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The Office of the Provost

Walden University
2019

Abstract

The Impact of Peer-Mediated Video Modeling on Social Interactions of

Adolescent Males Diagnosed with Autism Spectrum Disorder

by

Cheryl M. Botting-Hammack

MS, Walden University, 2012

BS, Oregon Institute of Technology, 2004

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

College of Social and Behavioral Sciences

Walden University

November 2019

Abstract

Individuals with ASD demonstrate deficits in social communication and social interaction. Video modeling (VM) has been successful in teaching new skills through short, targeted videos. Prior research in VM heavily focused on academic settings with primary age children. There is a gap in the literature on teaching social skills in natural settings to adolescents with ASD. The current research used a single- subject, multiple-baseline design to examine the impact of VM on the social behaviors of adolescent males, diagnosed with ASD, in natural social settings. The data were acquired from a developmental disability agency licensed and authorized by the Idaho Department of Health and Welfare. Data were collected during VM sessions conducted with adolescent boys diagnosed with ASD and participating in Developmental Disability Services with a licensed Disability Agency in western Idaho. These data used visual analysis, percentage of nonoverlapping data points, and effect sizes to identify significance in final outcomes. The study measured the acceptability and satisfaction of the intervention of providers and participants through a modified version of the Behavior Intervention Rating Scale and the Children's Intervention Rating Profile. Results revealed large effects for the adolescent participants when interacting socially in community settings. Outcomes indicated the treatment to be socially acceptable by adolescents and by habilitative intervention professionals.

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May 2018

Dedication

There have been many individuals in my life who provided me with the support, encouragement, and belief that I could complete my doctoral journey. Probably the most significant is my husband, Rod, who believed in me when I had even the smallest inkling of self-doubt. He has always recognized my ability when paired with hard work and focus. Rod would remind me of how as a team we had worked to improve our lives through education and this was a continuing step in setting an example for our son. During my doctoral process, Rod continued his education alongside me, providing an inspiring model as he completed his Master in Psychology. I am so thankful for an incredible teammate and life partner that always sees the best in me and has never doubted by ability to achieve my dreams.

Secondly, I want to recognize my son and his words of encouragement during long phone calls in this process. He has always seen me as invulnerable and capable of overcoming any challenge in front of me. I am so thankful and proud of him as he completes his Masters in Chemistry as I am completing this dedication.

Third, was a surprising team of women, who became my friends as part of the Walden experience, Jennifer Weigelt and Sherri Armistead. They provided feedback, encouragement, consultation, and friendship, helping me to remain positive and focused. They will be lifelong influences in my professional development.

Finally, I have to express gratitude and admiration for Dr. Little, who helped me to have confidence in completing the doctoral journey. He always provided words of encouragement and positive direction as I have navigated each step of this process. He is an inspiration to me and to those that I share his work with. I have learned so much from him while a student in his cognitive assessment class and later as a graduate assistant working with students. I am more than thankful for the opportunity I have had to collaborate with him on this research project and in each role, I have been privileged to have.

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Chapter 1: Introduction to the Study

Introduction

The prevalence of autism spectrum disorder (ASD) has grown

exponentially from 20 in 10,000 individuals in the late 1970s (Wing & Gould,

1979) to the current reports by the Centers for Disease Control and Prevention

(2015) of 1 in 68 children. Effective therapeutic intervention research has largely

focused on early intervention and behavior management with limited research on

adolescents and adult transition supports (Koegle, Kim, Koegel, & Schwarzman,

2013). Deficits in social communication and social motivation and interaction, as

part of ASDs, produce challenges not only for the individual diagnosed with ASD,

but also for those responsible for interventions that might be widely applied to

meet the needs of the individual (Centers for Disease Control and Prevention,

2009; Koegel & Koegel, 2006; National Institute of Mental Health, 2008; Rutter,

2005)

Adolescents with ASDs may not have interest in social opportunities or

have the skills needed to participate. Limitations in socialization may act as

vulnerabilities, which impact the individual's ability for relational success in a

wide array of functioning. The ability to structure opportunities to observe and

experience social behaviors in socialization may provide immersive learning trials

that can? impact positive or adaptive functioning (Vernon, Miller, Ko, & Wu,

2016). Social limitations experienced by individuals with autism may include:

deficit in social conversation, limited ability to think abstractly, lack of empathic

responding/thinking, minimal or deficit attention to social cues or constructs, and general lack of attention (Baron-Cohen, 1995; Blaire, Frith, Smith, Abell, & Cipolotti, 2002; Starr, Szatmari, Bryson, & Zwaigenbaum, 2003).

Interventions that have supported peer and social interactions in adolescents have included object-initiated interactions, self-management strategies, circle of friends, and social skills groups. Each of these scenarios has been reliant on the presence of adults or peers to mediate opportunities to practice or experience social interactions, requiring a third person as an observer or prompting method. There is need for more natural supports, which may be managed by the individual to encourage the maintenance and sustainment of interpersonal relationships (Rogers, 2000).

Statement of the Problem

The purpose of this study was to determine if VM can increase the proficiency of adolescent boys' success in reciprocal social interactions. The dependent variable was the presence and completion of observable reciprocal communication recorded through multiple probes during individual intervention sessions where the independent variable was the application of the VM treatment.

