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# A Comparison Of The Frequency Of Occurrence Of Stereotypic Behaviors Demonstrated By A Youth With Autism During Two Recreation Activities: Horseback Riding and Board Game Play

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A COMPARISON OF THE FREQUENCY OF OCCURENCE OF  
STEREOTYPIC BEHAVIORS DEMONSTRATED BY A YOUTH WITH AUTISM  
DURING TWO RECREATION ACTIVITIES: HORSEBACK RIDING AND BOARD  
GAME PLAY

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A Thesis  
Presented to  
the Graduate School of  
Clemson University

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In Partial Fulfillment  
of the Requirements for the Degree  
Masters of Science  
Parks, Recreation, and Tourism Management

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by  
Philip J. Brekke  
May 2008

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## ABSTRACT

The purpose of this study is to compare the frequency of occurrence of stereotypic behaviors demonstrated by a youth with autism during two recreation activities: horseback riding and board game play.. Stereotypic behaviors are one of the three diagnostic criteria for autism as listed in the DSM IV and can impact an individual's functional abilities by interfering with learning and daily social behaviors. This study examined the frequency of occurrence of stereotypic behaviors in two different recreation activities.

Despite the increase of attention and press coverage autism has received in recent years, there still remains a multitude of questions about the disorder. Many of the traditional therapy approaches do not address the multifaceted aspects of autism, and leave the individual's treatment plan incomplete. Alternative therapies, such as animal-assisted therapy, have shown to be beneficial for individuals with autism by increasing attention, on task behavior, and prosocial behavior, while reducing maladaptive behaviors. Therapeutic horseback riding is a type of animal-assisted therapy, which has shown to benefit individuals with various physical disabilities but has yet to be documented for individuals with autism.

## DEDICATION

I could sit here and write about how I thought this day would never come, I could explain all the ups and downs of the thesis process, it would all be true; but I am not writing this dedication for myself. This dedication is not for the authors of this thesis, but for those who were carrying the weight right along with me, the entire way; my family, my friends, and Jane, my Love and the strongest of them all. I am not and cannot go into all the countless way each one of you helped me, challenged me, and encouraged me but please know it will honestly never be forgotten, I promise you that. Each time I had the wind knocked out of me, a loved one got me back on my feet. Thank you much; to you all, I can honestly say it would not have been done without you, that is the truth with a TH.

The thesis and I have had a love/hate relationship, with a majority of time spent fighting what had to be done and feeling like it was a never-ending task. Over the past year, I have been extremely appreciative of the full four years it has taken me to acquire a two year degree, and beyond thankful that my thesis brought me back to Clemson after my internship. My return to Clemson allowed me to realize what all of twists and turns have been for, why I truly came here in the first place; it was for Jane.

Thanks again Mom, Dad, Erika, Bill, Beth, and the Brison Girl.

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## CHAPTER ONE

### Introduction

The number of children diagnosed with autism has steadily risen over the past decade. In the United States, statistics show 22,664 children aged 6-21 with autism attended school in 1994 compared with 193,637 in 2005 (Newschafer, 2005). Due to the increase of prevalence and incidence of autism, there is a current consensus within the medical community to expand research and treatment options for the disorder. Many theories have postulated the nature and science of autism, only to later be rebuked; this trend is likely to continue as the medical field continues to make advances.

### Etiology

There are many theories as to the etiology of autism. Autism is a disorder that was unheard of until approximately 65 years ago when Kanner wrote the first article (Kanner, 1943). One of the first theories that attempted to explain autism, suggested that autism was caused by a distant “refrigerator mother” who raised the child in a non-stimulating environment, which affected the communicative and social skills of the children, as well as general development. The “refrigerator mother” theory as well as its creator, Bruno Bettelheim, have since been discredited (Yazbak, 2003a). Another theory that attempted to explain autism was a psychological disorder without an organic basis (Rapin, 1997). More specifically, autism was thought to be another form of schizophrenia due to withdrawn and “odd” behavior. This theory was discredited when researchers carefully observed the differences between the two disorders and noted multiple inconsistencies. The most recent and widespread theory among the medical

community is that autism is a neurodevelopment disorder with multiple etiologies (Rapin, 1997) and strong genetic influence (Cook, 1998).

Other theories of the etiology of autism are currently under investigation and look closely at diet, toxins, and viral exposure (Gillberg & Gillberg, 1983; Yazbak, 2003b). There has been widespread speculation about the measles-mumps-rubella (MMR) vaccine containing the chemical thimerosal, a mercury type preservative (Yazbak, 2003b). The possibility that mercury may affect the immune system of children with a genetic predisposition to autism and trigger the disorder has never been ruled out (Bernard, Enayati, Redwood, Roger, & Binstock, 2001; S. Bernard, Enayati, Roger, Binstock, & Redwood, 2002).

#### Characteristics and Treatment of Autism

Autism, under the umbrella term pervasive developmental disorders (PDD), tends to be most obvious as a profound inability to relate to people, along with language abnormalities and stereotyped repetitive behaviors (Cohen, Paul, & Volkmar, 1986). There exists a negative relation between stereotypical behaviors and engagement in social activities for individuals with autism (Lee & Odom, 1996). This helps explain why many children with autism tend to be “socially withdrawn, lack appropriate social skills, and are disinterested and disengaged from their social environment” (Martin & Farnum, 2002, p. 659).

For therapists, trying to intervene with children diagnosed with autism can be difficult as well, due to the withdrawn nature of the individuals. Therapists need to develop an innovative therapy that fits the needs of their clients with autism since

“traditional therapies have not proved particularly advantageous to this population” (Martin & Farnum, 2002, p. 659). Examples of these traditional therapies are pharmacological interventions and educational therapies (e.g., sensory-motor therapy, communication therapy) (Martin & Farnum, 2002). One intervention that has shown positive outcomes in children with autism involves the use of animals combined with traditional therapies.

The American Psychiatric Association mentions an alternative, animal-assisted therapy (AAT), which “has been theorized to be an effective form of treatment for children with PDD,” (as cited in Martin & Farnum, 2002, p. 657). Studies have shown that AAT can serve as a intervention that can be facilitated by therapists, and is more effective at increasing attention and language skills among children with mental disabilities than the more traditional stimuli and reinforcements (Nathanson & De Faria, 1993). It is believed that “animals may be one way to increase attachment between children with PDD and their social environments” (Martin & Farnum, 2002, p. 657) thus keeping the child focused and on task. This stimulation of interest can be key to therapists since children who are nonverbal or withdrawn in the presence of adults become more socially interactive and are able to engage in dialogue more freely, with less physiological arousal, in the presence of animals (Fine, 2000). Specific to children with autism, AAT was found to increase prosocial behaviors, decrease self-absorption, and lessen stereotypical behaviors (Redefer & Goodman, 1989). Still, the scope of the findings involved with AAT is limited since a majority of the animal intervention studies

available at the present time deal with companion animals such as household pets (Martin & Farnum, 2002; Redefer & Goodman, 1989).

A less common and less researched type of animal intervention is horseback riding. Horseback riding has unique benefits beyond that of traditional animal-assisted therapy. “The value of horseback riding is based in the relationship that develops between the rider and the horse” and the horse can serve “as a medium of interaction, which can be used for a therapeutic purpose” (All & Loving, 1999, p. 52) which can provide a learning opportunity not available elsewhere. This is possible because the horse acts as a transitional object and is able to “bridge the gap between oneself and the outside world” (Blue, 1986, p. 86), which is helpful for individuals with autism. The reason the horse is able to make such a bond goes back to the idea that animals are believed to act as transitional objects, allowing children to first establish bonds with them and then extend these bonds to humans (Katcher, 2002). The horse can act as a means for the instructor to establish a relationship with the child with autism and allow for intervention where typical therapies might have failed.

Horseback riding has been noted as “improving the behavior...of autistic individuals” (DePauw, 1986, p. 222). Some of this may be related to the actual physical sensation of touching the horse, either while riding or grooming the animal (Redefer & Goodman, 1989). It has been shown that touch therapy alleviated anxiety and decreased depression in child patients (Field et al., 1992). Touch therapy has been associated with increased attention span and may reduce the off-task behavior noted in children with autism (Field et al., 1997; Porges, 1991). Research continues to show that

children involved with touch therapy show “fewer autistic behaviors (e.g. orienting to sounds, stereotypic behaviors) and improvement on social relating as measured on the Autism Behavior Checklist and the Early Social Communication Scales” (Field et al., 1997, pp. 338). It has been shown that educational benefits are derived from horseback riding by stimulating the person’s interest and motivation to learn (DePauw, 1986). Therefore, the constant warm physical contact between the horse and the child with autism could aid the instructor by capturing the child’s attention and keeping them on task. Yet the question still looms, why a horse, what is different for the child with autism while on a horse?

### Stereotypic Behavior

Part of the explanation lies in one symptom of autism, repetitive behaviors. Repetitive behaviors are required for the diagnosis of autism and are defined as “repetitive, nonfunctional activities or interests that occur regularly and interfere with daily functioning” (Gabriels, Cuccaro, Hill, Ivers, & Goldson, 2005). A specific type of repetitive behavior is stereotypic behavior, which has been described as motor behaviors that are repetitive, topographically invariant, often rhythmical, and appearing without obvious purpose (Powell, Newman, Pendergast, & Lewis, 1999). Throughout the medical field “there is a widely held assumption that sensory and repetitive behaviors are closely related” (Rogers & Ozonoff, 2005, pp. 1255). Through the literature concerning autism, “it has been suggested that repetitive behaviors have sensory origins or that both types of symptoms are driven by chronic hypo or hyper-arousal” (Rogers & Ozonoff, 2005, pp. 1255). Hypo-arousal, also known as under-arousal, can act as a stimulus

barrier for the individual with autism and their environment, thus making them unable to receive affective and sensory messages (Rogers & Ozonoff, 2005). Hyper-arousal, also known as over-arousal, can cause the autistic individual to become more reactive to sensory stimuli than other children and cause him or her to fail to, or are much slower to habituate to sensory stimuli in the environment. For those individuals who are chronically hypo-aroused or hyper-aroused, horseback riding might help satisfy some of the sensory deprivation or overload that is occurring. Therefore, the repetitive movement of the horse, the novelty of the animal itself, and the constant warmth/touch of experienced by the rider may induce a level of optimal arousal and reduce the frequency of stereotypic behaviors.

Optimal arousal level is a component of the arousal-seeking theory, which was first proposed by Ellis (1973). The theory states that people have a “need for arousal...called sensoristasis and has the basic characteristics of a drive” (Wehman & Abramson, 1976, pp. 556). Sensoristasis “is an energizing setting affecting activity level, it selectively alters the likelihood of responses occurring, and its alleviation is rewarding” (Ellis, 1973). In other words, people engage in certain activities “based on the drive to maintain an optimal arousal level” (Wehman & Abramson, 1976, pp. 557). Individuals who are “functioning at a suboptimal arousal level...strive to seek stimuli in the environment” (Wehman & Abramson, 1976, pp. 557). At the same time “there is also a point of supraoptimal arousal level in which the individual has received a stimulus overload and avoids more stimulation” (Wehman & Abramson, 1976, pp. 557). Both of the situations listed above are thought to be present in children with autism and may help

explain some of the sensory dysfunction that exists. Arousal-seeking theory “can help explain and predict behavior excesses such as stereotypic behavior”...by identifying and manipulating stimuli in the child’s environment” (Wehman & Abramson, 1976, pp. 558). Furthermore, it has been stated that it may be necessary to study an individual over time in a multitude of situations to detect patterns of physiological arousal in response to changes in the individual’s natural environment .

These findings lead to the research question: What is the difference between the frequency of occurrence of stereotypic behavior demonstrated by a youth with autism during two recreation activities: horseback riding and board game play?

#### Statement of Purpose

The purpose of this study is to compare the frequency of occurrence of stereotypic behaviors demonstrated by a youth with autism during two recreation activities: horseback riding and board game play.



### Definition of Terms

- Autism – A life-long developmental disability that typically appears during the first three years of life and impacts the normal development of the brain. Individuals with autism are diagnosed due to substantial delays in communication skills and social interaction, as well as restricted, repetitive, and stereotyped patterns of behavior (DSM IV, 1994).
- Horseback Riding (HR) – Mounted activities including traditional riding disciplines or adaptive riding activities organized and taught by a knowledgeable and skilled instructor for the purpose of recreation and progression in equestrian skills for all people, with or without disabilities.
- Stereotypic Behavior – Defined as repetitious, often rhythmical, and apparently nonfunctional behavior. Stereotyped behavior may take place in a variety of forms, including motor behaviors (e.g., body rocking, handflapping) and language behaviors (e.g., vocalizations, self talk) (Ahearn, Clark, MacDonald, & Chung, 2007).
- Social Validity – Defined as a program strategy to ensure the selection of socially significant goals, creation of socially acceptable methods, and attainment of socially important results (Fawcett, 1991).

