms, enhanced patient-staff relations, improved quality and quantity of social interactions (Levitt), improved relationships with peers and adults, greater ability to assume responsibility, and better coordination and physical skills (Mishna). Studies with adolescent psychiatric patients have shown increases in physical adequacy, self-reliance (Adams, 1970), and self-esteem (Adams; Kaplan, 1974).

While much early research has supported the use of outdoor experiential programs, Byers (1979) concluded from her investigation that strong statements about

efficacy of camp programs could not be made based upon inadequate empirical methodology. Levitt (1994) further specified that many early studies lacked control groups and random assignment of subjects to treatment conditions, which weakened internal and external validity of the studies. Nonetheless, Levitt suggested that more recent research with improvements in experimental design and methodology have yielded similar positive results regarding camping as a therapeutic setting for emotionally disturbed girls (Levitt).

Johns Hopkins University researchers and staff at the Center for Summer Learning investigated a variety of summer program models and evidence of their effectiveness in 2005. They found nine characteristics among each program's approach to learning and program infrastructure that provided a framework for effective and successful programs, which led to positive results for young people. Among the nine characteristics, three fell within the category of approach to learning: intentional focus on accelerating learning, firm commitment to youth development, and proactive approach to summer learning. The six remaining characteristics characterized program infrastructure and were strong, empowering leadership, advanced collaborative planning, extensive opportunities for staff development, strategic partnerships, rigorous approach to evaluation and commitment to program improvement, and clear focus on sustainability and cost-effectiveness. Positive outcomes for programs utilizing these characteristics included higher school-year attendance and achievement, increased motivation to learn, feelings of belonging, and reduced engagement in risk-taking behaviors. Bell & Carrillo (2007) suggested summer programs are most effective when learning opportunities are

integrated into enrichment activities such as field trips, rather than presented in traditional school-year methods. They further indicated that the most important goal of a summer program is to bridge the achievement gap that often occurs within the summer months, thereby preventing summer learning loss (Bell & Carillo), a problem that is especially detrimental for disadvantaged students. “Specifically, the out-of-school summer learning rates of disadvantaged students tend to be markedly slower than the growth rates of their more advantaged counterparts,” (Borman, Goetz, & Dowling, 2009).

Bell and Carillo (2007) cited several specific programs, which met their criteria for effective summer models. They contended that there is no single model to create an outstanding summer program but that all effective models are committed to quality programming and meeting the needs of young people, their families, and their communities during the summer months. Of particular interest was the Discovery Creek Children’s Museum of Washington, which provides meaningful outdoor experiences for underserved children in Washington, D.C. Each summer session is created around a theme teaching environmental education through science, art, culture, history, play, team building, and outdoor adventure (Bell & Carillo).

Beginning in the late 1800s, outdoor experiential programs have been available to give children with disabilities a “camp” experience. They have been offered through a number of different agencies (i.e., religious organizations, colleges and universities, not-for-profit organizations, and independent researchers) and have served a variety of populations of children (i.e., children with Down Syndrome, autism, neurological impairments, severe behavior problems, mental disabilities, learning disabilities, ADHD,

juvenile charges, and high levels of aggression). Outdoor experiential programs range from weeklong overnight camps to several hour day camps. They typically include structured and unstructured activities, such as swimming, singing, dancing, sports, arts and crafts, nature trails, cooperative games, and academic instruction. Outdoor experiential programs often provide a specific and deliberate emphasis on skill training, though others provide a focus on recreation and leisure with little overt skill development. Some camps even utilize a behavioral approach, using such strategies as shaping, positive reinforcement, and behavioral contracting. The results of outdoor experiential programs, though ranging in scope, size, and treatment integrity, have been consistently promising. Conclusions have boasted gains in academic attitudes, academic skills, self-concept, interpersonal skills, mastery of academic content, self-esteem, group responses, individual target behaviors, basketball skills, sportsmanlike behavior, classroom behavior, self-awareness, self-assertion, social behaviors, and positive peer relationships, along with decreased aggression and pathology.

Summer camp programs for children with autism

The National Research Council (2001) identified several characteristics of effective interventions for young children with autism, including early intervention, systematic instruction, one-on-one or small group instruction, ongoing monitoring of interventions, an emphasis on generalization of skills, opportunities for interaction with typically developing peers, intensive instructional programming (i.e., 25 hours per week, five days per week, and twelve months per year), and instructional objectives focusing on social skills, communication, adaptive living, recreation-leisure, cognitive, and academic

skills (Steege et al., 2007). Given the need for programming 12 months a year and the empirical evidence that supports that camps and outdoor experiential programs have been successful with a variety of populations of children with disabilities, it seems appropriate to provide children with autism and their families with services through an outdoor summer camp setting. Despite the widespread acceptance that intensive instructional programming is effective in working with children with autism, to date there is little research on the effectiveness of applied behavioral analytic approaches in summer camp settings.

Lopata and colleagues (2008) investigated the effectiveness of a manualized summer program aimed at social development for high-functioning children with autism spectrum disorders. The full-day camp, lasting six weeks, targeted social skills, face-emotion recognition, range of interests, and interpretation of non-literal language. All participants received the same manualized treatment and curriculum with high rates of explicit performance feedback, but half the group was randomly assigned to a response-cost point system, while the others received non-conditional performance feedback. Treatment was administered in small groups of approximately six children in both indoor and outdoor settings on a college campus. Significant social improvements on objective measures were reported by both parents and staff, though no significant superiority of either treatment condition was found. The authors suggested the high rates of explicit performance feedback and reinforcement in both groups were effective in promoting social skill development (Lopata et al., 2008).

Brookman and colleagues (2003) described a comprehensive summer camp program for children with autism that utilized applied behavior analysis and positive behavior support. The goal of the camp was to improve social skills through an inclusive camp setting with typically developing peers. The camp was implemented based upon the need, identified by parents, for continued inclusive programming during the summer months. Autistic campers of this program ranged from age 4 to 10 years and represented a wide range of functioning and communication levels. They participated in the day camp for one to three weeks and were supported by paraprofessional aides who were in addition to the regular summer camp staff. Camp lasted from 7:15 a.m. to 5:30 p.m., though some campers with autism participated for only half days. The camp setting consisted of a large campus university with approximately 200 campers each week throughout the summer. Camp activities consisted of swimming, dance, rock climbing, gymnastics, and art, which were divided into 45-minute blocks (Brookman et al., 2003).

Campers with autism were given individualized social and behavioral goals at the beginning of camp, which were developed through systematic observation of each child and functional assessment data. The paraprofessional aides targeted each child's approximately three goals during camp. Examples of goals included increasing appropriate social initiations with peers, increasing appropriate participation in camp routines and activities, and increasing the number of appropriate on-topic responses to questions from peers during social interactions. Camp aides used priming for novel activities, self-management of individual goals, and a variety of strategies to facilitate and encourage social interactions. Such strategies included facilitation of sharing exchanges,

encouragement of children with and without autism to seek assistance from one another, facilitation of social interactions between campers, and facilitation of social engagement in all camp activities. Though formal data were not presented by Brookman and colleagues (2003), they found children with autism were able to successfully participate in this summer program with the help of paraprofessional aides. The authors concluded both typically developing campers and traditional camp staff benefited from this inclusive program, and they found the program to be easily implemented for children of varying functional levels.

Camp Horizons, a summer program for youth with developmental disabilities, boasted their 85% camper return rate as well as high staff retention (Wetzel et al., 1995). The longstanding camp was evaluated to determine if the organization's stated mission translated into visible summer camp functions. Stated elements of the camp's mission were divided into two categories: natural human philosophy and successful daily routine for every camper. Natural human philosophy included the following principles: put people first, recognize gifts and talents, recognize and meet changing needs, and involve parents. Those elements which constituted a successful daily routine were health and fitness, excitement and fun, opportunities for friendship, opportunities to explore and have new experiences, opportunities for learning skills and practicing them, and opportunities for vocational training. An outside evaluator was hired to analyze the camp's written materials and archived videotapes of camp activities and to conduct an on-site visit in an attempt to evaluate the camp from an ecological perspective. It was

found that the camp successfully accomplished its overall mission and campers exhibited minimal aggressive or repetitious behaviors (Wetzel et al.).

Hung and Thelander (1978) described one summer camp treatment program for children with autism. The camp serviced 18 children for three weeks and provided a one-to-one staff-child ratio. The camp included an intensive treatment program along with fun and recreation. Components of the camp included structured training programs and classes, systematically applied behavior techniques, undergraduate trainers with extensive training and supervision, and objective measurement of child progress. The camp addressed four major areas: self-help skills, language training, generalization of language, and reduction of undesirable behaviors. Campers were grouped according to their functioning level. Camp staff included special educators, swimming instructors, a speech therapist, and an occupational therapist, in addition to the undergraduate students. All staff were trained in behavioral analysis strategies, including shaping, token economy, and stimulus fading, and received information regarding the behavioral characteristics of children with autism. The authors found every child improved 15% or more in at least one area of treatment during the camp. Positive feedback from parent reports was also noted in the discussion (Hung & Thelander).

Hung (1977) described a three-week summer camp in which four children with autism were provided with a one-on-one counselors during all waking hours, except for one day a week and a one-hour break per day. The children's ages ranged from eight to eleven and the camp was located in a wooded area by a small lake. According to the author, all four children were able to adequately demonstrate "curiosity" questioning in

the classroom, through the use of a token reinforcement system, though none of the children exhibited generalization across settings. Hung concluded that the primary factor in this lack of generalization was insufficient reinforcement control, demonstrating the need for appropriate and sufficient reinforcement within token economy systems (Hung, 1977).

In conjunction with research claims that effective treatment for children with autism includes year-long programming, several outdoor camp programs have been studied to determine the effects of this setting. Lopata and colleagues (2008) investigated a six week, full day camp utilizing a manualized treatment program. Significant improvements in social skills were reported by parents and staff on objective measures. Brookman and colleagues (2003) utilized ABA and positive behavior support through a one to three-week day camp. The authors did not present formal data but reported children with autism were successfully able to participate in camp with the help of professional aides. Wetzel and colleagues (1995) reported high rates of camper return and staff retention at Camp Horizons, which was analyzed by an outside evaluator. The camp was found to meet its overall mission of putting people first, recognizing gifts and talents, recognizing and meeting changing needs, and involving parents. Campers also were found to exhibit low rates of aggression or repetitious behaviors. Lastly, Hung and Thelander (1978) reported on a three-week camp for children with autism, which included “intensive treatment” along with fun and recreation. They found that all campers improved 15% or more in at least one area of treatment (i.e., self-help skills, language training, generalization of language, and reduction of undesirable behaviors).

Summary

Despite widespread changes within the field of autism over the course of decades, autism is now perhaps one of the most researched diagnostic categories among psychiatric and developmental disorders in the DSM-IV-TR. Though slightly revised from Leo Kanner's earliest conclusions about children with autism, the major deficits characterized by this disorder include impairments in social interaction, deficits in communication, and a markedly restricted range of interests and behaviors. Along with the other Pervasive Developmental Disorders, including Rett's Disorder, Childhood Disintegrative Disorder, Asperger's Disorder, and Pervasive Developmental Disorder Not Otherwise Specified (PDD, NOS), Autistic Disorder is characterized by a long-term pervasive course of deficits in the aforementioned areas.

Based upon a growing need for evidence-based practices for individuals with Autistic Disorder, Asperger's Disorder, and PDD, NOS, which make up the continuum referred to as autism spectrum disorders, applied behavior analysis (ABA) has emerged as the preferred treatment for this population. ABA, which finds its roots in the early work and learning theories of such historical figures as Pavlov, Thorndike, Skinner, and Watson, focuses on strategies that modify clinically and socially relevant behaviors through the manipulation of environmental factors that influence behavior. Intensive ABA programming is often defined as 40 hours per week of one-on-one instruction, with some studies reporting dramatic increases in intellectual functioning, adaptive skills, and language. The overall purpose tends to be aimed at increasing or maintaining desired behaviors while decreasing undesired behaviors.

Specific treatment techniques range from highly structured, adult-initiated strategies to those that occur in the natural environment and are initiated by the individual with autism, both offering strengths and weaknesses. The choice of a treatment package often stems from a functional behavior assessment, which identifies the individual needs of the person with autism, thereby individualizing the treatment package to meet the person's unique needs.

One area of treatment that has been cited in research for multiple decades has been the use of outdoor experiential programs, which includes summer camps and other outdoor therapeutic programs. Outdoor experiential programs for children with disabilities have ranged in length, population, setting, purpose, programming, and outcomes but have consistently boasted positive results over the years. While success serving children with autism has been reported in a few studies, not much research has firmly established the utility of this type of intervention, and much of the research presented has demonstrated qualitative effects or conclusions about the camp rather than outcomes demonstrated by the participants. There is a need for current research to demonstrate whether or not an outdoor summer camp setting that utilizes applied behavior analysis can affect positive behavioral change for children with autism.

CHAPTER III

Research Methodology

This chapter contains a description of the participants in the study, procedures used to collect data, specific methods utilized for data collection, setting and structure used within the camp, academic programming utilized, training implemented with camp staff, and the research design used. Visual inspection techniques used to analyze the data also are detailed in this section.

Participants

The children who participated in the current study included five boys between the ages of seven and nine who attended the 2008 Autism Academic and Behavioral Remediation Summer Camp. The five boys were selected from among a pool of approximately 28 children with autism spectrum disorders who participated in the summer camp. The investigator looked at the data for each child and eliminated campers from the participant pool based upon incomplete data (i.e., missed attendance), data in which a target behavior was removed and replaced midway through the camp because it did not appear to be a beneficial target (in some cases, target behaviors were added), and data that were inadequate due to methodological problems (e.g., poorly defined target behavior, data did not match the behavior intervention plan). The investigator was left with five participants whose data appeared to be complete and adequate. Children who

participated in the camp were primarily children whose parents were involved in a local autism support group or those who were involved with an affiliated social service agency. Participants in the summer camp also were recruited through local advertising to special education directors of nearby communities. Criteria for inclusion in the study was based on seven principles: (1) the child was diagnosed with autism or an autism spectrum disorder by an outside professional using criteria from the *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition – Text Revision (DSM-IV-TR; American Psychiatric Association, 2000)*; (2) each child was between six and 12 years of age; (3) each child presented with behavioral problems that adversely affected functioning in social, academic, or daily living; (4) no child exhibited severe self-injurious behavior; (5) no child was severely limited by a physical handicap so that his/her camping experience would be hindered; (6) no child was psychotic or brain damaged; (7) the child's parents, guardians, or referral agency was interested in participation in the program and research study and agreed to cooperate in providing full application information (including permission to assess the child for evaluation and/or research purposes – see Appendix A), providing records (i.e., child's school individualized education plan (IEP) and most recent psychoeducational report), answering a parent questionnaire, filling out two behavior rating scales for their child, and providing daily transportation to and from the camp.

Demographic and background information was taken from questionnaires included in the application, which were completed by the parents of all campers (see Appendix B). All five participants were male. Participants ranged in age from 7 years, 5

months to 9 years, 1 month ($M = 8$ years, 1 month, $SD = 8$ years, 1 ½ months). All participants had received diagnoses of Autism Spectrum Disorder and Communication Disorder as recognized by the school system in which they attended. Based upon parent reports, all participants were identified as Caucasian. Each participant's target behaviors and replacement behaviors were determined by graduate level students in special education or school psychology under the direction of a Board Certified Behavior Analyst (BCBA). Only two of the four tribes from camp, which will be referred to as Tribe Three and Tribe Four based on where they fell alphabetically, were represented by these participants. Information provided by parents before the start of camp (i.e., IEPs, Psychoeducational Evaluations, Teacher questionnaires) was analyzed to inform treatment planning. Parents also reported their highest level of education. The majority of the mothers (four out of five) had attended college for four years or more, while one had received one to three years of college. For the fathers, the most frequently reported highest level of achievement was four or more years of college ($N = 3$) with two of the fathers reporting a high school diploma or GED was their highest level of achievement.

Procedures

This study used archival data, which were collected by a team of professionals and students. Approval to conduct the study was granted by the Institutional Review Board (IRB) of Ball State University in June 2008. Data were collected over approximately two months, beginning in early June 2008 and concluding in late July 2008. All data were collected by graduate students in a school psychology program at

Ball State University, under the supervision of a Board Certified Behavior Analyst (BCBA) and a licensed psychologist.

Parents interested in having their children participate in the camp were mailed an application packet, which included a cover letter explaining the goals of the camp and the application procedures. Parents were asked to then complete a number of documents, including an informed consent form and questionnaires developed by the director of the camp requesting the following information: diagnoses, level of adaptive functioning, behavioral problems, emergency contact information, and health information. Another questionnaire created by the camp director was given to the prospective campers' teachers regarding school behavior and academic functioning. Parents were informed that if their child was accepted into the camp, they would be asked to provide several additional documents, including a report of their child's most recent physical by a medical doctor, their child's most recent immunization records, his or her current Individualized Education Plan (IEP), and the most updated psychoeducational evaluation. These forms were used by the camp director and other camp staff to verify inclusion criteria for the camp.

Due to the size of camp facilities, the director of the 2008 Autism Academic and Behavioral Remediation Summer Camp was required to limit the number of participants. Parents were therefore informed, through the aforementioned cover letter, that participants for the camp would be selected through a lottery system.

Setting

The 2008 Autism Academic and Behavioral Remediation Summer Camp was conducted at an outdoor facility owned and managed by a local social service agency, which provides residential, employment, and community support services to children and adults with mental and physical disabilities in a mid-sized Midwestern city (population = 65,000). The facility has offered summer camp programs for children and adults with disabilities for a number of years prior to this study. Because the facility offers residential camps throughout the summer, the autism summer camp was held alongside weeklong residential camps held by the organization. Campers from each organization rarely interacted. The facility offered a traditional camp setting, which included nature trails, wooded and hilly landscape, a bonfire pit, open grassy areas, an outdoor swimming pool, a nurse's office, a playground, and barn-like buildings used for arts and crafts, academic instruction, and lunch. Canvas tents covering wooden platforms also were used for academic instruction in the wooded areas, particularly as shelter when it rained during camp programming.

Camp Structure

The Autism Academic and Behavioral Camp setting consisted of daily sessions from 8:30 a.m. to 4:30 p.m. (Monday through Friday) for a total of 8 weeks. An instructional team of three or four counselors worked with each of four different groups (i.e., tribes) of seven to nine children, who were divided by age and a variety of behavioral symptoms. The groups were each given Native American tribe names, specific colors, and a decorated totem pole marking their meeting place before camp and

at various points during the day. The four tribes of children were kept physically separated the majority of the day, particularly during academic instruction, but were given time to interact during transition times, lunch, and other unstructured times throughout the day. Several additional counselors floated among the tribes to ensure staff supervision and adequate support. Several graduate level behavior specialists, selected by the camp director, were available for additional support. Each behavior specialist was a graduate student in a special education program or had taken coursework in applied behavior analysis.

A functional behavior assessment (FBA), based upon information received from parents (i.e., most recent IEP and psychoeducational evaluation; parent questionnaire), was conducted for each child to help guide camp staff in developing an individualized behavior intervention plan (BIP). Based upon these data, camp staff chose behavioral deficits (i.e., occurs too infrequently) and/or behavioral excesses (i.e., occurs too frequently) to target for intervention during camp. Behavior plans were designed prior to camp, from the information provided by each parent, and included specific strategies to address each child's individual behavioral needs. Behavioral excesses were called target behaviors for the purpose of the behavior plans and behavioral deficits were called replacement behaviors. In most cases, a functionally equivalent replacement behavior was identified to take the place (and function) of each target behavior (e.g., instead of flapping his hands, a camper might be taught to put his hands in his pockets when stressed). In many cases other adaptive or social skills that were viewed as important goals also were a focus of a camper's behavior plan. As camp progressed, these plans

were modified as needed and determined by the camp staff, behavior specialists, and BCBA. All counselors and teachers were expected to be familiar with the behavior plans for each child in their tribe and were prepared to utilize a number of specific intervention strategies to modify target behaviors. At least one behavior specialist, familiar with behavior plans for all campers, was available for additional support throughout the day. The behavior specialist provided support to tribes throughout the day, depending on need, and collected behavioral data on campers.

An overall token economy system was implemented as positive reinforcement for the camp. Each day campers were provided with a small punch card necklace (using yarn) that included several different colored stripes, corresponding with a reinforcement level system. Each color represented point levels and corresponded to a large camp “payoff” chart that indicated the reinforcers each child could earn at the end of the day. At the beginning of each day, all campers received a new necklace and punch card. Ten points were awarded for each level, with the reinforcers increasing in desirability up the levels. For example, free swim time was offered at the highest point level, while coloring was offered at the lowest level, as swimming was a highly coveted activity and coloring was not. Points were awarded by counselors and teachers based upon specific and individualized behavioral goals in each child’s behavior plan. Camp staff awarded points by punching holes in each camper’s punch card, allowing for immediate reinforcement throughout the camp day, leading up to delayed reinforcement at the end of the camper’s day.

The basic camp schedule was the same each day, providing for needed predictability and structure, which are helpful strategies for children with autism spectrum disorders. Campers arrived at camp between 7:30 and 8:30 a.m. and reported to a check-in station where parents could communicate with their child's counselors and teachers. Campers were then escorted to their totem pole where they could have free time until the start of classes. Between 8:30 a.m. and 12:30 p.m. campers participated in four academic classes, Language Arts, Science, Math, and Arts & Crafts, which were approximately 45 minutes in length to provide for transition time. Each tribe attended classes in a certain order during a given week of camp and the order changed each week to ensure that each camper had a well-rounded camping experience. An additional 20-minute snack break occurred between the second and third classes of the morning. Campers ate sack lunches (provided by parents) and sang group songs between 12:30 and 1:30 p.m. From approximately 1:45 until 2:45 (including built-in transition time), two tribes participated in individual tutoring sessions, while the other two tribes participated in a large group activity for twenty minutes before switching. During the tutoring sessions, each child was assigned his/her own tutor and instructional plan, which were specifically designed to address the child's most pronounced behavioral and/or academic difficulties. The large group activities were typically facilitated by local teachers, music therapists, and other social service agents who provided special programming, such as singing, playing instruments, and manipulating sensory equipment such as balls and parachutes. Next, all campers participated in a final activity for 30 minutes while preparing for payoffs (i.e., swimming, coloring, etc.), which comprised the last 50

minutes of the camp day. Campers then returned to their totem poles to await the arrival of their parents in order to go home for the evening.

Academic Programming

Morning academic classes utilized a disguised curriculum in which content was taught through games, activities, and experiential learning. Math class, for example, was held in the swimming pool where campers practiced addition, subtraction, multiplication, and division by using pool toys and games involving movement. Science was taught in the wooded area where teachers utilized the natural environment to facilitate learning opportunities. When possible, teachers utilized cross-curricular themes to enhance the learning experience. For example, when the children learned about spiders in science class, the Language Arts teacher read them a short storybook about spiders. Lesson plans were created by the teachers, who were licensed teachers, or advanced undergraduate students in an elementary education program. Lesson plans were tailored to fit the needs of each tribe and to meet the instructional skill level of the campers. As previously noted, each camper received an additional daily 20-minute tutoring session to meet his/her individual academic needs in a one-on-one setting.

Staff Training

Camp staff consisted of undergraduate and graduate students pursuing degrees in the areas of elementary education, special education, and school psychology. As previously mentioned, all four teachers (one for each subject) were licensed teachers or advanced undergraduate students in an elementary education program. Each teacher

remained in his/her “classroom area” during the morning academic instruction times but joined an assigned tribe for the remainder of the day to provide additional support, with the exception of an hour of preparation time each day.

All staff members participated in one week (8:00 a.m. to 5:00 p.m.) of training prior to the start of camp. They were instructed about camp procedures, fire/tornado procedures, autism, applied behavior analysis, songs and games, aggression management, and crisis intervention. Time was allotted for staff to conduct role plays, mock classes, and mock tutoring sessions and staff were trained by a licensed professional in appropriate crisis intervention, including restraint techniques. Behavior specialists working with the camp instructed counselors and teachers about the unique behavioral needs of campers prior to the start of camp. This information was based upon a functional behavior assessment conducted through a review of records provided for each camper. Counselors were administered brief oral evaluations by a behavior specialist to determine their knowledge of each camper’s individualized behavior plan (Appendix C). Camp staff were retrained as needed. An additional test was administered to assess each counselor and teacher’s understanding of the material presented in training and all counselors and teachers met predetermined cutoff scores.

Data Collection

Based upon a functional behavior assessment and subsequent behavior intervention plan, two to three behaviors targeted for acceleration or deceleration were identified for each camper. Data were then collected by a graduate level behavior specialist through behavioral observation. Baseline data were collected during the first

and second day of camp. Intervention/Treatment data were then collected at least once a week during a four-hour observation session, though at times this occurred over the course of two shorter observation sessions averaging about four hours each week. In general, the data collection specialists observed the same campers each week. To simplify the data collection process, all behaviors were recorded using a frequency-count method. All behavior observation data were collected by graduate-level students who were supervised by a Board Certified Behavior Analyst (BCBA).

Research Design

This study utilizes a single-subject research design, which is commonly used for educational research and, in particular, is utilized in research with autism spectrum disorders (ASDs). Using a single-subject design allows for each participant to function as his or her own control. Additionally, a single-subject design allows for the use of functional behavior assessments, which would be impractical with a group experimental design. Because a major focus of the camp is to modify individual behaviors, behavioral observation was used to assess outcome. Due to the limited external validity of this study, it is viewed as a preliminary investigation and, given significant findings, would necessitate replication studies in the future.

Data Analysis

Data were analyzed primarily through visual inspection, a process by which the researcher examined a graphical display of the data to determine whether or not a meaningful change occurred and the extent to which that change could be attributed to the independent variable. This is the most common method of summarizing and

interpreting single-subject data from applied behavior analysis (Kahng et al., 2010). In addition, a linear trendline was calculated for each set of raw data in order to compare the data in some measurable way. A trendline is used to demonstrate a linear relationship between two variables, in this case time (x) and occurrences of the behavior per hour (y). Regression analysis was used to calculate the best fit line in order to extrapolate how the behavior changed over time. The trendlines were represented in the form $y = mx + b$, where m indicates the slope of the line. The slope of the trendline for each set of data represents the rate of behavior change. A larger slope value indicates a more rapid rate of change, while a smaller value indicates a more gradual rate of change. A positive slope value indicates an increase in behavior over time, and a negative slope value indicates a decrease. The slopes were divided in the following way, using absolute values:

Minimal rate of change = 0 – 0.09,

Moderate rate of change = 0.1 – 0.5,

Substantial rate of change = higher than 0.5.

CHAPTER IV

Results

This chapter presents the five case studies used to determine the effectiveness of the autism day camp in modifying behaviors of children with autism spectrum disorders. For each case study, an in-depth description of each child's demographic and background information is provided. In addition, each child's, target behaviors, antecedents of behavior, functions of behavior, replacement behaviors, intervention plan, data collection procedures, data, and results are discussed. In addition, a brief overview of the results and a case summary are provided. Visual inspection techniques used to analyze the data for each case also are included in this section. It is important to note that any identifying information (e.g., names, schools, teacher names, etc.) have been altered to maintain confidentiality.

Case Study 1: Sam

Demographic Information

Sam was 9 years, 1 month of age at the time of the 2008 Autism Camp and was identified by his parent(s) as having a Mild Autism Disorder, which was diagnosed at an autism treatment center in 2003. He is Caucasian, and his parents denied that he had non-communicative speech, self-injurious behavior, physical limitations that would prevent him from participating in camp activities, a psychotic disorder, or brain damage at the

time of the 2008 Autism Camp. In the school setting, he qualified for special education services under the disability categories of autism spectrum disorder and communication disorder. Sam's mother indicated she completed four or more years of college, while his father reportedly received a high school diploma or GED (general equivalency diploma). Sam was placed in Tribe Four.

Background Information

During the 2007 – 2008 school year, Sam received the majority of his educational services in a special education classroom setting with nonacademic classes (i.e., physical education, music, and art) serviced in the general education environment. It was noted that he received occupational therapy and speech services as well. The following areas of need were indicated in Sam's Individualized Education Plan (IEP): language arts, time, money, mathematics, self-help skills, staying on task, self-stimulation behaviors, community-based skills, and overall communication. Sam's teacher described him as "friendly" and said he got along well with others. She noted that he struggled socially with his peers.

Target Behaviors

Based upon an analysis of the information provided by Sam's parents and teachers, including his most recent Individualized Education Plan (IEP), the following target behaviors were determined for Sam prior to the start of camp. As explored in the discussion section, behaviors three and four (i.e., whining and off-task behavior) were identified as relevant targets after camp started and were added into his behavior plan.

1. Gazing/Hand-flapping (self-stimulatory behavior) defined as staring at an unspecified object for longer than 30 seconds (During such time periods, Sam

may appear to be inattentive or “zoning out”) or making inappropriate hand movements.

2. Wandering defined as walking 10 feet or more away from group or activity without adult permission.
3. Whining defined as using a high-pitched voice rising at the end of each sentence or phrase. He often says, “I can’t,” or “I don’t know how,” in this tone of voice.
4. Off-task behavior defined as looking somewhere other than at the instruction, fidgeting with objects or nature (e.g., leaves, grass, twigs, etc.), or failing to participate in activities.

Antecedents of Behavior

A functional behavior assessment (FBA) was conducted in which simple A-B-C (i.e., antecedent – behavior – consequence) data were collected during observations within the first two days of camp. Based upon those assessments, the following antecedents and functions of target behaviors were identified. Because the FBAs were conducted during the first two days, using target behaviors identified prior to the start of camp, there were no identified antecedents or functions noted for behaviors three and four – whining and off-task behavior.

1. Gazing/Hand-flapping – occurred most often when he was presented with overwhelming sensory information or stimuli, such as loud noises or when he was not interested in an activity.
2. Wandering – occurred primarily when Sam observed an activity that appeared more desirable than the one in which he was currently engaged.

Functions of Behavior

1. Gazing/Hand-flapping– escape or avoidance of the situation, with a possible secondary function of automatic self-stimulation.
2. Wandering – access to preferred activities or items.

Replacement Behaviors

Several functionally equivalent replacement behavior(s) and social skills were identified as missing or occurring infrequently in Sam’s behavioral repertoire. They were therefore taught directly and reinforced specifically throughout the camp experience. A fourth replacement behavior, on-task behavior, was added to his plan during the fourth week.

1. Independently request headphones or a break in a noisy environment.
2. Go directly to activity area when prompted.
3. Increase social skills: initiate or verbally respond to a social interaction with another peer or adult.

Behavior Intervention Plan

Specific preventative (i.e., antecedent) and supportive intervention (i.e., consequent) strategies, based upon the results from his FBA, were developed for those involved in Sam’s treatment. Each counselor and teacher was trained in how to use these strategies and was familiar with his individualized behavior plan. The following strategies were implemented with Sam throughout the eight-week camp.

Preventative strategies included the following:

1. Allow Sam time to process and comply with requests.

2. Explain to Sam the reason for a command prior to giving it. Staff also should check for understanding.
3. When possible, offer Sam a choice in activities.
4. Give Sam a verbal prompt before entering a potentially noisy environment.

Intervention strategies included the following:

1. Positive reinforcement procedures:
 - a. Exaggerate verbal praise specifying the appropriate behavior (This can be used alone or paired with other reinforcers). For example, say, “I am proud of the way you followed directions!” or “I like the way you are doing your project!”
 - b. Provide a hole punch in Sam’s behavior card (i.e., immediate reinforcer which is later coupled with a larger reinforcement at the end of each camp day) when he endures a noisy environment without utilizing self-stimulation, stays with the group throughout an activity, requests headphones or a break, goes directly to an activity, engages in positive social interaction, remains on-task, or uses an appropriate tone of voice when prompted.
2. Gazing/Hand-flapping:
 - a. When Sam engages in staring or hand flapping behavior, verbally redirect him to the task.
 - b. Remind Sam to verbally request or use appropriate techniques that allow him to cope with noisy environments, such as headphones, asking for a 5-minute removal break, or asking to move to a quiet area in the room.