Although the literature on video-based interventions (VBI) has increased, there continues to be a lack of support or consistent validation for VBI's to be considered an evidence-based treatment option. Many of the studies reviewed for this study were conducted in an academic setting and not in the natural

environment of the individual. Much of the research has also been focused on early intervention. Since ASDs are marked by deficits in social interactions, there appeared to be a need for increased research in areas where social functioning becomes increasingly significant in human development, such as adolescence and preparation for adulthood. Very few of the studies reviewed contained social validity constructs as part of their research, which may impact the support for intervention implementation. The inclusion of a social validity test in the scope of the research to determine whether treatment was acceptable for community-based use and with adolescent students was accomplished in this research. Treatment was carried out in natural community settings, based on the individual's areas of interest, in order to directly measure the impact of VM on the adolescent's social performance. In order to establish VM as an evidence-based practice, future studies must become more attentive to the variation between the characteristics of participants and the intervention features and constructs (i.e., treatment setting, data collection protocol, video making procedures, and video delivery or access) in order to earn the distinction of evidence-based (Bellini & Akullian, 2007).

Nature of the Study

This research study employed a quantitative, single-subject, case design to measure the impact of the VM intervention. Single-subject designs provide the researcher with the opportunity to observe repeatedly baseline and intervention data to determine a treatment's lasting effect (Bellini & Akullian, 2007). This

design was used to determine if a relationship existed between the peer-mediated, video-modeled instruction and the acquisition of reciprocal social communication skills. The goal of this single-subject design was to explore the causal relationship or the existence of a relationship between a researcher-manipulated independent variable and a change in a dependent variable. The participant served as his own control in the single-subject design, where a baseline performance measurement prior to intervention was compared to the intervention performance (Gutman, Raphael-Greenfield, & Rao, 2012). The results of the single-subject design used in this study may be used to determine the effectiveness of peer-mediated VM as an evidenced-based intervention to increase and improve the participant's social communication performance.

Purpose of the Study

The purpose of this research study was to explore and determine if VM can improve or change the reciprocal social interaction performance of adolescent boys diagnosed with an ASD in a community-based setting. Secondary to the main purpose of this study was to provide additional support and validation for the implementation of peer-mediated, VBIs in natural community-based setting addressing identified social deficits in individuals diagnosed with an ASD.

Research Questions and Hypotheses

1. Will the habilitative intervention participants increase their reciprocal social behavior over baseline subsequent to the implementation of a peer-mediated, VM intervention?

H_a1: The habilitative intervention participantswill demonstrate at least 80% achievement on demonstrating reciprocal social behaviors over their baseline, as measured by the daily trials.

H_01: The habilitative intervention participantswill demonstrate less than 80% achievement on demonstrating reciprocal social behaviors over their baseline, as measured by daily trials.

2. Will the habilitative intervention participants maintain the increases in reciprocal social behavior, as observed in the peer-mediated VM intervention post-treatment?

H_a2: The habilitative intervention participants will maintain an achievement level of 60% or more on demonstrating reciprocal social behavior, as measured by the maintenance phase trials.

H_02: The habilitative intervention participants will not maintain an achievement level of at least 60% on demonstrating reciprocal social behaviors, as measured by the maintenance phase trials.

3. Will the habilitative intervention professional administering the treatment score the modified BIRS with an average rating of 4 or above, indicating that she finds the intervention acceptable?

H_a3: The average rating of the HIP's modified BIRS will be a 4 or above indicating that they believe the VM intervention is acceptable for community use.

$H_0{}^3$: The average rating of the HIP's modified BIRS will be less than

4 indicating that they believe the VM intervention is not acceptable

for community use.

4. Will the students receiving the VM treatment score the modified CIRP

with an average rating of 4 or above, indicating that they find the intervention

acceptable?

$H_a{}^4$: The average rating of the adolescent participants modified

CIRP will be 4 or above indicating that they believe the VM

intervention is acceptable

$H_0{}^4$: The average rating of the adolescent participants modified

CIRP will not be 4 or above indicating that they believe the VM

intervention is not acceptable.

Theoretical Framework

The theoretical framework supporting this study was Bandura's social

learning theory. Social learning theory suggest that human cognition influences

behavior through the observation of others in their environment (Bandura,

1977). The BoBo doll experiment in the 1960s, where Bandura gained support

for his theory, suggested children can learn behavior through the observation of

adult models; decades of research since then has supported this theory (Gini,

Pozzoli, & Hymel, 2014). In this particular case, the child acquired aggressive

behaviors after being exposed to a video of an adult exhibiting aggressive

behavior toward a plastic doll, a video of an adult exhibiting nonaggressive

behavior toward the doll, or a group where no video model was provided. After introduction to the stimuli or to the absence of stimuli, the children were observed in a general setting with no adults present. Children subjected to the aggressive model had higher levels of observed aggressive behaviors in comparison to the nonaggressive group and the control group (Bandura, 1961).