## CHAPTER TWO

### LITERATURE REVIEW

#### Introduction

Autism has increased in number of diagnoses each year (Newschaffer, Falb, & Gurney, 2005) and despite its rise, autism remains one of the least understood developmental disorders, especially in the area of stereotypic behavior (F. E. Yazbak, 2003a). Stereotypic behaviors, one of the diagnostic criteria for autism, inhibit the learning of new behaviors and skills, and interfere with the day-to-day functioning (Jennifer, Somer, Jennifer, & Catherine, 2007; Lee & Odom, 1996; Morrison & Rosales-Ruiz, 1997).

Theories of etiology and treatment of autism are constantly being created and examined. The manifestation of symptoms differs greatly from child to child since autism exists on a spectrum, and there has yet to be a consensus on a treatment. Due to the large variation in severity of autistic characteristics multiple treatment and intervention approaches exist.

An alternative to traditional therapies, animal-assisted therapy has shown to be an effective form of treatment for children with autism (Martin & Farnum, 2002). A subtype of animal therapy that has not been researched thoroughly, outside of its effects on people with physical disabilities, is therapeutic horseback riding. Therapeutic horseback riding requires a riding instructor certified by the North American Riding for the Handicapped Association (NARHA) and includes the use of a planned intervention with specific goals and outcomes. In this thesis Horseback Riding (HR) was the focus

since the sessions were geared for recreation, while learning general equestrian skills under the guidance of a Special Olympics Equestrian Instructor. The purpose of this study is to compare the frequency of occurrence of stereotypic behaviors demonstrated by a youth with autism during two recreation activities: horseback riding and board game play; not to examine the effectiveness of a specific intervention (e.g., animal-assisted therapy, therapeutic horseback riding, or recreation participation) on stereotypic behaviors. . The studies presented in this chapter are used to more clearly define the parameters of this study as related to autism, leisure and recreation, and stereotypic behaviors.

The studies identified in this chapter were located using electronic article databases, hand search, and inter-library loan system. Electronic articles were located through search engines such as PsycInfo, Academic Search Premier, and Expanded Academic. For articles that were not available electronically, a hand search was completed in the university library. For articles that were not carried in the university's catalog, an inter-library loan was submitted and sent via email or the postal service. After an exhaustive search of stereotypic behaviors, they have been found in many developmental disabilities including, but not limited to: autism, down syndrome, fragile X, asperger's syndrome, and mental retardation. For the purpose of this study, the focus was on stereotypic motor and language behaviors; self-injurious behaviors were not included.

### Autism

Autism tends to be displayed as a profound inability to relate to people, along with language abnormalities and stereotyped repetitive behaviors (Cohen et al., 1986). Autism, under the umbrella term pervasive developmental disorders (PDD), is a neurodevelopmental disorder with multiple etiologies (Rapin, 1997) and a strong genetic influence (Cook, 1998). Autism tends to appear within the first three years of a childhood and persists throughout an individual's lifetime, which requires educational, family, and adult service intervention that can cost an estimated of \$4 million per client (Jacobson, Mulick, & Green, 1998)

There has been considerable time and effort put forth to examine the various social impairments in autism (Travis & Sigman, 1998; Volkmar, Carter, Sparrow, & Cicchetti, 1993) as well as communicative impairments (Houghton, Bronicki, & Guess, 1987; Mundy, Sigman, & Kasari, 1994). These two impairments are intertwined, which in turn shape the individual socially throughout their lives, and can eventually compound the negative effects such as inappropriate nonverbal skills and a delay or lack of speech. Due to the overt day-to-day and immediate impact of the social and communicative impairments the third diagnostic criteria, stereotypic behavior, has been overlooked in a majority of research (Bailey, Phillips, & Rutter, 1996; Bodfish, Symons, Parker, & Lewis, 2000).

#### Treatment of Autism

Multiple treatment approaches and interventions are utilized when intervening with a person with autism. One of the most widespread forms of treatment is sensory integration therapy, which is an approach that focuses on the individual's sensory

systems such as their vestibular and proprioception. Despite its popularity among practitioners (Watling, Deitz, Kanny, & McLaughlin, 1999), sensory integration therapies have been questioned in their rationale due to nonsignificant empirical findings (Baranek, 2002). Sensory integration therapy as well communication therapy continue to be used, yet their effectiveness greatly depends on the effort put into teaching, but also the individual's overall intelligence (Gabriels et al., 2005).

Pharmacological interventions have not been shown to be effective with individuals with autism (Martin & Farnum, 2002); however, manipulating individuals' biochemistry with sedatives was a form of treatment in previous decades.

Behavior modification techniques such as Applied Behavior Analysis (ABA) therapy, have been shown to be effective in decreasing negative behaviors through the use of consistent reinforcement of positive behaviors (Lovaas, Newsom, & Hickman, 1987); however, some researchers believe it to increase repetitive behaviors (Harris & Wolchik, 1979). One method of reinforcement is overcorrection, which involves a trained professional providing continuous and unwavering verbal and physical cues to individual with autism (Harris & Wolchik, 1979). Research has indicated that it can be time consuming and difficult to implement due to the need for consistency in responses and the cost of outside assistance (Wells, Forehand, & Hickery, 1977). In addition, it can lead to aggressive behaviors (Wells et al., 1977). Since traditional therapies (e.g., sensory integration, behavioral therapy) have not

been demonstrated to be effective in changing behaviors of individuals with autism, alternative interventions have been incorporated into their treatment plans.

### Stereotypic Behavior & Arousal

Stereotypic behaviors can occur in various forms including: a) self-injury (e.g., slapping oneself), b) echolalia (e.g., repeating others words verbatim), c) rituals (e.g. watching the same movie every night before bed), d) compulsions (e.g., making a high pitch siren noise after hearing the word ‘ambulance’), e) obsessions (e.g., regardless of context, only communicating by repeating movie lines), and f) motor stereotypy (e.g., handflapping) (Bodfish et al., 2000). For the purpose of this study, we examined motor and language stereotypic behaviors.

Stereotypic behaviors, whether they are expressed through motor or language behaviors, have been shown to negatively impact the daily lives of individuals with autism. It has been shown that stereotypic behaviors occupy the individuals focus and interfere with learning, even in an adaptive learning setting (Gabriels et al., 2005), and disrupt skill acquisition and social interactions (Morrison & Rosales-Ruiz, 1997). Additionally, the expression of stereotypic behaviors sets the individual apart in a social setting and the behaviors are highly stigmatizing (Matson, Kiely, & Bamburg, 1997)

Even though Autism exists within the larger classification of PDD, there are differences in stereotypic behavior between autism and pervasive developmental disorder – not otherwise specified (PDD-NOS). In a study by Matson and Dempsey (2008), differences were noted in the presence of stereotypic/rituals between the two groups. The study examined 169 adults diagnosed with Autism Spectrum Disorder (ASD), from two

developmental centers in the Southeastern United States. The group was then further divided into individuals with autism ( $N=65$ ) and PDD-NOS ( $N=104$ ). The group of individuals with autism had significantly higher rates of occurrence of stereotypic behavior than the PDD-NOS group. This study demonstrates that rates of stereotypic behavior are the highest for individuals with autism when compared with other persons diagnosed with various disorders classified under ASD. Even though stereotypic behaviors are one the diagnostic criterion for autism, the medical community has not come to a consensus of their underlying causes.

There are multiple reasons for stereotypic behaviors. One theory of stereotypic behavior is that it is caused by sensory dysfunction (Kanner, 1943; Lovaas et al., 1987; O'Neil & Jones, 1997). This sensory dysfunction may be related to the processing of sensory messages within an individual's body. It is theorized individuals interpret sensory input (e.g. visual, tactile, auditory, proprioceptive, and vestibular) anywhere along a continuum from non-existent (no input) to overwhelming (excessive input), therefore potentially influencing their state of arousal. Due to the intricate nature of autism, Lacey's (1967) multidimensional concept of arousal will be used to describe the intricate interrelationships between stimuli and resulting behaviors demonstrated by individuals with autism. This multifaceted approach to arousal examines the changes in the respiratory, cardiovascular, and central nervous system (CNS) that accompany various levels of responsivity to external stimuli (Dawson & Lewy, 1989; Lacey, 1967). Ornitz and Ritvo (1968) were the first researchers to provide evidence that autism is marked by fluctuations between states of hyper- and hypo-arousal. These physiological

changes can result in an individual's inability to effectively regulate sensory stimuli. Thus an individual is required to consistently adjust their behaviors to reach an optimal level of arousal.

One end of the continuum can be described as hypo-arousal. The hypo-arousal theories related to autism were first proposed by Rimland (1964) and subsequently extended by DesLauriers and Carlson (1969). Rimland demonstrated a brain function deficit in the reticular activating system, which impairs an individual's ability to make connections between past and current experiences. Rimland theorized this impairment affects brain function by inhibiting an individual's ability to make generalizations and learn. This impairment can contribute to a lack of typical reaction or under-reaction to stimuli. For example, DesLauriers and Carlson (1969) suggested an imbalance in the reticular activating system that may suppress the limbic system. They surmised this suppression caused a stimulus blocker for typical environmental input, leaving the individual with autism unable to receive sensory and affective messages.

For example hypo-arousal (sensory deprivation) can result in behaviors that appear to serve no purpose, are maladaptive, and repetitive. An individual in a state of hypo-arousal will attempt to self regulate their state of arousal through various means including by seeking stimulation from their environment or engaging in stimulating behaviors (Dawson & Lewy, 1989; Ellis, 1973; Rogers & Ozonoff, 2005; Wehman & Abramson, 1976).

On the other end of the sensory dysfunction continuum lies hyper-arousal. Theories regarding hyper-arousal were first proposed by Hutt, Hutt, Lee, and Ounsted (1964).



Hutt and colleagues stated that an individual with autism is in a continuous state of hyper-arousal and that “typical autistic behaviors, especially stereotypic, repetitive motor behaviors and behavioral withdrawal, function to reduce arousal” (Dawson & Lewy, 1989). Hutt et al (1965) extended their initial hyper-arousal research by measuring electrical activity levels in the brains of children with autism by placing electrodes on their scalp, conducting electroencephalography (EEG). Hutt et al. reported that desynchronized EEG readings, indicated increased arousal, and slowly tapered off after the children engaged in stereotypic motor behaviors (as cited in (Dawson & Lewy, 1989). Zentall and Zentall (1983) suggested that there is a feedback model, which means an individual, is able to manipulate their level of stimulus and arousal by changing their stereotypic behaviors to fit their particular needs. An individual in a state of hyper-arousal will attempt to self-regulate their sensory needs by various means including withdrawing from their environment or engaging in behaviors that promote calmness and that provide the needed sensory feedback to lessen hyper-arousal (Dawson & Lewy, 1989; Ellis, 1973; Rogers & Ozonoff, 2005; Wehman & Abramson, 1976).

There are many studies that focus on motor stereotypes (Bodfish et al., 2000; Dyer, 1987; Gabriels et al., 2005) but relative little research has examined vocal stereotypes. Aheran, Clark, and MacDonald (2007) used an ABAB design and focused on the noncommunicative vocalizations of 4 children, 2 boys and 2 girls, diagnosed with autism. The intervention included response interruption and redirection (RIBD) by a teacher who could stop and correct a child whenever a vocal stereotype occurred. The findings show

that vocal stereotypy, like other forms of stereotypy, are not socially mediated but seem to have a sensory consequences (Ahearn et al., 2007).

It is likely that multiple factors influence the development and maintenance of repetitive behavior (Turner, 1999), rather than the sole purpose of repetitive behaviors being to influence states of arousal. Francis (1966) examined stereotypic behaviors of individuals with developmental delays, and found that over time, multiple behaviors became independent of settings important in their initial formulation. That is, Francis observed various stereotypic behaviors in individuals change over time, and begin to occur separate from their primary predictor or setting. Likewise, factors that promote stereotypic behavior can vary from factors sustain this behavior (Turner, 1999). For example, in a study by Sroufe, Stuecher, and Stutzer (1973) found that a boy with autism demonstrated the stereotypic behavior finger flicking. Finger-flicking was observed when he was excited and happy, when he was faced with novel situations and tasks which raised his pulse, and lastly it was observed at a high rate when he was alone and nonstimulated (Turner, 1999). This study supported that stereotypic behaviors can be determined multiply.