- c. Reinforce Sam when he is not engaged in the self-stimulating behavior, especially when in a noisy environment.
3. Wandering:
 - a. Provide additional supervision when Sam independently transitions between locations.
 - b. If Sam wanders off without permission, encourage him to return to the task at hand and express contingencies of completing tasks (“If you stay here and finish, then we can go shoot hoops”).
4. Independently request headphones or a break in a noisy environment:
 - a. Before entering a potentially noisy environment, tell Sam what to expect, about how long he will be there, what he will be doing, and set forth a contingency for him.
 - b. Remind him that if things are too noisy for him, he can request headphones or a break. Model for him how to do this, and then have him practice it.
 - c. Reinforce Sam when he requests headphones or a break.
5. Go directly to activity area:
 - a. When transitioning to a new activity, tell Sam that if he goes directly to the next activity and waits, he will get a specified reinforcer (Only do this if you can see him the entire time, and he cannot put himself in an unsafe situation –this can be done when you are within approximately 20 feet of the destination).
6. Increase social skills:

- a. Prior to changing activities, tell Sam where he is going and people he may see. Then tell him a possible greeting (e.g., “hello” or “what’s up?”) that he can express to the person/people.
 - b. When possible, tell him what the options will be for activities while transitioning and instruct him that he should let you know when you get there what he would like to do.
 - c. Role-play appropriate social skills with Sam (e.g., initiating a conversation, asking a friend to play with him, requesting an item/activity).
 - d. Help Sam to recognize and use nonverbal communication skills such as gestures and body language, facial expressions, voice (pitch, inflection, volume, and rate), and eye contact, by pointing them out to him. This will make them more overt for Sam. When possible, role-play scenarios so he can practice these skills.
7. Increase on-task behavior:
- a. Using a timer, provide Sam with a specific reinforcement when he is able to stay on-task for a prespecified amount of time. Increase the time limit over the course of camp.
8. Whining:
- a. Provide Sam with verbal prompts, including “Use your big boy voice.” Do not reward Sam or provide him with attention unless he uses a lower pitch.

Data Collection Procedures

Five graduate students under the supervision of a Board Certified Behavior Analyst (BCBA) and the Camp Director collected data for Sam throughout the eight-week camp. As previously noted, the FBA for Sam was conducted within the first two days of camp, utilizing a simple A-B-C method (i.e., antecedent – behavior – consequence). The behaviors of focus were those identified prior to the start of camp. Once antecedents and functions were identified, an individualized behavior plan was developed for Sam. Counselors learned the behavior plan and then implemented the interventions on the third day of camp. Starting on day three, Sam was observed for approximately four hours throughout the morning academic time. Sam was observed at least one day each week, and the same data collector generally observed him each week. To simplify data collection in this natural setting, all data collectors utilized a frequency recording data collection procedure. All target behaviors and replacement behaviors were observed during the same collection time for Sam.

Data

All raw data were calculated and graphed by one graduate student. To obtain the occurrences per hour rates, the number of tally marks from the data collection forms were multiplied by 60 (i.e., 60 minutes in an hour), and then divided by minutes observed. If more than one observation period occurred during the course of a week, the average was obtained by adding occurrences per hour and then dividing by the number of observation periods.

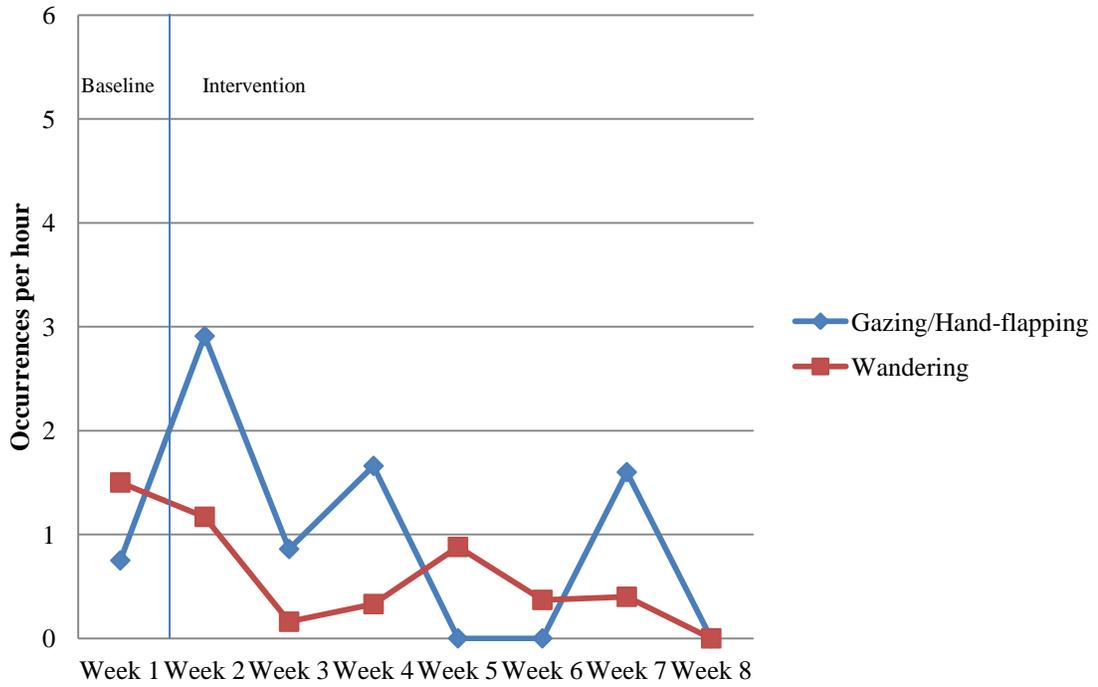


Figure 1.1 Baseline and intervention data of original target behaviors for Participant 1, Sam.

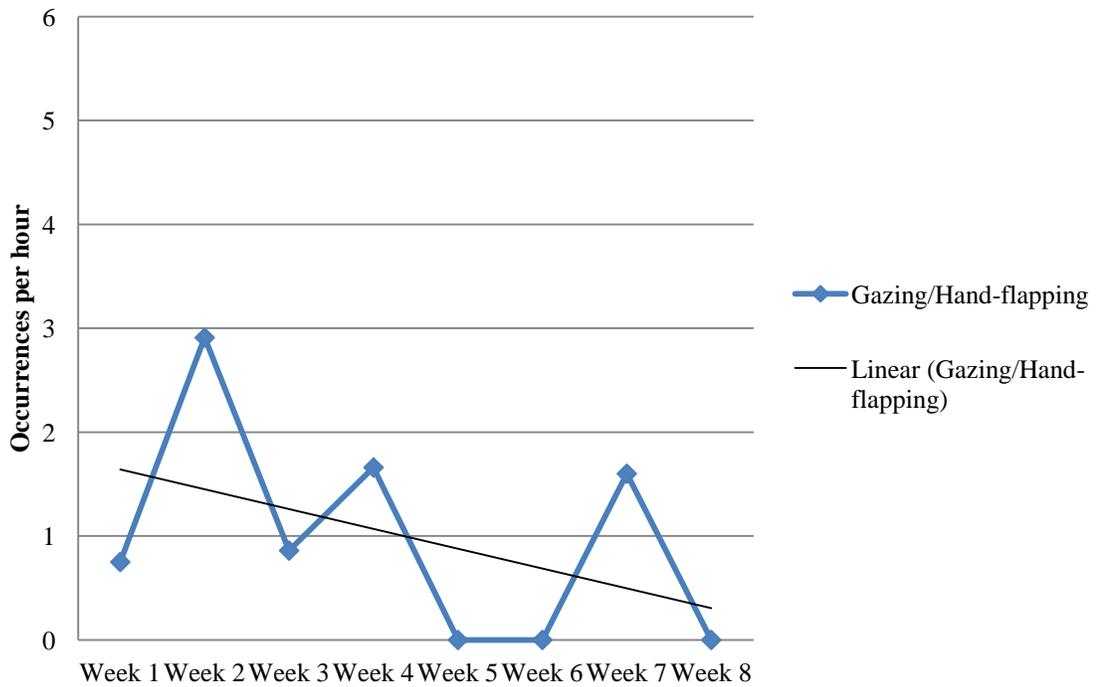


Figure 1.2 Gazing/Hand-flapping data with trendline for Participant 1, Sam.

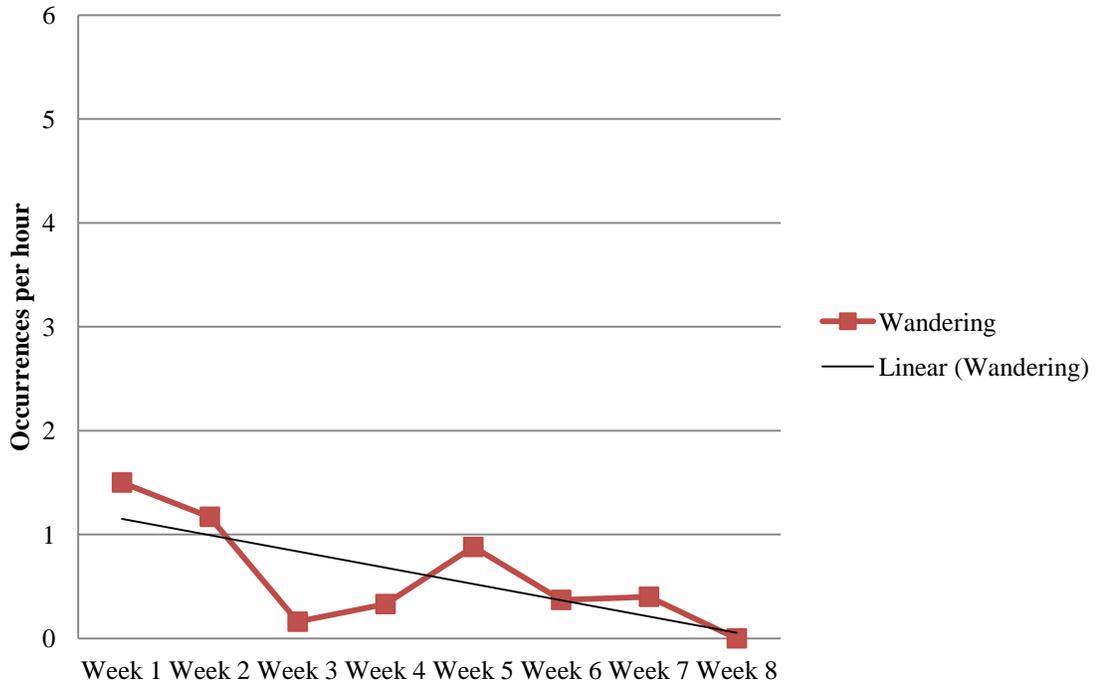


Figure 1.3 Wandering data with trendline for Participant 1, Sam.

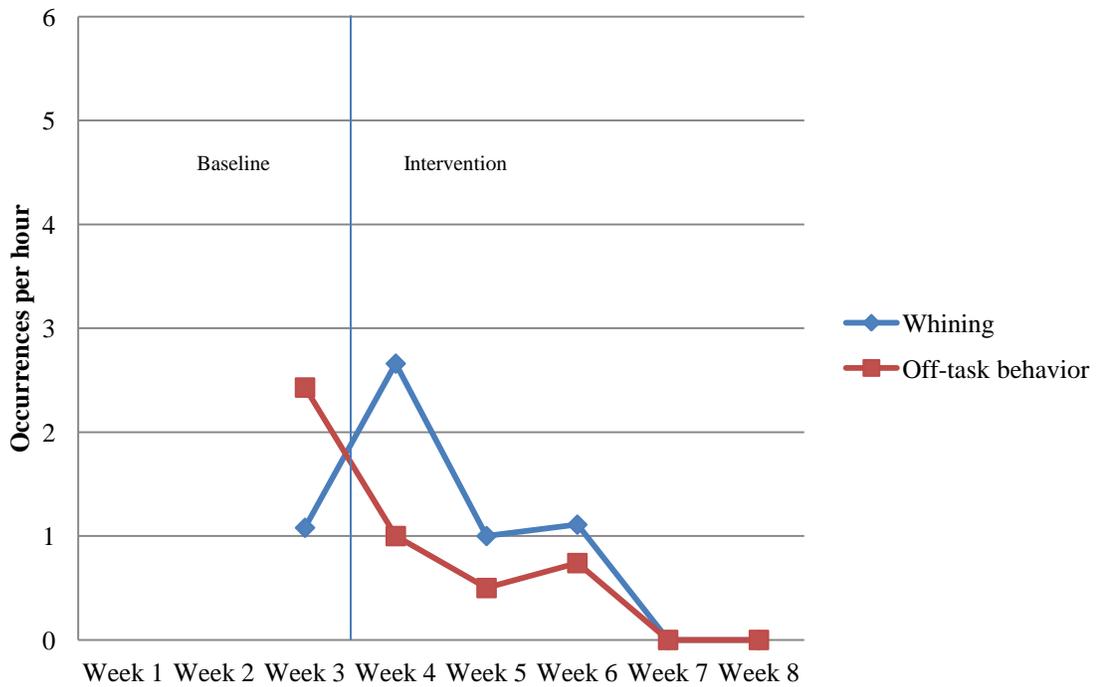


Figure 1.4 Baseline and intervention data of added target behaviors for Participant 1, Sam.

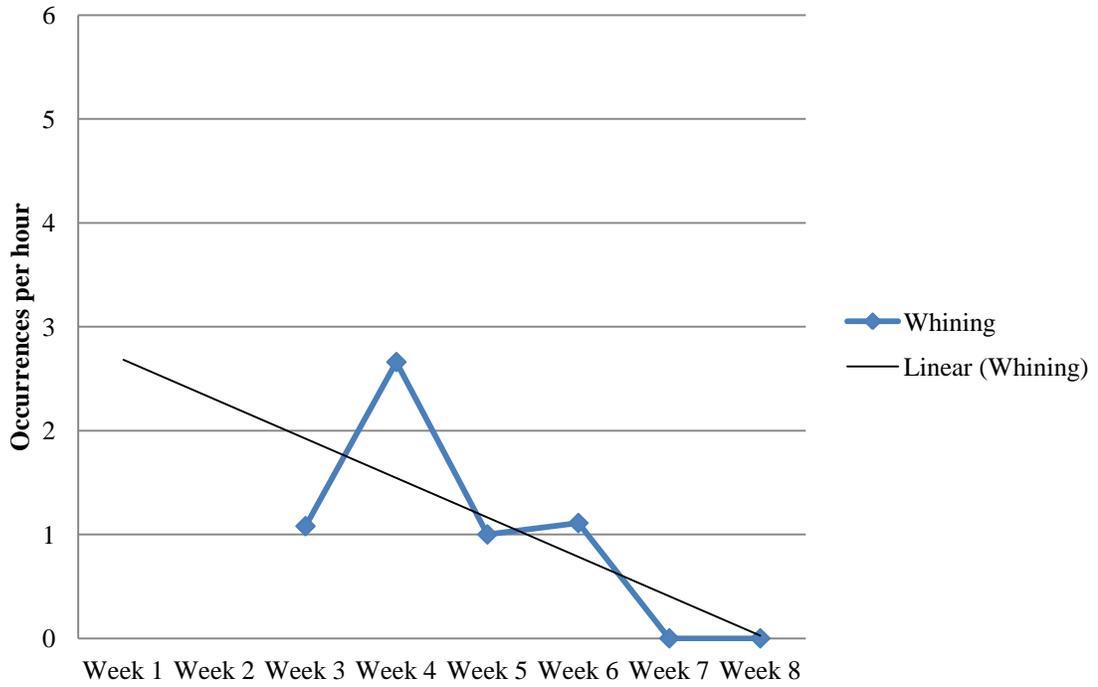


Figure 1.5 Whining data with trendline for Participant 1, Sam.

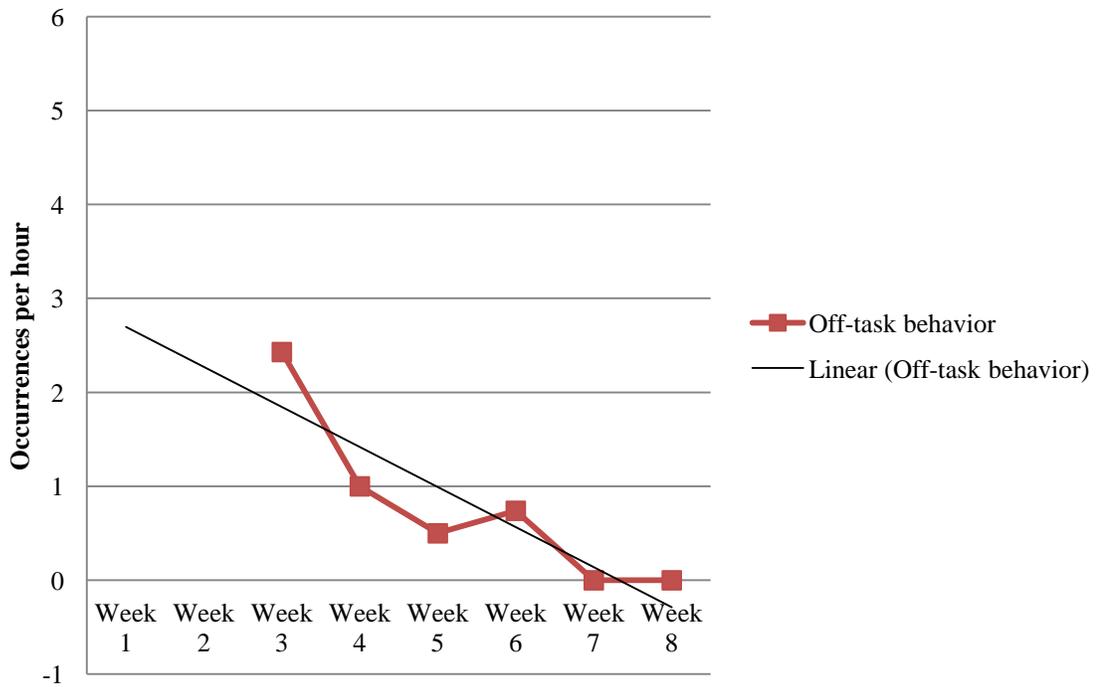


Figure 1.6 Off-task data with trendline for Participant 1, Sam.

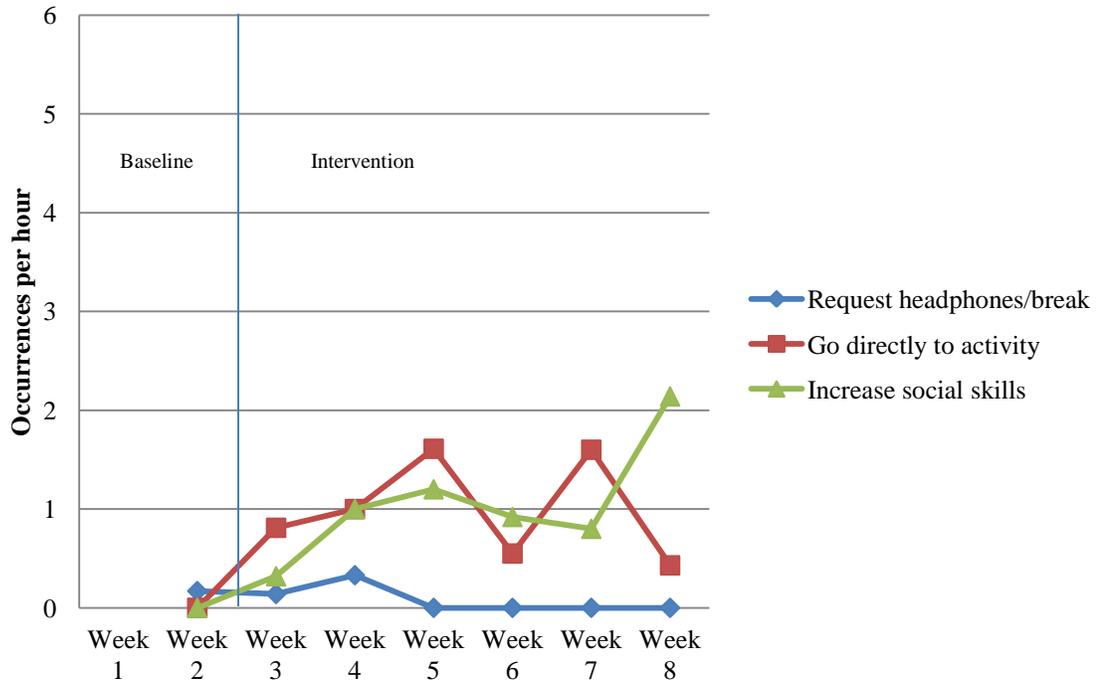


Figure 1.7 Baseline and intervention data of original replacement behaviors for Participant 1, Sam.

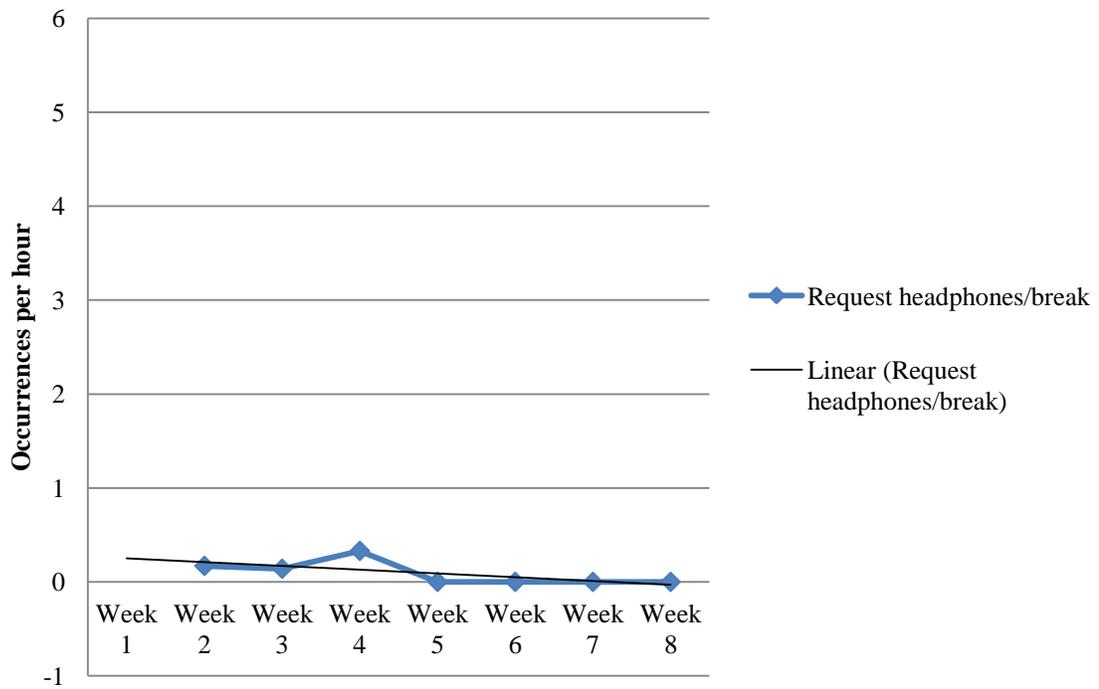


Figure 1.8 Request headphones/break data with trendline for Participant 1, Sam.

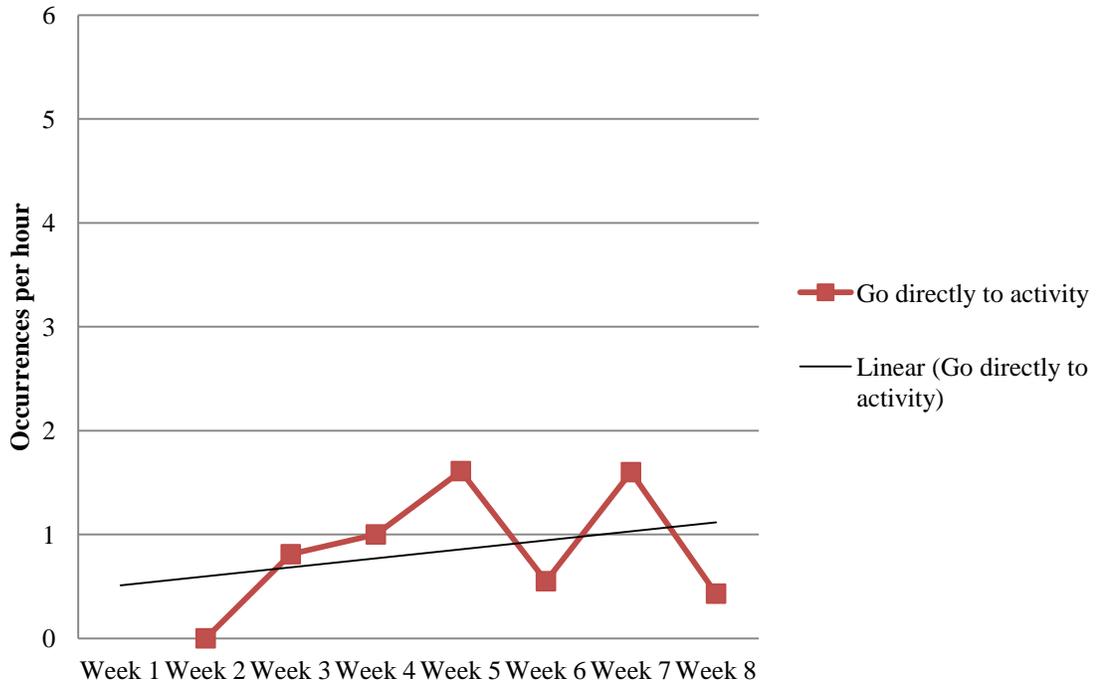


Figure 1.9 Go directly to activity data with trendline for Participant 1, Sam.

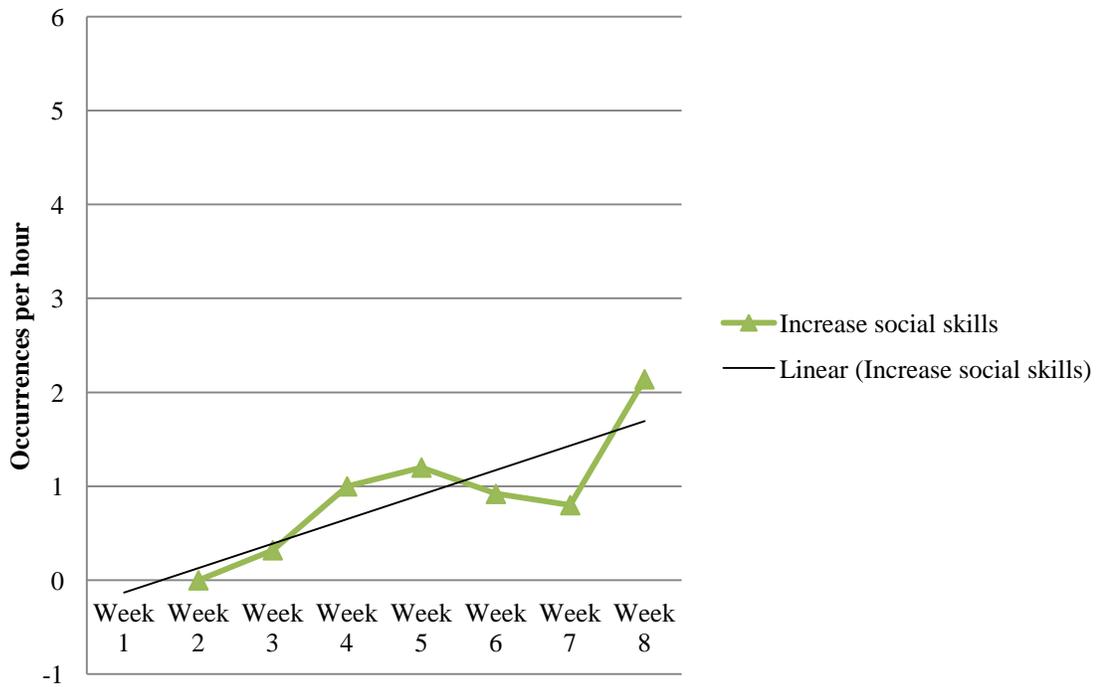


Figure 1.10 Increase social skills data with trendline for Participant 1, Sam.

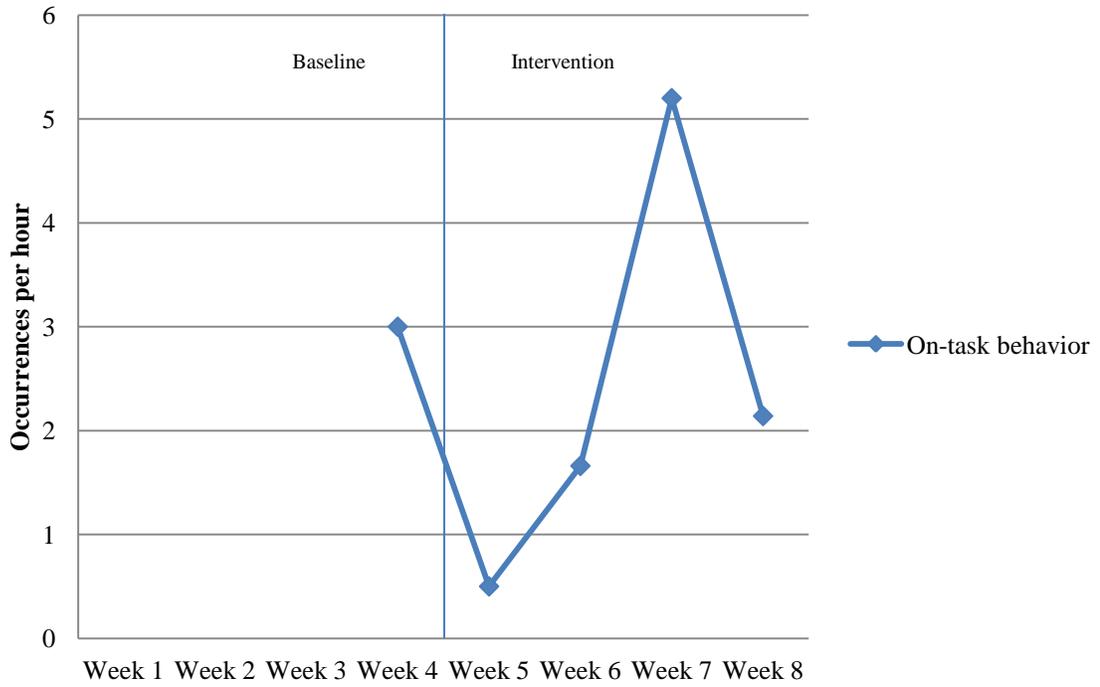


Figure 1.11 Baseline and intervention data of added replacement behavior for Participant 1, Sam.

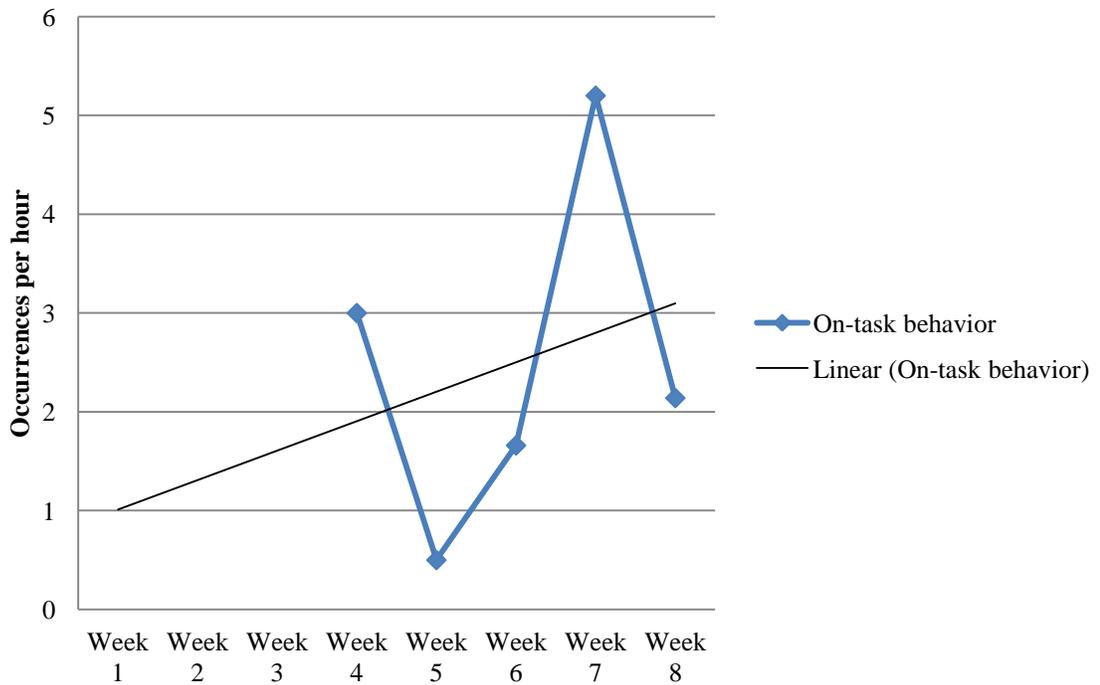


Figure 1.12 On-task behavior data with trendline for Participant 1, Sam.