<div align="center">**Definition of Terms**</div>

Video-Based Instruction: Video-based instruction (VBI) is the umbrella term used to identify different forms of video-based instructional techniques including VM, video self-modeling, and other computer-based video instruction. VBI has been used in many diverse fields including education, psychology, and medical practice in order to provide instructional information to targeted individuals for a variety of purposes (Plavnick, Sam, Hume, & Odom, 2013; Van Dam, 2012). In this research project the term VBI will be used to describe the various methods that have incorporated video technology that feature modeled behavior for the purpose of providing instruction or to teach targeted skills to specific individuals.

Video modeling: In this study, the specific VBI technique that will be used in the treatment phase is VMVM can be defined as the process of showing participants a video of an individual performing a targeted skill or behavior correctly (without error) and then providing the participant with the opportunity to perform the targeted skill independently (Hochhauser, Gal, & Weiss, 2015). Bellini and Akullian (2007) describe VM as using an adult or a peer to perform a

specific behavior (i.e., completing a task, conducting a social conversation, or playing with a peer) in front of a camera (without error) that is then watched by an individual for a selected number of sessions who is then requested (or is expected) to imitate the behavior that was observed on the video.

Video self-modeling: Video self-modeling (VSM) is similar to VM however instead of using a peer in the video, the individual that is targeted for behavior change is the one that is featured in the film. This technique has proven to be effective with individuals diagnosed with ASD due to its ability to help individuals see themselves performing the targeted skill successfully, which makes their ability to mimic the behavior more likely to occur in response to viewing the video (Cihak & Schrader, 2009). Despite the increasing popularity of VSM, VM was chosen for this study due to its acceptability for use across different settings and the ability of the provider to limit variation in the trials and data collection.

Feedforward: Feedforward is a method of teaching a behavior or skill that only highlights the future desired behavior. With both VM and VSM, the researcher must videotape for a considerable amount of time in order to receive enough footage of the model performing the target behavior positively. Although this technique requires the researcher to manipulate the footage, the expectation is that the individual viewing the video will be more likely to perform the behavior without negative behaviors present because they will not be modeled on the video clip (Vandenbroucke, Scholte, VanEngeland, Lamme, & Kemmer, 2009).

Peer-mediated intervention: Another aspect of VBI that this study has incorporated is the use of peers. Using peers similar in age or identical in gender as the individual(s) receiving the instruction is identified in the literature as peer-mediated (Schmidt & Stitcher, 2012). In this research project the term peer-mediated will be used to describe the type of VBI intervention used. Although the peers modeling the skills on film will not have direct communication with the participants in the study the participants will be learning the skill through the direct instruction of the model peers.

Single-subject, multiple baseline design: Single-subject research is experimental and its purpose is to document causal, functional relationships between independent and dependent variables (Gutman et al., 2012). Basic single case designs involve repeated, systematic measurement of a dependent variable before, during, and after the administration of an independent variable such as applying an intervention in this case being a video model (Kratochwill et al., 2010). Single case designs can provide strong evidence for the existence of causal relationships and are widely used in the clinical field of psychology and education (Kratochwill et al., 2010). The use of a multiple baseline design within a single subject study involves an effect replication option across multiple participants, settings, or behaviors (Herbrecht et al., 2015).

Limitations, Assumptions, Scope and Delimitations

The purpose of this study was to determine whether VM can improve the proficiency of habilitative intervention participants, specifically adolescents

diagnosed with ASD, with reciprocal social communication behaviors. Within the scope of this objective there were limitations, assumptions, and delimitations.

Limitations

There were two limitations to this research project. The first limitation was the ability to generalize results to an entire population of individuals diagnosed with ASD. The second was the inability to eliminate the effects of regular activity or distraction occurring in natural community settings where instruction was provided and data were collected. This project focused on one discrete skill in a specific content area and all of the participants identified for the study were male adolescentswho were close in age and had identified deficits in social communication paired with an individualized goal on their service plan for social communication. Although selecting this sample of participants helped to pinpoint the impact of VM with this specific population, it was still difficult to generalize the results to various content areas, environments, and cultures. Therefore, the baseline data were expected to naturally increase and it was necessary to measure the impact of the VM treatment based on trend changes of the slope.

Assumptions

This study was based on two assumptions that the research procedure was administered as practiced and designed, for example, that the HIPs selected participants that were appropriate for the experiment and the HIPs correctly oversaw the VM treatment and obtained all baseline, intervention, and maintenance phase data with fidelity. This assumption also included the belief

that all participants and the administrator were honest in their review of the intervention's social acceptability and that all participants completed the probes during each phase to the best of their ability.

Scope and Delimitations

This study was limited to adolescent, male, habilitative intervention participants, ranging in age from 12 to 18, who were all placed in an Idaho Department of Health and Welfare developmental disability program, which required the participant to be diagnosed with an ASD, have a 50% deficit in overall functioning, and a general maladaptive index score on the Scales of Independent Behavior-Revised of -21 or below. The scope of the study required at least three students. Another boundary was the limit to specific skills within a specific content area. Participants were assessed only on their ability to demonstrate reciprocal communication skills.

<div align="center">

Significance of the Study

</div>

Deficits in social communication are an identifying characteristic of individuals with an ASD. Deficits in social communication can significantly interfere with the ability of an adolescent to navigate his or her social environment, where most social activities require some form of social communication or interaction. Individuals with an ASD may have difficulty initiating and maintaining conversations, remaining on or extending the topic area, and sustaining reciprocal interactions in the social environment (Hochhauser, 2015).