#### Animal-assisted Therapy/Therapeutic Horseback Riding

Animal-assisted therapy (AAT) has utilized the unique bond that humans can have with animals but not until recently has there been research with much more than anecdotal excerpts. In a study looking at nursing home residents reactions to both a dog and a friendly visitor it was shown that the dog elicited more prosocial behavior (i.e. smiling, patting, moving closer) out of the residents than did the human

counterpart (Kaiser, Spence, McGavin, Struble, & Keilman, 2002). The findings also showed that when the residents were with the dog they were able to satisfy their need to nurture and to give and receive tactile comfort in a socially acceptable way (Kaiser et al., 2002). The overall effects of being in the presence of animals seem to be universal but there are specific changes in behavior and affect for individuals with autism. Redefer and Goodman (1989) conducted a study of 12 children with autism, 3 girls and 9 boys, and studied how the children reacted with and without a dog in their typical therapy sessions. Immediately when the dog was incorporated into a session there was a sharp increase in verbal and nonverbal behavior directed at either the therapist or the dog as well as a quick decrease in self-stimulation (Redefer & Goodman, 1989). Martin and Farnum (2002) followed up and conducted a study with 10 children, 2 females and 8 males, with pervasive developmental disorders (PDD) aged 3 to 13. Each child served as their own control due to the individualized nature of PDD and their behaviors were recorded in three settings, with a ball, with a stuffed dog, and with a live dog (Martin & Farnum, 2002). The children showed an increase in energy, focus, laughter, on task verbal feedback, and attention while in the presence of the dog (Martin & Farnum, 2002). These studies focused on the use of household pets but there is a type of AAT where horses are ridden to offer even more interaction and contact for the individual involved.

Therapeutic horseback riding has typically been associated with people who have a physical impairment. In a study that looked at a 12-week therapeutic horseback riding for 22 adults (15 females and 7 males) with a variety of physical disabilities,

Faris-Tomaszewski, Jenkins, & Keller, (2001) conducted pre and post tests to measure physical and global self-efficacy. It was shown that throughout the study that physical self-efficacy and behavioral self-confidence increased, while global self-efficacy did not change (Faris-Tomaszewski et al, 2001). Now HR benefits are being offered to persons with emotional, cognitive, speech, and behavioral disorders.

Macauley and Gutierrez (2004) examined the effectiveness of hippotherapy compared to traditional therapy for children with language-learning disabilities. Hippotherapy in this study is defined as a speech therapy treatment strategy utilizing equine movement (Macauley & Gutierrez, 2004). In the study 3 boys aged 9-12 years old and their parents completed satisfaction questionnaires at the end of both types of therapy and it was shown that after the hippotherapy all respondents had higher levels of satisfaction after being on horseback as well as improved motivation and attention (Macauley & Gutierrez, 2004).

The fields of physical, speech, occupational, and recreational therapy have accepted the use of horses as a worthwhile modality yet terminology among professionals, and researchers alike, lacks congruity. Terms such as therapeutic horseback riding, therapeutic horsemanship, equine-assisted activities, and hippotherapy have at times been used interchangeably and not always along the parameters set-aside by NARHA.

### Board Game Play

Social impairments of autism have been emphasized in research (Bailey et al., 1996; Cohen et al., 1986; Dawson & Lewy, 1989; Kanner, 1943) as one of the

prominent features of the disorder. In a multiple baseline study conducted by Baker (2000) she examined the effects of an intervention aimed at increasing the sibling social play interactions for three children, diagnosed with autism (Baker, 2000). The intervention included incorporating thematic ritualistic activities (objects, topics, or themes the child is focused on) of the children with autism into common games played with their siblings (Baker, 2000). The results showed that thematic ritualistic behaviors of children with autism can be successfully integrated into play and increase social interactions of siblings while participating in these recreation activities (Baker, 2000). These findings show that individualized recreation opportunities may allow an individual with autism to interact more with their peers when their interests are being addressed by the activity at hand.

Another major diagnostic criteria for individuals with autism, is an impairment or lack of communication (Cohen et al., 1986; Dyer, 1987; Kanner, 1943). In a quasi-experimental design conducted by Smith, Gooddard, and Fluck (2004) the researchers examined the effects of an intervention aimed to instill social attention skills and to promote socially meaningful communication in young children with autism (Smith et al., 2004). The intervention included incorporating research aspects of pre-linguistic development of children such as being able to communicate as both listener and talker and having appropriate facial expressions (Smith et al., 2004). The results showed that children with autism had increase in social participation and communication during group game play after going incorporating the intervention based on the social aspects of play (Smith et al., 2004). These findings show that

play may allow an individual with autism to be successful using and understanding language in a social context (Smith et al., 2004).

This study did not examine the effectiveness of HR, nor did an intervention take place. The focus of this study was behavioral observations, which allowed the researcher to compare the frequency of occurrence of stereotypic behaviors demonstrated by a youth with autism during two recreation settings: horseback riding and board game play.

Literature tells us stereotypic impact individuals with autism throughout their lives in areas of learning, social interaction, and communication (Gabriels et al., 2005; Morrison & Rosales-Ruiz, 1997). The presence of animals and more specifically horseback riding, has been shown to increase attention, global and physical efficacy, reduce maladaptive behavior for individuals with developmental disabilities (Faris-Tomaszewski et al., 2001; Macauley & Gutierrez, 2004). The incorporation of play or recreation has been shown to increase social interaction, attention, and communication skills for individuals with autism (Baker, 2000; Smith et al., 2004). This study extends the existing literature by comparing the frequency of occurrence of stereotypic behaviors demonstrated by a youth with autism the two different recreation activities: horseback riding and board game play.

## CHAPTER THREE

### METHODS AND PROCEDURES

#### Introduction

Data used for this research were gathered during the summer months of 2006. The objective of this research was to compare the frequency of occurrence of stereotypic behavior demonstrated by a youth with autism during two recreation activities: horseback riding (HR) and board game play (BGP).

This chapter describes the research design, center and participant requirements, procedures, instrumentation, and methods of data analysis used in Chapter IV.

#### Approval of Protocol Involving Human Subjects

A protocol involving human subjects was submitted to the Clemson University Institutional Review Board. The study was given final approval under full board review.

#### Research Design

This exploratory study was informed by behavioral observation techniques used in single subject design. Behavioral observation data were collected via videotape during both HR and during BGP. Researcher field notes, as well as qualitative interviews of individuals within the participant's support network (e.g. parents, teachers, and therapists) were conducted to assess the social validity of HR.

#### Description of Settings

##### Horseback Riding Agency

As Kravetz (1993) has suggested, instead of creating horseback riding programs primarily to conduct research, researchers should use more established riding programs.

Being a riding center conducting safe horseback riding lessons was the only criterion needed for this study. This criterion was put in place to ensure the reliability of the riding center and the safety of the rider, instructor, and horse. The riding center trained all the professional staff, the volunteer staff, the center's organization and administration staff, how to interact appropriately and safely with horses and the physical facility.

The riding center taught general horseback riding lessons to all people, those with and without disabilities. The lessons guided and instructed the riders through topics of a) anatomy of the horse, b) grooming equipment and techniques, c) riding tack d) safety and standard dismounts, e) riding posture, f) rein control, and g) responsibilities of a horse owner. The areas taught allowed the rider to experience not only riding the horse but the overall care needed to keep the rider and horse safe.

#### Home-based Game Play Area

The BGP occurred in an outbuilding adjacent to both the family farm and their home. The 'clubhouse' consisted of one room that served as a recreation room, which was filled with musical instruments, comics, Hero Clix ® figures, and many types of games. There was a large rectangular table in the center of room where all the board games were played.

#### Instructor Profile

During the period of my behavioral observations, the riding instructor was certified by the Special Olympics Equestrian Program. This certification required the instructor not only to pass the Special Olympics South Carolina Equestrian Exam but also to demonstrate equestrian riding abilities, and her ability to instruct with a lesson plan



(Dyer, 2000). The riding instructor and her horses have worked with many children with various disabilities ranging from physical disabilities to mental illnesses. She was certified to instruct the Special Olympics Equestrian Program previously in both Montana and Alabama over the past 15 years.

### Description of Participant

The participant recruited for this study was participating in HR and BGP. The participant involved in this study was Sam, a 13-year-old male diagnosed with autism. He resided with his parents and his 12-year-old brother at a home in Upstate South Carolina. The participant continued his education through a home schooling program. Sam was observed twice a week, for a total of seven sessions of data collection in each activity.

Sam's participation in this study was voluntary and there was no added incentive offered. Sam's characteristics included: a) diagnosis of autism at age 2-years-old, as described by the Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (1994), b) involved in a HR program at one riding facility d) involved in BGP e) involvement in HR and BGP occurred for 4 consecutive weeks.

Limiting study inclusion criterion to single rider with a diagnosis of autism was an attempt to lessen the influence of additional variables associated, when including participants with multiple disabilities. If the youth displayed atypical behavior then those behaviors could be potentially attributed to his single developmental disorder, autism. Selecting a participant with previous involvement in HR occurred to reduce a time-intensive, multi-step process of establishing rapport between the rider, therapist, and

horse. In addition, a participant with HR experience may have overcome the gravitational insecurity, which is a characteristic of autism, and potentially be able to ride independently, thus making his behaviors easily observable. Gravitational insecurity has been seen in many individuals with autism and can be described as sensory defensiveness or fear of falling down. This fear of falling is due to the fact that some individuals have an imbalance in their vestibular system, which causes the instability ("Information Sheet 7, Gravitational Insecurity," 2004).

During the time period Sam was involved in HR, he was also involved in another self-chosen and parent approved recreational activity, board game play (BGP). Both HR and BGP occurred weekly. BGP served as a comparison activity to the riding program and took place in a 1:1 or small group setting consisting of the participant and his parents, caretaker, friends, or sibling.

#### Description of Instrument

The instrument is a stereotypic behavioral checklist, which is divided into two categories: stereotypic motor behaviors and stereotypic language behaviors. The behaviors were compiled from the 1985 Aberrant Behavior Checklist (as cited in Marshburn & Aman, 1992) that are supported by research related to autism, (Bodfish et al., 2000; DSM-IV; Gabriels et al., 2005) and from preliminary interviews conducted with the participant's support network. The participant's parents, therapist, classroom teacher, and HR instructor were asked, "what are his (Sam's) physical or vocal stereotypic behaviors?" Two behaviors, finger snapping and body rocking, were not

initially listed on the observation form, but were later added after being identified by Sam's support network (Appendix C).

The behavioral checklist used a partial interval schedule for data recording and was broken into one-minute intervals. The study's focus was the occurrence of a specific behavior within a certain recreation activity, rather than the actual frequency of the behavior within a given time period. If a stereotypic behavior occurred within that one-minute interval the observer put one check in that box for an occurrence. One occurrence was noted regardless of how many times that behavior was seen within that specific interval of time.

### Activities

#### Horseback Riding

The riding center granted permission to conduct the present research study in the spring of 2006. The riding facility is located adjacent to the same land where Sam and his family reside. In addition to the riding facility, which is composed of a tack room and stables, there are grazing pastures for other livestock, gardens, a greenhouse, the family home, and an outbuilding dedicated to hobbies.

During the summer of 2006 the participant rode twice a week at the horseback riding center, roughly at 6:00pm on Tuesdays and Thursdays. A typical session began in the horse stables, where the horse was groomed and tacked by the participant, under the guidance of the riding instructor. The participant then led his horse to the riding pasture, which was a flat open-aired grassy field. The riding pasture was located adjoining to the stables and the surrounding fields consist of pastures used for grazing horses, llamas, and

goats. In addition to the rider, there was also the Special Olympics Equestrian instructor he worked with for multiple lessons during the riding session. The participant rode independently, meaning he was able to mount/dismount and maneuver his horse with reins without any additional assistance. The participant then went through the designed riding session, which varied in time due to the content and structure, (see table 1 for a description of each session). After the session the participant thanked his horse and his instructor and left the riding facility.