Results

Figure 1.1 shows a graph of the behavioral data collected on Sam's originally identified target behaviors, which included Gazing/Hand-flapping and Wandering. Baseline data were collected during the first two days of camp with intervention data collected from that point forward. Figure 1.2 shows Sam's Gazing/Hand-flapping behavior with a trendline.

A linear trendline basically connects two or more points on a graph and represents the slope of movement. Using regression analysis where time is the independent variable and the frequency of the problem behavior is the dependent variable, the trendline shows how time and frequency are related. The slope of each trendline, whether negative or positive, indicates the decline or increase of the behavior over time.

Figure 1.2 demonstrates a downward trendline, indicating that his self-stimulation behavior decreased over the course of the eight-week camp. Based upon this trend, it could be predicted that Sam's targeted self-stimulatory behaviors would continue to decrease to a near-zero level if his individualized intervention plan was sustained. Similarly, Figure 1.3 indicates a downward trend in his wandering behavior over the course of the eight-week camp, though he wandered less frequently than would have been predicted at the start of camp. In the camp setting, it appeared as though he wandered infrequently.

Figure 1.4 shows a graph of the target behaviors, whining and off-task behavior, which were added after the start of camp when they were identified as an important focus for camp because of the frequency with which they occurred. While whining reduces Sam's ability to socialize with others effectively, off-task behavior threatens Sam's

opportunities to participate in less restrictive environments in school and community settings and decreases his success and independence in those settings. Baseline data for these behaviors were collected during the third week and intervention data were collected from that point forward. Figure 1.5 shows Sam's whining behavior with a trendline, while Figure 1.6 shows his off-task behavior with a trendline. Both graphs illustrate a downward trend in the target behaviors, indicating that he demonstrated a gradual but progressive decrease in these target behaviors as well.

Figure 1.7 shows a graph of the behavioral data collected on Sam's replacement behaviors and social skills, which were observed from Week Two, when baseline data were collected, through the end of camp. These behaviors include requesting headphones or a break, going directly to an activity, and increasing social skills. Figure 1.8 includes the data collected when Sam requested headphones or a break when in situations that were overwhelming to his senses, along with a trendline, which demonstrates a slight downward trend. The intervention plan was not successful in accelerating this replacement behavior and it was demonstrated rarely during the eight-week camp. Figures 1.9 and 1.10, however, demonstrate upward trends in the other two behaviors, going directly to an activity and increasing social skills, which were the desired outcomes.

Lastly, Figure 1.11 shows a graph of the replacement, on-task behavior, which was added during Week Four of camp. The trendline shown in Figure 1.12 also indicates an upward trend, which would indicate Sam's on-task behavior increased over the course of the camp under his individualized intervention plan.

Discussion of Results Related to Sam

Overall, Sam demonstrated a decrease in gazing/hand-flapping, wandering, whining, and off-task behavior. He demonstrated an increase in his ability to go directly to an activity and an increase in social skills during this eight-week summer camp. Though he requested headphones or a break infrequently at the start of camp, this replacement behavior did not maintain throughout camp and was not observed during the last four weeks of camp.

Sam's self-stimulatory behaviors, which seemed to occur when he was overstimulated, particularly by loud noises, increased to their highest level during the second week of camp. It is speculated that the level of noise at camp may have increased during the second week once campers became more familiar with the environment and either felt more challenged (e.g., yelling or repetitive phrases common among children with autism) or felt more comfortable (e.g., active engagement during camp activities). Regardless of the reason for an increase in noise, it could have affected Sam in a negative way, causing him to engage in self-stimulation. Another possible explanation may be that Sam himself became more or less comfortable after the novelty of camp wore off. It is this author's hypothesis that Sam's intervention plan was effective, however, in decreasing this behavior over the remaining weeks of camp.

Sam wandered much less frequently than was expected given the reports from his parents and teachers. Because it was determined that Sam primarily wandered to attain access to preferred activities or tangibles, it is speculated that the outdoor environment of the camp setting was critical in maintaining Sam's interest and minimizing wandering.

Observations indicated Sam's wandering decreased over the course of camp though it occurred rather infrequently to begin with.

As was the case for Sam's self-stimulatory behaviors, his whining increased rather sharply during Week Two. This might indicate Sam became overwhelmed or overstimulated after the novelty of the camp setting diminished. Because Sam often used the phrases, "I can't," or "I don't know," in this tone of voice, it might be hypothesized that he was given greater or more difficult task demands after the first week of camp. Naturally, camp staff may have increased their expectations of campers after the first week, once they were able to get to know the individual needs and personalities of the children.

Off-task behavior, however, which was defined as looking somewhere other than at the instruction, fidgeting with objects or nature (e.g., leaves, grass, twigs, etc.), or failing to participate in activities, was at its highest level during the baseline phase. This might be due to the novelty of the camp setting. It would seem probable that Sam was distracted during the first week of camp and may have had difficulty sustaining attention on class instruction, even given the disguised curriculum. While the outdoor environment can be a positive asset in increasing the level of interest and engagement from campers, it may initially have had the opposite effect for this population of children in particular, who are not generally given such opportunities for learning. Based upon the downward trend, it would appear Sam was able to function well in this environment once the novelty decreased and the interventions were applied.

As previously noted, Sam rarely demonstrated the replacement behavior of requesting headphones or a break when in a noisy environment. Though the camp schedule was fairly predictable overall, it may have been difficult for camp counselors to warn Sam when entering a potentially noisy environment, as suggested by his intervention plan. Different lessons each day produced differing levels of noise depending on the activities implemented. It also is possible Sam did not like wearing the headphones when they were supplied for him. With regard to requesting a break, it is speculated Sam may have been reluctant to leave camp activities, even when they were noisy or overly stimulating for him. Though his self-stimulatory behaviors generally indicated he was uncomfortable with the noises around him, they also appeared to occur at times when he was excited and enjoying camp. At such times, he would be unlikely to request a break.

The interventions implemented with Sam appeared to help him transition more efficiently and independently to new activities. Because of the predictable schedule and routine of the camp day, Sam always knew which class was next and where it was located. This predictable schedule allowed him to transition independently with his group (i.e., without an adult guiding him) to the next activity. Coupled with reinforcers for going directly there, Sam was able to increase this behavior.

Increasing social skills and interactions can be a substantial challenge for children with autism spectrum disorders. Therefore, several intervention strategies, both antecedent and consequent, were used with Sam to help make these skills more overt. While his progress was gradual over the eight-week camp, the data did demonstrate an

upward trend resulting from his overall participation in camp and his individualized intervention plan.

Sam's on-task behavior data indicated a large degree of variance throughout the five weeks it was observed. An overall upward trend was found, but his on-task behavior decreased slightly during Weeks Five and Six. Perhaps this was related to his level of interest in the specific activities during the observation periods. In general, Sam may have become bored with camp after several weeks. Notably, his interest, as demonstrated through on-task behavior, peaked significantly during Week Seven. Similarly, this may have represented a week in which Sam was particularly interested and engaged in the activities observed. Because there was an overall upward trend, it could be concluded that the camp setting and ABA interventions used were effective in increasing Sam's on-task behaviors.

Based upon his behavior at camp and his response to the interventions used, the following recommendations were provided to Sam's caregivers at the end of camp:

1. Sam responds well when very specific concrete expectations are placed upon him. Using a timer, tell Sam he must complete an activity or pay attention to the teacher for 2 – 3 minutes, and then he may receive a specific reinforcer (point, token, break, etc.). Gradually increase the amount of time he is expected to stay on-task.
2. Verbally prompt Sam to use a "big boy" voice to help prevent and/or address whining behavior. Require Sam to ask for preferred objects or activities in a "big boy" voice and do not respond to requests until this instruction is fulfilled.

3. Use brief verbal prompts (e.g., calling his name; “up here,” etc.) when Sam engages in off-task, gazing, or self-stimulation behavior to help redirect him to the activity or instruction.
4. Continue to encourage and prompt Sam to engage in social interactions with his peers. Sam made improvement during camp, but he still tended to withdraw from interaction with peers. When he did interact on the playground, he often teased other campers through pretend play (e.g., pretending to “steal” their treasure), causing the other campers to become upset and avoid playing with him. Role-play positive peer interactions with Sam to help him learn how to appropriately engage in such interactions.

Case Summary – Sam

Sam, a 9-year-old, Caucasian male diagnosed with an autism spectrum disorder attended the 2008 Autism Summer Camp. An analysis of information provided by Sam’s caregivers and teachers indicated he struggled with peer interaction, had a tendency to wander from locations in which he was expected to be, and engaged in self-stimulatory behaviors when overwhelmed or frustrated. Using this information, two behavior categories – Gazing/Hand-flapping and Wandering – were identified as problematic behaviors that could be targeted for intervention during the eight-week summer camp. Graduate students then conducted a Functional Behavior Assessment and collected baseline data based upon these target behaviors. Once antecedents and functions were determined, the graduate students developed a behavior intervention plan for Sam’s camp staff to address these problem areas in his behavioral repertoire. After camp started, a number of additional target and replacement behaviors were included into Sam’s

behavior plan, as they were determined to be important behaviors for change. Those included decreasing whining, decreasing off-task behavior, requesting headphones or a break, going directly to an activity, increasing social skills, and increasing on-task behaviors.

Baseline and intervention data indicated Sam demonstrated a decrease in gazing/hand-flapping, wandering, whining, and off-task behavior. He demonstrated an increase in his ability to go directly to an activity and an increase in social skills during this eight-week summer camp. Sam rarely requested headphones or a break during the first few weeks of camp, and this replacement behavior was not observed at all during the last four weeks of camp.

Overall, the camp was helpful in increasing Sam's ability to refrain from using self-stimulatory behaviors or whining when overwhelmed or overly stimulated. He rarely wandered in the camp setting and may have been more engaged due to the outdoor environment. Nevertheless, this behavior did decrease during the eight weeks, as did off-task behavior. The camp program assisted Sam in transitioning easier and more independently to new areas or activities, a skill that was likely assisted by the predictable schedule and routine. Sam made improvements in social interactions with peers but needs to continue to learn social skills, such as friendship skills. It was determined at the end of camp that he should continue work on increasing the duration of time he is on-task (i.e., eyes directed toward instruction, head up, alert body posture, participating in activity), using a normal tone of voice, and engaging in positive peer interactions.

It could be concluded that this camp program, based upon ABA methods and strategies, was effective in decreasing maladaptive behaviors and increasing adaptive skills demonstrated by Sam. There are several possible reasons for the success that was demonstrated. The outdoor environment, structure, and novelty of camp were probably critical factors that affected Sam's behavior. Because he was interested and engaged in the environment overall, he was more likely to engage in the disguised academic activities and was less likely to employ avoidance behaviors such as whining, staring at other things, or refusing to participate. The teachers also were able to utilize nature in their lessons (e.g., looking at a spider web after reading a fictional story about spiders or using leaves for an art project), making them more engaging for Sam. The ABA strategies, including positive reinforcement, antecedent interventions, and shaping, were developed and implemented specifically to meet Sam's individual needs. The interventions chosen were based on an analysis of information provided by Sam's parents and teachers and a Functional Behavior Assessment conducted during the first week of camp, which probably made them more effective in addressing his needs because they identified the probable functions of his target behaviors. Positive reinforcement in particular, which was a large component of the camp structure and was administered to all campers at the end of each day, probably played a significant role in motivating Sam toward behavior change.

Case Study 2: Gary

Demographic Information

Gary was 7 years, 11 months of age at the time of the 2008 Autism Camp and was identified by his parent(s) as having a Moderate Autism Disorder, which was diagnosed in 2004 by his pediatrician. He is Caucasian, and his parents denied that he exhibited self-injurious behavior or had a psychotic disorder, brain damage, or physical limitations that would prevent him from participating in camp activities at the time of the 2008 Autism Camp. They reported that he primarily engaged in non-communicative speech. In the school setting, he qualified for special education services under the disability categories of autism spectrum disorder and communication disorder. Both of Gary's parents reported they had completed four or more years of college. Gary was placed in Tribe Four.

Background Information

During the 2007 – 2008 school year, Gary received the majority of his educational services in a separate special education classroom setting, largely due to his lack of expressive speech. It was noted that he received occupational therapy, speech, and alternate transportation services as well. The following areas of need were indicated in Gary's Individualized Education Plan (IEP): social skills, math, fine motor, and language. Gary's teacher indicated that she wanted to see him increase his compliance and spontaneous verbal responses during the summer. Reports indicated Gary engaged in head banging and biting himself or others in school, as well as "whining" and screaming. It was reported Gary utilized a number of sensory supports in the classroom, including a

trampoline, move-n-sit cushion, vibrating chewy pen, weighted vest, Theraband, and wearing a hat. At the time of his conference prior to the 2007 – 2008 school year, there was discussion by his case conference committee as to whether or not his needs were being adequately met in his home school. The case conference committee was considering an alternative behavior center.

Gary's parents indicated that he was diagnosed with PANDAS, an internal strep infection that causes physical joint pain. In addition, PANDAS can cause an increase in obsessive-compulsive behaviors, an increase in aggression, and an increase in hyperactivity. His parents reported Gary would enter school with compliant behavior and leave school with sudden onset tics (i.e., flip his head to one side repeatedly). Due to the fact Gary was not often able to express when or where he was experiencing pain, his parents indicated he was more likely to exhibit acting-out behaviors such as whining, crying, screaming, head banging, and biting himself. They suggested staff ask Gary, "Do you hurt?" and indicated Gary would typically respond to yes or no questions about his pain. They reported using the following: "Show me where" or "Use your words" to prompt Gary to identify the location of his pain.

Target Behaviors

Based upon an analysis of the information provided by Gary's parents and teachers, including his most recent Individualized Education Plan (IEP), the following target behaviors were determined for Gary prior to the start of camp. As explored in the discussion section, behaviors three and four (i.e., oral stimulation and out-of-seat/off-task behavior) were identified as relevant targets after camp started and were added into his behavior plan during the second week of camp.

1. Noisy and Self-Injurious Behavior ranged from screaming or making loud noises to head banging to self-biting.
2. Biting or Hitting Staff.
3. Oral Stimulation included putting his hands or other objects in his mouth or picking his nose.
4. Out of Seat/Off-Task included getting out of his seat (or up from a sitting position on the ground), wandering around, laying his head down, or ignoring the teacher/instruction.

Antecedents of Behavior

A functional behavior assessment (FBA) was conducted in which simple A-B-C (i.e., antecedent – behavior – consequence) data were collected during observations within the first two days of camp. Based upon those assessments, the following antecedents and functions of target behaviors were identified. Gary's target behaviors occurred most often when he was prompted to complete tasks he disliked, when he was required to work or participate in an activity for more than 15 minutes at a time, when he was asked to sit still for extended periods of time (10 or more minutes), and when a teacher made a request that he did not want to do.

Functions of Behavior

1. Noisy/Self-Injurious behavior: Gary appeared to engage in self-injury, screaming, and making noises primarily to escape or avoid task demands and gain adult attention.
2. Biting or Hitting staff: avoidance of task demands.

3. Oral Stimulation: self-stimulation.
4. Out-of-seat/Off-task: avoidance of task demands and to gain adult attention.

Replacement Behaviors

Several functionally equivalent replacement behavior(s) and social skills were identified as missing or occurring infrequently in Gary's behavioral repertoire. They were therefore taught directly and reinforced specifically throughout the camp experience.

1. Comply with a verbal request or task demand given by an adult within 30 seconds of the request/demand.
2. "Use words" to communicate needs and wants (e.g., "I don't like this," "Can you help me?" "I need a break," or "I am frustrated.").

Behavior Intervention Plan

Specific preventative (i.e., antecedent) and supportive intervention (i.e., consequent) strategies, based upon the results from his FBA, were developed for those involved in Gary's treatment. Each counselor and teacher was trained in how to use these strategies and was familiar with his individualized behavior plan. The following strategies were implemented with Gary throughout the eight-week camp.

Preventative strategies included the following:

1. Look for signs of agitation or frustration and intervene to help him calm down (e.g., allow a break, give him a hug, reinforce what he is doing, have him take a deep breath or close his eyes to calm down, have Gary rub his legs, take a walk, swing) before Gary engages in self-injurious behavior. If Gary is upset, he has a

picture communication book available in his file, which may help him to communicate more easily.

2. Allow Gary to use sensory stimulation products – weighted vest, blanket, baseball hat (gives input and prevents head banging), vibrating pen, and Theraband.
3. Do not use time-out with Gary if he is failing to participate in the task/activity.
4. Only one staff should attend to Gary when he is displaying inappropriate behavior. Other staff should only get involved if the original staff asks for assistance. Additional staff should not talk to Gary or make eye contact with him, and should only touch when necessary for response-blocking or physical prompting.

Intervention strategies included the following:

1. Positive reinforcement procedures:
 - a. Exaggerate verbal praise specifying the appropriate behavior (This can be used alone or paired with other reinforcers.). For example, say, “I am proud of the way you followed directions!” “I like the way you are doing your project!”
 - b. Provide a hole punch in Gary’s behavior card (i.e., immediate reinforcer which is later coupled with a larger reinforcement at the end of each camp day) when he completes tasks without becoming noisy or engaging in self-injury, biting or hitting staff, engaging in out-of-seat or off-task behavior, or engaging in oral stimulation. Also provide hole punches when he complies with a verbal request within 30 seconds of the request or “uses words” to communicate a need or a want.

- c. Provide physical touch (i.e., hugs or rub his arms and legs) for appropriate behavior.
 - d. Engage in activities or discussions involving trains or cars (Pixar – “Mater”) when Gary is exhibiting appropriate behavior.
 - e. Utilize his interests (i.e., drawing, coloring, or reading) as reinforcers.
 - f. Allow him to engage in physical activities such as swinging, bouncing on a trampoline, running, and so forth when his behavior is appropriate for the setting.
 - g. Provide positive reinforcement and/or deep pressure (i.e., verbal praise, hugs, rub his arms or legs) for appropriate behavior (e.g., completing tasks, especially when they are non-preferred; verbalizing frustration rather than becoming non-compliant or self-injurious; remaining quiet during activities; remaining on-task, etc.).
2. Divide tasks into smaller segments (and time periods) that are more manageable for Gary and tie the segments to reinforcement. For example, if Gary is completing a craft activity, instruct him to complete one part of the project (or work for 5 – 10 minutes) and tell him he will then get to jump around for 2 minutes. Then have him complete another section and provide another “pay-off” activity or reinforcer such as verbal praise.
3. Noise/Self-Injury:
 - a. Prompt to completion – Do not allow Gary to escape or avoid the completion of a task.

- b. During self-injurious behavior, block Gary's hands to stop head-banging or biting.
- c. Use a 1 to 5 prompting system with Gary to help him self-monitor his mood and redirect himself. Gary is familiar with this concept, so you might tell him, "Gary, you are at a 3 right now, I need you to calm down and bring it to a 1 or 2." Then proceed to give him reminders to take deep breaths, close his eyes, rub his legs, and so forth:

1 & 2: Gary is able to focus; he is calm, happy, and engaged in tasks.

3: Gary may be pacing, flapping his hands, putting his hands in his mouth, etc. He needs to perform calming activities (e.g., deep breaths, rub legs, take a break, close eyes) to de-escalate and get to stages 1 or 2.

4: Gary is frustrated, mad, starting to melt down, and engaging in minor self-injurious behavior.

5: Gary is screaming, non-communicative, and needs restraint.

Counselors should focus on stopping the screaming and helping Gary to calm down.

- 4. When Gary appears to be engaging in the target behaviors deliberately (e.g., may be laughing while head banging) use the phrase "not appropriate" and then redirect him to the task to stop non-compliant behavior.
- 5. Out of Seat/Off-task:

- a. Redirect Gary to the task at hand with a verbal or gestural prompt or cue.
 - b. Provide immediate reinforcement when he resumes the task.
6. Comply with a verbal request or task demand given by an adult within 30 seconds of the request/demand.
- a. Use a prompt hierarchy when asking Gary to complete a non-preferred activity or task. Start with the least intrusive prompt and move toward the most intrusive prompt. (i.e., 1. Verbal Instruction – “Gary, please sit down.” 2. Gesture – tap Gary’s seat to prompt him to sit down 3. Physical guidance – physically guide Gary to sit down).
 - b. Provide Gary with prompts or cues prior to a non-preferred activity to warn him of the upcoming activity, and emphasize contingencies (“pay-off”) for completing the activity (“We’re about to do _____, Gary, and when we finish, you and I can shoot some hoops.”).
7. “Use words” to communicate needs and wants (“I don’t like this,” “Can you help me?” “I need a break,” or “I am frustrated.”).
- a. Provide immediate reinforcement when Gary uses his words to express a need or want.

Data Collection Procedures

Five graduate students under the supervision of a Board Certified Behavior Analyst (BCBA) and the Camp Director collected data for Gary throughout the eight-week camp. As previously noted, the FBA for Gary was conducted within the first two days of camp, utilizing a simple A-B-C method (i.e., antecedent – behavior – consequence). The behaviors of focus were those identified prior to the start of camp.

Once antecedents and functions were identified, an individualized behavior plan was developed for Gary. Counselors learned the behavior plan and then implemented the interventions on the third day of camp. Starting on day three, Gary was observed for approximately four hours throughout the morning academic time. Gary was observed at least one day each week, and the same data collector generally observed him each week. To simplify data collection in this natural setting, all data collectors utilized a frequency recording data collection procedure. All target behaviors and replacement behaviors were observed during the same collection time for Gary.

Data

All raw data were calculated and graphed by one graduate student. To obtain the occurrences per hour rates, the number of tally marks from the data collection forms were multiplied by 60 (i.e., 60 minutes in an hour), and then divided by minutes observed. If more than one observation period occurred during the course of a week, the average was obtained by adding occurrences per hour and then dividing by the number of observation periods.

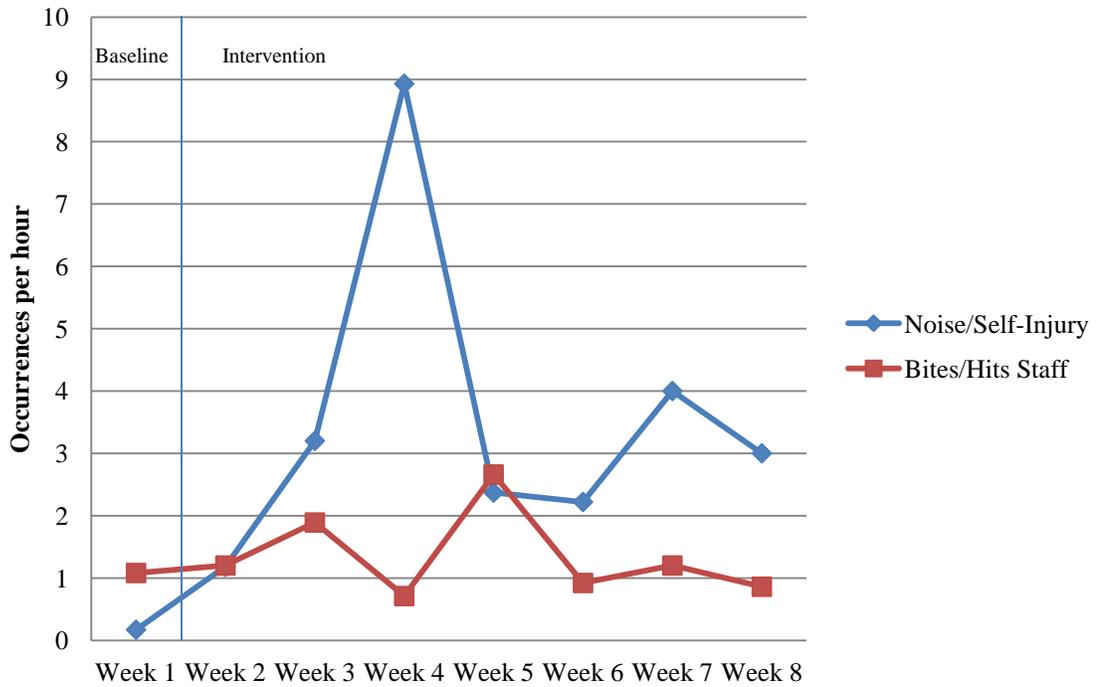


Figure 2.1 Baseline and intervention data of original target behaviors for Participant 2, Gary.

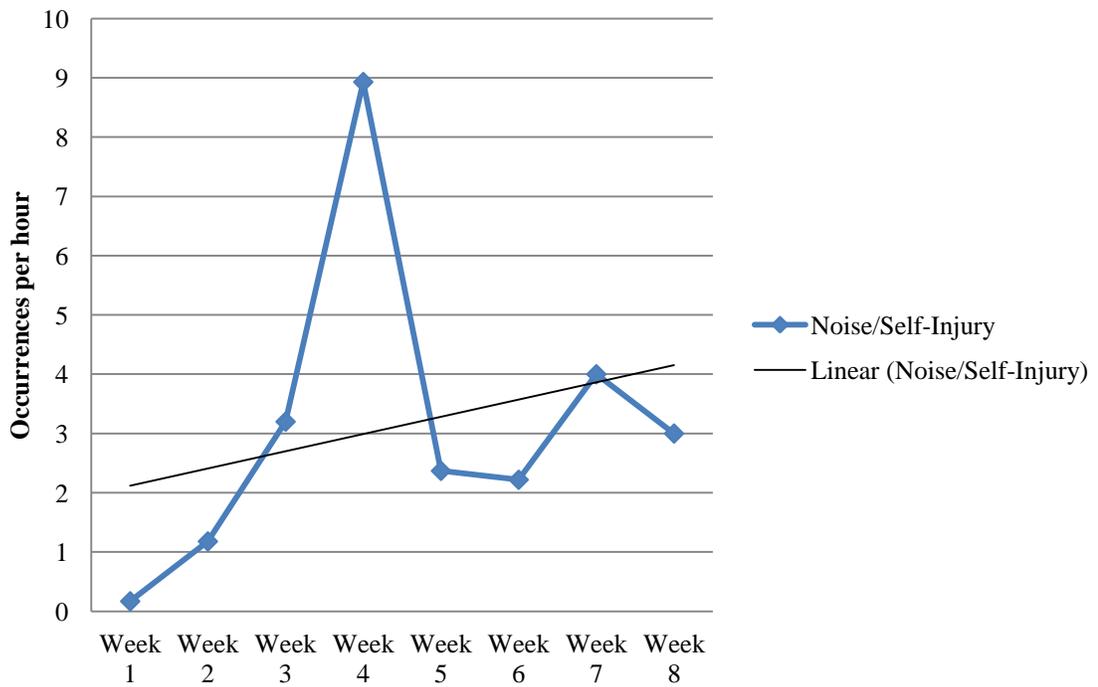


Figure 2.2 Noise/Self-Injury data with trendline for Participant 2, Gary.

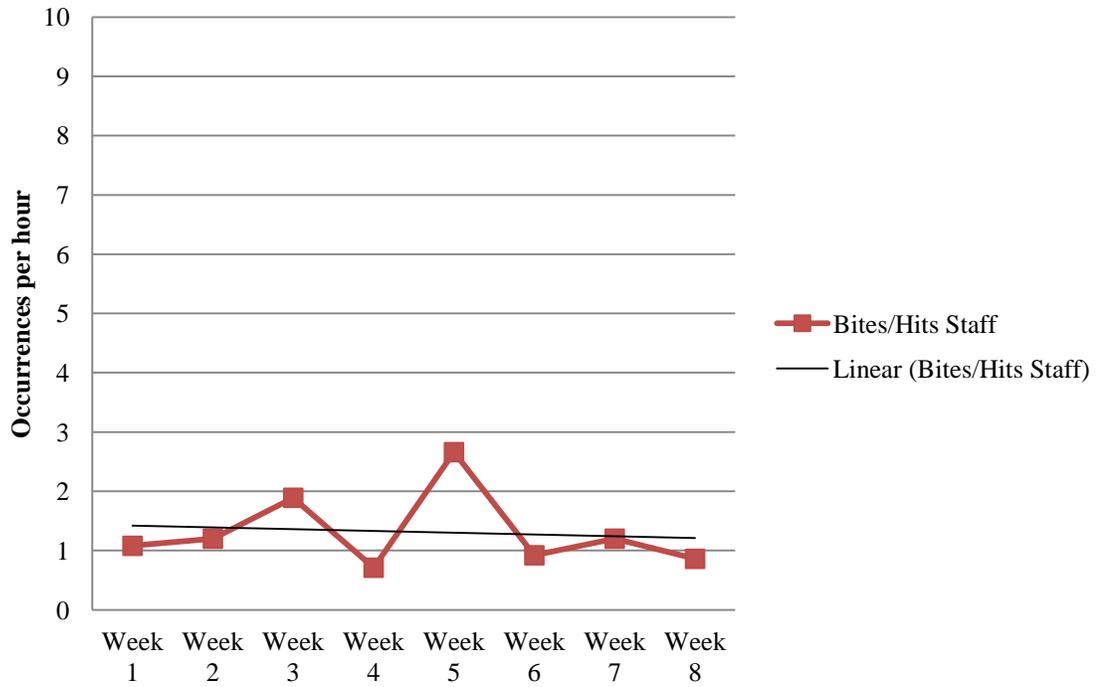


Figure 2.3 Bites/Hits staff data with trendline for Participant 2, Gary.

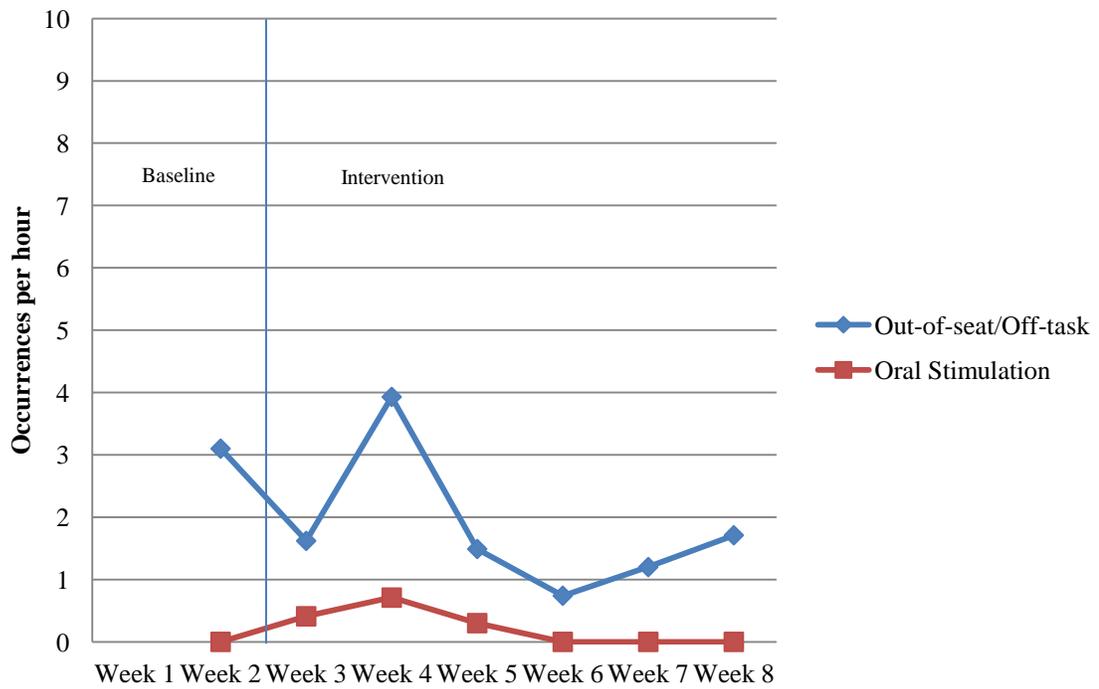


Figure 2.4 Baseline and intervention data of added target behaviors for Participant 2, Gary.