This research project was unique because it sought to determine if the use of peer-mediated, VM could significantly impact the reciprocal social behavior proficiency of adolescent boys diagnosed with ASD. This approach added to the perspective on the use of VM, because it combined peer-mediated instruction and technology, which are two instructional techniques that have received significant support for increasing social connection with children diagnosed with autism (Odom et al., 2015). Consequently, this study aimed to identify peer-mediated VM as an effective method of increasing mastery in the content area of social communication.

Positive Social Change

This research project aligned with Walden University's mission to achieve positive social change by analyzing a new treatment technique for the field of psychology. VBIs can be used in multiple areas of learning and and in multiple environments that may have a larger impact on helping the number of individuals diagnosed with autism in a less stigmatizing intervention format. In addition to assisting participants to learn via various media, this study also sought to validate VM as an evidence-based treatment, which could ultimately assist identified participants in reaching and maintaining expected levels of proficiency in social functioning.

Summary

Individuals with ASD demonstrate deficits in social communication and social interaction. Video modeling (VM) has been successful in teaching new

skills through short, targeted videos. Prior research in VM heavily focused on academic settings with primary age children. There is a gap in the literature on teaching social skills in natural settings to adolescents with ASD. This research used a single- subject, multiple-baseline design to examine the impact of VM on the social behaviors of adolescent males, diagnosed with ASD, in natural social settings. The data were acquired from a developmental disability agency licensed and authorized by the Idaho Department of Health and Welfare. Data were collected during VM sessions conducted with adolescent boys diagnosed with ASD and participating in Developmental Disability Services with a licensed Disability Agency in western Idaho. HIP's administered VM interventions while recording occurrences of targeted behaviors. These data used visual analysis, percentage of nonoverlapping data points, and effect sizes to identify significance in final outcomes. The study measured the acceptability and satisfaction of the intervention of providers and participants through a modified version of the Behavior Intervention Rating Scale and the Children's Intervention Rating Profile. Results revealed large effects for the adolescent participants when interacting socially in community settings. Outcomes indicated the treatment to be socially acceptable by adolescents and by habilitative intervention professionals.

Chapter 2: Literature Review

Introduction

The purpose of this study was to explore whether peer-mediated VM can improve the social opportunities of adolescents diagnosed with ASD. This study may add to the documentation of VBIs as an evidence-based approach to the treatment of adolescents with ASD in a natural social environment, while also providing supporting documentation and evidence for the use of technology-based video instruction in the acquisition of social skills for individuals affected by autism.

The literature review was conducted by accessing resources from the following research databases: Academic Search Complete, ERIC, PsycARTICLES, PsycINFO, SocINDEX with Full Text, Google Scholar, SAGE Premier, and Education Research Complete. The following keywords were used: *autism, video self-modeling, video modeling, video behavior intervention, natural supports, adolescence, communication, reciprocal conversation,* and *socialization.* Combinations of these keywords expanded the amount of literature that was accessible for this literature review. Studies that involved the use of electronic technology or media as a model for instruction and skill acquisition were found to span from the early 1960s to the current day Therefore, historical literature has been included in this review to outline the efficacy and development of technology as a form of evidence-based intervention.

The literature review explores the history of autism, the increasing diagnosis of ASD, common evidenced-based approaches, VBI, the increased need for effective and affordable interventions for individuals with autism, and the theory that has supported observational and modeled learning. The chapter concludes with a summary of the literature review, which indicates the need for future research designed to understand the effectiveness of using VM with adolescents with ASD.

Autism Spectrum Disorder

Diagnostic Overview

ASD is a neuro-developmental disorder that presents in a variety of ways. However, the deficits are mainly in three areas; social interaction, communication, and repetitive, stereotyped behaviors (Corbett & Abdullah, 2005). ASD encompasses a broad field of individuals, which previously included individuals diagnosed with Asperger's, Pervasive Developmental Disorder and other Social/Communicative Disorders. Previously, the *DSM-IV TR* recognized these disorders separately. The *DSM-5* now incorporates these separate disorders into a single disorder with different levels of severity of characteristic symptoms (McGuinness & Johnson, 2013). ASD is characterized by deficits in social communication, social interaction, and restricted repetitive behaviors, interests, and activities. Karim, Cook, and O'Reilly (2012) suggested that diagnosing ASD can be complicated by the presence of co-occurring conditions, such as Fragile-X, intellectual disability, seizures, depression, or social anxiety. Diagnosing ASD is

further complicated by the fact there is no specific formula for identification of deficits and many of the tools available are subjective measures based on caregiver observational reporting.

Individuals with ASD may have several characteristics including difficulty, making eye contact, initiating social communication and interactions, participating in reciprocal activities, completing daily living skills, tolerating sensory input, in addition, they often demonstrate repetitive behaviors or perseverations (Bagal, Kadam, & Parkar, 2016). Language delays or loss of emerging language skills are also a common characteristic that can limit the ability to effectively communicate their wants and needs (Acar & Diken, 2012). Additionally, children with ASD may not respond as expected to socially driven environmental prompts or motivators (Corbett & Abdullah, 2005).