Table 1

Description of HR Sessions

| Day/Time                           | Length of Session /<br>Number of Onlookers | Location/Horse            | Description of Session                                                                                                                                                                                      |
|------------------------------------|--------------------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tuesday - 6:30pm<br>Training Video | 34 minutes<br>2 People                     | Pasture 1<br>Belgian      | Training Video - Sam's first ground lesson focusing on riding safety. Did not mount horse.                                                                                                                  |
| Thursday - 6:30pm<br>Session 1     | 43 minutes<br>2 People                     | Pasture 1 Belgian         | Riding safety continued, first time on horse, practiced safety dismount.                                                                                                                                    |
| Tuesday - 6:05pm<br>Session 2      | 32 minutes<br>3 People                     | Pasture 1 Belgian         | Groundwork/grooming at beginning of session and then Sam's first time riding.                                                                                                                               |
| Thursday - 6:15pm<br>Session 3     | 30 minutes<br>1 Person                     | Pasture 1 Belgian         | Sam rode first, practiced turns and maneuvering horse with reins.                                                                                                                                           |
| Tuesday - 6:35pm<br>Session 4      | 26 minutes<br>2 People                     | Pasture 1<br>Belgian      | Started with grooming, then went to lead work, finished with riding                                                                                                                                         |
| Thursday - 6:30pm<br>Session 5     | 31 minutes<br>4 People                     | Pasture 2<br>Quarterhorse | New pasture and horse. Sam rode the horse in a big loop off to a distant field to get to know horse. He trotted for the first time ever at end of session.                                                  |
| Tuesday - 6:33pm<br>Session 6      | 40 minutes<br>8 People                     | Pasture 2<br>Quarterhorse | Sam's stepbrother rode first. Sam engaged in body rocking while waiting. During Sam's lesson the horse hurt it's hoof and the session ended early.                                                          |
| Thursday - 6:15pm<br>Session 7     | 22 minutes<br>5 People                     | Pasture 2<br>Quarterhorse | Sam rode first and become frustrated with the riding instructor's teaching style. His teacher/previous therapist had to step in. Sam's mom told me he is keeping track of how many sessions I left to film. |

## Board game play

Sam also participated in a strategic fantasy board game, Hero Clix®, which served as the comparison recreation activity. The Hero Clix® sessions occurred twice a week, on Tuesdays and Thursdays at approximately 5pm, for each session. Hero Clix® was played prior to horseback riding and this activity continued for four consecutive weeks. Hero Clix® is a strategic board game, which uses Marvel® and DC® comic book figures to build a team and “battle” an opposing team. The game uses an intricate game board, which is an aerial layout of a cityscape and comic books figures move to various locations of the board per number on the game dice. This game can be played solo, where an individual sets up different teams and “battles” them against each other, or played in a group setting of up to five people with each person controlling their own team. The game was played on a large table in the center of the ‘clubhouse’. Each of the Hero Clix® games occurred at the same time of the day, on the same days of the week, and in the same room. The only variations between games were the number of participants involved. During sessions 1 and 5 Sam played with two friends aged 10 and 12, and during sessions 3 and 4 Sam’s father and brother Rich were in the room, but not participating in the game. For session 2, 6, and 7 Sam played in solo sessions and the researcher was the only other person in the room.

A typical Hero Clix® session occurred in an outbuilding, called the clubhouse, next to Sam’s home. The game began with the player(s) collecting as many figures, each assigned a set point value, as needed based on the point limit of that particular game. Once teams were compiled the player(s) then rolled the die to see which team moved

first. Game duration varied due to the number of players and the varying point levels used. Each Hero Clix® session lasted approximately one hour and could host as many three full games (see table 2).

Table 2

Description of BGP Sessions

| Day/Time                           | Length of Session /<br>Number of Players | Number of<br>Onlookers | Description of Session                                                                                                                                |
|------------------------------------|------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tuesday - 5:00pm<br>Training Video | 22 minutes<br>1 Person                   | 1 Person               | Training Video – Sam played by himself and explained some of the basic rules of the board game.                                                       |
| Thursday - 5:10pm<br>Session 1     | 29 minutes<br>3 People                   | 1 Person               | Sam played with two friends and they all carefully chose their teams and then played one full game.                                                   |
| Tuesday - 5:00pm<br>Session 2      | 49 minutes<br>1 Person                   | 1 Person               | Sam played by himself today and was able to play 3 full games.                                                                                        |
| Thursday - 5:05pm<br>Session 3     | 43 minutes<br>1 Person                   | 3 People               | Sam played by himself but his Dad and his brother Rich were in the room at the time of the game. Sam played 2 full games.                             |
| Tuesday - 5:00pm<br>Session 4      | 51 minutes<br>1 Person                   | 3 People               | Sam played by himself today and spent the first few minutes choosing his team and then played 1 long game.                                            |
| Thursday - 5:00pm<br>Session 5     | 62 minutes<br>3 People                   | 1 Person               | Sam played with 2 friends again and they all choose large teams. Only 1 game was completed.                                                           |
| Tuesday - 5:15pm<br>Session 6      | 38 minutes<br>1 Person                   | 1 Person               | Sam was tired today from working on the farm but said he enjoyed playing the board game. He played a full two games by himself.                       |
| Thursday - 5:05pm<br>Session 7     | 32 minutes<br>1 Person                   | 1 Person               | Sam asked how many more sessions we had left today. He played by himself and seemed a bit distracted and only played one game which he did not finish |



### Data Collection

Behavioral observation data were collected via digital video footage using a recordable DVD camera. The videotaped observations occurred two times per week during each activity for a total of four weeks and was conducted by the researcher using a Sony® DCR-DVD92 NTSC camera and tripod. One activity was HR and the second activity was a recreation activity chosen by Sam and approved by his parents. Video footage was recorded prior to the start of each activity, during, and after each activity. Each activity was viewed while using the behavioral checklist that was divided into a 60-second intervals to record behaviors via partial interval recording.

Various measures were taken to limit the effect of a new individual and/or object in the target participant's riding session. For example, in an attempt to reduce the participant's and horse's sensitivity to new objects (e.g., camera, tri-pod) and presence of unfamiliar individuals in close proximity) prior to filming, the camera/tripod were introduced in the riding pasture for an entire session while the researcher simulated videotaping procedure. The simulation included moving the camera and tripod to various locations in the riding pasture. This also provided the researcher with the opportunity to realistically test the camera's image quality, zoom capacity, and microphone capabilities in the pasture while no lesson was occurring the previous week.

### Data Coding

The data collection and analyses in this study were influenced by single subject design methods. Single subject design is a research strategy that has been developed to document changes in the behavior of the individual participant (Tawney & Gast, 1984).

Single subject design examines an individual via repeated measurement, to verify functional relationships between an individual's behavior and changes in the environment (Dattilo, 1986). Examining in detail specific, observable behaviors of a single individual was appropriate due the nature of the study and close examination of stereotypic behaviors engaged in by a 13-year-old boy with autism. Using aspects of single subject design allowed Sam to serve as his own experimental control in the two activities being analyzed.

### Data Analysis

#### Training of the Secondary Observer

Footage was captured during a riding lesson, prior to any data collection, to train the secondary observer involved in the study. The secondary observer was chosen due to her graduate education focused on social science research and recreation for individuals with disabilities. The researcher was responsible for viewing the training video with the secondary observer and teaching her how to: identify both types (e.g., motor, language) of stereotypic behavior, differentiate between similar behaviors, operate the viewing devices, and use the behavioral checklist. The training occurred on two separate days for one hour each day. During this hour session the researcher trained the secondary observer how to operate the DVD program, Power DVD, on which all data would be viewed. The computer used was a Dell Dimension Desktop 4550 with a 17 flat panel monitor. During training sessions the researcher would stop the DVD after every two minutes and discuss what the secondary observer observed. The researcher would then review the specific behavior on the data there was a discrepancy about and ultimately

refer to the behavioral definitions, which serve as a guideline for the stereotypic checklist.

The trained secondary observer then coded 20%, or four full sessions, of the video data collected to establish inter-observer reliability. The secondary observer randomly selected the footage to be reviewed by drawing two out of the seven slips of paper out of a hat, each slip representing two sessions of data, one in each activity. Sessions 2 and 4 were selected for both the BGP and the HR activities. Reliability checks were used on 20% of the data collected to measure the interval by interval method and occurrence agreements (Tawney & Gast, 1984).

After data were observed by both the researcher and the secondary observer, the researcher applied two reliability coefficients. The first method of reliability coefficient applied was interval by interval agreement, which uses all intervals in calculating inter-observer agreement. Interval by interval agreement technique “examines the records of two observers and counts 1 for each interval in which there is an agreement that a behavior occurred” (Tawney & Gast, 1984). The interval by interval method is expressed in a formula as  $[\text{Agreements} / (\text{Agreements} + \text{Disagreements})] \times 100 = \text{Percent of Agreement}$ . Throughout the study the inter-observer rate for the interval by interval method did not fall below 90% and therefore eliminated the need to retrain the secondary observer since 90% agreement exceeded the recommended minimum percentage (80%) of agreement between the researcher and secondary observer. The interval by interval agreement method yielded an overall inter-observer median of 93% (mean of 94%), with a range of 90%-99%, across both activities (HR and BGP).

The second method of reliability coefficient calculation was an occurrence agreement method. This method is recommended “when target behaviors are reported to have occurred in less than 75% of the intervals” (Tawney & Gast, 1984). This method was appropriate for all data since the highest rate of occurrence in one session, in either activity, was a maximum of 72% of the intervals. Occurrence agreement is calculated by using “only those intervals in which one or both of the observers record an occurrence” (Tawney & Gast, 1984). If occurrence inter-rater reliability dropped below 80% the secondary observer would require re-training; however this did not occur. Overall, occurrence agreements yielded an inter-observer median of 92% (mean of 91%) with a range of 87%-94%, across activities.

#### Behavioral Observations

Data recorded in the behavioral checklists were entered into Microsoft Excel® to develop graphical representation of the data. The comparison of the occurrence of stereotypic behaviors during HR and BGP, for a youth with autism, was conducted through visual inspection. Visual inspections of graphic displays are often the most effective means to determine the aspects of an activity being analyzed (Parsonson & Baer, 1978). The magnitude of the difference between the varying activities can be determined by examining the ordinate value (vertical distance) between the data points being compared (Tawney & Gast, 1984).

Graphs were created and illustrated the frequencies of stereotypic behaviors from the two activities onto a single graph. For example, for each stereotypic behavior a bar graph displayed the frequency of occurrence for a specific stereotypic behavior during the

HR activity as well as the frequency of occurrence of this same stereotypic behavior from the BGP. In these graphs each bar represented the cumulative frequency of a type of stereotypic behavior, either motor or language for that given session of observation. The construction of these graphs allowed the viewer to visually identify a difference, if present, in the type of stereotypic behavior present in a particular activity.

#### Semi-structured Interviews

The semi-structured interviews were incorporated into the data analysis through the use of specific quotes. Each question asked to a member of the support network was divided by topic and further segmented through individual respondents by following the qualitative analysis of clustering data. For each question applicable quotes were selected to represent the multiple points of views and interactions of the respondents with the target participant. Information specific to triggers and reductions of stereotypic behaviors allowed the researcher to speculate how levels of arousal might affect the target participant, particularly the frequency of stereotypic behavior observed.

#### Social Validity

There was an interview component with the target participant's support network to gather data, which could add to the comparison of stereotypic behaviors observed in the physical and social environment. This same data was also used to assess the social validity of HR. Social validity allowed the consumers and significant others the chance to evaluate the acceptability of an activity (Schwartz & Baer, 1991). Social validation was used as a strategy to help ensure the selection of socially important goals, procedures, and attainment of socially important outcomes (Fawcett, 1991). The support

network, as stated before, consisted of the participant's parents, therapist, teacher, and therapeutic riding instructor. The preliminary questions asked to the support network, took place prior to any coding and inquired about any specific motor or communicative stereotypic behaviors that exist in the target participant. In addition, during these initial interviews there was a set of questions focusing on situational variables that affect the frequency of the participant's stereotypic behaviors. The questions were: 1) are there certain situations or variables in the environment that trigger the participant's stereotypic behavior, and 2) are there certain situations or variables in the environment that reduce the participant's stereotypic behavior? This second set of questions allowed the researcher to speculate the cause or reduction of stereotypic behavior across multiple environments including: school, home, and HR.

The last set of questions occurred after all video footage had been collected and was retrospective in nature. The entire set of questions was asked just to the parents, and the first two questions were asked to other members of the participant's support network involved with the participant during horseback riding sessions. Examples of follow-up questions were as follows: 1) have you seen a change in the participant since they began horseback riding? 2) Have you seen a change in the frequency of stereotypic behaviors since the participant began horseback riding? 3) Why have you continued sending the participant to horseback riding? 4) Do you plan on having the participant continue in the riding program for seasons to come? The responses to these questions helped give a parents point of view of the social validity of HR as it related to overt behavior of the participant.