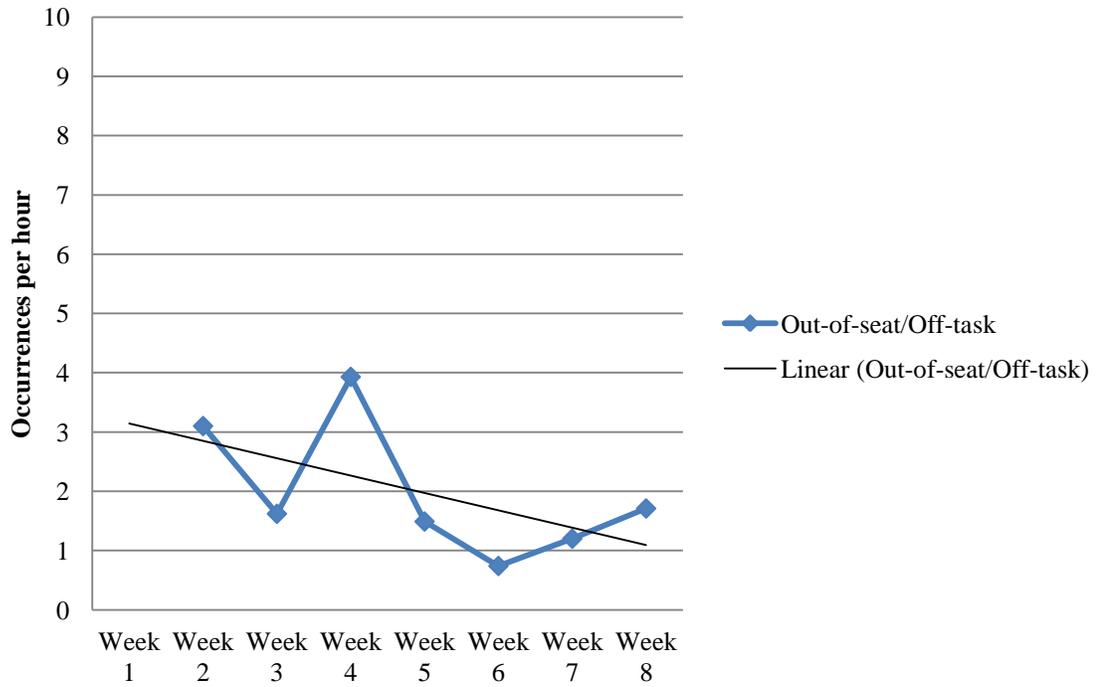


Figure 2.5 Out-of-seat/Off-task data with trendline for Participant 2, Gary.

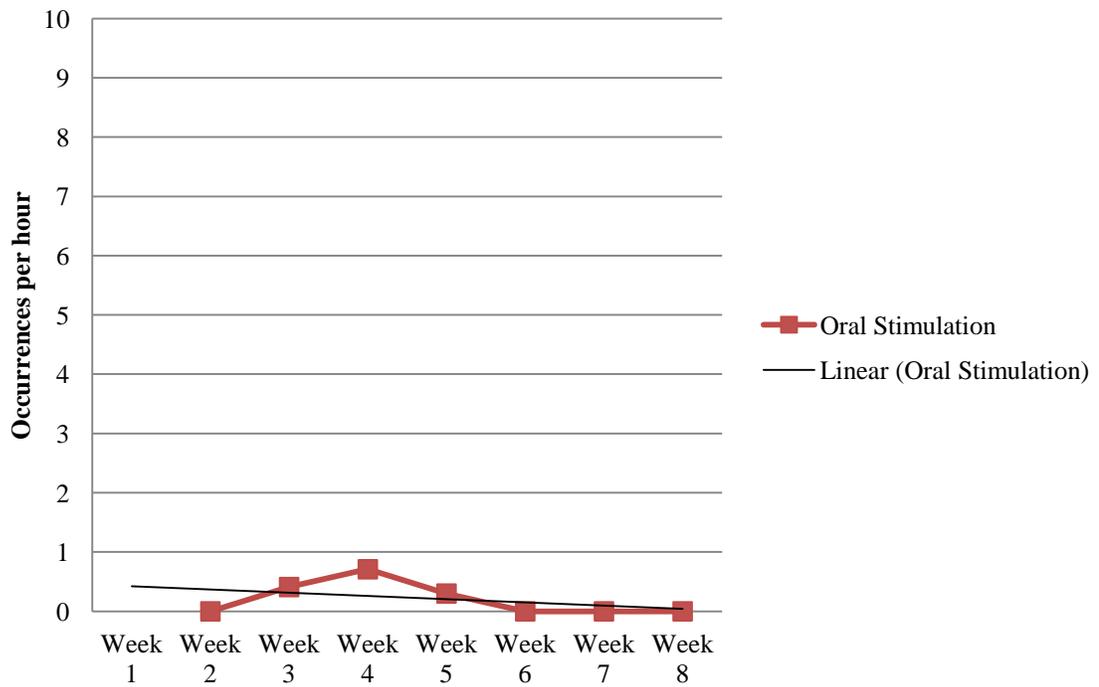


Figure 2.6 Oral Stimulation data with trendline for Participant 2, Gary.

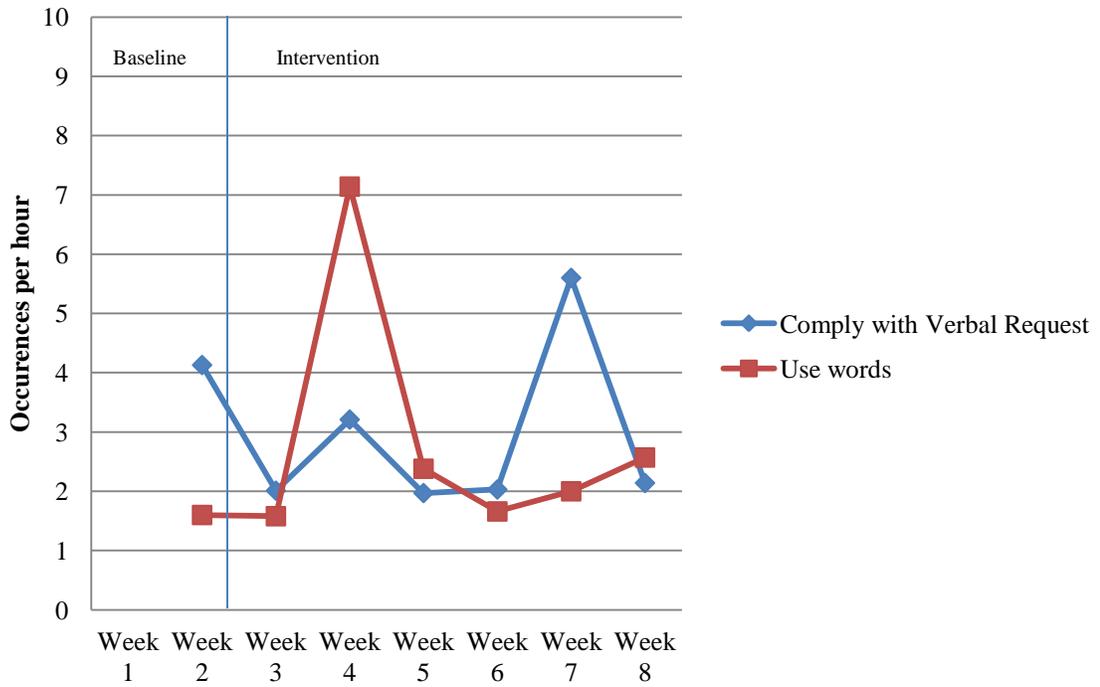


Figure 2.7 Baseline and intervention data of replacement behaviors for Participant 2, Gary.

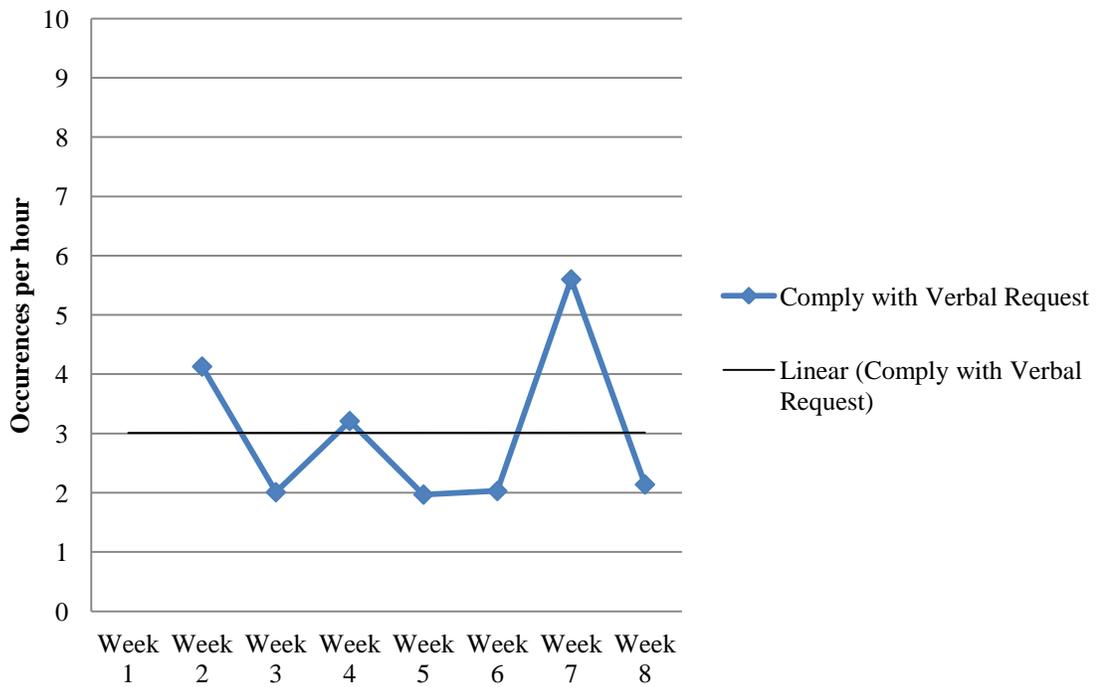


Figure 2.8 Comply with Verbal Request data with trendline for Participant 2, Gary.

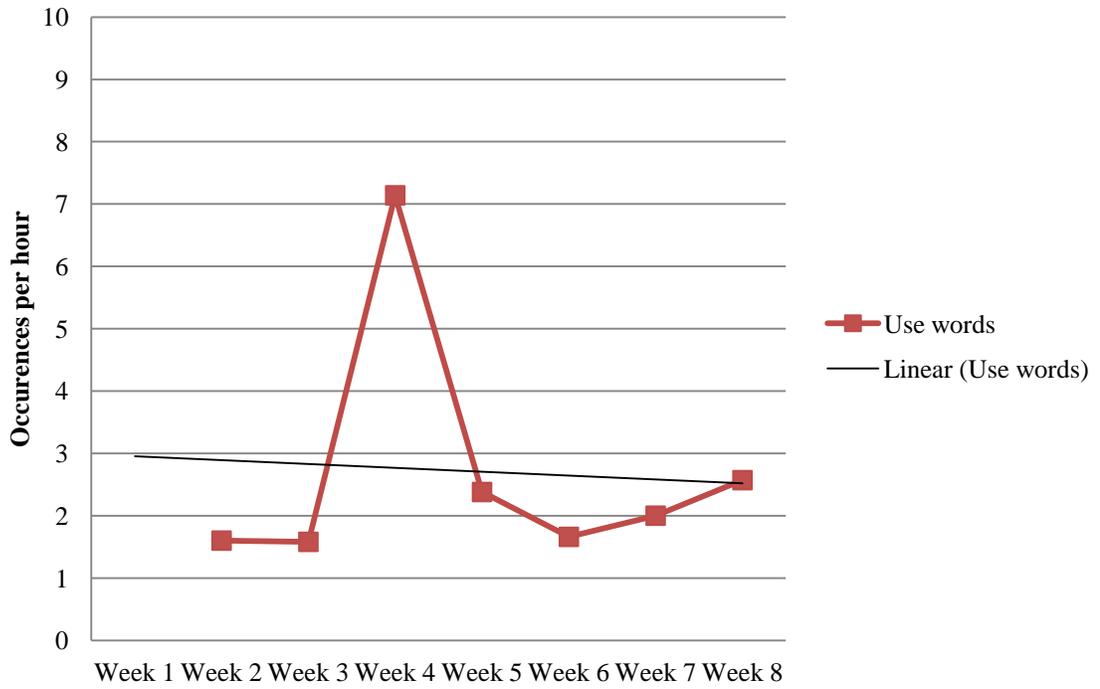


Figure 2.9 Use Words data with trendline for Participant 2, Gary.

Results

Figure 2.1 shows a graph of the behavioral data collected on Gary's originally identified target behaviors, which included Noisy/Self-Injurious behavior and Bites/Hits Staff. Baseline data were collected during the first two days of camp with intervention data collected from that point forward. Figure 2.2 shows Gary's Noisy/Self-Injurious behavior with a trendline, which demonstrates a slight upward trend, indicating this behavior increased over the course of the eight-week camp. Based upon this trend, it could be predicted Gary's targeted self-injury and noise-making behaviors would continue to increase over time; however, you can see from visual inspection of the data that this behavior spiked significantly on Week Four, somewhat skewing the data. Though little improvement was demonstrated, Figure 2.3 indicates a slight downward trend in his biting and hitting behavior over the course of the eight-week camp. This behavior, however, was observed infrequently.

Figure 2.4 shows a graph of the target behaviors, Out-of-seat/Off-task behavior and Oral Stimulation, which were added after the start of camp when they were identified as an important focus for treatment because of the frequency with which they occurred. Gary's off-task behavior reduces his ability to participate in less restrictive environments in school and community settings, impacts his learning, and ultimately reduces his independence. Gary's need for oral stimulation was generally met by preventative strategies (i.e., mouth chewie); however, its occurrence prevents his ability to socialize with peers and others. Baseline data for these behaviors were collected during the second week and intervention data were collected from that point forward. Figure 2.5

shows Gary's out-of-seat/off-task behavior with a trendline, while Figure 2.6 shows his oral stimulation with a trendline.

Figure 2.7 shows a graph of the behavioral data collected on Gary's replacement behaviors and social skills, which were observed from Week Two, when baseline data were collected, through the end of camp. These behaviors included complying with verbal requests and using words to indicate his needs and wants. Figure 2.8 includes the data collected when Gary complied with a verbal request, along with a trendline that demonstrates no trend due to the variation in the data. Figure 2.9 as well demonstrated a slight downward trend, which would indicate he struggled to verbally express his needs and wants at camp.

Discussion of Results Related to Gary

Overall, the behavioral results for Gary were somewhat disappointing and unexpected. He demonstrated an increase in screaming, making loud noises, head-banging, and self-biting. He demonstrated a slight decrease in biting and hitting staff and oral stimulation, while his out-of-seat and off-task behavior decreased more substantially at camp. With regard to his replacement behaviors, Gary's compliance with verbal requests stayed about the same over the course of the eight weeks, while his ability to use words to express himself appeared to decrease slightly in the camp setting.

Camp staff made every effort to require Gary to complete academic activities despite escape/avoidance behavior and saw decreases in aggression, noise, and self-injurious behavior, though some of these behaviors increased again toward the end of the camp. Without further information regarding what might have affected Gary's

significant increase in noise-making and self-injury behavior during the fourth week, it might be speculated that some unidentifiable variable, perhaps his PANDAS, played a role in his behavior that week. Though the data point from the fourth week skewed the graph to some extent, the other noisy/self-injury data also demonstrated an upward trend in this target behavior, indicating Gary's intervention plan was not successful in decreasing this maladaptive behavior in the camp setting. One explanation might be camp activities were too demanding for Gary, causing him to engage in avoidance behaviors. It also is possible his PANDAS affected him more often than was identified by camp staff. Differentiating between his response to pain and his avoidance behavior proved to be a difficult task for staff.

Biting and/or hitting staff was observed somewhat infrequently throughout camp and peaked in frequency during the fifth week. Considering his teachers and parents reported an unacceptable level of biting and hitting others at school, this appeared to be a setting in which he demonstrated lower levels of this behavior. Aggression, though somewhat typical for a child with autism who uses minimal communicative speech, must be extinguished for Gary to participate independently in school or community settings. Because he cannot express his needs or wants, he is much more likely than other children to engage in aggressive behaviors. Given the fact Gary used little communicative speech this gradual decrease is promising.

The downward trend in Oral Stimulation and Out-of-Seat/Off-Task behavior indicated he demonstrated a gradual but progressive decrease in these target behaviors. His out-of-seat/off-task behavior, however, decreased at a higher rate, based upon the

slope of the graph. This would indicate that if his intervention plan continued in this setting, we could expect to see this behavior eventually reach near-zero low levels. As noted, Gary utilized sensory materials most of the time during camp and therefore, was rarely observed to engage in the oral stimulation of putting his hands or other unapproved objects in his mouth or picking his nose.

Gary's compliance was an area in which his classroom teacher hoped he would progress over the summer months. The data, however, indicated that his intervention plan was not successful overall in accelerating this replacement behavior though he demonstrated a significant increase in compliance during the seventh week. It might be speculated that the reinforcers used at camp were not strong enough to consistently increase this behavior. Given the many conflicting variables at camp (e.g., weather, open grassy spaces, lack of desks), Gary had significant difficulty sustaining his attention to tasks and following the general routine. Staff were often required to prompt Gary multiple times before gaining compliance, while at other times he was completely non-compliant. Staff members were somewhat successful in using a timer with Gary to require that he complete "work" for prespecified time periods before receiving a break or reinforcer. He struggled, however, to maintain alert and appropriate body posture, having a tendency to lean on others, fall on the ground, or purposefully run into things for sensory integration needs. Unfortunately, many resources that may be effective with Gary were not practical in the camp setting (i.e., weighted vest, picture communication system, strict visual schedules). In this setting (open grassy areas), it was difficult for staff to promote independence on certain activities, as Gary had a tendency to run. This forced staff members to hold his hand or arm much of the time.

Interestingly, his noisy/self-injurious behavior (i.e., Figure 2.2) spiked noticeably during Week Four, as did his use of words to express himself (i.e., Figure 2.9). It might be suspected that those behaviors were related in some way, particularly as they both involved verbal expression of some sort. It is possible Gary's screaming, whining, and self-injury increased due to his PANDAS, while the increase in verbal expression may have accelerated as his family had been working on phrases for him to use to identify his pain.

Gary's lack of communicative speech, along with his recent diagnosis of PANDAS, were significant barriers to success in the camp setting. Because the pain caused by this infection resulted in similar behaviors as those Gary demonstrated when attempting to avoid or escape a task, it was difficult for camp staff to respond consistently to Gary's behaviors. The unrestricted nature of the camp setting (i.e., open grassy fields) also created an obstacle to Gary's treatment, as he began to demonstrate increases in elopement behavior. To address his running, camp staff were forced to provide physical prompts, which in turn affected his other behaviors (i.e., whining, screaming, leaning on staff, etc.). Interestingly, Gary exhibited low levels of biting or hitting staff despite their need to physically prompt him (i.e., hold his hand or arm) more often. This might raise questions about the function of Gary's biting and hitting, which was suspected to be avoidance or escape of task demands. Perhaps he used these behaviors to gain attention more often than he did to escape or avoid task demands. It is very likely that Gary's biting and hitting of adults serve different functions at different times. There are probably times when he becomes aggressive in this way to escape or avoid tasks, and

other times when he does so to gain adult attention. In the camp setting, he was provided with a high degree of adult attention, particularly because of running behavior, and we saw relatively low levels of aggression.

Based upon his behavior at camp and his response to the interventions used, the following recommendations were provided to Gary's caregivers at the end of camp:

1. Continue to work with Gary on increasing the duration of time he spends engaged in academic activities. Use a timer to visually show Gary how long he is expected to work (e.g., 3 minutes) before allowing him to have a break or access to a preferred tangible item (i.e., train). Using a timer, allow Gary to have a break (or preferred object) for a specified amount of time (e.g., 2 minutes). Then require Gary to return to work, going back and forth using the timer. Gary's schedule should gradually lengthen the amount of time spent working and shorten the amount of time spent on break. Provide frequent positive reinforcement (e.g., exaggerated praise, a short break, short period of time doing a preferred activity, etc.) for time on-task.
2. School staff may consider utilizing sensory integration tools (i.e., weighted vest, chewies, fidgets, etc.) to help him receive an appropriate amount of sensory stimulation.
3. Gary likes to run and benefits from physical activity, which should be routinely incorporated into his day. Schedule specific times when he can jump on a trampoline, bounce on a ball, swing, or just run. This will help him to get large body sensory input and to expend extra energy.

4. Continue to use a prompt hierarchy with Gary, using the least intrusive prompting whenever possible. If at all possible, do not use physical prompts so Gary will learn to do things on his own. Provide frequent and exaggerated physical and verbal praise when Gary complies with requests or completes academic tasks.
5. Provide brief verbal or gestural prompts to redirect Gary when he is leaning on something or lying down (e.g., “Gary sit up.”), using a firm tone of voice.
6. It is recommended teachers and parents consider using some form of picture communication system (PECS) to help Gary find the words to communicate needs and wants. Require Gary to use the pictures and to verbally express (repeat if necessary) the word, which correlates with what he needs or wants.

Case Summary – Gary

Gary, a 7-year-old, Caucasian male diagnosed with an autism spectrum disorder attended the 2008 Autism Summer Camp. An analysis of information provided by Gary’s caregivers and teachers indicated he struggled with behaviors such as whining, screaming, biting himself, biting others, and hitting teachers. It was reported Gary used minimal communicative speech and engaged in frequent self-stimulatory behaviors such as running, jumping, and bumping into walls and objects. Using this information, two behavior categories – Noisy/Self-Injurious Behavior and Biting/Hitting Staff – were identified as problematic behaviors that could be targeted for intervention during the eight-week summer camp. Behaviors appeared to serve the same function for Gary were grouped together and included screaming, making loud noises, head-banging, and biting himself (noisy/self-injury) along with biting or hitting staff. Graduate students then conducted a Functional Behavior Assessment and collected baseline data based upon

these target behaviors. Once antecedents and functions were determined, the graduate students developed a behavior intervention plan for Gary's camp staff to address these problem areas in his behavioral repertoire. After camp started, a number of additional target and replacement behaviors were included into Gary's behavior plan, as they were determined to be important behaviors for change. Those included decreasing oral stimulation, decreasing out-of-seat/off-task behavior, increasing compliance with verbal requests, and increasing his use of words to express needs and wants.

Baseline and intervention data indicated Gary demonstrated an increase in screaming, making loud noises, head-banging, or biting himself over the course of this eight-week summer camp. It is postulated this outdoor setting might have been overstimulating and distracting for Gary. The environment probably had some positive effects, as noted below, but it also may have been difficult for Gary to focus on tasks and activities. Though this was not mentioned as a problematic behavior at school, Gary was found to run away from staff frequently in the camp setting. As a result, they often held his hand to increase compliance and decrease these escape behaviors, which probably led to screaming, making loud noises, biting himself, and so forth. He demonstrated a slight decrease in biting and hitting staff, though these behaviors were infrequent overall. Because they are such inhibiting behaviors that threaten Gary's opportunities to participate in less-restrictive and more independent settings, this decrease was important and encouraging. Both target behaviors that were added for Gary, Oral Stimulation and Out-of-seat/off-task behavior decreased, with the second decreasing at a much higher rate. This was quite encouraging as his off-task behaviors impact his learning and reduce

the amount of time he can spend in less-restrictive environments in the school setting in particular. In addition, though his noisy/self-injurious behaviors increased, perhaps in an effort to escape task demands, his off-task behavior decreased. One might hypothesize that his off-task behavior may have decreased due to his interest and level of engagement in the outdoor camp setting. He demonstrated low levels of oral stimulation, which included putting his hands or other (unapproved) objects in his mouth or picking his nose. Gary was provided with a “chewie” so he could meet his oral sensory needs in an appropriate way. Therefore, this behavior appeared to be addressed primarily with preventative strategies. With regard to his replacement behaviors, Gary made little observable improvement overall. His compliance with verbal requests stayed about the same, while his use of words to communicate needs and wants decreased slightly over the eight weeks.

Overall, the camp was beneficial in decreasing Gary’s biting and hitting of staff, out-of-seat/off-task behaviors, and oral stimulation. Though some of these decreased at a low rate over the course of the eight weeks, the data demonstrated improvement in areas of behavior that are often extremely difficult to change, particularly for a child with little communicative speech. In addition, Gary demonstrated low levels of biting or hitting to begin with, which appeared to be a result of the camp setting as his parents and teachers indicated this to occur more frequently at school. Camp staff indicated Gary used a “chewie” to help provide oral stimulation, but noted he did not require its use toward the end of camp. It was determined at the end of camp that he should continue to work on increasing the duration of time he is on-task (i.e., eyes directed toward instruction, head

up, alert body posture, and participating in activity), verbal communication, controlling large body movements, and opening his fingers.

It could be concluded that this camp program, based upon ABA methods and strategies, was effective in decreasing some of the maladaptive behaviors demonstrated by Gary. He showed little to no progress, however, in the selected replacement behaviors. There are several possible reasons for these results. The outdoor environment and novelty of camp was probably a critical factor that affected Gary's behavior in both positive and negative ways. In some ways, it might have been distracting to Gary, causing him to run away in attempts to play or interact with the environment. When redirected, he may have been more likely to scream, make loud noises, or bite himself. At other times, because the environment itself and nature (i.e., sticks, bugs, trees, etc.) were incorporated into the curriculum, he might have been more likely to stay on-task and participate (i.e., decrease in off-task behaviors). The wide open environment created some barriers for Gary as he started running away from staff, a behavior that was not mentioned as a problem at school. This caused staff to hold his hand more often, restricting his independence at camp. Gary also had a tendency to lean on others, fall on the ground, or purposefully run into things for sensory integration needs, and it is possible these behaviors increased as a result from the physical prompting staff were required to use. Despite the necessity for physical prompting, Gary bit or hit staff infrequently, also behaviors that decreased over the course of camp. The camp experience appeared to be a positive one for Gary overall, which might explain his lack of biting and hitting staff.

Unfortunately, many resources that may be effective with Gary were not practical in the camp setting (i.e., weighted vest, picture communication system, strict visual schedules). The ABA strategies that were used, including positive reinforcement, antecedent interventions, shaping, and prompting were developed and implemented specifically to meet Gary's individual needs. The interventions chosen were based on an analysis of information provided by Gary's parents and teachers and a Functional Behavior Assessment conducted during the first week of camp, which probably made them more effective in addressing his needs because they identified the probable functions of his target behaviors. Gary's replacement behaviors, compliance with verbal requests and using words to communicate, showed little to no progress, which was somewhat disappointing. Given the many variables at camp, along with the fact that these were extremely difficult behaviors to shape, it might be speculated that there was not enough focus placed on accelerating the replacement behaviors. Gary's intervention plan was somewhat complex, making it difficult for staff to successfully implement all strategies. Future camps should simplify the intervention plan to address fewer behaviors at one time during camp.

In addition, camp staff may not have accurately identified the appropriate antecedents to his behaviors and/or the functions of his behavior. Therefore, it was difficult to implement an effective behavioral plan. Because the camp was only eight weeks in duration, it was difficult to conduct another FBA, revise the behavior plan, develop a new intervention plan, and implement the new plan. In other settings, however,

(e.g., school, home, clinic), additional assessments could be conducted and the behavior plan modified.

Case Study 3: Doug

Demographic Information

Doug was 8 years, 5 months of age at the time of the 2008 Autism Camp and was identified by his parent(s) as having a Mild Autism Disorder. A psychoeducational report from 2007 indicated a possible diagnosis of Asperger's Disorder, and Doug qualified for special education services under the disability categories of autism spectrum disorder and communication disorder in the school setting. He is Caucasian, and his parents denied that he had non-communicative speech, self-injurious behavior, physical limitations that would prevent him from participating in camp activities, a psychotic disorder, or brain damage at the time of the 2008 Autism Camp. Both parents indicated they completed four or more years of college. Doug was placed in Tribe Four.

Background Information

During the 2007 – 2008 school year, Doug received the majority of his educational services in a general education classroom and participated in occupational and speech therapy as well. School records indicated the following areas of need: difficulty with attention, socialization, following multi-step verbal directions, consistently making eye contact, and acting impulsively. Doug's teacher described him as "creative" and said he was serious about whatever he was working on. She reported that he rarely interacted with his classmates and often seemed confused during interactions, though she reported that he exhibited average to above average skills in reading, writing, and math. A psychoeducational evaluation indicated Doug was retained in Kindergarten, and his mother reported he had difficulty relating to other children his age. She noted he enjoyed talking to adults about his favorite topics, but seemed "overly focused on his own

interests.” On an objective assessment, Doug’s mother and teacher both indicated he displayed behaviors, which were highly indicative of someone with Asperger’s Disorder.

Target Behaviors

Based upon an analysis of the information provided by Doug’s parents and teachers, including his most recent Individualized Education Plan (IEP) and a psychoeducational report, the following target behavior was determined for Doug prior to the start of camp:

1. Gazing: Looking away from a speaker and looking at an unspecified object/direction for a period of time greater than 30 seconds.

Antecedents of Behavior

A functional behavior assessment (FBA) was conducted in which simple A-B-C (i.e., antecedent – behavior – consequence) data were collected during observations within the first two days of camp. Based upon this assessment, it was determined Doug primarily engaged in gazing when he was given an instruction to complete an academic task.

Functions of Behavior

Doug’s FBA indicated that he appeared to engage in gazing behavior when attempting to avoid completing an academic task.

Replacement Behaviors

Two functionally equivalent replacement behaviors/social skills were identified as missing or occurring infrequently in Doug’s behavioral repertoire. They were therefore taught directly and reinforced specifically throughout the camp experience.

1. Maintain eye contact for at least 15 seconds while receiving an instruction.

2. Spontaneously initiate greetings with peers.

Behavior Intervention Plan

Specific preventative (i.e., antecedent) and supportive intervention (i.e., consequent) strategies, based upon the results from his FBA, were developed for those involved in Doug's treatment. Each counselor and teacher was trained in how to use these strategies and was familiar with his individualized behavior plan. The following strategies were implemented with Doug throughout the eight-week camp.

Preventative strategies included the following:

1. Use clear, concise instructions.
2. Give instructions in a calm, pleasant tone of voice.
3. Let Doug know ahead of time that you are available to answer his questions.
4. Avoid repeating instructions.
5. Give Doug prompts during conversation to appropriately reciprocate & reinforce when he tries (e.g., Ask Doug what his favorite part of the activity was. Then prompt him to ask you what your favorite part was).

Intervention strategies included the following:

1. Positive reinforcement procedures:
 - a. Exaggerate verbal praise specifying the appropriate behavior (This can be used alone or paired with other reinforcers.). For example, say, "I am proud of the way you followed directions!" or "I like the way you are doing your project!"
 - b. Provide a hole punch in Doug's behavior card (i.e., immediate reinforcer which is later coupled with a larger reinforcement at the end of each camp

day) when he maintains eye contact for 15 seconds while receiving an instruction.

- c. Utilize Doug's preferences, including books, videos, pictures of Egypt, and drawing, as reinforcers.

2. Gazing –If Doug looks away for 30 seconds when being given an academic instruction, then:

- a. Keep a calm, pleasant affect, and use a brief verbal prompt (e.g., “Doug”) or gestural prompt (e.g., move into his line of sight).
- b. Praise Doug for looking at you while you are talking.
- c. If Doug looks away again, or continues to look away, finish giving him the instruction and then conclude by asking him if he understands.
- d. Prompt Doug to look at you to tell you if he understands or not.
- e. Immediately reinforce Doug for looking at you.

3. Maintain eye contact for at least 15 seconds while receiving an instruction:

- a. When Doug makes eye contact for at least 15 seconds while receiving instruction, immediately provide reinforcement (e.g., verbal praise and hole punch).
- b. Give opportunities for Doug to practice making eye contact during non-instructional time (e.g., say “Doug, tell me something new about Egypt today” or “Doug, do you want to draw a picture?”) and reinforce for eye contact during these interactions.