History of Autism

The term *autism* is most notably attributed to work by psychiatrist Eugene Bleuler in 1908. He presented a lecture to the German Psychiatric Association regarding his studies in schizophrenia, describing demonstrative traits as being autistic in nature (Bleuler, 1961). Thirty-five years later (1943 and 1944), Leo Kanner and Hans Asperger published two distinct papers referencing studies of children who demonstrated clearly distinct behaviors that suggested *autism* was significantly different than schizophrenia (Fombonne, 2003; Lyons & Fitzgerald, 2007; Wolf, 2004). In a 1943 article?, "Autistic Disturbances of Affective Contact*,"*Kanner detailed research on 11 children who were identified as having

symptoms that were "markedly" and "uniquely" different, meriting further exploration. Children included in his research were reported as demonstrating unusual temper outbursts, social withdrawal, perseverative, and obsessive symptoms, lack of, regression, or delay in communication skills, presence of echolalia, questions of cognitive ability, and incongruent emotional and social response to stimuli. He described very similar characteristics in each of the 11 cases although at varying degrees of intensity and frequency. Although some of the children in his study had previously been diagnosed with cognitive disorders or schizophrenia, he suggested the shared symptoms be recognized as examples of "inborn autistic disturbances of affective contact," setting the stage for autism to be considered a wholly separate and distinct diagnostic term (Kanner, 1943, p. 250).

Asperger's 1944 work identified four boys with similar exhibitions of behaviors including difficulties forming relationships, lack of reciprocal conversation skills, perseveration or rigid interests, lack of coordination and empathy for others. His work resulted in similar attributes identified by Kanner (1943), however it never gained the popularity or distribution that Kanner did. For this reason, Kanner is more prominently recognized. Despite, the importance of both Kanner and Asperger's work they both discovered a population of individuals with similar symptoms which required further research to eventually define autism. What has resulted since that time, is an ever-changing discussion of how to define, diagnose, research, and treat individuals who are diagnosed

with an ASD (Lyons & Fitzgerald, 2007; Volkmarr & Reichow, 2013). Kanner and Asperger both similarly identified individual differences in regards to intensity, severity and frequency of symptoms. In addition, both noted the unknown nature of the underlying etiology of the disorder.

Prevalence

The prevalence of ASD has grown from 20 in 10,000 in the late 1970's to the current reports by the Centers for Disease Control and Preventions (2015) of 1 in 68 children (Karim et al., 2012; Wing & Gould 1979). ASD is not limited by race, ethnicity, or socioeconomic status (Simmons, 2014). It has been estimated to be more prevalent in boys at a rate of 1 in 42 boys compared to girls being approximately 1 in 189. There have been a number of ideas highlighted as impacting the increase in prevalence of ASD. Hypothesis include, potential genetic and environmental factors, increased awareness, as well as improvement in the development and definition of criteria (Neggers, 2014). In addition, some suggest the addition of valid and reliable testing tools have also contributed to the number of individuals diagnosed earlier (Zykstra, Prater, Walthour, & Aponte, 2014). Also hypothesized, individuals mildly impacted by autism-like symptoms are now diagnosed and would have previously gone undiagnosed (Rice, Rosanoff, Dawson, Durkin, Croen, Singer, & Yeargin-Allsopp, 2012).

Treatment/Intervention for Autism

History of Treatment

One of the earliest approaches to treating individuals with autism explored specialized education and therapy separating children from their parents with the belief parents and the living environment were the core connection to symptom development (Meyer, 2010). Bettelheim believed if the child afflicted with ASD was removed from their home and placed in a therapeutic setting, symptoms would dissipate (Bettelheim, 1959).

In the 1960s, there was a belief, persons with ASD had underlying personality disturbances, which fueled the controversial research using d-lysergic acid diethylamide (LSD). The drug was thought to alter the perceptive state and mood of the child, which in fact had some positive result. However, the use of LSD was highly criticized and research studies decreased, eventually ceasing altogether by the early 1970's (Sigafoos, Green, Edrisinha, & Lancioni, 2007). Current pharmacological interventions approved for the treatment of ASD include risperidone (Risperdal) and aripiprazole (Abilify). Both of the medications are atypical antipsychotics recommended in the treatment or management, not of ASD itself, however, the symptoms associated, such as irritability (Nightingale, 2012; Scahill, Koenig, Carroll, & Pachler, 2007).

In the mid-1970s, shock therapy was introduced to address self-injury and to reduce maladaptive behaviors in children with ASD. Lichstein and Schreibman (1976) found compliance with low-level shock therapy attained positive

outcomes. Electroconvulsive therapy studies also resulted in decreases in self-injurious behaviors, however the exact mechanism accounting for the reduction in symptoms is unknown (Wachtel et al., 2009). Other treatments focused on sensory sensitivities identified in children with ASD. Such approaches included auditory, diet, and language interventions targeted at re-teaching skills perceived as lost or ineffectively learned. Treatment options influenced by earlier work are still incorporated into addressing symptoms today. Speech and occupational therapy attempt to make modifications to learning environments, prompting, stimuli, and reinforcements in an effort to address deficits in social and communication skills (Hebert, Kehayla, Prelock, Wood-Dauphinee, & Snider, 2014).