## CHAPTER IV

### RESULTS

This chapter presents the data collected through video footage, interviews, and memoing. First, there will be a review of the stereotypic behavior frequencies in both the HR activity and the BGP activity. Next, there will be a presentation of themes as related to the interviews conducted to members of the participant's support network. Lastly, there will be examination of the researcher's daily notes specially looking at variables across sessions.

#### Stereotypic Behavior Frequency of Occurrence

Behavioral observations and the data captured via digital videotaping, allowed the researcher to compare the frequency of occurrence of stereotypic behaviors demonstrated by a youth with autism in during the two recreation settings: HR and BGP. The findings of each of the motor and language stereotypic behaviors will now be presented in detail.

#### Body Rocking

Body rocking occurred during eight sessions of data collection (see figure 1, pp. 47). Specifically, body rocking occurred in six out of seven (86%) of the HR sessions. Body rocking was the only stereotypic behavior in which the rate of occurrence was higher during the HR sessions in multiple sessions (i.e., four out of six). During the HR sessions, body rocking occurred from a range of 4% (4% = the frequency of the observed behavior divided the total number of 60 second intervals within a session) to 31% of the intervals, with a median (*Mdn*) of 10%. The lowest percentage of this stereotypic behavior, 4%, occurred on session four and the highest percentage, 31%, occurred on

session two. Even in the sessions where body rocking was recorded, regardless of activity, there was only a total of two sessions where the behavior was coded in more than 20% of the respective data.

Body rocking was observed in two out of seven (29%) of the BGP sessions. During the BGP sessions, body rocking occurred from a range of 0 to 21% of the intervals, with a *Mdn* of 0. The lowest percentage of this stereotypic behavior, 0, occurred on sessions two, three, four, six, and seven. The highest percentage of observed body rocking during BGP was 21% and occurred on session five.

#### Tongue Rolling

Tongue rolling occurred during eleven sessions of data collection (see figure 2, pp. 48). Specifically, the behavior was observed in four out of seven (57%) HR sessions. Tongue rolling was always observed at a rate of less than 20% for the respective HR data, with a range of 0 to 18% of the intervals. The lowest rate of observation, 0, occurred on sessions two and three, while the highest rate of observation, 18%, occurred during HR session seven. Throughout the HR sessions tongue rolling was observed with *Mdn* of 12%.

Tongue rolling was observed in seven out of seven (100%) BGP sessions. Within BGP, the range of frequency of occurrence varied from 16% to 72% of the intervals. The lowest rate of observation of tongue rolling, 16%, occurred in session seven and the highest rate of observation, 72%, occurred in session one. During four of the sessions, tongue rolling was observed at over 45%. The *Mdn* for this behavior was 47%, making it the highest median for any behavior, in either activity.



### Self Talk

Self talk was observed in ten sessions of data collection (see figure 3, pp. 49). This behavior was observed in three out of seven (43%) sessions of HR. The observation of self talk ranged from 0 to 13% of the intervals for all of the HR sessions. The lowest rate of observation for this behavior was zero and occurred in HR sessions two, three, six, and seven. The highest rate of observation for self talk was 13% and occurred in HR session five. The *Mdn* for this behavior during HR was zero.

Self talk was observed in seven out of seven BGP sessions. Within BGP the observations for this behavior ranged from 14% to 57% of the intervals. The lowest rate of self talk observed was 14% and occurred in session one. The highest rate of self talk observed was 57% and occurred in session five. During three of the sessions, self talk was observed at over 45%. The *Mdn* for this behavior during BGP was 24%.

### Finger Snapping

Finger snapping occurred in five sessions of data collection (see figure 4, pp. 50). Specifically, this behavior occurred in two out of seven (29%) HR sessions. Within the HR sessions the observation rate for finger snapping ranged from 0 to 3% of the intervals. The lowest rate for this behavior was zero occurred in all HR sessions except one and five. During session five the highest rate of observation, 3%, occurred.

Finger Snapping was observed in three out of seven (43%) BGP sessions. Within BGP the observations for this behavior ranged from 0 to 10% of the intervals. The lowest rate of finger snapping observed was 0 and occurred in sessions three, four, six,

and seven. The highest rate of finger snapping observed was 10% and occurred in session one. The *Mdn* for this behavior during BGP was 0.

#### Repetitive Speech

Repetitive speech was observed in two sessions of data collection (see figure 5, pp. 51). In particular, repetitive speech was not observed in HR (0%), making it the only behavior completely absent from the horseback riding activity. As for BGP, repetitive speech was observed in two out of seven (29%) sessions. The range for this behavior during BGP ranged from 2% of the intervals, which occurred in session two, to 7% of the intervals in session one. The *Mdn* for repetitive speech was zero.

#### Hand Flapping

Hand Flapping was observed in one session of data collection (see figure 6, pp. 52). Specifically hand flapping was not observed in BGP (0%), making it the sole behavior completely absent from the BGP activity. As for the HR activity, hand flapping was observed only in session five at 5% of the intervals. The *Mdn* for this behavior was zero.

#### Social Validity

Semi-structured interviews were conducted to examine the social validity of the study's methods, goals, and overall social importance of the findings. The participant's parents and members of his support network were interviewed twice during the duration of the study. The participant's support network for this study consisted of his ABA therapist/home schoolteacher and also a family friend/ employee of the Heritage Place Equestrian Center. Each of the persons interviewed had day-to-day interactions with the

participant during the duration of the study and also years of previous contact with the participant, varying from parent to teacher to friend.

The first set of interviews was conducted prior to data collection to aid in the development of the checklist used for coding behavioral observations (Appendix C) and also to learn about situational variables that may affect the frequency of the participant's stereotypic behavior. The second set of interviews was conducted after data was collected to get a view of the social validity of HR as it relates to the overt behavior of the participant. The parents and support network stated that they have noticed a behavioral change in the participant during the course of the study. The participant's father expressed that "Sam's behavior seems to be more focused and calm during horseback riding" and that "Sam reports that it helps him 'quiet his mind'." Sam's mother stated a change "in his confidence, calmness, expansion of desire to try new things, and an understanding of animals' and others' feelings – related to learning about horse psychology and 'reading' horses' moods." Both of Sam's parents commented that they saw a reduction in his stereotypic behavior following a HR session. Members of Sam's support network expressed that he "shows more self confidence, and is willing to participate in the activity longer than in the initial session." They also stated, "during the later ridings lessons the participant was used to the routine and could do most activities independently, therefore reducing the stress of having to focus on verbal cues." Lastly Sam's parents stated that he has continued in a HR program for the following reasons: "seen benefits both emotionally and behaviorally, enjoyment, ability to calm, increased self confidence, and stimulation and strengthening of core muscles, which helps promote

neural pathway creation.” Lastly, Sam’s mother also reported a statement in which he said “ ‘I like it because it pulls me out of my own world’ and that ‘I focus better’.”

Overall the interviews supported the notion that HR impacted the participant’s frequency of stereotypic behaviors. The parents and members of the support network expressed how Sam’s frequency of stereotypic behavior decreased after HR and that he enjoyed riding in general. The statements also relate what occurred during the riding lesson to other aspects of the participant’s life such as social interaction, understanding other’s emotions, and levels of self-confidence.

#### Observations for Researcher’s Journal

The researcher recorded observations throughout the duration of the study as to supplement the video data. Some of the written observations note behaviors or situational contexts that would not otherwise be recorded on videotape. The following observations are from the journaling notebook.

The first four HR sessions occurred in the pasture near the family home and Sam rode a Belgian horse. The Belgian is an extremely large horse that stands about six feet tall at the shoulder and is not used for trotting or running in any manner. The next three HR sessions occurred across the street in the Heritage Place Equestrian Center pastures near the large stables. For these three sessions Sam and Rich both rode Bojo, a veteran therapeutic riding horse and older American Quarter-horse who belonged to their riding instructor. At the time Bojo had been used in HR for over 3,000 different youths. Sam was able to trot and even slightly gallop with Bojo during the last three sessions due to the fact that the horse was capable and used to that sort of riding. During HR sessions the

order in which Sam, the participant, and Rich, his stepbrother, would ride varied session to session. While one person was riding with the instructor, the other waited until it was their turn. Each rider always rode bareback because neither one of them had boots to wear while in stirrups. It was the riding instructor's policy that no one can ride on a saddle with stirrups without boots due to overall safety.

The BGP sessions always started prior to the HR sessions. Some sessions Sam would play by himself and other sessions he would have two friends to play with, each managing their own team. Other sessions, people would be in the room reading comics, surfing the internet, or chatting. Some sessions multiple games, three or four, would occur and other sessions only a portion of one. On certain sessions Sam would take large amounts of time choosing his team while other sessions it was a fairly quick process. Sam mentioned he liked to move the characters by their heads, "like they are talking." All the players seemed to use sound effects when moving their respective players around the board or when they were being "hit or fired upon" but not when it was a peers' move. Sam would become annoyed if outside interference would disrupt the game (i.e., a football hitting the door).