4. Spontaneously initiate greetings with peers:

- a. Prior to changing activities, tell Doug where he will be going and some of the people he may see. Then tell him a sample greeting (e.g., “hello” or “what’s up?”) he can tell the person/people.
- b. Provide reinforcement immediately after Doug initiates a greeting.
- c. If Doug does not initiate a greeting, give him a minimal verbal or a gestural prompt, and then reinforce when he gives the greeting.

Data Collection Procedures

Five graduate students under the supervision of a Board Certified Behavior Analyst (BCBA) and the Camp Director collected data for Doug throughout the eight-week camp. As previously noted, the FBA for Doug was conducted within the first two days of camp, utilizing a simple A-B-C method (i.e., antecedent – behavior – consequence). The behaviors of focus were those identified prior to the start of camp. Once antecedents and functions were identified, an individualized behavior plan was developed for Doug. Counselors learned the behavior plan and then implemented the interventions on the third day of camp. Starting on day three, Doug was observed for approximately four hours throughout the morning academic time. Doug was observed at least one day each week, and the same data collector generally observed him each week. To simplify data collection in this natural setting, all data collectors utilized a frequency recording data collection procedure. All target behaviors and replacement behaviors were observed during the same collection time for Doug.

Data

All raw data were calculated and graphed by one graduate student. To obtain the occurrences per hour rates, the number of tally marks from the data collection forms were

multiplied by 60 (i.e., 60 minutes in an hour), and then divided by minutes observed. If more than one observation period occurred during the course of a week, the average was obtained by adding occurrences per hour and then dividing by the number of observation periods.

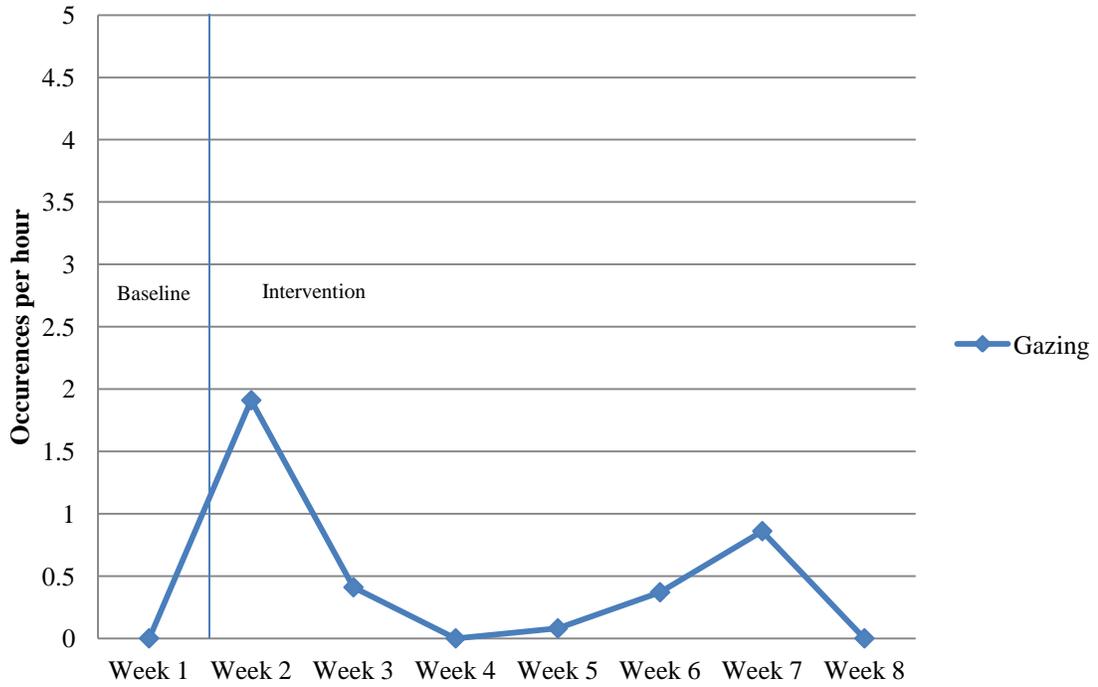


Figure 3.1 Baseline and intervention data of original target behaviors for Participant 3, Doug.

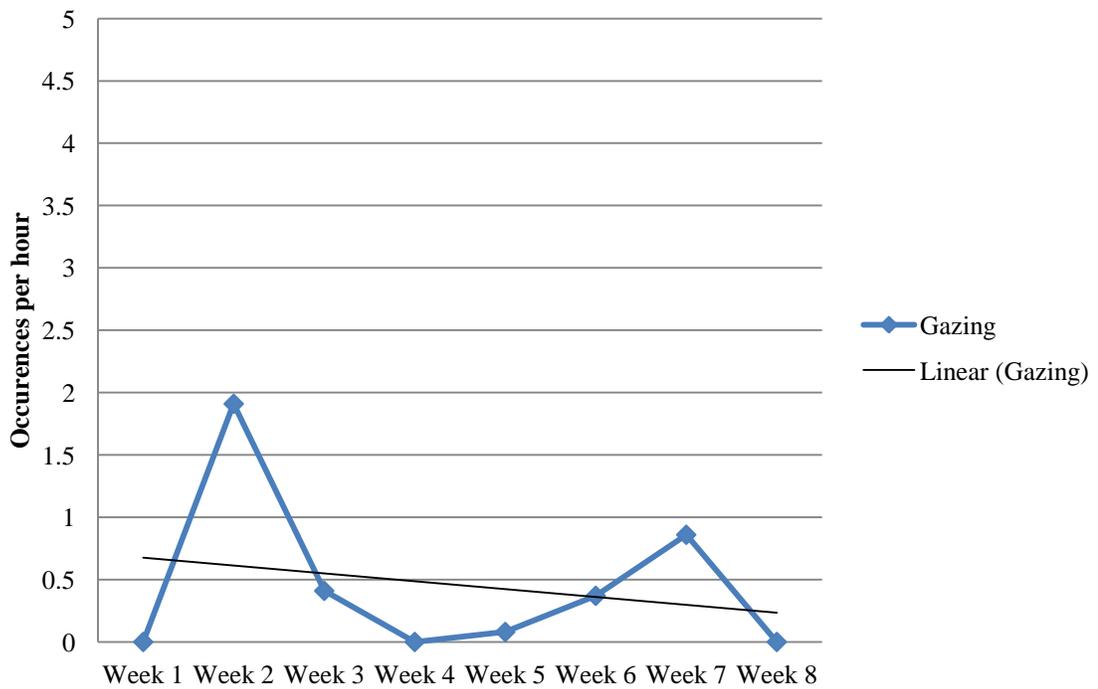


Figure 3.2 Gazing data with trendline for Participant 3, Doug.

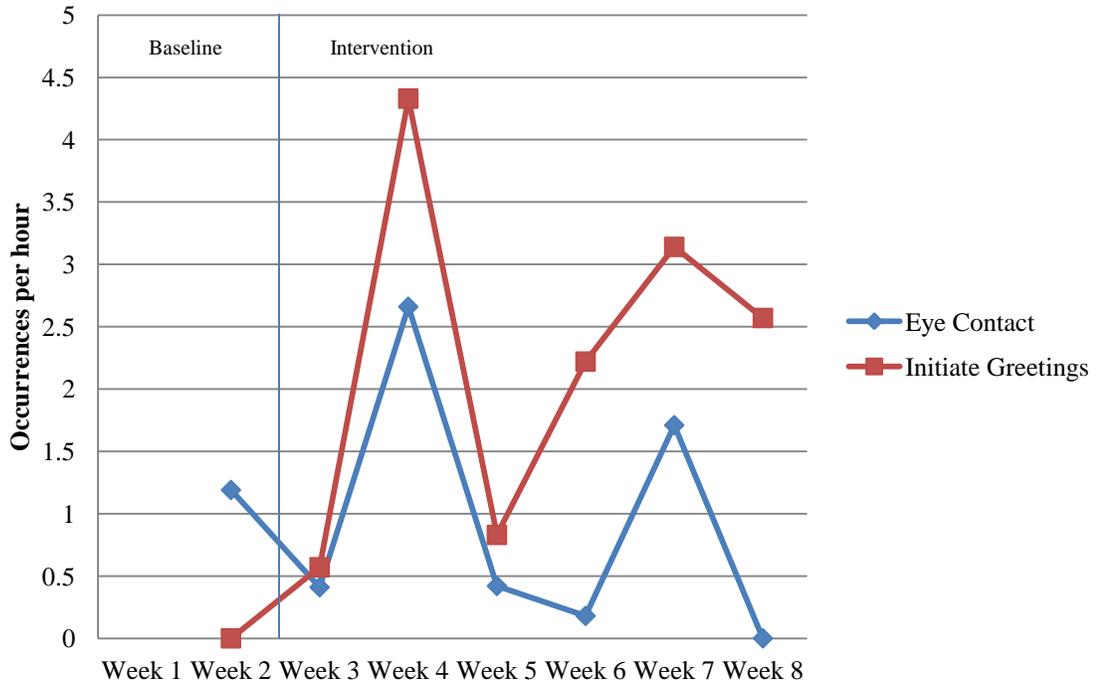


Figure 3.3 Baseline and intervention data of replacement behaviors for Participant 3, Doug.

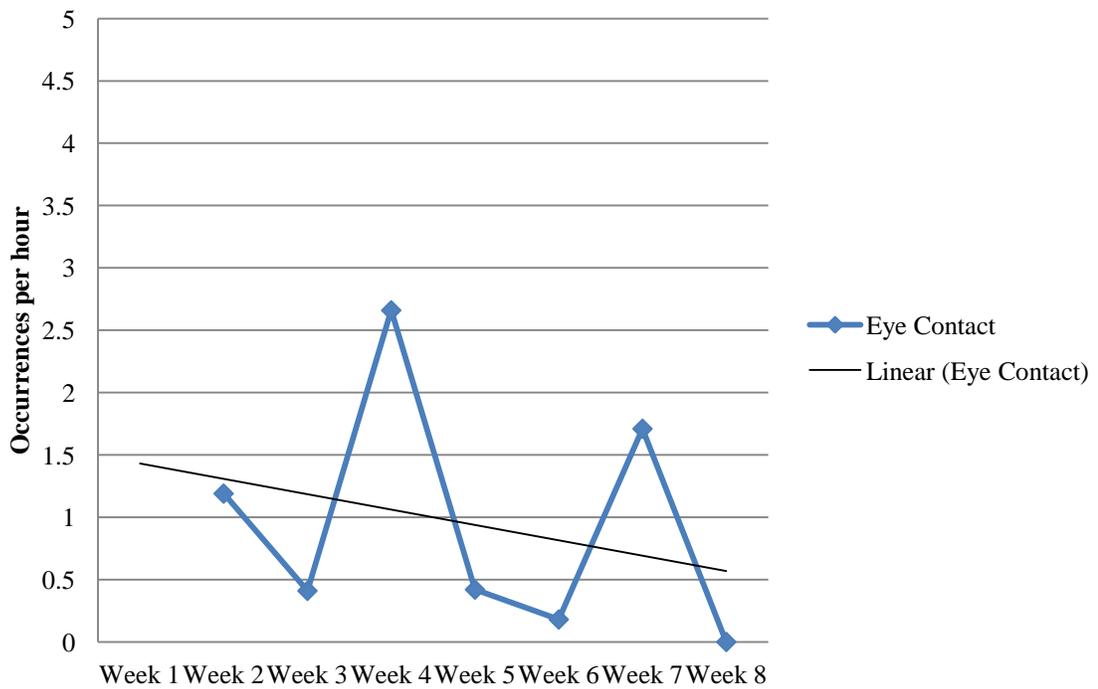


Figure 3.4 Eye contact data with trendline for Participant 3, Doug.

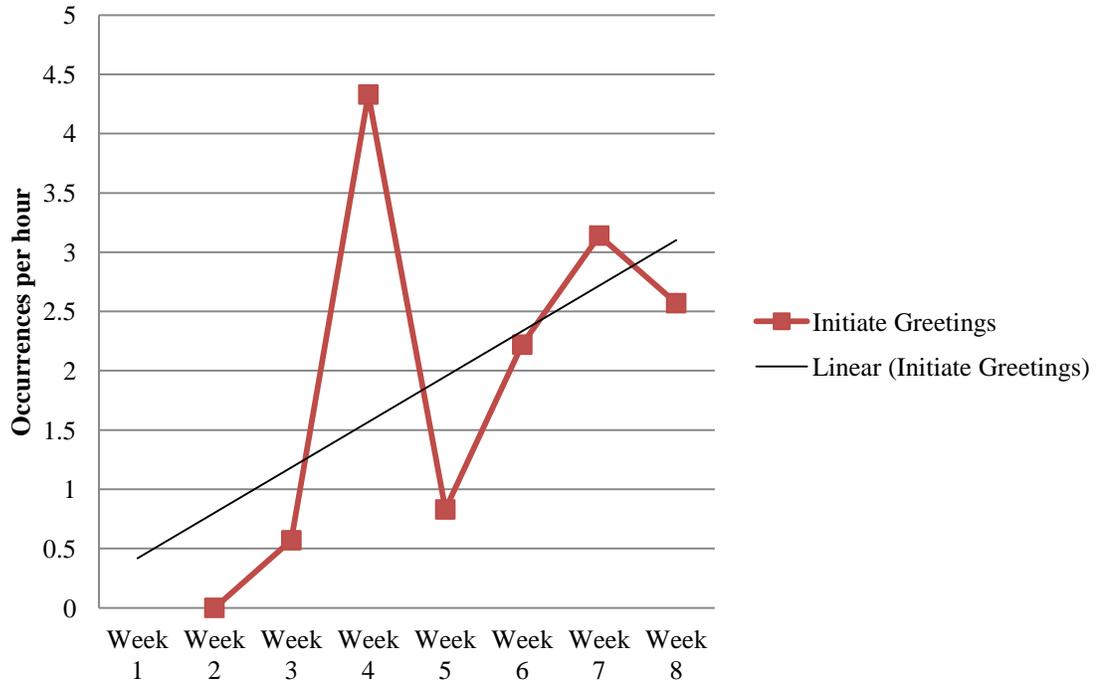


Figure 3.5 Initiating greetings data with trendline for Participant 3, Doug.

Results

Figure 3.1 shows a graph of the behavioral data collected on Doug's originally identified target behavior, gazing. Gazing was defined as looking away from a speaker and looking at an unspecified object/direction for a period of time greater than 30 seconds. Baseline data were collected during the first two days of camp with intervention data collected from that point forward. Figure 3.2 shows Doug's gazing behavior with a trendline, which represented the downward slope of this behavior. This would indicate his gazing behavior decreased over the course of the eight-week camp, and based upon this trend, it could be predicted Doug's gazing would continue to decrease to a near-zero level if his individualized intervention plan was sustained.

Figure 3.3 shows a graph of the behavioral data collected on Doug's replacement behaviors, which were observed from Week Two, when baseline data were collected, through the end of camp. These behaviors included maintaining eye contact and initiating greetings. Figure 3.4 includes the data collected when Doug maintained eye contact for at least 15 seconds while receiving instructions, along with a trendline, which demonstrates a downward trend. Figure 3.5 demonstrates an upward trend in the other replacement behaviors, initiating greetings with peers.

Discussion of Results Related to Doug

Overall, Doug demonstrated a decrease in gazing, a decrease in eye contact during instruction, and an increase in initiating greetings with peers. Reports from Doug's parents and teachers indicated he struggled to sustain attention in the school setting. This appeared to manifest itself through gazing behavior, which is common among children

with autism spectrum disorders. Doug's gazing appeared to serve the function of allowing him to avoid completing task demands, and this behavior affected his learning and ability to pay attention. In the camp setting, Doug demonstrated gazing behavior less often than was expected. It could be speculated that he was more interested and engaged in the tasks and activities at camp, making it less likely for him to attempt to avoid completion. The overall environment at camp appeared to have a positive effect on Doug's behavior, as he was excited about being in an outdoor setting and seemed to pay attention quite well at camp. It also is possible that Doug's gazing behavior served different functions in different settings or with different people. At camp, his gazing was infrequent and may have even served a different purpose or may not have been reinforced as it appeared to be in other settings. What little amount of gazing did occur, however, was decreased over the course of the eight-week camp, as evidenced through the downward trendline.

Doug's replacement behaviors, maintaining eye contact and initiating greetings with peers, were variable over the eight week camp. Interestingly, they followed a similar visual pattern, peaking significantly during Weeks Four and Seven. Maintaining eye contact, however, demonstrated a downward trend overall, indicating that his ability to maintain eye contact toward instruction decreased over time. This behavior peaked during Week Four but was very low during Weeks Five, Six, and Eight, the latter portion of his camp experience. It is postulated that Doug's initial interest and engagement in camp tasks and activities lessened over the course of the summer as the novelty diminished. There was, however, another peak during Week Eight, which could be

explained by a multitude of reasons (i.e., more alert or engaged during that observation, interested in the topic of that lesson, etc.). Doug's mood appeared to be somewhat labile during camp, shifting from cheerful to serious to upset, depending on the circumstances. He was particularly bothered by competitive activities in which he did not perform as well as expected. Such incidents caused Doug to experience an agitated and sullen mood, during which he was more likely to avoid eye contact and attempt to escape task demands.

Doug's second replacement behavior, initiating greetings with peers, was an important focus for change during camp as his mother and teacher indicated that he struggles to relate to other children his age and had difficulty making friends. Doug appeared to have a generally good time at camp (except when upset about competitive activities) and made significant progress in social skills. The data for initiating greetings demonstrated a fairly steep upward trend, which indicated this behavior increased at a relatively high rate. Being around other children with autism spectrum disorders in a camp setting may have given him more comfort in initiating interactions. Doug was a very intelligent young man, with mild autistic characteristics. It is speculated his ability level, as compared to lower-functioning campers, provided him with confidence to interact more frequently. Children with Asperger's often have a strong desire to have friends but lack the skills to do so successfully. In this setting, Doug's skills may have been more adequate than when he is around normally-developing peers at school.

During the course of camp, other problematic behaviors emerged and were identified as future goals for Doug. Based upon his behavior at camp and his response to

the interventions used, the following recommendations were provided to Doug's caregivers at the end of camp:

1. Teachers and parents should continue to work with Doug on handling disappointment. They may wish to teach him specific strategies to use when upset by something another child says or does. For example, Doug can learn to walk away from the situation, take deep breaths to calm down, and count to twenty. Certain strategies may work better for Doug, but the important thing is to teach him that he has control over how he reacts to others. Parents and teachers should empower Doug to control his emotions and to be able to calm down when someone has upset him.
2. Continue to work with Doug on handling competitive situations. Provide him with opportunities to engage in competitive activities or games but make efforts to prepare Doug for how to be a "good sport" if his team loses or he does not play well. Have conversations with Doug before the game about how it feels to lose and how we cannot win or play well all the time. Let him know that it's okay to lose, and encourage him that the more he plays something, the better he will get. Also, provide positive reinforcement, such as verbal praise, when Doug does handle a loss well.
3. Work with Doug on making his conversations or stories concise. Practice this skill with him, demonstrating or modeling how to tell a story that is to-the-point. First, tell a story that is long and drawn out. Then, tell him the same story in a brief and concise fashion to show him the difference. Before Doug tells stories,

give him a verbal reminder, like “Keep it brief,” for example. If Doug tells a long story, consider having him tell it again but only making the important points.

Praise Doug when he does a good job of this, especially when he does so independently.

4. Doug enjoys dancing and singing. Use these activities as reinforcement for a job well done, and provide lots of positive reinforcement when he makes behavioral improvements.

Case Summary – Doug

Doug, an 8-year-old, Caucasian male diagnosed with an autism spectrum disorder attended the 2008 Autism Summer Camp. An analysis of information provided by Doug’s caregivers and teachers indicated he struggled with paying attention, socializing and relating with peers, following multi-step verbal instructions, making eye contact, and demonstrating self-control. Using this information, a target behavior of Gazing was pursued for intervention during the eight-week summer camp. Graduate students then conducted a Functional Behavior Assessment and collected baseline data based upon this target behavior. Once antecedents and functions were determined, the graduate students developed a behavior intervention plan for Doug’s camp staff to address this problem area in his behavioral repertoire. After camp started and Doug was observed, two replacement behaviors were included into Doug’s behavior plan, as they were determined to be important behaviors for change. Those included maintaining eye contact during instruction for at least 15 seconds and initiating greetings with peers.

Doug's intervention plan included a number of preventative and supportive strategies that were designed to meet his specific needs. Overall, baseline and intervention data indicated Doug demonstrated a decrease in gazing, a decrease in maintaining eye contact, and an increase in initiating greetings during this eight-week summer camp. It is suspected that this camp program, based upon ABA methods and strategies, was effective overall in changing Doug's target behaviors. His gazing behavior was observed less frequently than expected based upon reports from his parents and teachers. It was suspected Doug engaged in gazing largely to avoid completing task demands, as this behavior occurred most often when he was given instructions. Because this type of avoidance behavior can be detrimental in the school setting and in situations in which Doug is expected to learn, any decrease in this behavior may be beneficial for Doug.

Doug demonstrated a deficit in his ability to maintain eye contact, a common behavior exhibited by children with an autism spectrum disorder. This was targeted for change during camp, particularly as it applied to his sustained attention toward instruction from teachers and other adults. Unfortunately, the data indicated a downward trend in this target over the course of camp. What is encouraging, however, is Doug was able to maintain higher rates of eye contact during several weeks of camp. Because he demonstrated lower rates during three of the last four weeks, it might be speculated that his level of interest and engagement decreased as the novelty of camp diminished.

Lastly, and perhaps most encouraging, was the data for initiating greetings. The data demonstrated a fairly steep upward trend in the rate at which he initiated greetings

with peers. Given the social challenges faced by children with Asperger's, the improvement Doug exhibited is important. It is speculated that he excelled in this setting, because his level of confidence was heightened at camp. Children with Asperger's often have a strong desire to make friends but are lacking the skills to do so successfully. In this setting, with other children with autism spectrum disorders, it is hypothesized Doug felt more comfortable to take risks. In addition, he was provided with large amounts of reinforcement for demonstrating these behaviors and also was supported with preventative strategies. It could be concluded that this camp program, based upon ABA methods and strategies, was effective in decreasing maladaptive behaviors and increasing adaptive skills demonstrated by Doug.

Case Study 4: Calvin

Demographic Information

Calvin was 7 years, 7 months of age at the time of the 2008 Autism Camp and was identified by his parent(s) as having a Moderate Autism Disorder. He is Caucasian, and his parents denied he exhibited self-injurious behavior or had a psychotic disorder, brain damage, or physical limitations that would prevent him from participating in camp activities at the time of the 2008 Autism Camp. They reported he engaged in some verbal speech but also utilized gestures and sign language to communicate. In the school setting, he qualified for special education services under the disability categories of autism spectrum disorder and communication disorder. Both of Calvin's parents reported they had completed four or more years of college. Calvin was placed in Tribe Three.

Background Information

During the 2007 – 2008 school year, Calvin received the majority of his educational services in a separate special education classroom, though his Individualized Education Plan (IEP) indicated a goal was for him to participate in the general education setting in increasing increments. It was noted that he received occupational therapy, speech, and alternate transportation services as well. The following areas of concern/need were indicated in Calvin's school records: antisocial behavior, rule-following, distractibility, organization (i.e., confused, problems following directions or a sequence), relationships with teachers or other adults, relations with peers, withdrawal, rigid or inflexible behavior, unusual reactions to normal stress, safety/following directions, transitions, fine motor skills, and communication skills. Calvin's teacher described him as "a visual learner" who did well with picture cues and schedules. She

indicated he was interested in cars and enjoyed working on the computer. His teacher identified the following as areas in which she would like to see him improve: sharing toys, waiting his turn in a game, and sustaining his attention in an adult-led group setting. A psychoeducational evaluation indicated Calvin's achievement skills in all academic areas (e.g., reading, math, written language) were well-below average, falling within the mild to moderate mentally disabled range. Calvin's parents reported he engaged in hand flapping when excited and biting or chewing on clothing.

Target Behaviors

Based upon an analysis of the information provided by Calvin's parents and teachers, including his most recent Individualized Education Plan (IEP), the following target behavior was determined for Calvin prior to the start of camp. Refusal to join group interactions: Calvin physically avoids group interaction and isolates himself from peers or adults by verbally refusing to join a group (i.e., "no"), walking away, or refusing to physically join a group of people.

Antecedents of Behavior

A functional behavior assessment (FBA) was conducted in which simple A-B-C (i.e., antecedent – behavior – consequence) data were collected during observations within the first two days of camp. Based upon this assessment, the following antecedents and functions of target behaviors were identified. Calvin's target behavior occurred when he was requested to join a group of peers or adults who were interacting socially.

Function of Behavior

The function of Calvin's target behavior appeared to be escape/avoidance from situations in which he might be required to engage in social interactions. This is likely due to his deficits in social skills.

Replacement Behaviors

Two functionally equivalent replacement behaviors were identified as missing or occurring infrequently in Calvin's behavioral repertoire. They were therefore taught directly and reinforced specifically throughout the camp experience.

1. Calvin will improve his socialization skills by maintaining a three-part conversation including a greeting (e.g., "Hello"), a question (e.g., "How are you?"), and a closing (e.g., "Goodbye").
2. Go to an activity when prompted.

Behavior Intervention Plan

Specific preventative (i.e., antecedent) and supportive intervention (i.e., consequent) strategies, based upon the results from his FBA, were developed for those involved in Calvin's treatment. Each counselor and teacher was trained in how to use these strategies and was familiar with his individualized behavior plan. The following strategies were implemented with Calvin throughout the eight-week camp.

Preventative strategies included the following:

1. Include Calvin in established social settings with verbal encouragement and physical proximity (e.g., "Calvin, let's walk over to the totem pole and see what the Choctaws are talking about. They seem excited about something!").
2. Show him the schedule before transitioning to each activity.

3. Ask Calvin if he would like to assist with something as you transition to new an activity/area (e.g., wagon, carry supplies, etc.) or hold hands with someone as he walks.
4. Use a timer for staying at an activity and present a contingency (e.g., “If you stay within the circle for three minutes, when the timer goes off you can have a break.”).

Intervention strategies included the following:

1. Positive reinforcement procedures:
 - a. Exaggerate verbal praise specifying the appropriate behavior (This can be used alone or paired with other reinforcers.). For example, say, “I am proud of the way you followed directions!” “I like the way you are doing your project!”
 - b. Provide a hole punch in Calvin’s behavior card (i.e., immediate reinforcer which is later coupled with a larger reinforcement at the end of each camp day) when he joins a group activity or maintains a three-part conversation.
 - c. Utilize Calvin’s interests as reinforcers – books, puzzles, jumping, swimming, shooting hoops, or running.
2. Refusal to join group interactions:
 - a. If Calvin will not join the group, use the prompt hierarchy. First provide a verbal prompt (i.e., “Calvin, you have 5 seconds to join the group”), then a gestural prompt if necessary (i.e., Use your hand to motion toward the activity), and lastly, physically guide him to the group and as needed for him to complete the task or activity. (DO NOT talk to him during this

time, except when providing the verbal prompt and praise. If assistance is needed, only the lead person should do the prompting.).

- b. Reinforce successive approximations (i.e., shaping) to the desired goal (Calvin independently joining and participating in group activities). First reinforce Calvin with verbal praise and/or a hole punch for making some movement toward the group (even just one step if needed with physical guidance). Then reinforce Calvin for actually walking closer to the group. Then reinforce him for joining the group, etc. As the weeks progress, require Calvin to exhibit more independent behavior in order to receive reinforcement.
3. Calvin will improve his social skills by engaging in a three-part conversation including a greeting, question, and closing.
 - a. Role play with Calvin about common social interactions that are likely to occur between him and other campers. Tell Calvin, “We are here at camp to make friends and learn about others. One way to do this is to start a conversation with someone.”
 - b. Practice the following with Calvin:
 - i. A greeting (e.g., “Hello,” “Hi,” or “What’s up?”).
 - ii. A prepared question (e.g., “How are you?” or “What did you do in swimming today?”).
 - iii. A closing (e.g., “Bye” or “See you later.”).
 - c. After role playing with Calvin, set up a situation for him to practice with another staff. Then identify a situation for Calvin to practice with a peer.

- d. Give Calvin reminders and/or cues (e.g., “What can you say to start a conversation?” or gesture with hands) as he attempts to complete conversations with peers or adults.
 - e. Help Calvin to identify skills to make and keep friends (e.g., have conversations, share toys, play together, ask questions about the other person, compliment his friends, etc.)
 - f. Provide reinforcement immediately after Calvin demonstrates one of these skills.
4. Go to/walk to activity.
 - a. When preparing to transition to a new activity or area, show Calvin the schedule, and establish a contingency for him walking independently (without physical prompting, but with supervision) to the next activity/area.
 - b. When possible, have one staff go ahead, and another staff follow behind Calvin. Then prompt him to walk to the staff person who is ahead and give them a high “5.” Praise and provide reinforcement upon completion.

Data Collection Procedures

Five graduate students under the supervision of a Board Certified Behavior Analyst (BCBA) and the Camp Director collected data for Calvin throughout the eight-week camp. As previously noted, the FBA for Calvin was conducted within the first two days of camp, utilizing a simple A-B-C method (i.e., antecedent – behavior – consequence). The behaviors of focus were those identified prior to the start of camp.

Once antecedents and functions were identified, an individualized behavior plan was developed for Calvin. Counselors learned the behavior plan and then implemented the interventions on the third day of camp. Starting on day three, Calvin was observed for approximately four hours throughout the morning academic time. Calvin was observed at least one day each week, and the same data collector generally observed him each week. To simplify data collection in this natural setting, all data collectors utilized a frequency recording data collection procedure. All target behaviors and replacement behaviors were observed during the same collection time for Calvin.

Data

All raw data were calculated and graphed by one graduate student. To obtain the occurrences per hour rates, the number of tally marks from the data collection forms were multiplied by 60 (i.e., 60 minutes in an hour), and then divided by minutes observed. If more than one observation period occurred during the course of a week, the average was obtained by adding occurrences per hour and then dividing by the number of observation periods.

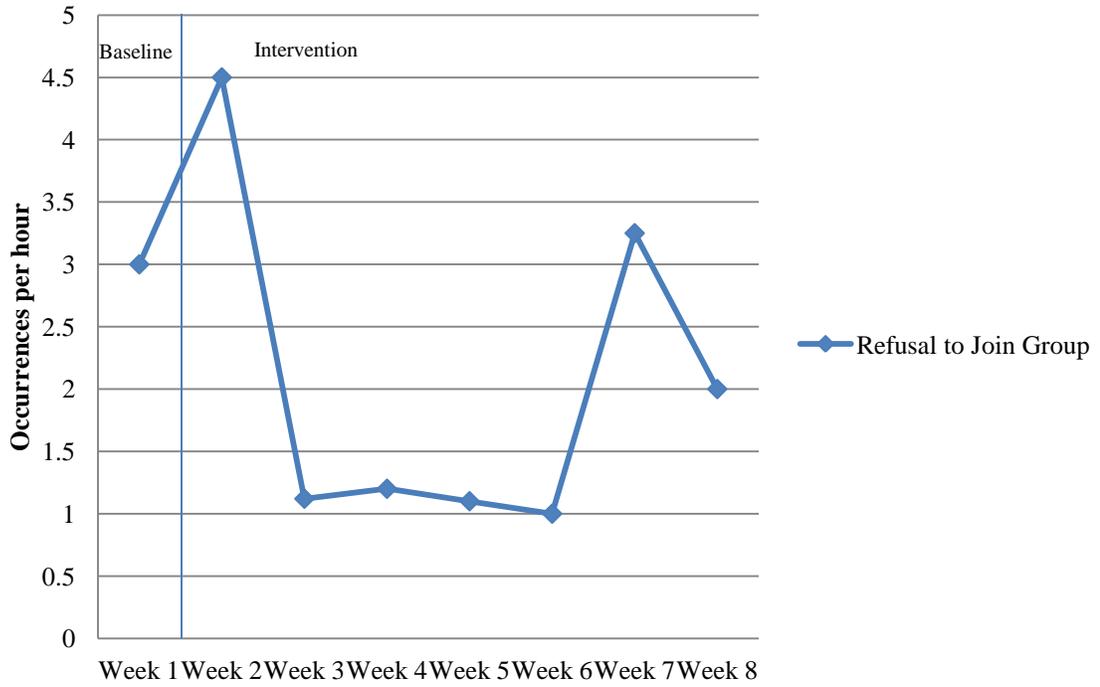


Figure 4.1 Baseline and intervention data of original target behavior for Participant 4, Calvin.