The most successful evidenced-based treatment to this point has been applied behavior analysis (ABA) developed by Lovaas in the 1960's. The intervention uses observation to identify antecedents, behaviors, consequences, and reinforcements effective in learning adaptive behaviors improving independent functioning. Early and intense ABA intervention has been identified as a highly beneficial treatment for ASD. Generally, ABA is delivered in a one-on-one setting where environmental factors may be controlled and replacement behaviors are taught (Smith & Eikeseth, 2011).

Video Modeling

Much of human learning is done through observation and modeling. Through observing others one forms and idea of how new skills are performed,

which guides of their later implementation of similar behaviors. From infancy through adulthood individuals are exposed to models beginning with parents and transitioning to peers and individuals in the natural social environment.

VM has been identified as one of the most effective methods of teaching social skills. The use of VM began in the 1960's with O'Connor who was able to collect frequency evidence of peer interactions demonstrating increased interactions amongst pre-school age children (Evers & Schwartz, 1973). More recent studies have documented successful implementation of VM as in intervention for skill acquisition for children and adults diagnosed with ASD (Alacatara, 1994; Apple, Billingsley, & Schwartz, 2005; Bellini & Akullian, 2007; Buggy, Toombs, Garnder & Cervetti, 1999; Charlop & Milstein, 1989; Charlop-Christy, Le & Freedman, 2000; Coyle & Cole, 2004; Hagiwara & Myles, 1999; Haring, Kennedy, Adams & Pitts-Conway, 1987; Lasaster & Bardy, Mechling, Pridgen & Cronin, 2005; MacDonald, Clark, Garrigan & Vangala, 2005; Nikopoulos & Keenan, 2003; Nikopoulos & Keenan, 2004; Norman, Collins & Schuster, 2001; Ogletree & Fischer, 1995; Sherer et al., 2001; Shipley-Benamou, Lutzker, & Taubman, 2002; Simpson, Langone, & Ayres, 2004; Taylor, Levin, & Jasper, 1999; Thiemann& Goldstein, 2001; Wert & Neisworth, 2003).

VM targets individual skills, tasks, or behaviors to be performed by an individual. A video is made documenting a peer, family member, or other individual successfully performing the targeted skill, which serves as a model for imitation eventually leading to independent mastery of the target behavior

(Nikopoulos & Keenan, 2007). Advances in technology such as smart phones, tablets, portable video players, laptops, and media players have opened the door for VM to be used in an immediate and much needed option (Plavnick, 2012).

Video self-modeling (VSM), in the same lines as VM, the individual watches a recording of a targeted behavior or skill. However, instead of recording a peer, family member, or outside individual, the individual him/herself is recorded successfully demonstrating the targeted skill. At times, this can take a bit of time and editing in an effort to have a successful self-model (Boudreau & Harvey, 2013). VSM focuses only on the positive and removes evidence of negativity, mistakes, or prompting from outside sources to create a model that represents a desired targeted outcome (Buggey & Ogle, 2012).

Benefits. VM allows very specific and detailed instructions to be performed and recorded for accessible instruction, thereby reducing the reliance on verbal instruction (Plavnick, 2012). VM reduces outside distractions and has been effective for replacing targeted behaviors or teaching skills to address areas of delay (MacDonald, Dickson, Martineau, & Ahearn, 2015). Pre-production of the video model reduces the need to have direct care professional staff immediately available for direct implementation. Training can be provided to paraprofessionals, peers, family members, and the direct individual to deliver the video prompt as needed. The use of a video model may decrease the occurrence of mistakes in modeling as the video model contains only the appropriate demonstration of the targeted skill or behavior (Plavnick, 2012). VM can be used

when and where it is needed and in a repetitive manner that cannot be replicated in live modeling. Reduction of time where the model is observed and the skill is imitated or practiced is lessened with VM. VM can be employed for skill acquisition across the lifespan and is not limited to only early developmental stages. VM can be used in education, home, community, and therapy settings. It moves intervention closer to being a natural support replacing intrusive, attention drawing models that may be viewed as intrusive or punitive (Ganz, Earles-Volrath, & Cook, 2011; Simmons, 2014).

Downfalls. If a child does not have the ability to focus on a video screen then this skill would have to be taught first decreasing the immediate efficiency of using a video model. Buggey (2007) identified VM in a study attempting to develop verbal initiations and responding in two mid-teen students diagnosed with autism did not result in positive effects. Buggey stated a high level of perseverative and self-stimulating behaviors may have interfered with the students' ability to focus on the video. Buggey inferred students that do not have the cognitive or attention skills prior to the intervention may not demonstrate positive effects in response to VM.

Efficacy. VM is shown to be an effective intervention strategy for addressing social-communication skills, including conversational skills (Charlop & Milstein, 1989; Charlop-Christy et al., 2000; Sherer et al., 2001), giving compliments (Apple et al., 2005), social initiation (Apple et al., 2005; Buggy et al., 1999; Nikopoulos & Keenan, 2003; Nikopoulos & Keenan, 2004),

spontaneous greetings (Charlop-Christy et al., 2000), play behavior (Charlop-Christy et al., 2000; D'Ateno et al., 2003; MacDonald et al., 2005; Nikopoulos & Keenan, 2003; Nikopoulos & Keenan, 2004; Taylor et al., 1999) and social responses (Haring et al., 1987). In addition, VM has been shown effective in improving behavioral functioning, such as purchasing behaviors (Alacatara, 1994; Haring et al., 1987; Mechling et al., 2005), using a zipper (Norman, Collins & Schuster, 2001), setting a table, pet care (Shipley-Benamou et al., 2002), managing off task behavior (Coyle & Cole, 2004) and hand washing (Hagiwara & Myles, 1999). Further, VM promotes skills acquisition which have demonstrably been maintained over time and transferred across persons and settings (Bellini & Akullian, 2007). Effectiveness has also been recognized in the reduction of maladaptive behaviors (Corbett & Abdullah, 2005).