Figure 1

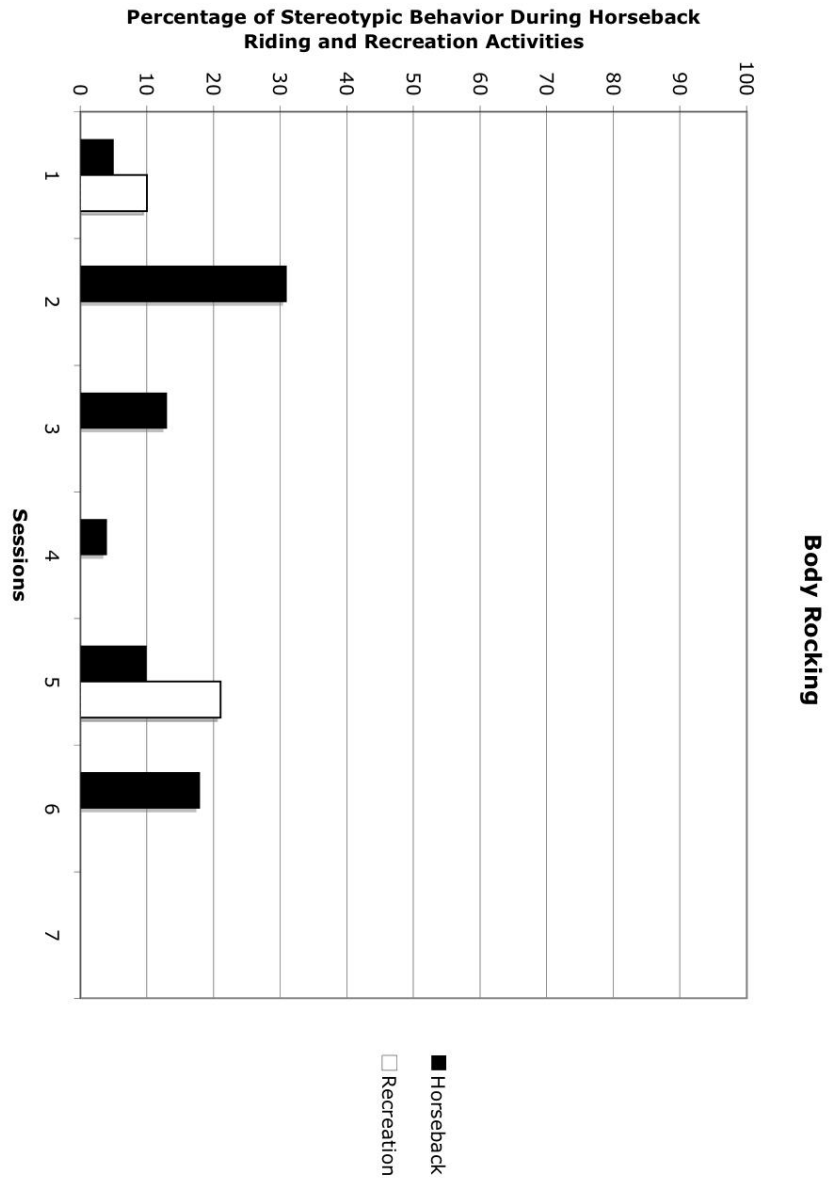


Figure 2

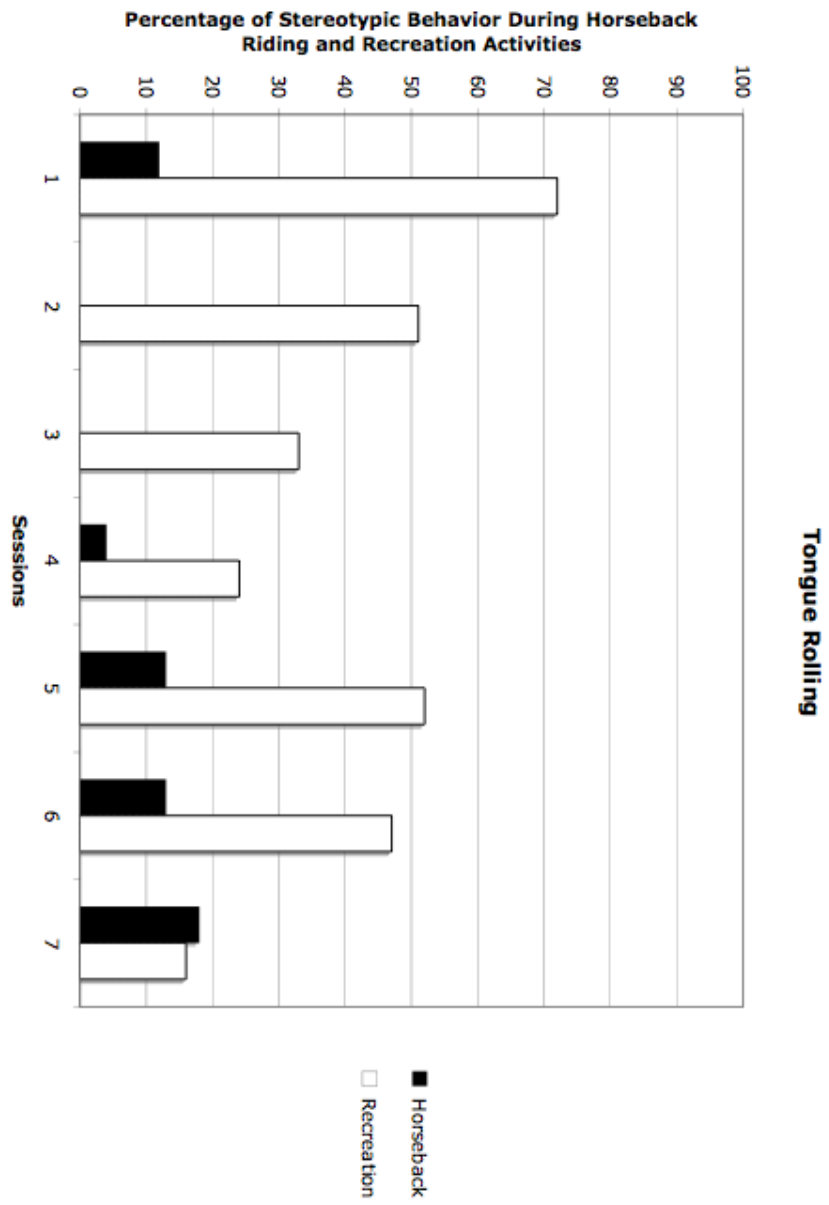


Figure 3

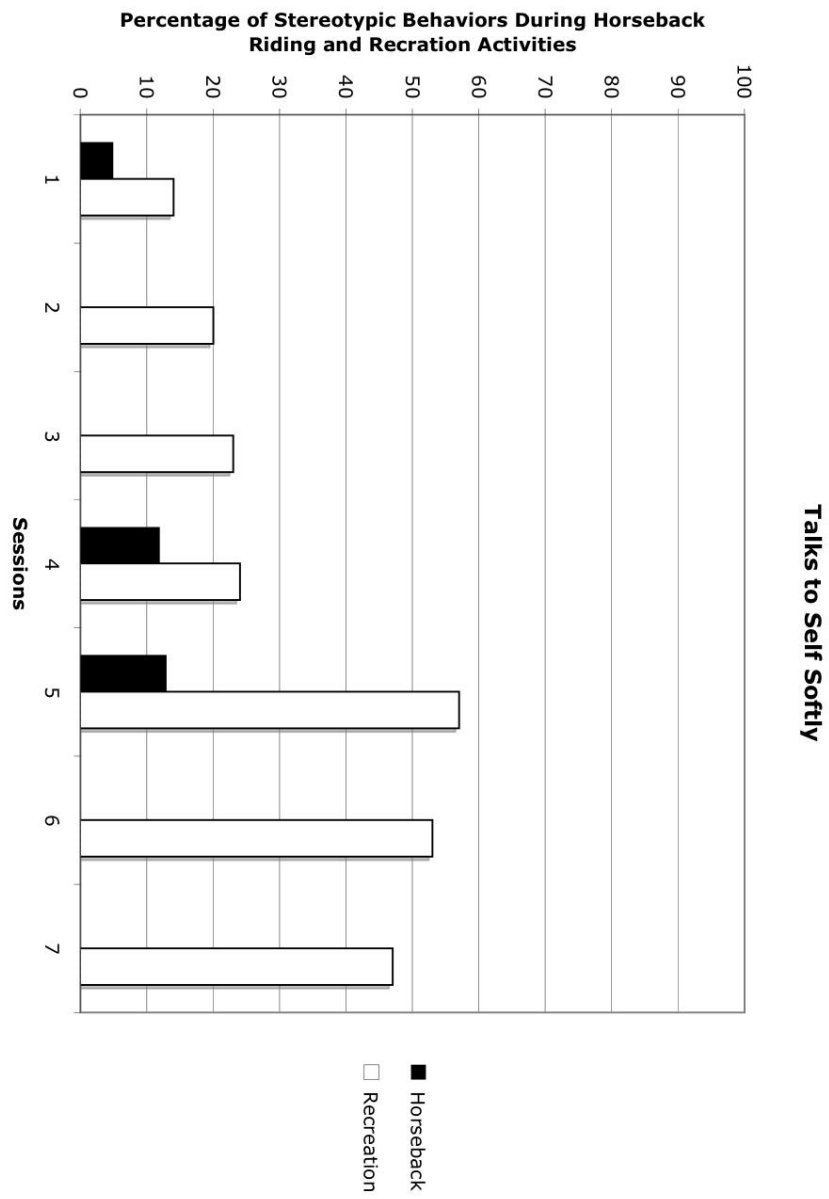




Figure 4

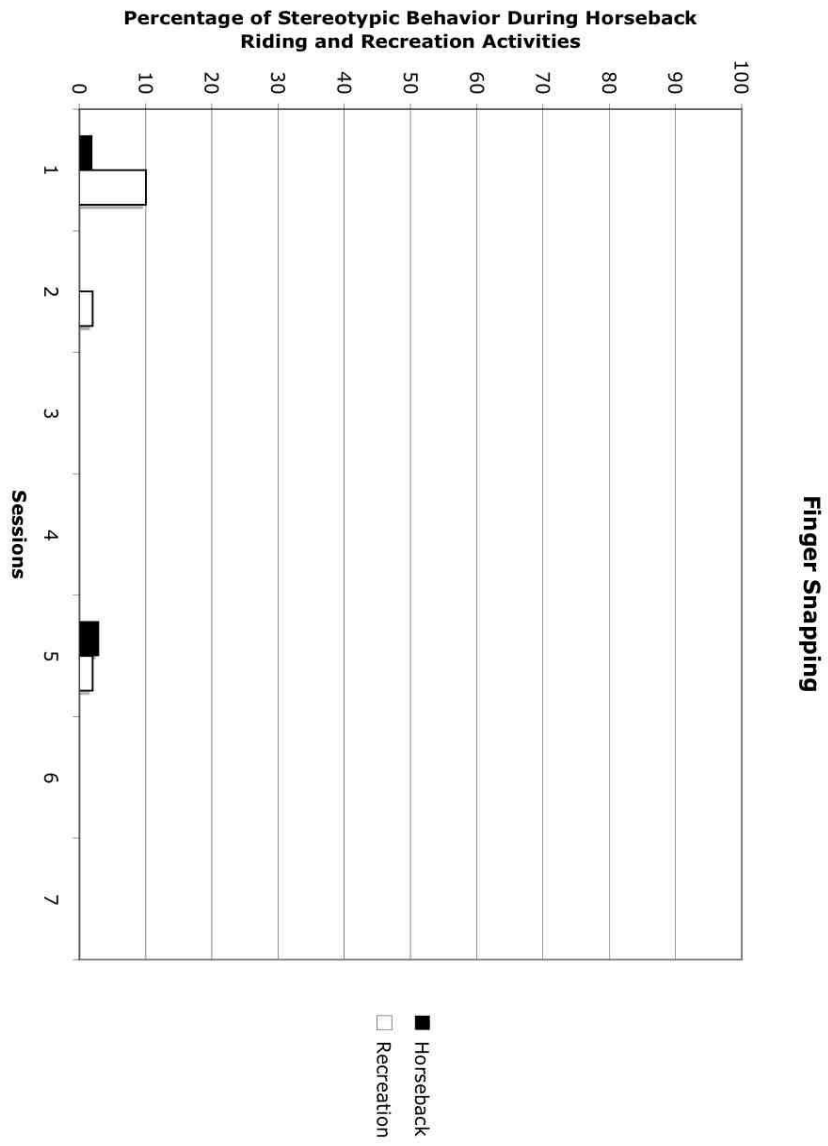


Figure 5

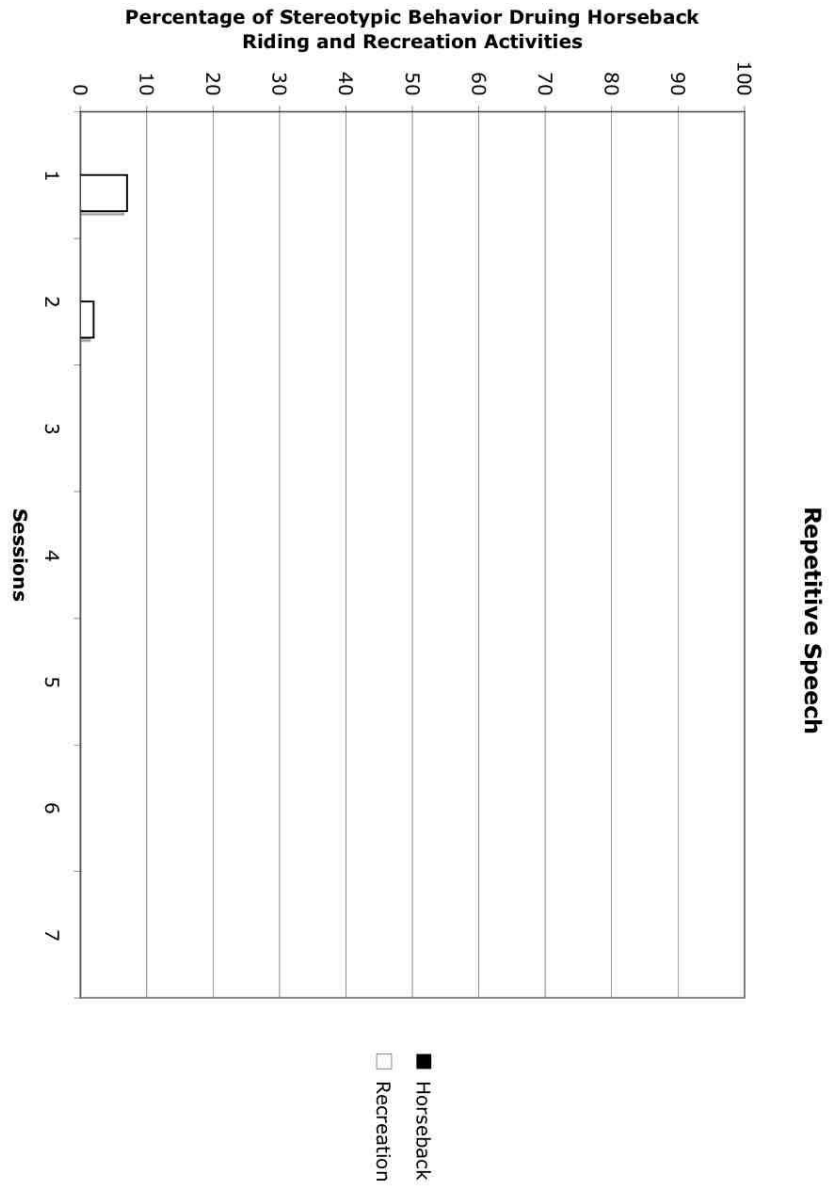
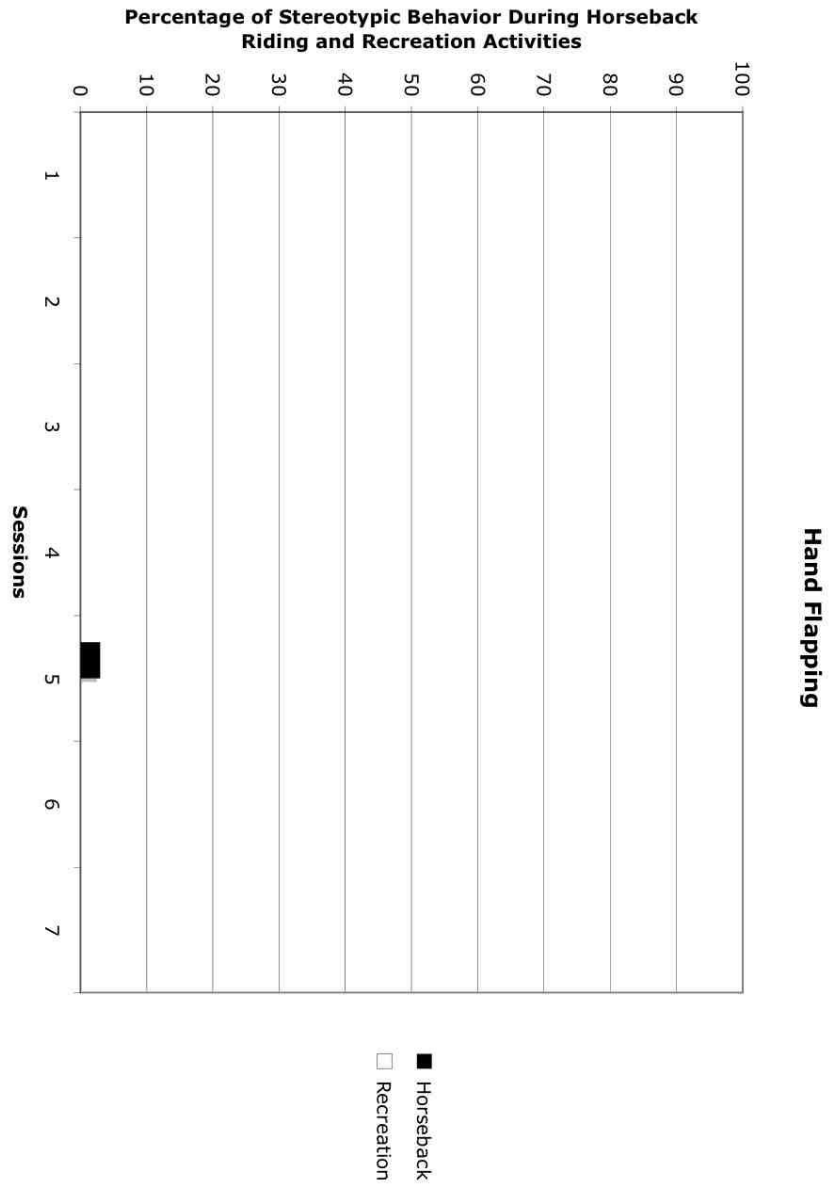


Figure 6



## CHAPTER V

### DISCUSSION AND RECOMMENDATIONS

#### Introduction

The purpose of this study was to compare the frequency of occurrence of stereotypic behaviors demonstrated by a youth with autism during two recreation activities: horseback riding and board game play. The primary method of data collection was behavioral observations of the participant in a HR activity and also in BGP. Additional data collected were assessed for social validity through pre- and – post family and support network interviews and also the researcher’s journal. This chapter presents findings of the study, specific limitations, and lastly recommendations for future research.

#### Summary of Findings

##### Behavioral Observations

Body Rocking was the only stereotypic behavior in which the rate of occurrence was higher during the HR sessions, six out of seven, then in BGP sessions, two out of seven. The *Mdn* for tongue rolling in HR was 12%, while the *Mdn* in BGP was 47%, making it the highest median for any behavior in either activity. The range for self talk during HR was 0 to 13% while the range for this behavior was 14% to 57% during BGP. Finger snapping occurred in five sessions of data collection, in particular it was observed in two out of seven HR sessions and three out of seven BGP sessions. Repetitive speech was only observed not observed in the seven HR sessions. Hand flapping was not observed during the seven BGP sessions.

The total number of observed stereotypic behaviors occurred at a higher frequency in the BGP activity as compared to the HR activity. Three behaviors (e.g. finger snapping, repetitive speech, hand flapping) regardless of activity did not reach 10% occurrence rate in any session. Three behaviors (e.g., body rocking, tongue rolling, self talk) occurred at a frequency of at least 10% of intervals in both activities. During the HR activity, body rocking occurred at *Mdn* rate of 86 % and 29% during the BGP activity, tongue rolling and self talk, occurred at *Mdn* rates of 57% and 43% during HR and 100% each during BGP respectively. Body rocking was the only behavior observed at a higher frequency, which occurred more often in HR.

### Discussion

Stereotypic behaviors are defined broadly as “repetitive, nonfunctional activities or interests that occur regularly and interfere with daily functioning” (Gabriels et al., 2005). Little is known about patterns and types of stereotypic behaviors specific to individuals with autism, nor is it clear how associated symptoms in autism may influence or be influenced by stereotypic behaviors (Gabriels et al., 2005). It has been shown that stereotypic behaviors “sometimes interfere with the learning of new behaviors, as well as the performance of those previously learned” (Morrison & Rosales-Ruiz, 1997). Therefore, since there is an “apparent incompatibility of learning and stereotypic behavior, the reduction or transformation of these behaviors has been considered necessary for the further development of these children” (Lovaas, 1981). Despite their impact, stereotypic behaviors are a complex and individualized area of study that the findings from one study make generalizations impossible. During this study, even though

stereotypic behaviors were present in both activities, the rate of occurrence was lower for five out of six behaviors during the HR sessions. There are a multitude of theories to attempt to explain these particular findings, including sensory dysfunction within participant and hyper/hypo levels of arousal, and how they may interact with the activities, content/structure of the BGP and HR.

Three behaviors were observed at a consistently low occurrence rate throughout the study. Finger snapping, repetitive speech, and hand flapping did not reach a 10% rate in either activity during the behavioral observations. There are once again a multitude of possibilities for this finding. One of the reasons is that these behaviors were atypical for the participant and perhaps we were observing his typically occurring behavior.

Secondly, Sam was involved in extensive Applied Behavior Analysis (ABA) training earlier in his life. During this training, overt abnormal behaviors, which would affect Sam socially, were extinguished first. There is evidence that the occurrence of repetitive behaviors, in autism, may be mediated by level of cognitive ability (Bodfish et al., 2000). It has been theorized that complex repetitive behaviors (e.g., subtle rhythmic movements of the hands and feet, tongue tapping) would more likely be observed in higher functioning individuals with autism (Bodfish et al., 2000). Therefore, it is possible that because of Sam's cognitive function he may be less apt to display stereotypic behaviors; however, one limitation for this study is that the behaviors were not chosen to be observed.

Another being that Sam's hands were occupied in either activity. In the BGP activity Sam was manipulating die, moving figures, or using his hands in some form of

non-verbal communication (e.g., making a celebratory gesture, throwing hands in the air in frustration). During the HR sessions, Sam used his hands to employ grooming equipment, holding a lead rope to walk his horse, or holding reins to maneuver his horse while riding.