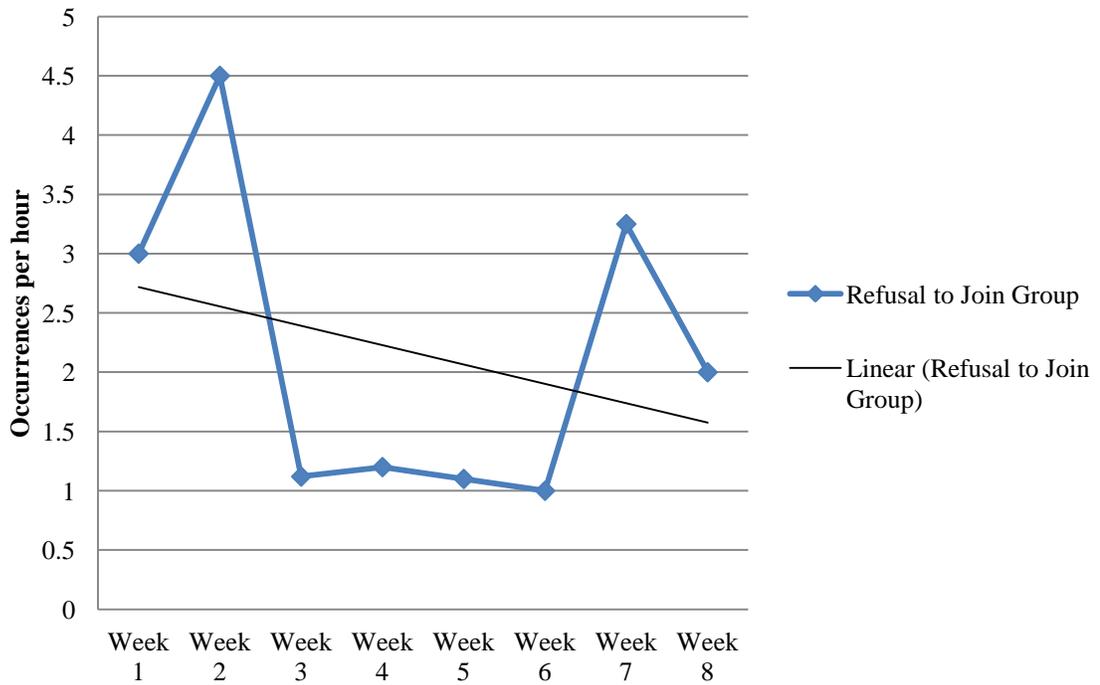


Figure 4.2 Refusal to join group data with trendline for Participant 4, Calvin.

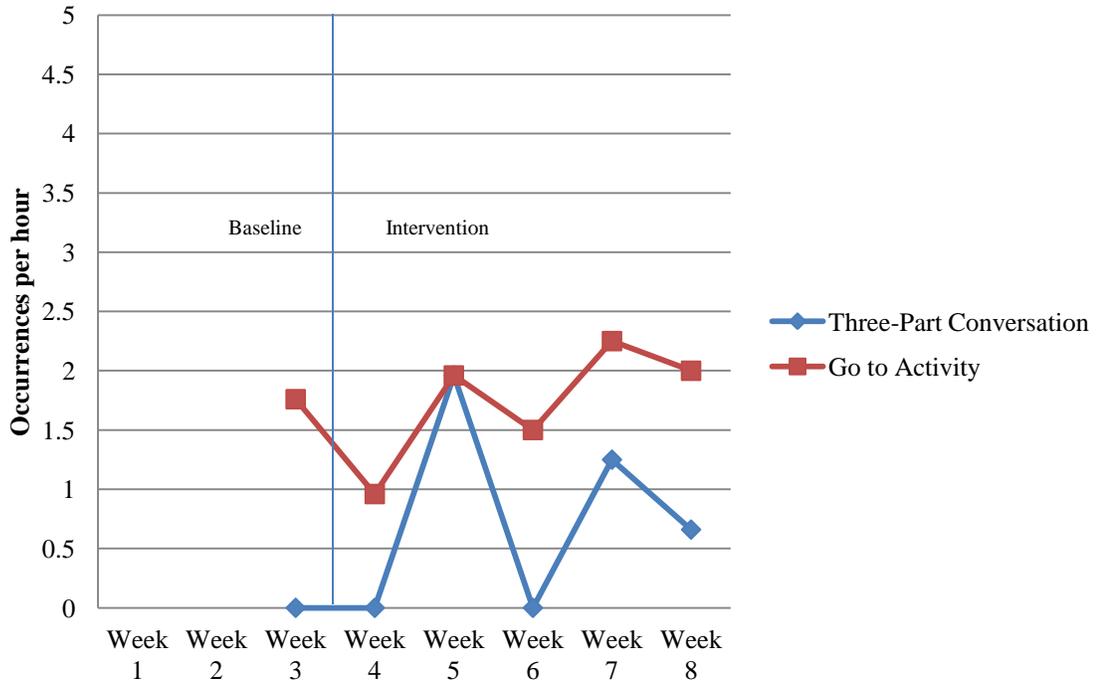


Figure 4.3 Baseline and intervention data of replacement behaviors for Participant 4, Calvin.

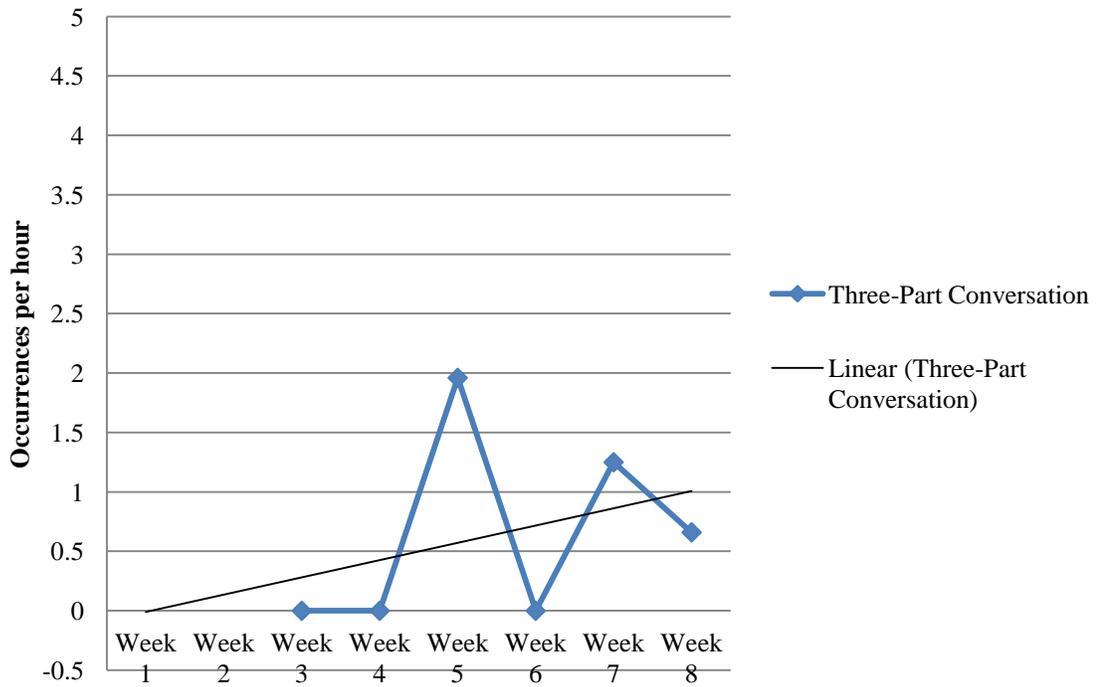


Figure 4.4 Three-part conversation data with trendline for Participant 4, Calvin.

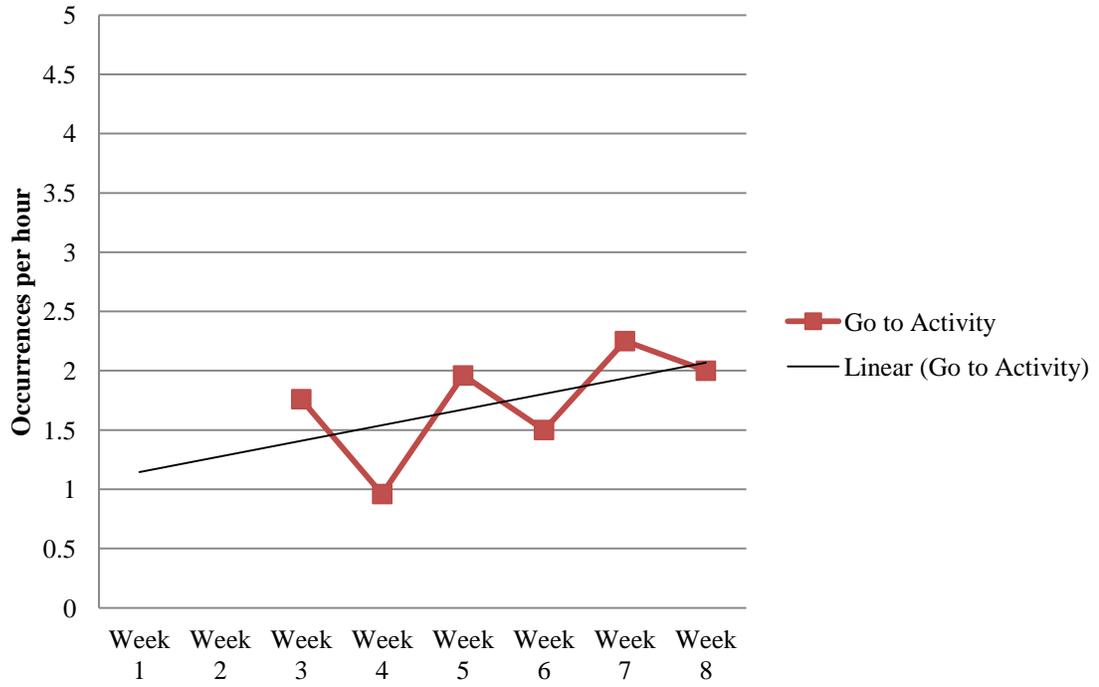


Figure 4.5 Go to Activity data with trendline for Participant 4, Calvin.

Results

Figure 4.1 shows a graph of the behavioral data collected on Calvin's originally identified target behavior, which was Refusal to Join a Group. Baseline data were collected during the first two days of camp with intervention data collected from that point forward. Figure 4.2 shows Calvin's Refusal behavior with a trendline, which demonstrates a downward trend, indicating that this behavior decreased over the course of the eight-week camp. Based upon this trend, it could be predicted Calvin's targeted behavior would continue to decrease to a near-zero level if his intervention plan were sustained in this setting.

Figure 4.3 shows a graph of Calvin's replacement behaviors, which were identified as occurring infrequently in his behavioral repertoire. They were determined after the start of camp and baseline data were therefore collected during Week Three, with intervention data collection after that point. Figure 4.4 shows a graph of the data regarding his engagement in three-part conversations with a trendline. These data demonstrated an upward trend in this important social skill, over the course of the eight-week camp. Lastly, Figure 4.5 shows the data tracking Calvin's progress in going to an activity. The trendline indicates an upward trend for this replacement behavior as well.

Discussion of Results Related to Calvin

Overall, the behavioral results for Calvin were very encouraging. He demonstrated a decrease in his refusal to join group activities, an increase in his engagement in three-part conversations, and an increase in his compliance of going to an activity. Each of these behaviors changed in the anticipated and desired direction, with change occurring at a promising rate.

Calvin's target behavior of refusing to join a group was defined by his avoidance of group interaction by verbally or physically refusing to join a group or walking away. His intervention plan included strategies, such as verbally or physically prompting him to join groups, reinforcing successive approximations to the goal, and reinforcement of him joining groups. The data for this target were interesting as they peaked significantly during the second week of camp, possibly when the task demands given to Calvin were increased. During the first week, as counselors and teachers got to know the campers and observed their behaviors, it might be speculated task demands were lower. However, Calvin's refusal behavior went down to its lowest frequency during the middle four weeks of camp. Perhaps he settled into the routine and became more comfortable with peers and staff with whom he was interacting. During the last two weeks, the frequency of this behavior elevated. As children with autism often struggle with transitions, it is hypothesized Calvin's behavior increased as he anticipated the end of camp. Nonetheless, the data for this behavior demonstrated a downward trend over time, indicating Calvin's intervention plan was successful in the camp setting.

Both of Calvin's replacement behaviors, which were important for his social skill acquisition and increased independence, were found to demonstrate an upward trend. Calvin was able to participate in three-part conversations (i.e., expressing a greeting, question, and closing) at camp, a behavior that increased over time. This was an encouraging finding, particularly because Calvin did not display large amounts of expressive speech. With prompting, role-play, practice, and structured opportunities with peers, Calvin was able to demonstrate this behavior at an increasing rate.

Similarly, Calvin's compliance in going to activities at camp, increased over the course of the eight weeks. The trend in his data increased at a steady rate, and it appeared as though Calvin became more interested in camp and interacting with his peers as camp progressed. It is speculated his success in this area was related to the camp setting and curriculum, his increasing familiarity with peers and staff, and the ABA strategies utilized.

Based upon his behavior at camp and his response to the interventions used, the following recommendations were provided to Calvin's caregivers at the end of camp:

1. Calvin would benefit from a specific picture schedule to follow throughout his day.
2. Reinforce Calvin when he has followed directions.
3. Put in place the expectations for a line leader system.
4. Give Calvin other leader jobs (e.g., carrying a back pack, thermoses, etc).

Case Summary – Calvin

Calvin, a 7-year-old, Caucasian male diagnosed with an autism spectrum disorder attended the 2008 Autism Summer Camp. An analysis of information provided by Calvin's caregivers and teachers indicated he struggled with behaviors such as avoiding peer interaction, ignoring rules and directions, withdrawing from others, and transitions. It was reported Calvin used both communicative speech and gestures or sign language to communicate. School records indicated Calvin's achievement skills in all academic areas fell within the range of mild to moderate mental disability. Using this information, his refusal to join group activities, was identified as a problematic behavior that could be

targeted for intervention during the eight-week summer camp. Graduate students then conducted a Functional Behavior Assessment and collected baseline data based upon this target behavior. Once antecedents and functions were determined, the graduate students developed a behavior intervention plan for Calvin's camp staff to address these problem areas in his behavioral repertoire. After camp started, two replacement behaviors were included into Calvin's behavior plan, as they were determined to be important behaviors for change. Those included increasing social interaction through three-part conversations and increasing his compliance in going to an activity.

Baseline and intervention data indicated Calvin demonstrated a decrease in his refusal to join group activities, an increase in three-part conversations, and an increase in his compliance of going to an activity. It appeared as though camp was a positive experience for Calvin, and it is postulated that the outdoor setting had positive effects on his behavior change. Calvin may have been more interested in the disguised curriculum and activities offered at camp. He may have been less likely to avoid group interactions as he became more familiar with his peers, all of whom also demonstrated social deficits and autistic behaviors. Calvin also may have benefited from the small group setting of camp and high staff to camper ratio. His intervention plan required staff to verbally and physically prompt him (when needed) if he refused to join group activities, and staff provided large amounts of reinforcement when he engaged in this behavior. Calvin's level of motivation may have been heightened at camp due to the reinforcement available, which included swimming and other outdoor activities.

It was quickly noted, during the first week of camp, that Calvin preferred to be the leader of the group (e.g., taking the wagon and walking 10 to 15 feet in front of counselors and campers). Camp staff developed several strategies to allow others to pull the wagon and to encourage Calvin to be the “caboose” of the wagon at times. These strategies generally resulted in appropriate language from Calvin, such as, “I am pushing the wagon” and “I want to pull the wagon.” At times, however, Calvin was insistent about pulling the wagon and camp staff continued to address this behavior throughout camp. Staff eventually took digital photos of the campers and rotated through them for each transition of the camp day. This gave each camper a chance to lead the group and provided Calvin with a visual aid to show him when he would have a turn to lead the tribe.

Calvin’s identified replacement behaviors, engaging in three-part conversations and going to an activity, also increased in the camp setting. Again, it is speculated that his familiarity with similarly disabled peers, his interest in the camp activities in general, and the treatment provided by camp staff (i.e., role playing, structured opportunities, reinforcement, etc.) contributed to his success in this area.

Overall, the camp was beneficial for Calvin, and it could be concluded that this camp program, based upon ABA methods and strategies, was effective in decreasing maladaptive behaviors and increasing prosocial skills for Calvin. The ABA strategies that were used, including positive reinforcement, antecedent interventions, shaping, and prompting were developed and implemented specifically to meet Calvin’s individual needs. The interventions chosen were based on an analysis of information provided by

Calvin's parents and teachers and a Functional Behavior Assessment conducted during the first week of camp, which probably made them more effective in addressing his needs because they identified the probable functions of his target behaviors.

Case Study 5: Carl

Demographic Information

Carl was 7 years, 5 months of age at the time of the 2008 Autism Camp and was identified by his parent(s) as having a Mild Autism Disorder. Carl qualified for special education services under the disability categories of autism spectrum disorder and communication disorder in the school setting. He is Caucasian, and his parents denied he had non-communicative speech, self-injurious behavior, physical limitations that would prevent him from participating in camp activities, a psychotic disorder, or brain damage at the time of the 2008 Autism Camp. Carl's parents indicated his father attained his high school diploma or GED, while his mother completed one to three years of college. Carl was placed in Tribe Three.

Background Information

School records indicated Carl received the majority of his educational services in a special education classroom, but participated in the general education setting for language arts, music, art, and physical education. It was noted he received occupational therapy, speech services, and alternate transportation as well. School records indicated the following areas of need: social skills, math, articulation, expressive language, and receptive language. School records indicated Carl was interested in roller skating, soccer, Boy Scouts, and Webkins on the computer. Carl's teacher indicated he needed to work on gaining social skills and better frustration tolerance. A psychoeducational evaluation indicated Carl's cognitive ability fell within the Borderline range, while his achievement skills ranged from low average to average.

Target Behaviors

Based upon an analysis of the information provided by Carl's parents and teachers, including his most recent Individualized Education Plan (IEP), a target behavior of Verbal outbursts was determined for Carl prior to the start of camp. This was defined in the following way: Carl yells, increases the volume of his voice, uses an angry tone (voice inflection goes up), and speaks more rapidly. During the first week of camp, it was determined Carl engages in physical outbursts as well, which were defined as: stomping his feet, hitting objects, and throwing objects.

Antecedents of Behavior

A functional behavior assessment (FBA) was conducted in which simple A-B-C (i.e., antecedent – behavior – consequence) data were collected during observations within the first two days of camp. Based upon this assessment, Carl's target behaviors occurred when he lost at a game or did not get his way (e.g., preferred activity, line leader, etc.). He also got upset with himself when he did not do something correctly or perfectly. Staff noted his physical outbursts typically followed a verbal outburst if Carl was unable to calm down and redirect.

Functions of Behavior

Both verbal and physical outbursts seemed to occur in an attempt to escape or avoid an undesired situation, task, or activity. Carl struggled to demonstrate coping skills when he perceived himself as having failed at something and often demonstrated the target behaviors after situations in which he perceived a failure. The behaviors prevented him from participating in subsequent activities. It appeared as though the behaviors provided an escape from feelings of incompetence. In addition, verbal outbursts occurred

when he did not get his way, indicating that their function was access to preferred activities or tangibles.

Replacement Behaviors

Two functionally equivalent replacement behaviors/social skills were identified as missing or occurring infrequently in Carl's behavioral repertoire. They were therefore taught directly and reinforced specifically throughout the camp experience.

1. Congratulate another camper on winning a game or activity.
2. Take deep breaths to calm down.
3. Appropriately remove himself from a frustrating situation to calm down (e.g., going to the swing with permission from an adult).

Behavior Intervention Plan

Specific preventative (i.e., antecedent) and supportive intervention (i.e., consequent) strategies, based upon the results from his FBA, were developed for those involved in Carl's treatment. Each counselor and teacher was trained in how to use these strategies and was familiar with his individualized behavior plan. The following strategies were implemented with Carl throughout the eight-week camp.

Preventative strategies included the following:

1. Use clear, concise instructions.
2. Give instructions in a calm, pleasant voice.
3. Let Carl know ahead of time that you are available to answer his questions.
4. Emphasize group goals and accomplishments when participating in competitive activities (e.g., "You really helped your group!!" or "Thanks for helping the group!")

5. Emphasize individual effort and individual progress rather than wining (“You really tried hard on that!” or “Good effort!”)
6. Preventatively allow Carl to remove himself from a frustrating situation to calm down (e.g., going to a swing with adult permission) before he escalates to a physical outburst (look for and anticipate situations in which Carl may lose or become frustrated). Prompt him to take a break.
7. Whenever possible, give Carl choices during the day. For example, he may be able to choose what activities he would like to complete, how he would like to complete them, or in what order he would like to do them.

Intervention strategies included the following:

1. Positive reinforcement procedures:
 - a. Exaggerate verbal praise specifying the appropriate behavior (This can be used alone or paired with other reinforcers.). For example, say, “I am proud of the way you followed directions!” or “I like the way you are doing your project!”
 - b. Provide a hole punch in Carl’s behavior card (i.e., immediate reinforcer which is later coupled with a larger reinforcement at the end of each camp day) when he handles disappointment, failure, or a non-preferred activity without having a verbal or physical outburst, congratulates a peer, asks appropriately to remove himself when frustrated, or takes deep breaths to calm down.
 - c. Utilize Carl’s preferences, including animals and the outdoors. He also likes to wave a stick in front of his face. This is reinforcing for him. He

likes to balance on a ball or complete activities such as swinging at the playground.

- d. Immediately reinforce Carl for good tolerance of frustration.
 - e. Immediately reinforce Carl for demonstrating good sportsmanship such as congratulating another camper on a victory.
2. Congratulating another camper on winning an activity or game:
 - a. Model and prompt Carl to congratulate others.
 - b. Provide immediate reinforcement.
 3. Remove himself from a frustrating situation to calm down (e.g., going to a swing with permission).
 - a. Provide graduated prompts before and during frustration.
 - b. Provide a hole punch on his behavior card.

Data Collection Procedures

Five graduate students under the supervision of a Board Certified Behavior Analyst (BCBA) and the Camp Director collected data for Carl throughout the eight-week camp. As previously noted, the FBA for Carl was conducted within the first two days of camp, utilizing a simple A-B-C method (i.e., antecedent – behavior – consequence). The behaviors of focus were those identified prior to the start of camp. Once antecedents and functions were identified, an individualized behavior plan was developed for Carl. Counselors learned the behavior plan and then implemented the interventions on the third day of camp. Starting on day three, Carl was observed for approximately four hours throughout the morning academic time. Carl was observed at least one day each week, and the same data collector generally observed him each week.

To simplify data collection in this natural setting, all data collectors utilized a frequency recording data collection procedure. All target behaviors and replacement behaviors were observed during the same collection time for Carl.

Data

All raw data were calculated and graphed by one graduate student. To obtain the occurrences per hour rates, the number of tally marks from the data collection forms were multiplied by 60 (i.e., 60 minutes in an hour), and then divided by minutes observed. If more than one observation period occurred during the course of a week, the average was obtained by adding occurrences per hour and then dividing by the number of observation periods.

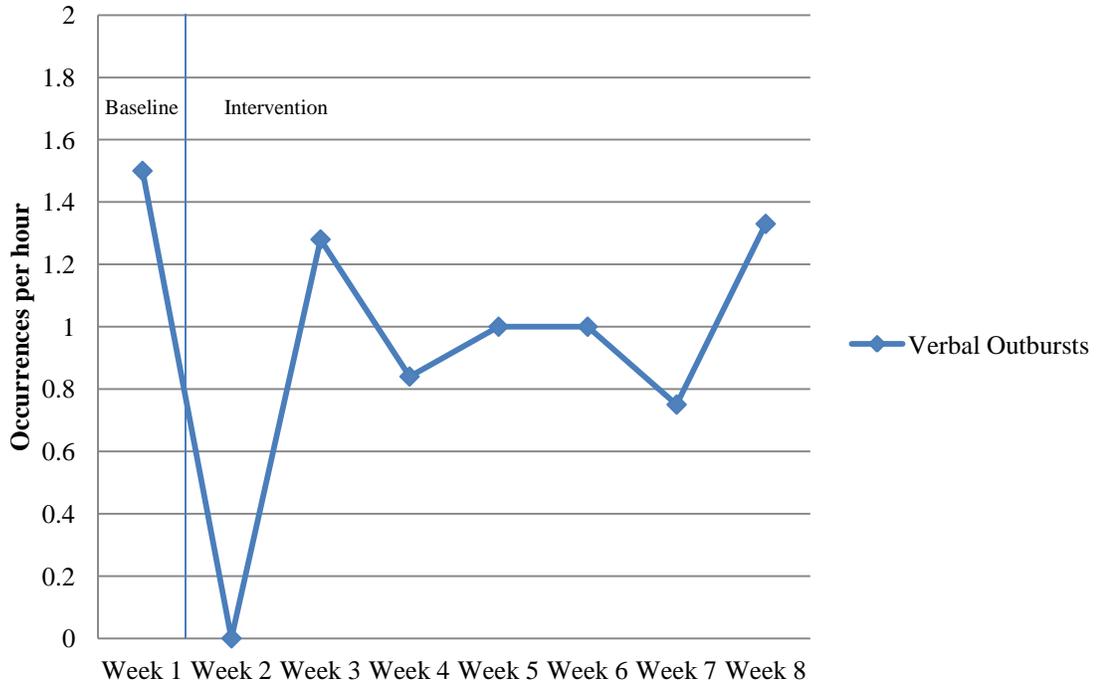


Figure 5.1 Baseline and intervention data of original target behavior for Participant 5, Carl.

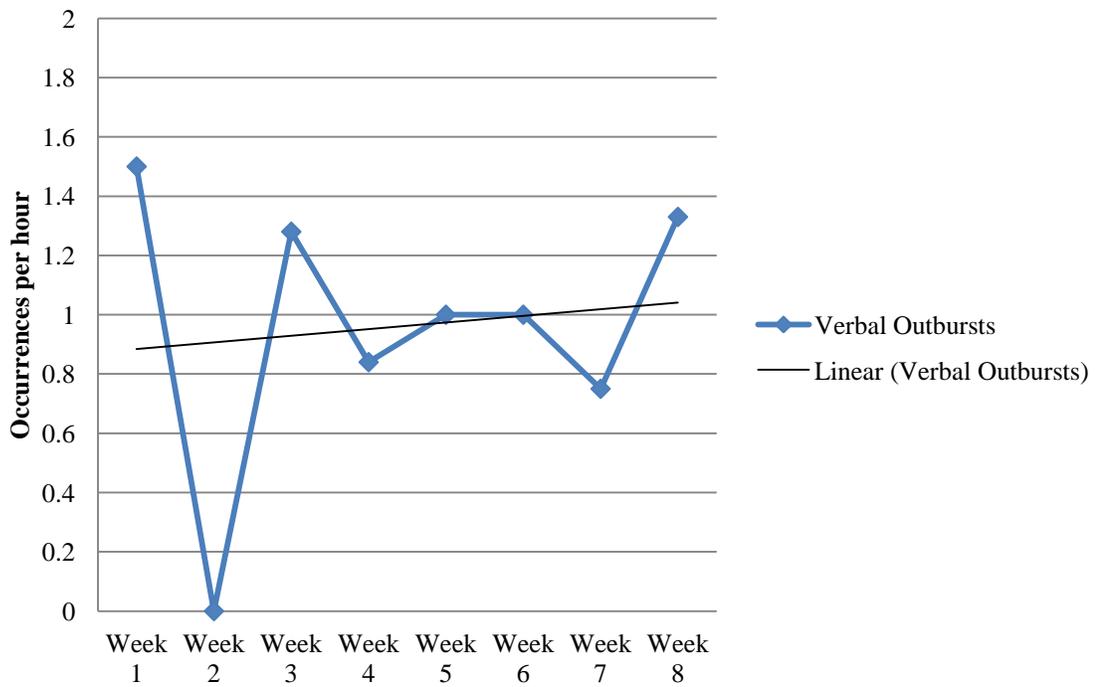


Figure 5.2 Verbal Outbursts data with trendline for Participant 5, Carl.

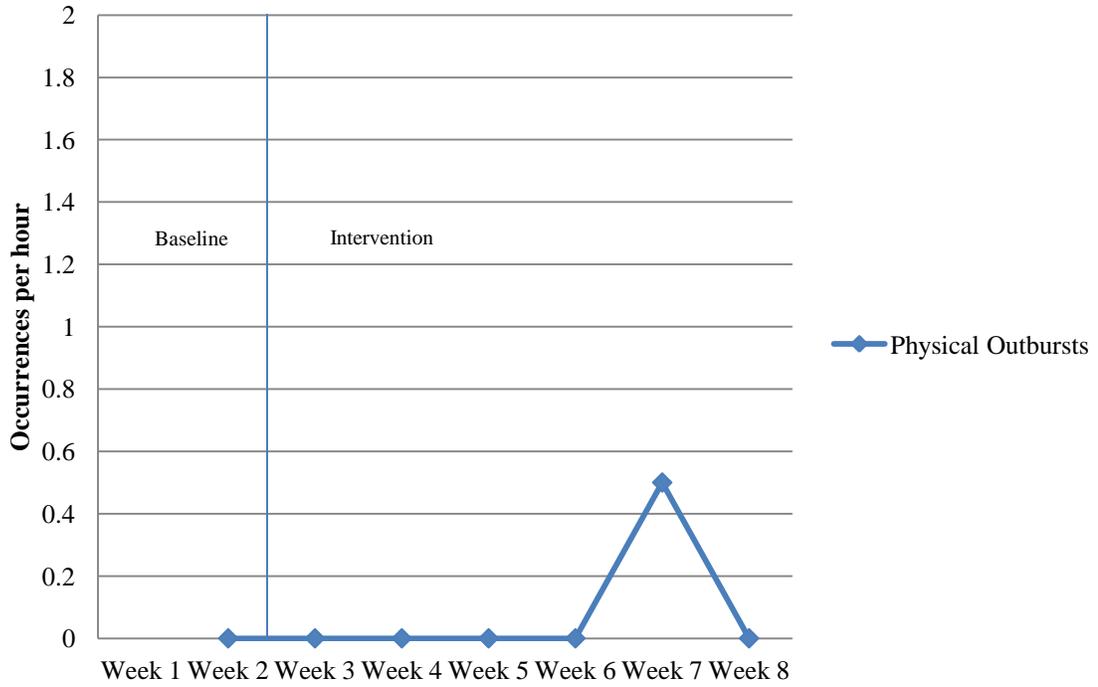


Figure 5.3 Baseline and intervention data of added target behavior for Participant 5, Carl.

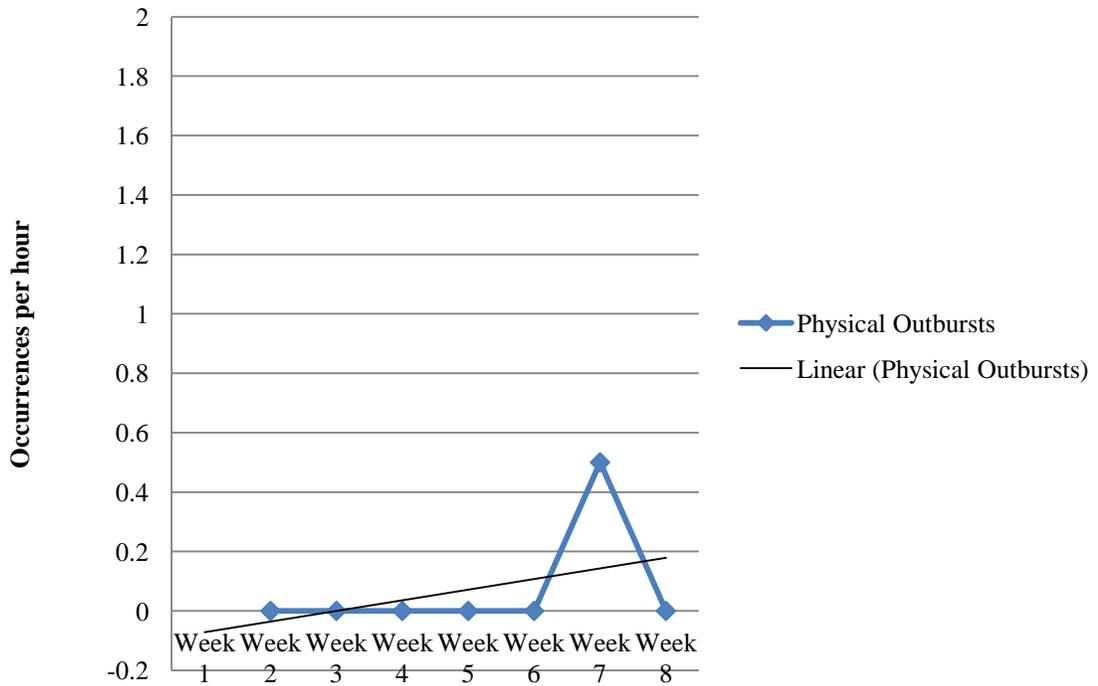


Figure 5.4 Physical Outbursts data with trendline for Participant 5, Carl.