Theory. The effectiveness of VM can be explained by Bandura's (1977) social learning theory, which suggested most human behavior is learned through observations and behavioral modeling. Models for learning are a natural part of a social environment. Children diagnosed on the ASD who demonstrate deficiencies in social and communicative skills may have a reduced likelihood for learning if reliant only on natural models and observations. In order to learn from observations an individual must have the ability to attend to and focus attention on a targeted behavior. Attention and focus deficits may limit the ability of a child with autism to respond to live models (Plavnick, 2012).

Bandura, Ross, and Ross's (1963) Bobo doll experiment explored how preschool children's behavior could be changed based on observing others through electronic media. Bandura suggested a person's future behaviors could be predicted based on observations they experienced, making adjustments based on the cognitive prediction of outcomes and internal motivations for success (Bandura, 1961). In the Bobo doll experiment, the children were divided into three groups. The children were then exposed to one of two behavior models; aggressive or non-aggressive model of behavior, with the third group as the control. When the children were then introduced to a generalized setting, children were observed to demonstrate behaviors similarly related to the model they were exposed to. The experiment demonstrated children learn through indirect observation.

As Bandura continued his research he refined his social learning theory, addressing the concepts of learning through observation. He identified behavior changes can be noted in a person after he/she observes the action of another person through modeling (Bandura, 1986). He identified four processes needed in order for observational learning to occur, which include attentional, retentional, production, and motivational. An individual must be able to first attend to a stimuli or model in order to take in information being presented. Second must be able to retain the information interpreting it into meaningful data to be stored into memory. Third the individual must have the ability to copy

or mimic the modeled behavior. Finally, the individual must be able to be reinforced by the duplication of the behavior (Bellini, Akullian, & Hopf, 2007).

The observational learning noted by Bandura is the mechanism which accounts for the learning process in VM. The video models demonstrate the desired behavior being performed and the person with ASD will see the activity performed with skill absent of failure or errors, and receiving a positive outcome. These conditions may provide an optimal method for the person with ASD to imitate or utilize the new skill providing new social opportunities supporting acceptance and inclusion.

Limitations of the Research of Video Self-Modeling

VM and Adolescents

Bellini and Akullian (2007) completed a meta-analysis of the VM and video self-modeling research. Of the 24 studies reviewed, the majority (21) of them focused on elementary-aged children (Alacatara, 1994; Apple et al., 2005; Buggy et al., 1999; Charlop & Milstein, 1989; Charlop-Christy et al., 2000; Coyle & Cole, 2004; Hagiwara & Myles, 1999; MacDonald et al., 2005; Nikopoulos & Keenan, 2003; Nikopoulos & Keenan, 2004; Norman et al., 2001; Ogletree & Fischer, 1995; Sherer et al., 2001; Shipley-Benamou et al., 2002; Simpson et al., 2004; Taylor et al., 1999; Thiemann & Goldstein, 2001; Wert & Neisworth, 2003, while on only a few (three) focused on adolescents (Haring et al., 1987; Lasaster et al., 2005). Since Bellini and Akullian's (2007) meta-analysis only a few

additional studies have emerged focusing on VM and VM in adolescents with ASD (Cite all the people).

Allen, Wallace, Renes, Bowen and Burke (2010) explored VM to teach occupational and vocational skills to four adolescents and young adults. The task taught included wearing of a mascot uniform in order to advertise and entertain customers in a business. Baseline observations were conducted to measure the participant's response to general instructions of the job and skill performance. In the second stage the participant was introduced to the video model demonstrating the expected tasks including interaction with customers. Measurements were taken again after being introduced to the video of the targeted job skills. Researchers returned a month later to again measure the demonstration of targeted work skills. The results demonstrated increased acquisition of targeted skills improving overall work performance.

Plavnick, Sam, Hum, and Odom (2012) evaluated the effects of social skills training in a video based group intervention. The study was conducted in a school setting where live instruction combined with VM was used as intervention for four adolescents aged 13-17. Targeted behaviors were measured which included social initiation, awareness, and reciprocal interactions. Results obtained demonstrated that each participant had a rapid increase in complex socialization skills and were independently able to engage in social behaviors even when video models were faded. These findings suggested a causal

relationship between the intervention and the increased demonstrated social skills.