Unusual responses to sensory stimuli, sensory dysfunction, are seen in many children with autism (Rogers & Ozonoff, 2005). These responses are expressed as over- or under-responsiveness, preoccupations with sensory features of objects, and withdrawing from people or the environment (Dawson & Lewy, 1989). There is a widely held belief that stereotypic behaviors and sensory responses are closely related, and suggest that their origins are driven by chronic hypo- or hyper arousal (Rogers & Ozonoff, 2005). Hypo- or hyper arousal are on two ends of the continuum in Ellis's arousal-seeking theory. The theory states that people continually strive for sensory variation, in particular the need for arousal, which is called sensoristasis (Ellis, 1973; Wehman & Abramson, 1976). When an individual is experiencing sensory dysfunction, their bodies are not properly encoding and processing sensory information thus causing the individual to either be hypo- or hyper- aroused. For a person with autism it has been theorized that because of this disruption in state regulation the same person can fluctuate between periods of hyper and hypo-arousal (Kinsbourne, 1987). An individual experiencing hypo-arousal will attempt to meet their sensory needs by either seeking stimulation from their environment or engaging in stimulating behaviors, which provide the needed sensory feedback (Dawson & Lewy, 1989; Ellis, 1973; Rogers & Ozonoff, 2005; Wehman & Abramson, 1976). On the other hand, individuals experiencing hyper-

arousal will attempt to meet their sensory needs by either withdrawing from their environment or engaging in calming behaviors, which provide the needed sensory feedback (Dawson & Lewy, 1989; Ellis, 1973; Rogers & Ozonoff, 2005; Wehman & Abramson, 1976). Regardless of whether individuals are hypo- or hyper-aroused, it is theorized that they will seek out an optimal level of stimulation until their unique biologically determined arousal level is met (Zentall & Zentall, 1983). Although speculative at this time, the findings of this study suggest a trend between activity and the stereotypic behaviors observed but still cause one to wonder what Sam's level of stimulation was in the various sessions.

The BGP sessions were composed of a strategic forward planning board game, which could vary in length from 20 minutes to hours on end. The board game could be played solo or with a number of participants. Sam either played by himself, meaning he setup multiple teams to "battle" each other, or he played with two family friends his age. During BGP two stereotypic behaviors, tongue rolling and self talk were present in each session. These two behaviors are the only two behaviors, in either activity, to be present in seven out of seven sessions. Each of these behaviors differs from body rocking due to the fact that they do not involve large muscle groups moving in a rhythmical motion, but also since both behaviors tend to surface when a person is occupied in focused mental activity.

A possible explanation for that would be the various situations in which the participant engaged in the BGP activity. When Sam was playing solo, it is possible that his level of stimulation or arousal from the environment was low, and he engaged in



either tongue rolling or talking to self softly to get some sensory stimulation and raise his level of hypo-arousal. Sam's father and a member of his support network expressed that "alone time that allows him to withdraw into a self absorbed state," or an hypo aroused state, triggers his stereotypic behavior. At the same time, when Sam would play with others, it is possible that the clamor and energy from the group, as well as waiting for his turn, would put him in a state of hyper-arousal. Sam's family and support network stated, prior to any data collection, that "waiting, an increase in commotion (e.g. people, noise, excitement), and a noisy environment" cause him to be hyper-aroused, which could trigger his stereotypic behaviors. Even though Sam never directly played with his step-brother during BGP he was present in various sessions. Sam's family stated that competing with his brother for the 'limelight'" also triggered the expression of stereotypic behaviors. This heightened state of arousal could cause Sam to engaged in either tongue rolling or talking to self softly to lower his state of arousal. Regardless of whether Sam was trying to lower or raise his state of arousal, Ellis's work (1973) would suggest he was attempting to shift into a level of optimal arousal, using his stereotypic behavior as a homeostatic regulator (Zentall & Zentall, 1983).

The stereotypic behaviors could also have been observed in the BGP activity due to the format of the game itself. During Hero Clix®, the players must use forward planning and even basic arithmetic to move their figures on the board. These moves require the players to concentrate, which could add a certain level of stress to the game. Stress was noted by a member of Sam's support network as a trigger for stereotypic behaviors. For many people in general there are certain behaviors that are displayed

during times of intense concentration or stress, for example, the greatest basketball player ever, Michael Jordan sticking out his tongue when focusing. At the same time, Sam could be engaging in a movement, tongue rolling, like many people in the general public do (e.g. tapping their feet, bouncing their legs) when focusing their attention. Also a possible explanation for self talk could be that Sam was using his imagination and giving “life” to the figures in the game by adding sound effects during “battle moments” of the game. Lastly, body rocking may not have appeared often due to the fact that the players sit in chairs for the duration of the board game and that Sam’s mind was ‘awake’ more than his body.