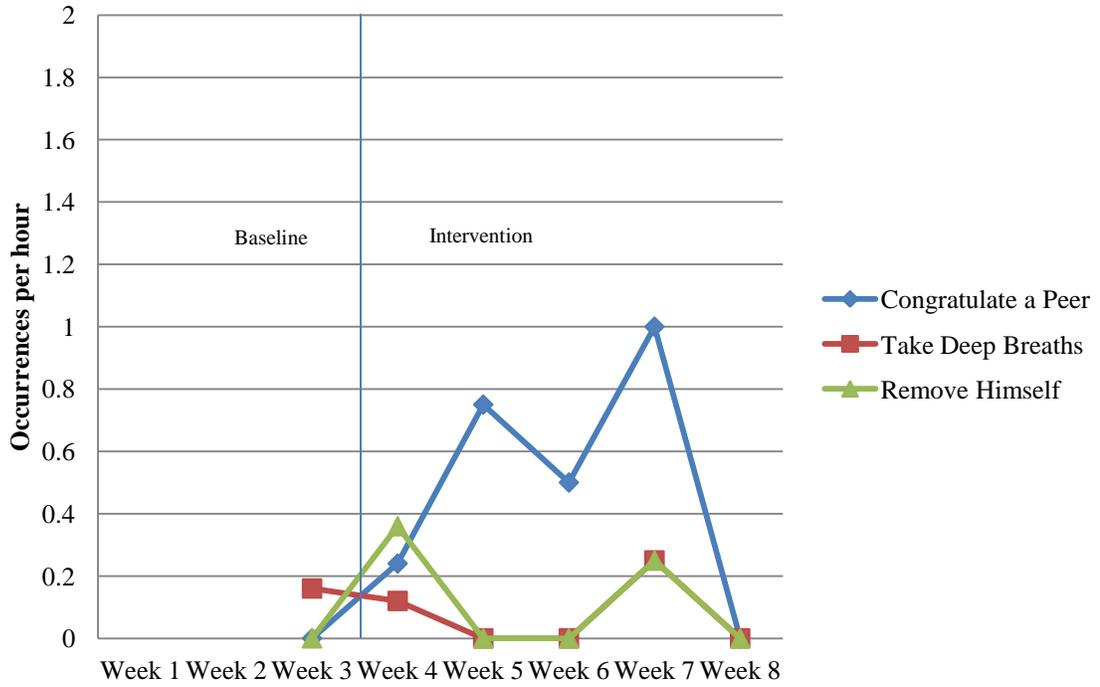


Figure 5.5 Baseline and intervention data of replacement behaviors for Participant 5, Carl.

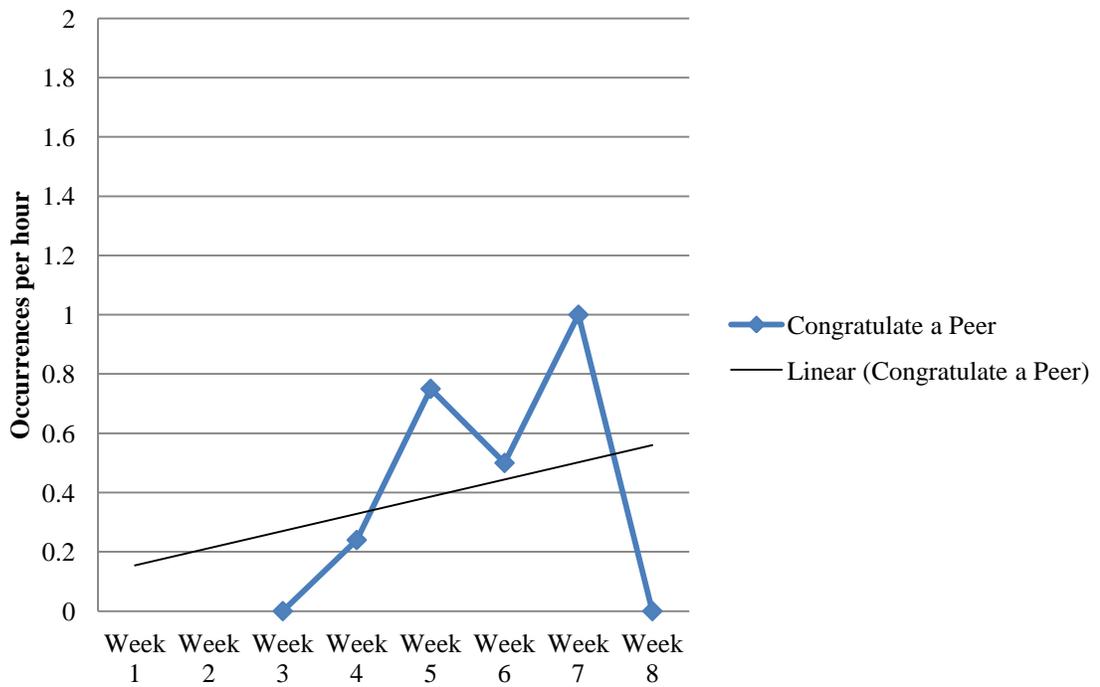


Figure 5.6 Congratulate a Peer data with trendline for Participant 5, Carl.

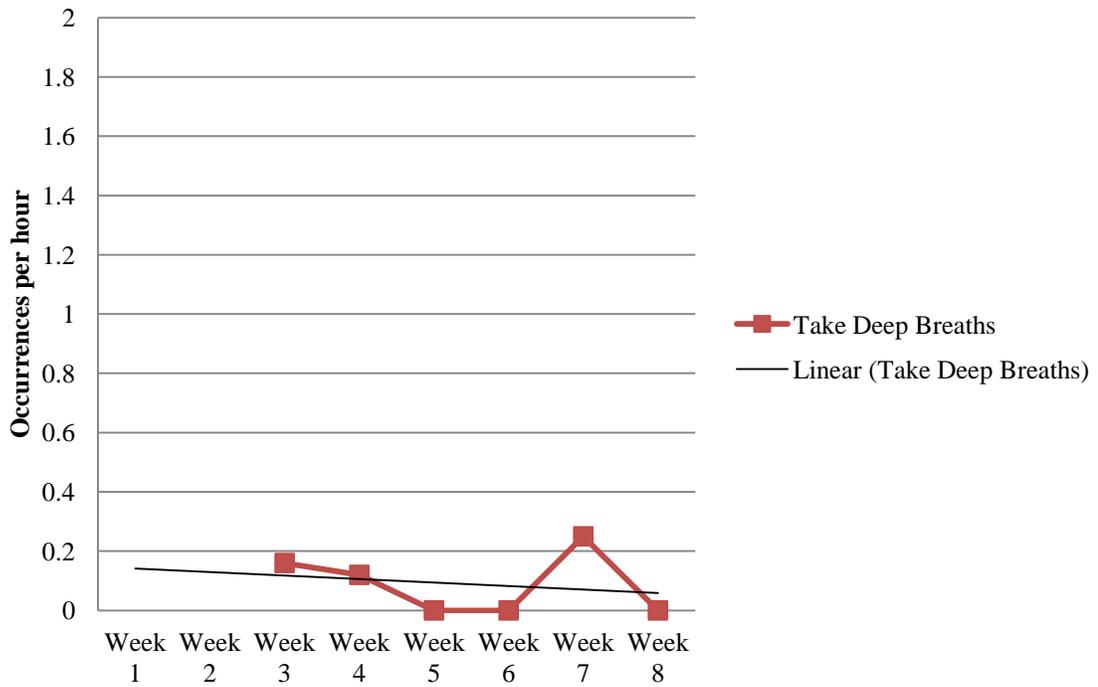


Figure 5.7 Take Deep Breaths data with trendline for Participant 5, Carl.

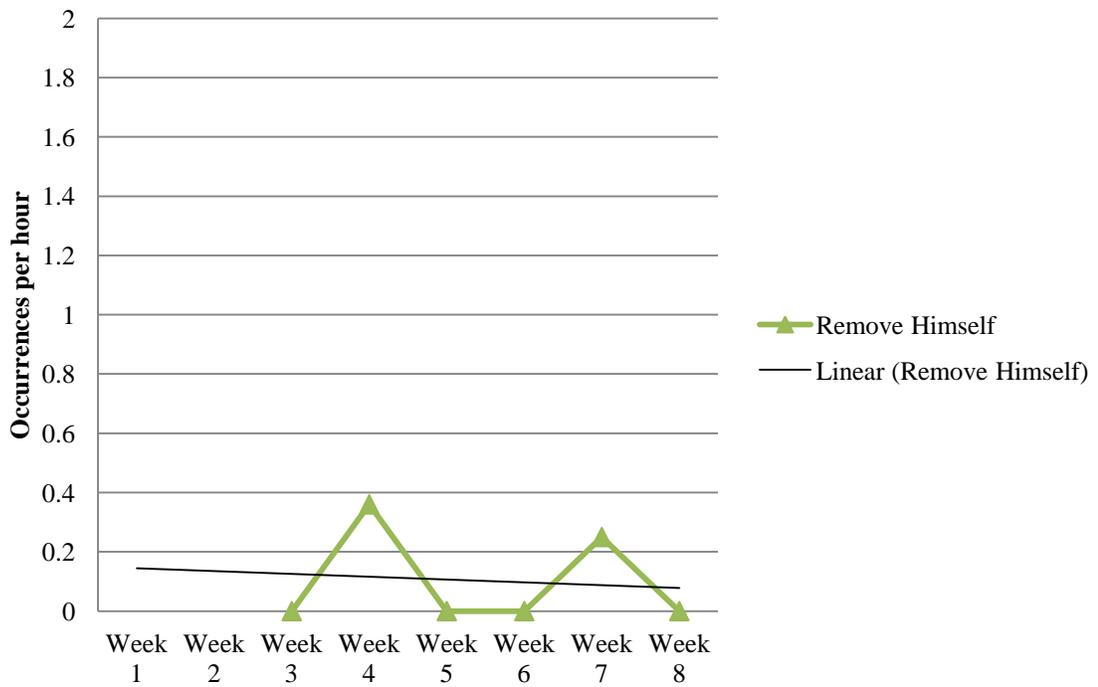


Figure 5.8 Remove Himself data with trendline for Participant 5, Carl.

Results

Figure 5.1 shows a graph of the behavioral data collected on Carl's originally identified target behavior, verbal outbursts. Verbal outbursts were defined in the following way: Carl yelled, increased the volume of his voice, used an angry tone (voice inflection goes up), and spoke more rapidly. Baseline data were collected during the first two days of camp with intervention data collected from that point forward. Figure 5.2 shows the data tracking Carl's verbal outbursts with a trendline, representing the upward slope of this behavior, which would indicate that his verbal outbursts increased slightly over the course of the eight-week camp.

Figure 5.3 shows a graph of the data collected on Carl's added target behavior, physical outbursts, which were defined as stomping his feet, hitting objects, and throwing objects. Staff indicated physical outbursts generally followed verbal outbursts that did not deescalate. The downward trendline depicted in Figure 5.4, indicates Carl's physical outbursts increased in frequency over the course of this summer camp. Other possible conclusions will be considered in the following discussion section.

Figure 5.5 shows a graph of the behavioral data collected on Carl's replacement behaviors, which were observed from Week Three, when baseline data were collected, through the end of camp. These behaviors included congratulating a peer, taking deep breaths when frustrated, and removing himself when escalated. Figure 5.6 includes the data collected when Carl congratulated a peer, along with a trendline, which demonstrates an upward trend. Figure 5.7 and 5.8 both demonstrate a slight downward trend in the

other replacement behaviors, taking deep breaths and appropriately removing himself when frustrated.

Discussion of Results Related to Carl

Overall, Carl's data indicated both positive and negative results. His use of verbal outbursts appeared to increase over time, however, these data may have been slightly skewed by Week Two in which no verbal outbursts were observed. If the data point representing Week Two were removed from the set, a downward trend would be depicted, as Week Two was somewhat of an outlier. Furthermore, Carl demonstrated the highest rate of verbal outbursts during the baseline phase of data collection and showed much lower rates during the fourth through seventh weeks of camp. It could be speculated he exhibited a higher rate of verbal outbursts on the last week as children with autism spectrum disorders often struggle with transitions. It is possible Carl's behavior increased again as he anticipated for the end of camp and a change to his daily routine. All variables considered, it appeared as though Carl did in fact make progress in his inappropriate verbal responses to frustration. It is unknown why no occurrences were observed on Week Two, but he appeared to benefit from the intervention plan created for him. Several strategies, both antecedent and consequent, were utilized to manage this behavior. Camp staff emphasized group goals and individual accomplishments during competitive activities, which were likely to precipitate Carl's outbursts. They prompted Carl to take deep breaths or a break when frustrated, teaching him to manage his frustration by focusing on his physical responses or removing himself to avoid escalation. They also provided large amounts of positive reinforcement for appropriate frustration tolerance and good sportsmanship.

Similarly, the data recording Carl's physical outbursts demonstrated an upward trend, which would indicate he exhibited more physical outbursts over the course of camp. However, physical outbursts were added as a target behavior during the second week of camp because they were observed by staff to occur relatively frequently during Week One. No frequency data on this behavior were collected during Week One. Once data collection started in Week Two, physical outbursts were rarely observed. In fact, during data observation periods, physical outbursts were only recorded on one occasion during Week Seven. The upward trend, therefore, is not indicative of an increase in this behavior over time, but rather it represents the one occurrence that was observed toward the end of camp. It could be hypothesized Carl engaged in a higher rate of physical outbursts the first week of camp as he adjusted to this new setting, though there is no official data to demonstrate this possibility. It also could be postulated Carl's intervention plan may have been effective in addressing his verbal outbursts, as physical outbursts were more likely to occur after a verbal outburst when Carl could not calm down. The lack of physical outbursts may indicate his verbal outbursts were well managed during camp.

Figure 5.5, presents the data recording Carl's replacement behaviors and social skills of congratulating a peer, taking deep breaths when frustrated, and (appropriately) removing himself when frustrated. In Figure 5.6, an upward trend is demonstrated with regard to Carl's congratulating peers. This behavior was chosen both to encourage positive social interactions and to address Carl's difficulty handling losses or perceived failures during competitive activities. Carl was encouraged to congratulate his peers who

had done well or had won games at camp. Staff modeled these behaviors in front of Carl and prompted him to engage in similar behaviors. Carl also was reinforced immediately after demonstrating this behavior. The upward trend in Figure 5.6 would indicate Carl congratulated his peers more often over the eight weeks of camp, an encouraging finding. For children with autism spectrum disorders, many social and communicative behaviors have to be made overt because they do not notice or understand many social cues or “rules.” It is speculated Carl was more aware of opportunities to congratulate peers in part because his staff pointed them out. It also might be reasoned that Carl may have demonstrated higher rates of social behavior (demonstrated by congratulating peers) simply because of the overall camp setting. Because this is a deficit area for children with autism spectrum disorders, camp staff made efforts to encourage social interaction, to structure social opportunities, and to reinforce social skills. In this type of environment, alongside other children with social deficits, Carl may have been more comfortable practicing social skills, and he may have found it easier to make friends.

Figures 5.7 and 5.8 depicted the other replacement behaviors, which were a focus of camp – taking deep breaths and removing himself when frustrated. Graphs of the data indicated slight downward trends in both of these behaviors, however, it might be speculated that he experienced less frustration as camp progressed. When data from the second week is removed, we see a downward trend in verbal outbursts as well, which might indicate he experienced less frustration as he adjusted to camp or that he managed his frustration better in the camp setting. It is therefore possible that he had less of a need to utilize the coping skills if taking deep breaths or removing himself. However, it is

certainly possible that the correct antecedents and functions of Carl's behavior were not identified, in which case, his intervention plan may not have adequately addressed his needs. If inaccurate functions were identified, then the selected replacement behaviors would probably not have been effective either, perhaps resulting in a lower frequency of the replacements.

During the course of camp, other problematic behaviors emerged and were identified as future goals for Carl. Based upon his behavior at camp and his response to the interventions used, the following recommendations were provided to Carl's caregivers at the end of camp:

1. Review established steps for calming down with Carl prior to an anger incident (i.e., take deep breaths, tell an adult what is wrong, ask to take a break, etc.).
Include a visual picture or chart to review with him. Practice the steps as a preventive measure so when Carl feels angry and out of control, he has a familiar sequence he can use with assistance in calming down.
2. Use a visual picture cue, hand sign or key word, when Carl is becoming upset.
This allows Carl a moment to stop and think of his options.
3. Write a social story with Carl after an incident occurs and read the social story with Carl prior to the situation occurring again.
4. It was very soothing for Carl to wave a stick in front of his face. In home and community settings, it might be helpful to provide Carl with a more suitable fidget. Alternatively, his family could reduce the size of the stick daily until it eventually fits in Carl's pocket.

5. Establish rules for using the stick (or another fidget), such as keeping it in a designated place and using it only during certain time periods. Carl did not demonstrate any dangerous behavior with his stick or use it to harm another camper; however, this should be monitored to ensure the safety of other children.

Case Summary – Carl

Carl, a 7-year-old, Caucasian male diagnosed with an autism spectrum disorder attended the 2008 Autism Summer Camp. An analysis of information provided by Carl's caregivers and teachers indicated he struggled with social skills and frustration tolerance. Using this information, a target behavior of verbal outbursts was pursued for intervention during the eight-week summer camp. Graduate students then conducted a Functional Behavior Assessment and collected baseline data based upon this target behavior. Once antecedents and functions were determined, the graduate students developed a behavior intervention plan for Carl's camp staff to address this problem area in his behavioral repertoire. After camp started and Carl was observed, another target behavior of physical outbursts along with three replacement behaviors were included into Carl's behavior plan, as they were determined to be important behaviors for change. Those included congratulating peers, taking deep breaths when frustrated, and removing himself when escalated.

Carl's intervention plan included a number of preventative and supportive strategies designed to meet his specific needs and were based on ABA principles. Overall, baseline and intervention data indicated a decrease in verbal outbursts, however, upon further inspection, it was noted Carl demonstrated zero verbal outbursts during the

observation period of Week Two. This data point skewed the graph, and when removed, the remaining data represent a downward slope. This would indicate Carl's verbal outbursts decreased in general over the course of camp, and it is unknown why there were no occurrences observed during the second week. A number of strategies were specifically used to address Carl's verbal outbursts. Camp staff emphasized group goals and individual accomplishments during competitive activities, which were likely to precipitate Carl's outbursts. They prompted Carl to take deep breaths or a break when frustrated, teaching him to manage his frustration by focusing on his physical responses or removing himself to avoid escalation. They also provided large amounts of positive reinforcement for appropriate frustration tolerance and good sportsmanship.

Data indicated a slight increase in physical outbursts, which also appeared to be slightly misrepresentative. Though physical outbursts were observed during the first week, before frequency data were collected, they occurred rarely from that point forward. In fact, they were only observed once during data collection sessions. The upward trendline, therefore, did not represent an increase over time but rather an occurrence during the seventh week of camp. It could be hypothesized physical outbursts were less likely to occur as Carl's verbal outbursts were addressed through the intervention strategies mentioned above.

Regarding Carl's replacement behaviors and social skills, the data indicated an upward trend in congratulating peers, a behavior that was especially important as it served the purpose of increasing social interactions and decreasing frustration related to competitive activities. Carl was able to demonstrate this behavior with increasing

frequency over the course of camp, which was likely related to his level of comfort at camp, the high levels of reinforcement provided by camp staff, and a higher level of confidence as he interacted with other children who had social deficits. The other two replacement behaviors, taking deep breaths and removing himself when frustrated, were not observed frequently and the data representing these behaviors demonstrated a slight downward slope. It is speculated these methods of coping with frustration were less needed by Carl as his verbal outbursts and frustration in general were managed through his intervention plan. It could be concluded that this camp program, based upon ABA methods and strategies, was effective in decreasing maladaptive behaviors and increasing adaptive skills demonstrated by Carl.

Chapter V

Discussion

This chapter reviews the rationale for this study, the research hypotheses, and the research questions. A summary of the results of all five case studies is presented along with a discussion about the overall effectiveness of the camp. The results are then compared to other single-subject research in the area of summer camps and outdoor experiential programs. The implications of this study will be explored. Limitations of the study are discussed along with recommendations for future research in this area of the field.

Review of Rationale, Purpose, and Significance of this study

Recent federal legislation has mandated the use of empirically-based interventions with children who receive services under the disability category of autism spectrum disorder (ASD) in the school setting. Because the number of children receiving such services (i.e., those diagnosed with autism spectrum disorders) has increased significantly over the past several decades, there is an even greater need to differentiate between effective and non-effective interventions. Children with autism spectrum disorders demonstrate marked deficits in social skills and communication. Because these deficits almost always lead to difficult behavioral challenges, interventions within the field of applied behavior analysis have become the predominant strategies used to treat children

with ASDs. Such interventions have been applied to many different behaviors in many different settings, and a breadth of research has validated ABA principles overall.

Intensive ABA programming has been found to have a significant impact on the learning, behavior, and social skills of children with ASDs, with the greatest gains occurring when such programming occurs all-year round.

A significant branch of research has explored the use of outdoor experiential programs, which include camps and other outdoor programs aimed at producing different types of positive change in the lives of children. Dating back to the 1800s, outdoor experiential programs have boasted positive results, including skill acquisition, increased self-esteem, increased self-reliance, increased competency, increased self-concept, improved self-control, decreased aggression, and increased empathy, to name a few. Because outdoor programs have natural reinforcers (i.e., nature trails, animals, plants, etc.), they provide a unique setting for behavior change. In particular for children with ASDs, camp might be an exceptional setting also due to the opportunities for social interaction with other children.

Despite the likely benefits, there has been little research looking at summer camp programs for children with autism spectrum disorders. Unfortunately, because of the deficits experienced by children with ASDs, including their difficulty interacting with other children and managing the stimuli in their environment, they are often thought of as unlikely candidates for summer camps. Also, the high cost, large number of camp staff needed, and the intensive training required for staff, has made it difficult to develop summer camp programs for children with ASDs. Like other children, however, there is great potential for children with ASDs to benefit from the environment offered at a

summer camp. For this reason, it seemed logical to explore the effectiveness of combining year-round instruction using ABA strategies with the benefits of an outdoor summer camp setting. Not only did this camp utilize the preferred method of intervention for children with ASDs, ABA programming, it also took advantage of the highly motivating outdoor setting. Favorable conclusions from this research may lead clinicians and other professionals to develop similar summer camps for children with ASDs who would otherwise be excluded from the benefits of this experience. It also may lead to additional research, building upon the results of this study. In the future, a manual could be developed to help other professionals create similar camp programs and facilitate research.

Summary of Results

Overall, all five participants demonstrated both favorable and unfavorable results from the 2008 Autism Summer Camp. Of interest was the pattern of effects within the behavioral data, regarding how behaviors changed over the eight weeks of camp. This author will explore how the interventions within the camp setting affected children with different levels of ASDs (i.e., mild or moderate) as well as how quickly or slowly behavior change occurred. The ways behavior changed also was considered. Because this is a preliminary, single-subject investigation, utilizing an A-B research design, the results must be interpreted with caution. Future studies exploring similar camp programs must be conducted in order to demonstrate firm conclusions about the effectiveness of summer camps for children with ASDs. Possible conclusions of this study will be explored here and recommendations for future research in this area will be discussed.

Participant 1, Sam, was a 9-year-old Caucasian male. He was identified as having Mild autism spectrum disorder, and in the school setting, he received the majority of services in a separate special education classroom. After analyzing school records and input from his parents, the following target behaviors were identified for Sam prior to the start of camp: Gazing/hand-flapping and wandering. Whining and off-task behavior were added as target behaviors once Sam was observed at camp. A few replacement behaviors also were identified as targets during camp: independently requesting headphones or a break, going directly to an activity area, and increasing social skills. An individualized intervention plan, based upon a functional behavior assessment (FBA), was then implemented by camp staff.

Overall, Sam demonstrated a decrease in gazing/hand-flapping, wandering, whining, and off-task behavior. He demonstrated an increase in his ability to go directly to an activity and an increase in social skills during this eight-week summer camp. Though he requested headphones or a break infrequently at the start of camp, this replacement behavior did not maintain throughout camp and was not observed during the last four weeks of camp.

Participant 2, Gary, was a 7-year-old Caucasian male. He was identified as having Moderate autism spectrum disorder, and in the school setting, he received the majority of services in a separate special education classroom. Gary's parents indicated he engaged primarily in non-communicative speech and suffered from PANDAS, an internal strep infection that causes joint pain. After analyzing school records and input from his parents, the following target behaviors were identified for Gary prior to the start

of camp: Noise/self-injury and biting or hitting staff. Oral stimulation and out-of-seat/off-task behavior were added as target behaviors once Gary was observed at camp. A few replacement behaviors also were identified as targets during camp: comply with a verbal request or task demand within 30 seconds and use words to communicate a need or want. An individualized intervention plan, based upon a functional behavior assessment (FBA), was then implemented by camp staff.

Overall, Gary demonstrated an increase in screaming, making loud noises, head-banging, and self-biting. He demonstrated a slight decrease in biting and hitting staff and oral stimulation, while his out-of-seat and off-task behavior decreased more substantially at camp. With regard to his replacement behaviors, Gary's compliance with verbal requests stayed about the same over the course of the eight weeks, while his ability to use words to express himself appeared to decrease slightly in the camp setting.

Participant 3, Doug, was an 8-year-old Caucasian male. He was identified as having Mild autism spectrum disorder, and in the school setting, he received the majority of services in a general education classroom. An outside evaluation suggested the possibility of Asperger's Disorder. After analyzing school records and input from his parents, gazing was identified as a target behavior for Doug prior to the start of camp. Two replacement behaviors also were identified as targets during camp: maintaining eye contact for 15 seconds during instruction and spontaneously initiating greetings with peers. An individualized intervention plan, based upon a functional behavior assessment (FBA), was then implemented by camp staff. Overall, Doug demonstrated a decrease in gazing, a decrease in eye contact during instruction, and an increase in initiating greetings with peers.

Participant 4, Calvin, was a 7-year-old Caucasian male. He was identified as having a Moderate autism spectrum disorder, and in the school setting, he received the majority of services in a separate special education classroom. Calvin's parents reported he engaged in some verbal speech but also utilized gestures and sign language to communicate. After analyzing school records and input from his parents, Calvin's refusal to join group activities was identified as a target behavior prior to the start of camp. Two replacement behaviors also were identified as targets during camp: maintaining a three-part conversation and going to an activity when prompted. An individualized intervention plan, based upon a functional behavior assessment (FBA), was then implemented by camp staff.

Overall, Calvin demonstrated a decrease in his refusal to join group activities, an increase in his engagement in three-part conversations, and an increase in his compliance of going to an activity. Each of these behaviors changed in the anticipated and desired direction, with change occurring at a relatively high rate.

Participant 5, Carl, was a 7-year-old Caucasian male. He was identified as having Mild autism spectrum disorder, and in the school setting, he received the majority of services in a separate special education classroom. After analyzing school records and input from his parents, the verbal outbursts were identified as a target behavior for Carl prior to the start of camp. Physical outbursts were added as target behaviors once Carl was observed at camp. A few replacement behaviors also were identified as targets during camp: congratulating another camper on winning a game or activity, taking deep breaths to calm down, and appropriately removing himself when frustrated. An

individualized intervention plan, based upon a functional behavior assessment (FBA), was then implemented by camp staff.

Overall, Carl's use of verbal outbursts appeared to increase over time; however, these data appeared to be skewed by Week Two in which no verbal outbursts were observed. If the data point representing Week Two, which could be considered an outlier, were removed from the set, a downward trend was depicted. It could be therefore concluded that verbal outbursts actually decreased. Similarly, the data recording Carl's physical outbursts demonstrated an upward trend, which would indicate that he exhibited more physical outbursts over the course of camp. However, physical outbursts were rarely observed once data collection started in Week Two, occurring on only one occasion during Week Seven. The upward trend, therefore, is not indicative of an increase in this behavior over time, but rather it represents the one occurrence that was observed toward the end of camp. With regard to his replacement behaviors, Carl demonstrated an increase in congratulating peers, a slight decrease in taking deep breaths, and a slight decrease in removing himself when frustrated.

Table 1.1 visually summarizes the results for each participant for the purpose of comparison. An overall goal of each participant's intervention plan was to decrease target behaviors and increase replacement behaviors. The following results are based on trendlines for each behavior, depicting change over time as demonstrated by the upward or downward slopes discussed more thoroughly in chapter four.

Participant and Tribe	Age	Level of Autism	Target Behaviors	Results	Replacement Behaviors	Results
Sam (T4)	9	Mild	1. Gazing/hand-flapping 2. Wandering 3. Whining 4. Off-task	1. Decreased 2. Decreased 3. Decreased 4. Decreased	1. Request headphone/break 2. Go to activity 3. Increase social skills 4. On-task	1. Decreased 2. Increased 3. Increased 4. Increased
Gary (T4)	7	Moderate	1. Noise/self-injury 2. Biting/Hitting staff 3. Oral Stimulation 4. Out-of-seat/Off-task	1. Increased 2. Decreased 3. Decreased 4. Decreased	1. Comply with request 2. Use words	1. No change 2. Decreased
Doug (T4)	8	Mild	1. Gazing	1. Decreased	1. Eye contact 2. Greet peers	1. Decreased 2. Increased
Calvin (T3)	7	Moderate	1. Refusal to join group	1. Decreased	1. Three-part conversation 2. Go to activity	1. Increased 2. Increased
Carl (T3)	7	Mild	1. Verbal outbursts 2. Physical outbursts	1. Decreased 2. N/A*	1. Congratulate peer 2. Take deep breaths 3. Remove himself	1. Increased 2. Decreased 3. Decreased

Table 1.1 Comparison of participants' data

*only one incident of behavior occurred

Discussion of Results

Though each individual participant demonstrated both favorable and unfavorable results, the camp overall appeared to have been successful in reducing problematic behaviors that interfere with learning and increasing adaptive skills and social behaviors. As shown in Table 1.1, of the twelve target behaviors that were identified for all participants combined, ten decreased over time as displayed through a downward trend in the data, one showed virtually no change over time, and one increased during the eight weeks of camp. There were thirteen replacement behaviors identified for the five participants, and among those, seven increased over the course of camp, five decreased, and one demonstrated virtually no change. As a whole, these results were exceptionally favorable and in part confirmed the effectiveness of the summer camp in changing behaviors of children with ASDs.

The rates at which the target behaviors decreased varied from participant to participant, with some behavior change occurring more gradually and some occurring more rapidly during the eight week camp. The rate of behavior change can be determined by the slope of the trendline for each set of data. A higher slope value indicates a more rapid rate of change, while a lower value indicates a more gradual rate of change. A positive slope value indicates an increase in behavior over time, and a negative slope value indicates a decrease. The slopes were divided in the following way, using absolute values: Minimal rate of change = 0 – 0.09, Moderate rate of change = 0.1 – 0.5, Substantial rate of change = higher than 0.5. The following tables depict the rates of change for each participant's behaviors, based upon the slope of each data's trendline.