The other stereotypic behavior that was seen in eight sessions of data collection was body rocking. As stated previously, body rocking was the only stereotypic behavior in which the rate of occurrence was higher during the HR sessions, six out of seven, then in the BGP sessions, two out of seven. There are a multitude of explanations for this particular situation including, the sensory stimulation of a repetitive movement, excitement/novelty of the horse, or the structure of the riding sessions. The actual movement of a horse can be both a calming repetitive movement yet at the same time stimulates the central nervous system and multiple muscle groups of the body. Hyper-arousal can cause the individual with autism to become more reactive to sensory stimuli than other children and cause him or her to fail to, or are much slower to habituate to sensory stimuli in the environment (Rogers & Ozonoff, 2005). Since horseback riding is not a day-to-day activity for most people the simple act of being around a horse can cause one to become excited and over stimulated, which could result in the expression of a

stereotypic behavior to attempt to bring one's self into a state of optimal arousal. Hypo-arousal can act as a stimulus barrier in the environment for an individual with autism, thus, making them unable to receive affective and sensory messages (Rogers & Ozonoff, 2005). The structure of the sessions themselves would leave Sam with downtime either prior to riding or after riding where he was waiting. During the semi-structured interviews both parents and each member of Sam's support network stated that waiting during an activity triggered the expression of stereotypic behavior. Sam's parents stated that "alone time that allows him to withdraw into a self-absorbed state" would cause him to use stereotypic behaviors for feedback or stimulation. Lastly, during the HR sessions, self talk was observed in three out of seven sessions while tongue rolling appeared in five out of seven sessions, with neither behavior ever reaching a 20% occurrence rate. The fact that these behaviors were observed only at low rates during HR, and occurred solely while Sam was being lectured on horse anatomy, riding safety, or grooming, raises the question of whether these behaviors were seen because of low level of stimulation during lectures or because of mental focus. From the findings in this study it is possible to suggest that the particular characteristics of an activity, such as an activity requiring the participant to be physically engaged or demanding focused attention, can influence the type of stereotypic behavior expressed.

### Implications and Recommendations

Autism is a developmental disorder that is being reported higher at higher incidence worldwide (Newschaffer et al., 2005). This cognitive disorder is life-long and

there is not a cure at this time. Autism occurs on a spectrum and can slightly affect an individual, while at the same time, cause a person to be completely detached from reality. There are many different theories about how to treat an individual with autism ranging from pharmacological therapies to sensory integration therapies. There is not one approach that works for all individuals with autism, due to its individualistic nature.

Therapeutic Recreation (TR) Practitioners are one of a few groups of professionals associated with the medical field that still can maintain a personal relationship with its clients. TR can offer a holistic approach for families and individuals with autism trying to adapt to day-to-day life. This approach can look at the family's leisure/recreation lifestyle, or lack there of, and examine how this may affect their overall quality of life. This study tentatively suggests that when working with an individual with autism it is going to be worthwhile to experiment with a few different recreation activities before finding one that fits the individuals need for stimulation and enjoyment. The Certified Therapeutic Recreation Specialist (CTRS) can introduce the family to various types of recreation and work with them through leisure education session on which activities work well with their family member with autism.

Specific to this study, HR could be appropriate for their child and the rest of the family can either observe the riding session or ride recreationally as a family. A CTRS does not have to step aside during the HR session but could add a North American Riding for the Handicapped Association (NARHA) certification to their credentials to complement their training for working with the disabled through recreation. HR has already been noted as a future facilitation technique for TR and would offer the field

another unique niche (Dattilo, Born, Cory, 2000). TR is an individualized profession, which may be able to aid in the treatment of an individualized disorder such as autism.

A way Therapeutic Recreation offers freedom and personal expression to clients is through choice. This process would take place after a careful assessment of the client to ensure overall safety, and that developmentally appropriate options are offered. This empowering process not only allows the individual to take an active role with the CTRS but choice-making has been shown to reduce problem behaviors such as stereotypy (Dyer, 1987). Choice making has also been shown to increase desirable behaviors such as task performance, task engagement, responsiveness, and direction following (Morrison & Rosales-Ruiz, 1997). The activities the client is able to choose from need be compiled by the CTRS with special consideration, since it has been shown that various activities either suppress or increase stereotypic behavior (Kern, Koegel, & Dunlap, 1984).

#### Limitations

There were a number of limitations associated with this study. The first limitation is that there was only one video camera used throughout the data collection process. This fact did not inhibit the data collection during BGP but it did limit the video footage of the participant during the HR. Since this study was conducted to be as least intrusive as possible, the researcher did not move the camera and tripod in an area that would interfere with the session for a better camera angle. Another limitation was the fact that there were not multiple observers present during the data collection process, not just for additional filming, but also to note any behaviors that the researcher overlooked either in filming or note taking. Also, the study only looked at the effects HR had on one youth,

thus making generalizability difficult. It would have been interesting to see how different youths responded to the HR coupled with various types of games (e.g. videogames, computer games). With autism, it is hard to compare one individual with another due to the fact that the disorder occurs on a spectrum and there is a huge variation in how that impacts one's life. In that respect, a single subject complements the intricacies of autism.

Another limitation was the fact that the data collection occurred in the same order every day possibly causing a sequencing/ordering effect. This means the BGP sessions happened at the same time of day, 5pm, for roughly an hour prior to the HR, which began at 6pm. It was possible that behavioral observations would have been different if an alternating activity schedule were put in place. It would have been intriguing to see how the data would have developed if the sequencing was changed week by week. At the same time, since this study used a naturalistic approach, focusing on behavioral observation, the researcher did not want to interfere in the daily schedule that was already used by the participant and his family.

The findings of this study are limited since there were not baseline measurements taken outside of the data collection sessions. This means that the data from this study can only be compared between the data sessions and not against the participant's day-to-day behavior. It would have been exciting to be able to compare the participant's behavior outside of BGP and horseback riding to the behavior recorded in the data sessions.

It would have been beneficial to use the same horse and same riding pasture throughout the HR component of the study. The first four HR sessions occurred in a small pasture next to the family's home and with a Belgian horse. This pasture was

literally Sam's backyard and right next to the greenhouse and livestock pens where he would do his daily chores. Sam's family owned the horse itself even though he was rarely ridden prior to the study, and treated mostly like a large pet. The last three HR sessions occurred in the pastures across the street from the house where a riding arena and large horse stable were being built. These pastures were much larger than the previous riding location and boarded various horses. The riding instructor boarded her quarter horses in these pastures, and they were used in the last three HR sessions with both Sam and his stepbrother. The first riding location allowed for easier positioning of the camera and closer shots than the second location due to size of the area. In the first location most of the riding was done in a circular pattern in a close proximity to the camera. The second location allowed the riders to go on longer rides and include some running/galloping but did not allow for close camera angles. Even though a uniform riding location and horse would have helped the overall consistency in the study, the shift in location and horse could have produced results not seen otherwise. The two horses not only were different in size, but also in gait, their walking pattern, temperament, riding experience, and training. The variation in horses could have elicited distinct behaviors from Sam due to how he processed the differences listed above. Also, the shift to a less familiar activity, the second riding location, and the fact that the horse boarders and their families would come out to feed their horses during some of the riding sessions could have caused Sam's behavior to change from the previous location.

This study focused on observable, language and motor behaviors. It would be worthwhile for future research to examine other complex behaviors (e.g., rituals) (Morrison & Rosales-Ruiz, 1997).

An additional limitation was the familiarity of location of the data collection. The participant lived on site where data collection took place, which could potentially influence the frequency of occurrence of stereotypic behaviors. Sam's family and friends were onsite and would stop by, and/or participate in with BGP or HR, could have also played a part in the behaviors that were observed.

#### Suggestions for Future Research

For future studies it would be beneficial to have a larger sample size. This larger sample size will allow researchers to explore more than one individual's behaviors. Having both male and female participants within the age range of 11-22 years old could potentially promote generalization. It would be helpful to gather baseline data with these participants prior to them, participating in HR and BGP to allow further comparison of behaviors across activities. Also, being able to have follow-up measures of participants' behaviors after the initial data is collected would indicate trends of behaviors over time.

In the future it would be worthwhile to see if a traditional experimental design would complement the purpose of the study. Ways to incorporate this type of design would be to randomly assign group members into participant and control groups. With some individuals participating in HR and BGP, while others would participate in only one, and others serving as a control. Each participant would then cycle through the three experimental phases, as to serve as their own control. This would be beneficial to the



study since autism occurs on a spectrum and the variation from one person to the other can be quite drastic making comparison impractical. There would be an opportunity to look at various recreation activities and examine how they affected the expression of stereotypic behaviors for the respective participant. Lastly, the researcher could look at how using other therapy animals such as household pets (e.g. dogs, cats, birds) would affect the participants' behavior and compare that to their behavior during HR.

Despite its limitations and the convenience of hindsight when reflecting on methodology, the researcher remains optimistic that this study will serve two purposes. One, that the findings disseminate to the pertinent literature body and two, that it causes others to think about the role recreation may have in life of an individual with autism. If either of the two take place, then this study and all the sacrifices, time, and energy of all involved, will be well spent.

## APPENDICES

## Appendix B

### Characteristics of Autism

Autism is listed in the DSM-IV with three major diagnostic criteria: impaired social interaction, impaired communication, and repetitive/stereotypic behavior. Below are the most recent diagnostic criteria for Autistic Disorder as stated in the DSM-IV.

- Qualitative impairment in social interaction, as manifested by at least two of the following:
  - Marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction.
  - Failure to develop peer relationships appropriate to developmental level
  - A lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)
  - Lack of social or emotional reciprocity
- Qualitative impairments in communication as manifested by at least one of the following:
  - Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
  - In individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others

- Stereotyped and repetitive use of language or idiosyncratic language
- Lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level
- Restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:
  - Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
  - Apparently inflexible adherence to specific, nonfunctional routines or rituals
  - Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
  - Persistent preoccupation with parts of objects

## Appendix B

### Behavioral Definitions

#### *Stereotypic Motor Behaviors*

Hand flapping – continuous movement of hands either in a vertical or horizontal plane.

Body rocking – continuous rhythmical movement of body either in a front to back or side to side motion. The individual's feet may come off the ground during rocking motion but overall body positioning remains stable.

Hand gazing – deliberate and overt staring at one's hand or hands for a period of at least 3 seconds. The rest of the body remains inactive during gazing period.

Repetitive behavior while hand gazing – any repetitive behavior that coincides with the act of hand gazing.

Moves or rolls head back and forth – continuous rhythmical movement of the head either in a front to back motion or in a circular motion. The rest of the body remains still during this behavior.

Tongue rolling – repetitive back and forth movements of the tongue while the individual's mouth is open.

Finger snapping – repetitive snapping of fingers.

Other – any stereotypic motor behavior that is noticed during multiple coding sessions or identified by the participant's support network, which is not already a behavioral category.

#### *Stereotypic Language Behaviors*

Repetitive speech – continuous repetition of a word or words while communicating with others.

Yells at inappropriate times – sudden bursts of excessive voice volume which take place in a context or environment outside the social norm.

Meaningless recurring vocalizations – continued use of noises or sounds other than words, that do not convey communicative context.

Talks to self loudly – use of words meant for one’s self, but loud enough for individuals 5 feet away to hear.

Self talk – use of words meant for one’s self and soft enough where words are indistinguishable from 5 feet away.

Other – any stereotypic language behavior that is noticed during multiple coding sessions or identified by the participant’s support network, which is not already a behavioral category.

Appendix C

| occurrence = ✓                        |             |             |             |             |             |             |  |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|--|
| <b>Stereotypic Motor Behaviors</b>    | 00:00-00:60 | 01:01-02:00 | 02:01-03:00 | 03:01-04:00 | 04:01-05:00 | 05:01-06:00 |  |
| hand flapping                         |             |             |             |             |             |             |  |
| body rocking                          |             |             |             |             |             |             |  |
| hand gazing                           |             |             |             |             |             |             |  |
| repetitive behavior while hand gazing |             |             |             |             |             |             |  |
| moves or rolls head back and forth    |             |             |             |             |             |             |  |
| tongue rolling                        |             |             |             |             |             |             |  |
| finger snapping                       |             |             |             |             |             |             |  |
| Other:                                |             |             |             |             |             |             |  |
| <b>Stereotypic Language Behavior</b>  | 00:00-00:60 | 01:01-02:00 | 02:01-03:00 | 03:01-04:00 | 04:01-05:00 | 05:01-06:00 |  |
| repetitive speech                     |             |             |             |             |             |             |  |
| yells at inappropriate times          |             |             |             |             |             |             |  |
| meaningless recurring vocalizations   |             |             |             |             |             |             |  |
| talks to self loudly                  |             |             |             |             |             |             |  |
| talks to self softly                  |             |             |             |             |             |             |  |
| Other:                                |             |             |             |             |             |             |  |

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