Participant: Sam Age: 9-1 Level of autism: Mild		Rate of change	Slope of trendline
Target Behaviors	1. Gazing/hand-flapping 2. Wandering 3. Whining 4. Off-task behavior	1. Moderate decrease 2. Moderate decrease 3. Moderate decrease 4. Moderate decrease	1. -0.191 2. -0.1568 3. -0.3791 4. -0.426
Replacement Behaviors	1. Request headphone/break 2. Go to activity 3. Increase social skills 4. On-task behavior	1. Minimal decrease 2. Minimal increase 3. Moderate increase 4. Moderate increase	1. -0.04 2. 0.0864 3. 0.2607 4. 0.298

Table 2.1 Slope and rate of change for Sam's data

Participant: Gary Age: 7-11 Level of autism: Moderate		Rate of change	Slope of trendline
Target Behaviors	1. Noise/self-injury 2. Biting/Hitting staff 3. Oral Stimulation 4. Out-of-seat/Off-task	1. Moderate increase 2. Minimal decrease 3. Minimal decrease 4. Moderate decrease	1. 0.2906 2. -0.0298 3. -0.0546 4. -0.2929
Replacement Behaviors	1. Comply with request 2. Use words	1. No change 2. Minimal decrease	1. 0.0011 2. -0.0618

Table 2.2 Slope and rate of change for Gary's data

Participant: Doug Age: 8-5 Level of autism: Mild		Rate of change	Slope of trendline
Target Behaviors	1. Gazing	1. Minimal decrease	1. -0.063
Replacement Behaviors	1. Eye contact 2. Greet peers	1. Moderate decrease 2. Moderate increase	1. -0.1232 2. 0.3836

Table 2.3 Slope and rate of change for Doug's data

Participant: Calvin Age: 7-7 Level of autism: Moderate		Rate of change	Slope of trendline
Target Behaviors	1. Refusal to join group	1. Moderate decrease	1. -0.1632
Replacement Behaviors	1. Three-part conversation 2. Go to activity	1. Moderate increase 2. Moderate increase	1. 0.1454 2. 0.1317

Table 2.4 Slope and rate of change for Calvin's data

Participant: Carl Age: 7-5 Level of autism: Mild		Rate of change	Slope of trendline
Target Behaviors	1. Verbal outbursts 2. Physical outbursts	1. Minimal decrease* 2. N/A**	1. -0.0504
Replacement Behaviors	1. Congratulate peer 2. Take deep breaths 3. Remove himself	1. Minimal increase 2. Minimal decrease 3. Minimal decrease	1. 0.058 2. -0.0117 3. -0.0094

Table 2.5 Slope and rate of change for Carl's data

*slope of trendline excluding the data point from Week Two

**did not calculate trendline because only one incident of behavior occurred

Results indicate that all five participants demonstrated two or more behaviors that changed in the intended direction (i.e., target behaviors decreased, replacement behaviors increased). For Participant 1 (i.e., Sam), seven out of eight behaviors (88%) changed in the intended direction, with six (86%) changing at a moderate rate. Three out of the six behaviors (50%) for Participant 2 (i.e., Gary) changed in the intended direction. Only one of the three (33%), however, demonstrated a moderate rate of change. Participant 3 (i.e., Doug) had three behaviors upon which the camp focused. Among those, two changed in the intended direction (67%), with only one changing at a moderate rate (50%). For Participant 4 (i.e., Calvin), all three behaviors changed in the intended direction (100%), and all three changed at a moderate rate (100%). Lastly, five behaviors were focused on during camp for Participant 5 (i.e., Carl). Because one behavior only occurred during one observation session, it will be excluded here. Among the other four, two changed in the intended direction (50%) and neither of those changed moderately (0%). Overall, seventeen of the twenty-five behaviors targeted for change demonstrated favorable results (i.e., target behaviors that decreased and replacement behaviors that increased), which was a 68% success rate. Among those behaviors that changed in the intended direction, 65% demonstrated a moderate rate of change.

Based upon the results, certain behaviors appeared to be more conducive to change in this setting than others. Gary's replacement behavior of using words to indicate needs and wants, for example, demonstrated a minimal decrease. This behavior, for a child with minimal expressive speech, is very complex and would take a great deal of time to change. Because any increase of verbal behavior in any setting would be ideal,

this could be considered an appropriate goal. However, behavior change in this area would be expected to be gradual. Because Gary was in a completely novel setting with many distractions and unfamiliar stimuli, his ability to expend energy toward talking may have been compromised. Because there is little research investigating the effects of a summer camp setting on children with ASDs, it is unknown whether another child might have experienced much different results in this setting. More research will be necessary to determine whether or not expressive speech can be increased in this setting. For some children, the novelty and engaging environment might be so reinforcing that researchers see an increase in verbal expression. Ingersoll and colleagues (2012) reported naturalistic interventions, those taught in informal settings not traditionally used for instruction, have been found to facilitate social communication skills that generalize well to other natural environments. For Gary, this naturalistic setting appeared to have an unfavorable effect. In addition, Gary's replacement behavior was defined as using words to communicate needs and wants, a very broad target. Perhaps identifying one or two specific words or phrases, such as "I need help" and "More please," would have been more successful. This would have given Gary and his camp staff a very specific objective that was more feasible in the camp setting within the eight week time period. If verbal behaviors are targeted in future camps, it might be necessary for camp staff to be trained more thoroughly in the area of verbal behavior so they can more adequately teach these skills.

Several self-regulated behaviors were targeted during camp. "Self-regulation describes a number of methods used by students to manage, monitor, record, and/or assess their behavior or academic achievement" (Reid, Trout, & Schartz, 2005).

Specifically, Sam was taught and prompted to request headphones or a break when in a noisy environment or when overstimulated. Carl was taught and prompted to take deep breaths and/or remove himself when frustrated. These behaviors all serve the function of helping the child to cope with an unpleasant or undesired stimulus. In each case, however, a slight decrease in the behavior was reported. Again, it is suspected that these behaviors might be too complex to address within the camp setting. The child is required to first recognize and label his own reactions and emotions. He must be able to recognize when overwhelmed or frustrated, interrupt his emotional reaction, and verbally express his need to an adult (i.e., headphones, break, removal), or in the case of Carl, respond on his own by taking deep breaths. A prominent characteristic often exhibited by children with autism spectrum disorders is a deficit in self-management skills. Children with ASD often have difficulty controlling, inhibiting, maintaining, and generalizing behaviors required to adjust to everyday challenges without external support and structure from others (Wilkinson, 2008). Though self-management techniques are considered an evidence-based practice for children with emotional and behavioral disorders (Farley, Torres, Wailehua, & Cook, 2012), Wilkinson (2008) suggested self-management techniques are not appropriate for every child, and may not be well suited for children with seriously challenging behaviors. The sequence of events required for Sam and Carl were most likely too difficult to exhibit without shaping each step. Successful results might have been possible if camp staff were able to work with each camper individually on each step of the process. Eventually, with practice, the child may have been able to demonstrate the replacement behavior. Because the camp was only eight weeks long, however, and each child did not have a one-on-one aide, these self-regulated behaviors

may have been too complex for the camp setting. Future camps should consider whether or not self-regulated behaviors are feasible replacement behaviors.

Another category that was targeted in several different cases was some type of compliance, a commonly reported problem among children with autism spectrum disorders (Riviere, Becquet, Peltret, Facon, & Darchville, 2011; Schumacher & Rapp, 2011). Compliance-related behaviors were those in which a prompt or instruction was given and a specific response was expected from the participant. Specifically, Sam's ability to go to an activity, Gary's ability to comply with verbal requests within 30 seconds, and Calvin's ability to join the group and go to activities were documented. Noncompliance can often lead to a decrease in on-task behavior, which affects academic achievement (Banda & Kubina Jr., 2010). Failure to comply also is related to exclusion from community settings and poor social interactions (Donohue, Casey, Bicard, & Bicard, 2012). The data regarding Sam indicated he showed a minimal increase in his ability to go directly to an activity when prompted, a behavior that was found to occur infrequently. Gary demonstrated virtually no change in his compliance with verbal requests. Calvin's refusal to join groups decreased moderately and his ability to go to an activity increased moderately. Among the four compliance behaviors targeted, three changed in the intended direction with two changing at a moderate rate. In general, compliance-related behaviors, therefore, appear to be appropriate targets that can be effectively addressed in the camp setting.

Off-task versus on-task behavior (e.g., paying attention to instruction and participating in activities as expected) was recorded for both Sam and Gary, as previously

noted, a behavior that affects opportunities to engage in academic instruction and impacts academic achievement (Banda & Kubina Jr., 2010). Sam's off-task behavior demonstrated a moderate decrease, while his on-task behavior indicated a moderate increase. Gary's out-of-seat/off-task behavior decreased at a moderate rate, and this was the most successful change demonstrated by Gary. The high staff-to-camper ratio and the structure of the daily activities were particularly conducive to higher rates of sustained attention. During each disguised subject area, one teacher led the group instruction, while the counselors from each tribe monitored campers. As instruction was given, the counselors were able to implement individualized strategies, which often included prompting (verbal, gestural, and physical) and positive reinforcement for on-task behaviors. In addition, the outdoor setting probably had intrinsic interest for the children, resulting in greater degrees of attention.

Many children with autism spectrum disorders engage in self-stimulatory behaviors that are referred to as stereotypies. These are repetitive body movements used to stimulate one's own senses. Among the five case studies, gazing/hand-flapping was targeted for Sam, while oral stimulation was recorded for Gary. Sam showed a moderate decrease, while Gary showed only a minimal decrease. These were both promising findings, and because Sam was identified as having a mild ASD, while Gary was identified as having a moderate ASD, it could be expected Sam might demonstrate greater gains in a short time period. Positive results were reported by Azrin and colleagues (1973) in their seminal work regarding the use of positive reinforcement and the reduction of self-stimulatory behaviors in adults with mental retardation.

Social skills, behaviors which are the building blocks for interacting with others in a social manner, were identified as replacement behaviors for several campers and are an inherent area of deficit for children with ASDs to one degree or another. Social competence has been linked to school readiness and academic success (Blair, 2002) and social skills promote positive social interactions in natural settings (Laushey & Heflin, 2000). The camp offered an ideal setting to address social interactions due to the semi-structured environment and access to peers. Because of the population served, children were often encouraged to interact and to talk with peers, behaviors that are often discouraged in the school setting so instruction is not disrupted. Therefore, the camp structure itself (i.e., “treatment as usual”) probably had a positive impact on social development. Though other target or replacement behaviors also affect social interactions, the following behaviors were considered social skills for the purpose of this discussion because the focus of intervention was to increase a skill directly related to social communication with peers or adults. Sam had a goal of increasing social skills (i.e., initiate or verbally respond to a social interaction with another peer or adult) and demonstrated a moderate increase, Doug worked on greeting peers and showed a moderate increase. Eye contact for Doug was not included as a social skill because the goal was for him to maintain eye contact with the teacher during instruction. Calvin was taught and prompted to engage in three-part conversations, which increased moderately, and Carl was expected to congratulate peers, a behavior that demonstrated a minimal increase as well. These results were extremely successful overall, suggesting the camp setting both intrinsically and deliberately supported social skill development. Social skills training programs of a similar nature (i.e., instructions, models, and praise) have

been found to increase the social behaviors of greeting peers, gesturing to peers, imitating peers, offering something to peers, and accepting something from peers in a toddler (Cheng-Hsien, Hursh, Walls, Stack Jr., & Lin, 2012).

Other variables likely affected the degree of success at camp. Because intermittent reinforcement is so powerful, and often leads to the persistence of behavior, the amount of reinforcement administered outside of camp (i.e., at home or in the community) for target behaviors may have impacted the degree to which they decreased at camp. For example, if Sam's wandering behavior, which was thought to occur in an attempt to gain access to a preferred activity or item, was reinforced at home, then it would have been much more difficult to decrease in the camp environment. More specifically, let us presume Sam's parents asked him to clean up his toys. If after prompting him to clean up, his parent was distracted by a burning meatloaf, Sam might be likely to wander from the activity of cleaning up to something more desirable. If his wandering was not interrupted and Sam was not required to complete the task of cleaning up, then he would have been reinforced for wandering from the task at hand. This type of intermittent reinforcement can be powerful and can, to some extent, reverse the effects of other strategies aimed at decreasing his wandering behaviors. Other outside variables, like the level of stress at home, the degree of structure outside of camp, a child's diet (Pennesi & Klein, 2012), the amount of support provided at home, and many other factors could affect a child's ability to demonstrate behavior change at camp. Many behaviors have multiple functions that may occur in different settings or with different people. Some of the target behaviors may occurred in other settings for different reasons,

making them more likely to occur at camp as well for different reasons. Given the brevity of camp and the limited opportunity to conduct FBA's, there is room for error when identifying the functions of behaviors, in particular when there is more than one function to identify. In turn, there is less opportunity to conduct another functional assessment, develop a new plan, retrain staff, and implement modifications. The more complex a behavior is, the more difficult this process can become. Future camps might consider if more complex behaviors (i.e., verbal behaviors or self-regulated behaviors) are the most appropriate targets for camp.

Somewhat unexpectedly, the level of autism did not appear to affect camp results significantly. It might have been speculated that higher functioning children would have demonstrated greater gains in terms of behavior change in this short time period, but this did not appear to be the case. Of the five case studies, three were identified as having a mild ASD and two were identified as having a moderate ASD. Sixteen behaviors were targeted for the three participants with a mild level of autism, and among those, eleven changed in the intended direction (i.e., 69% success rate). Among the behaviors that changed in the intended direction, seven demonstrated a moderate increase or decrease (i.e., 64% success rate). Nine behaviors were targeted for the two participants with a moderate level of autism. Six of the nine behaviors changed in the intended direction (i.e., 67% success rate) and four of those six demonstrated a moderate change (i.e., 67% success rate). Thus, similar overall success rates were indicated for all of the participants. As previously noted however, the specific behaviors targeted for change, along with the child's level of autism, should be carefully considered in future camps.

Children with little or no expressive speech may not substantially increase verbal behavior in the camp setting. Specific and manageable behaviors should be selected that are feasible for change in a novel setting within a relatively short period of time.

Implications of the Study with Regard to Previous Research

Among the research regarding summer camps and outdoor experiential programs, the camps investigated by Rawson (1973/1978), were structured the most closely to the 2008 Autism Summer Camp explored here. The main difference between the current study and Rawson's would include the population of campers. Rawson's camps serviced children with behavior problems, while the current study focused specifically on children with ASDs. Rawson's camps began during a time when much less was known about autism spectrum disorders and fewer ABA strategies were empirically validated. The current study utilized validated ABA strategies that were individually tailored to meet the needs of children with ASDs. In addition, Rawson looked at self-concept, academic skills, interpersonal skills, mastery of academic content, self-esteem, and attitudes toward school and teachers, while the current study investigates the outcomes of behavioral observation data. Both studies, however, report favorable findings that suggest summer camps benefit children with behavioral problems, with the current study indicating specific benefits for children with ASDs. As Rawson suggested, this author would purport that a summer camp setting appears to increase children's motivation for change. The positive results discussed above add to the small body of research in this area, particularly as replication is a necessary component of single-subject research.

Other camps using ABA strategies reported gains in verbal behavior (Heckel et al., 1977) and increases in children's self-concept (Roswal et al., 1986). Baker (1972) reported behavioral gains from a camp based upon behavioral modification techniques, but outcomes were determined from parent reports, teacher reports, and behavioral incidents following the camp experience. Similarly, Henley (1999) reported decreases in impulsivity and other behaviors associated with ADHD, as perceived by parents. As previously noted, a number of other outdoor experiential programs, which did not utilize ABA methods specifically, have indicated positive results in a wide variety of areas with a wide variety of populations.

Five studies were found that looked at camps specifically servicing children with autism spectrum disorders. Lopata and colleagues (2008) targeted social skills, face-emotion recognition, range of interests, and interpretation of non-literal language through a manualized program for children with Asperger's Disorder or high-functioning autism. All participants received the same manualized treatment, and significant improvements were reported by parents and staff on objective measures. Brookman and colleagues' (2003) research differed from the current study as it investigated an inclusive camp that serviced typically-developing peers along with children with ASDs. In addition, the camp provided paraprofessional aides in addition to regular camp staff. Formal data were not presented by Brookman et al. Hung (1977) and Hung & Thelander (1978) described summer camps that provided children with autism a one-on-one camper to staff ratio for three weeks. Hung reported in 1977 that all participants demonstrated "curiosity" behavior in the classroom through use of a token reinforcement system. In 1978, they

found every child improved by 15% or more in at least one area of treatment, based upon behavioral observation data. Lastly, Wetzel and colleagues (1995) reported outcomes that were focused on a camp for children with developmental disabilities. They found the camp successfully accomplished its overall mission but did not report any child-specific outcomes.

Though the studies reported above investigated camps that share common features to the camp explored here, none of the studies or camps were structured in exactly the same manner. Unlike the studies mentioned above, the current study looks at a summer camp program designed specifically for children affected by different levels of autism spectrum disorders. Intervention plans were individually created for each child, with the aim of decreasing problematic behaviors and increasing replacement behaviors and social skills. And, outcomes were based upon behavioral observation data. The combination of these factors is unlike any previous research, but yet adds to the findings in this area of the field, which are mentioned above and more thoroughly explored in chapter two. Future replications of this camp are needed to make firm conclusions, but this preliminary investigation provides initial support for the benefits of offering summer camps for children with ASDs. Replication studies would add to the field and could possibly culminate in a manual providing professionals with a structure for providing similar camps in the future.

Limitations of the Study and Recommendations for Future Research

A number of limitations and weaknesses should be considered regarding this study, and because single-subject research relies on replication, there also should be

changes made to future studies. Inherent in the research design are weaknesses (i.e., small subject size, limited external validity, and lack of a control group), which were discussed in chapter three. Therefore, they will not be reiterated here. Additional methodological issues, however, should be considered because this was a study conducted in the natural environment, a setting in which many variables affect research. Due to the brevity of camp, baseline data were collected as quickly as possible within the first two days. This allowed camp staff to begin implementing intervention plans on the third day of camp, an important expectation of families. Ideally, the baseline phase of data would last longer to ensure that a trend is established before a behavior is changed. This would allow more firm conclusions to be made regarding any changes in behavior. Future camps could address this issue by collecting data in ten or fifteen minute observation sessions. This would result in a larger number of data points during the first two days, which could then be analyzed to determine whether or not a trend existed during the baseline phase. Once determined, the individualized intervention could be implemented as quickly as possible. In some cases, even more baseline data may need to be collected to determine a trend, but for most campers, individual intervention strategies could be implemented by the third day as planned. Another option would be for future camps to employ a general ABA program throughout the entire first week of camp, while baseline data are collected. During the second week, staff could then implement the individualized treatment plans for each camper, specific to his or her unique needs.

Similarly, this study utilized an A-B design, where A represented the baseline phase and B represented the intervention phase. A flaw that occurs in A-B designs is that

one cannot be sure that behavior change was in fact a result of the intervention, as other outside variables may affect behavior. Because, as mentioned previously, 68% of behaviors changed in the intended direction with 65% of those demonstrating a moderate rate of change, there is more evidence to suggest the summer camp setting affected change. Nonetheless, this conclusion cannot be made without caution. Future studies could implement an A-B-A-B reversal design in which the treatment is selectively removed during prespecified observation sessions. Favorable results under these conditions would be more powerful in their conclusions. This, however, could be difficult (not impossible) to implement in a camp setting. This would require camp staff to remove any individual treatment strategies during certain observation periods to see how the target behaviors are affected. Presumably, this could be very difficult for camp staff who might observe favorable results from the interventions being used. The reason behind briefly removing an effective intervention would have to be thoroughly explained to camp staff so they could understand the importance of demonstrating effectiveness through data. Because the treatment would only be removed for brief observation sessions, the removal would not significantly affect the overall program in a negative way.

Data collection within the natural setting can be especially difficult as there are so many factors and many variables cannot be controlled (unlike a laboratory setting). To simplify data collection, a frequency method of recording was used for all behaviors. Future studies might consider other types of data recording, such as duration or time-sampling, depending on the behaviors selected for change. Such types of data collection

can increase accuracy but are often complicated to implement. In addition, all target and replacement behaviors for each participant were collected at the same time due to a limited number of data collectors. In future studies, if adequate personnel are available, each behavior should be observed individually to minimize observation error.

Additionally, there were not enough personnel in this study to conduct interrater reliability checks, which are an integral component in order to establish the accuracy of data. Future research should employ interrater observations that adhere to at least 80% reliability. Though trendlines were helpful to visually inspect and compare the data, they should be interpreted with caution because they did not fully represent the high degree of variance in some of the data sets. As previously mentioned, shorter observation sessions of ten to fifteen-minute increments would be recommended as they would yield more accurate data and more data points, which in turn would result in better fitting trendlines. Similarly, visual inspection was used because it is the most common means of interpreting single-subject data, but other types of statistical procedures might be considered in future studies.

Lastly, people can often have lofty ambitions when it comes to goals for producing positive change in children. In several of the cases discussed (i.e., Sam, Gary, and Carl), too many target and/or replacement behaviors were identified for change. Ideally, the summer camp setting will affect a number of behaviors inherently in the design, but a select few should be targeted for change in order to ensure treatment integrity and accurate data collection. Similarly, the intervention plans of all participants were much too complex, a factor that decreases treatment integrity. For example, the

intervention plan for Participant 1, Sam, addressed four different target behaviors and four different replacement behaviors. Attempting to change eight different behaviors in only eight weeks is probably unreasonable. Similarly, Sam's behavior intervention plan included four preventative strategies and seventeen intervention strategies that were identified to meet his individual needs. While each of these strategies may have been helpful in addressing his problem behaviors and facilitating the replacement behaviors, it is unlikely camp staff were able to use all seventeen strategies consistently when needed. When the intervention plan becomes too overwhelming, staff have difficulty implementing it consistently. This reduces the overall effectiveness of the treatment and the accuracy of data because it is difficult to ensure that staff implemented the plan as it was written. To combat this weakness, competency training was conducted and staff were tested on their competency with regard to their knowledge of each child's behavior intervention plan (see Appendix C). Staff were required to achieve 100% competency and any missed items were retrained until this level of competency was reached. Nonetheless, future researchers should minimize the number of behaviors targeted for change and should develop simple, manageable intervention plans that address a select number of behaviors.

Determining the challenges of running a camp of this nature and identifying problems with methodology and data collection can be just as beneficial as finding significant positive results. This type of pilot study paves the way for future research in the field and gives researchers and clinicians qualitative information to improve treatment. Future studies of summer camps for children with autism spectrum disorders

could expand this preliminary study in many directions. One interesting insight is that all five participants from this study who were ultimately selected came from two of the four tribes. As previously mentioned, all other cases were rejected due to incomplete or inadequate data, which raises the question of whether or not there was something different about these two tribes that resulted in better data. It might be suggested that staff assigned to these two tribes had some type of significant impact, and future research could look at how staff variables impact behavioral results. More experienced staff, those from certain backgrounds or areas of study, or staff who worked at the camp in previous years might be related to the success of campers. In addition, future studies could look at other variables, like comorbidity of diagnoses or the impact of attendance.

Future studies could investigate whether or not behavior change demonstrated at camp maintains in the school setting by collecting post-camp behavioral data at school. Similarly, baseline data could be collected in the school setting prior to camp. Data of this sort could help determine whether camp effects maintain and whether or not camp bridges the gap between school years. In addition, preliminary baseline observations in the school setting might help camp staff better identify target and replacement behaviors. In the current study, information from parents and teachers was used to determine initial target and replacement behaviors, but there is a strong possibility some teachers and parents are missing fundamental behaviors that should be taught first. Utilizing a trained professional in ABA to collect baseline data at school could possibly yield more appropriate target and replacement behaviors.

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APPENDIX A:

**Exploring the Effectiveness of an Academic and Behavioral Remediation Summer
Camp Program for Children with Autism Spectrum Disorders**

The purpose of this study is to investigate the effectiveness of using applied behavioral analysis (ABA) for children with autism spectrum disorders within a summer day camp setting. This project will study the effectiveness of ABA in decreasing negative behaviors and developing adaptive replacement behaviors, both of which facilitate the acquisition of new skills, within a summer day camp setting. The program will focus on changing behaviors that interfere with learning, which may mean decreasing inappropriate behaviors or increasing appropriate responses. This project will be done over the summer of 2008.

Shanna Metz, doctoral student in school psychology, will observe each child selected to participate in this study to collect baseline and intervention data. Baseline data will be collected within the first three days of the camp and will provide the researcher with a current estimate of the frequency of the child's target behavior. Throughout the remainder of the camp, intervention data will be collected to assess any changes in the target behavior that may occur as a result of participating in the camp. Interobserver reliability (agreement between independent observers) and adherence to the intervention procedures will be assessed during at least a third of the sessions to make sure that the agreement is well above the conventional 80% between independent observers or the children will be video-recorded throughout each observation period, allowing inter-rater reliability to be assessed during repeated viewings by a second rater and to ensure at least 95% agreement between raters. This will be dependent on the exact logistics of the camp set-up, in particular, the amount of time spent outside and the feasibility of utilizing video recording equipment.

There is minimal current research on the effectiveness of an individualized applied behavior analytic approach to working with children with autism in a summer camp setting. The National Research Council (2001) identified several characteristics of effective interventions for young children with autism, including early intervention, instructional objectives focusing on social skills, communication, adaptive living, recreation-leisure, cognitive, and academic skills, ongoing monitoring of interventions, an emphasis on generalization of skills, and systematic and intensive (defined as 25 hours per week, 5 days per week, and 12 months per year) one-on-one or small group instruction (Steege et al., 2007). While many children receive such services during the school year, there is a lack of services provided during the summer months, especially for children who attend public schools. Given the need for intensive instructional programming throughout the year, it seems not only appropriate, but necessary to provide children and families with services during the summer months.

If your child is selected for participation in the study, the primary researcher will select two or three behaviors to be targeted for change. Those behaviors will be observed and recorded during the first few days of the camp to determine the current level of the behavior. An individual behavioral plan will be developed to specifically address the target behaviors throughout the summer camp setting. Interventions will be used by camp staff to apply behavioral principles to the specific target behavior. Ongoing data will be collected through behavior observation to determine how the target behavior changes over the course of the 8-week camp.

In addition, you will be asked to complete a series of questionnaires about demographics and behavioral characteristics of your child. It will take approximately 45 minutes to complete the questionnaires.

All data will be maintained as confidential and no identifying information such as names will appear in any publication or presentation of the data. Data will be stored in a locked filing cabinet in the researcher's office.

For purposes of accuracy in data collection, with your permission, your child may be video-taped at the camp. Video tapes will only be reviewed by research staff and will be destroyed after the research project is completed.

The foreseeable risks or ill effects from participating in this study are minimal. There is minimal to no risk for the present study. Parents may become mildly uncomfortable in having their children videotaped. However, no one will observe the tapes except for the research assistants in charge of data collection. The tapes will be erased after they are observed. Due to the nature of the camp and the population being served, there may be a possible need for staff members to employ restraint procedures under emergency circumstances. All staff will be trained in proper restraint procedures.

One benefit your child may gain from participating in this study may be positive changes in behavior.

Your child's participation in this study is completely voluntary and you are free to withdraw your permission at anytime for any reason without penalty or prejudice from the investigator. Please feel free to ask any questions of the investigator before signing this Parental Permission form and at any time during the study.

For one's rights as a research subject, the following person may be contacted:
Coordinator of Research Compliance, Office of Academic Research and Sponsored Programs, Ball State University, Muncie, IN 47306, (765) 285-5070, irb@bsu.edu.

I give permission for my child to participate in this research project entitled, "Exploring the Effectiveness of an Academic and Behavioral Remediation Summer Camp Program for Children with Autism Spectrum Disorders." I have had the study explained to me and my questions have been answered to my satisfaction. I have read the description of this project and give my permission for my child to participate. I understand that I will receive a copy of this informed consent form to keep for future reference.

Parent's Signature

Date

Parent's Signature

Date

Principal Investigator:

Faculty Supervisor:

Shanna L. Metz, Graduate Student

Dr. David E. McIntosh, HSPP,
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Other graduate student data collectors include: Terri Truex, Belinda Hughes, Teresa Laking, and Joel Martin

Edition Date: 06/06/2008

APPENDIX B:

Research Participant Information

Parent Name(s): _____

Address(s): _____

Home Phone: _____ Work Phone: _____

Email: _____

What is the best way for us to contact you? _____

When is the best time for us to contact you? _____

Highest grade level completed by each parent in the home (place and X where appropriate)

Father: _____ Less than 9th grade
_____ Some high school, no diploma
_____ High School diploma or GED
_____ 1-3 years of college
_____ 4 or more years of college

Mother _____ Less than 9th grade
_____ Some high school, no diploma
_____ High School diploma or GED
_____ 1-3 years of college
_____ 4 or more years of college

Current occupation:

Father: _____

Mother: _____

Child's Name: _____

Gender: M F

Date of Birth: _____

Age: _____

Ethnicity (circle): African American White (Caucasian)
Hispanic/Latino Asian

Other: _____

Does your child have non-communicative speech? _____

Please rate the severity of your child’s autism: Mild: _____
Moderate: _____
Severe: _____

Does your child display any self-injurious behaviors? ____ Yes ____ No
(Children who display self-injurious behaviors will not be included in this study)

Does your child have any physical limitations that would hinder the camp experience? ____ Yes ____ No
(Children who have physical limitations will not be included in this study)

Has your child been diagnosed with a psychotic disorder or brain damage? ____ Yes ____ No
(Children with psychotic disorders or traumatic brain injury will not be included in this study)

I have read and understand the above information and give permission for _____ (insert child’s name) to participate in the research project entitled, “Exploring the Effectiveness of a Behavioral Remediation Summer Camp Program for Children with Autism Spectrum Disorders.”

Parent Signature Date

Parent Signature Date

NOTE: Completing and returning this application form is no guarantee that your child will be selected to participate in the aforementioned research project. We will be selecting only 5 children to participate in the current study. If your child is not selected to participate, you will be contacted via mail within one week of submitting this application. The deadline for submitting this application is Friday, June 6th.

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Appendix C:

CAMPER:

TRIBE:

DATE: 5/28/2008

Instruction: Put a √ mark next to the number if that item is missed and needs to be retrained. Train to competency on any missed items. For competency, the staff must achieve 100%.

1. Trainee correctly identifies behaviors targeted in Behavior Support Plan (BSP) (List).
Trainee should provide the target behaviors specific to the client and a brief description of the target. Immediate feedback should be provided on any missed items and the trainee should be tested again until competency is achieved.
2. Trainee correctly identifies function(s) of behavior targeted in BSP.
3. Trainee correctly identifies antecedents (triggers) for target behaviors.
For full credit at least three must be identified. Trainee should be provided with immediate instruction on antecedents and setting events and retested until competency is achieved.
4. Trainee correctly identifies Preventative and Support strategies and demonstrates (if applicable) how to perform steps of Preventative and Support strategies.
For full credit at least half of the strategies must be identified. Immediate feedback should be provided on any missed items. Trainee should be retested until competency is achieved.
5. Trainee identifies positive behavior reinforcers to be used in program.
Trainee should identify at least three reinforcers to receive full credit.
6. Trainee identifies and demonstrates the appropriate training of the replacement behavior(s) to be taught.

Appendix D:



Institutional Review Board

DATE: June 11, 2008
TO: Shanna Metz, M.S.
FROM: Ball State University IRB
RE: IRB protocol # 89446-2
TITLE: Exploring the Effectiveness of an Academic and Behavioral Remediation
Summer Camp Program for Children with Autism Spectrum Disorders
SUBMISSION TYPE: Revision
ACTION: APPROVED
DECISION DATE: June 10, 2008
EXPIRATION DATE: June 9, 2009
REVIEW TYPE: Expedited Review

The Institutional Review Board has approved your Revision for the above protocol, effective June 10, 2008 through June 9, 2009. All research under this protocol must be conducted in accordance with the approved submission.

As a reminder, it is the responsibility of the P.I. and/or faculty sponsor to inform the IRB in a timely manner:

- when the project is completed,
- if the project is to be continued beyond the approved end date,
- if the project is to be modified,
- if the project encounters problems, or
- if the project is discontinued.

Any of the above notifications should be addressed in writing and submitted electronically to the IRB (<http://www.bsu.edu/irb>). Please reference the IRB protocol number given above in any communication to the IRB regarding this project. Be sure to allow sufficient time for review and approval of requests for modification or continuation. If you have questions, please contact Amy Boos at (765) 285-5034 or akboos@bsu.edu.