Morlock, Reynolds, Fisher, and Comer (2015) conducted a study examining the effectiveness of VM in word recognition and pronunciation in three male adolescents aged 17-18, diagnosed with an ASD in the school environment. In this study students were selected from a student body of a magnet school for children with an ASD. Videos were viewed by the students in the classroom setting and were chosen based on each of the student's needs. Videos were short in length ranging from 9-45seconds focusing on the task of learning new words. After viewing the video, children were exposed to a visual or interactive stimulus to measure if the subject was able to identify or use the modeled word in an applicable way. Results were measured by assessing new word recognition, word pronunciation, and social validity. Their research demonstrated consistent effectiveness adding to the literature of VM as an effective model for teaching.

Despite some additional research on the use of video-modeling with adolescents, the majority of the research continues to focus on elementary-aged children, suggesting the continued need to focus on expanding the body of literature around the use of such interventions for adolescents with ASD.

Significance

Autism and Adolescence

Adolescents with ASD may have different or additional characteristics compared to elementary-aged children with ASD. Khor, Melvin, Reid and Gray (2014) suggested adolescents with an ASD are at higher risk for behavior and emotional problems, which are likely linked to deficits and challenges in communication, emotion identification, social skills, and behaviors demonstrating repetitiveness and rigidity. They explored coping behaviors of 31 adolescent children diagnosed with ASD through the use of self and caregiver report and questionnaire-based instruments. The study suggested as anticipated, withdrawal or isolation behaviors were highly associated with increased level of behavior and emotional problems.

During adolescence, deficits in social and communication skills increase difficulties initiating, maintaining, or effectively interacting with peers, family members, or community individuals. Additionally, adolescents with ASD have increased reports of depression and anxiety symptoms as they experience segregation from social groups (Hammond & Hoffman, 2014). It is not uncommon for adolescents to have participated in early intervention learning programs to have new challenges associated with entering a new phase of life where the expectation to communicate in an independent and social manner. They must begin learning to navigate life without supports. Many intervention services to adolescents with an ASD are provided by adults through their school,

family, or service providers, thus limiting the ability of the adolescent to connect with peers or other in their own social group (Kucharczyk, Reutebuch, Carter, Hedges, Zein, Fan, & Gustafson, 2015).

Additional challenges for children specifically diagnosed with ASD, is varying awareness of having a disorder which such significant impairments. Some adolescents with an ASD begin to, with greater frequency, recognize differences between their own ability and the ability of their peers. This can further impact the confidence around their continued functioning in peer and social opportunities (Hammond & Hoffman, 2014). The awareness of differences may also impact their relationship or willingness to work with support providers. They may find having a physical person intervening with behavioral and communication deficits in environments including classrooms, community settings, and social opportunities as embarrassing and a reminder of their difficulty making and maintaining relationships (Locke & Mitchell, 2016). Consequences of inadequate treatment for individuals with an ASD vary as much as symptoms vary in each of the individuals. ASD is a lifetime disorder meaning treatment may be necessary across the lifespan in order to manage symptoms. Without treatment individuals have a higher risk of hospitalization, incarceration, or residential treatment without the development of necessary skills to maintain safe and meaningful independent lives (Scahill et.al., 2007). The ability to experience inclusion decreases as children with an ASD get older

and early executive, communication, and social skills are not acquired (Carr, Moore, & Anderson, 2014).

Summary

ASD is a neuro-developmental disorder characterized by deficits in social and communication skills and the presence of repetitive stereotyped behavior impacting the ability of an individual to function effectively. As a spectrum disorder, the severity, frequency, and occurrence of symptoms varies person to person. ASD may co-occur with other conditions including intellectual disability, depression, and anxiety. Historical treatments have focused on managing symptoms through medication, shock therapy, educational intervention, and behavior training. VM is an observational learning approach where the individual views a desired behavior or skill being executed to then imitate the behavior in the model in the natural setting. Video self-modeling incorporates the subject into the initial video, providing the opportunity for the subject to view their success completion of a desired behavior to increase the probability of imitation in the natural environment. VM has led to improvement of targeted behaviors, including social and behavioral functioning skills. While the majority of studies conducted have identified effectiveness with primary age children, there is a lack of understanding of the efficacy in the adolescent population specifically in a community-based setting. Adolescents experience hormonal and physical changes which may be exacerbated by symptoms of ASD. This time of development is where children begin to develop plans for their future as they

navigate an increasingly social environment. If untreated, individuals with ASD may not develop effective social skills and may not learn to talk or interact with the world around them, leading to overall poor quality of life for themselves, family members, and caregivers. Without these skills costs for long term care as ASD's are a lifetime disorder will continue to grow. Therefore, developing effective treatment interventions can help individuals with ASD acquire social, communicative, and language skills making it possible to develop social relationships with peers and family members, cope with environmental transitions and changes, increase positive initiations to have needs and wants met, and provide a more independent opportunity for a meaningful life.

Chapter 3: Research Method

Introduction

The purposes of this study were to determine whether VMimpacts the demonstration of social communication skills, provides additional evidence for the utility of VM as an evidenced-based practice with adolescents with autism, and to examine the perceived acceptance of the intervention in community settings.

This chapter describes the methods used to test the research hypotheses presented in Chapter 1: the research design, setting and sample, instrumentation, procedures, and protection of participants.

Research Design

This applied research study used a single-case or single-subject design. In a single-subject design, the subject serves as the control for the study, replacing the need for a control group or larger number of participants. ASD can impact individuals in a diverse manner. Choosing a research design sensitive to individual differences provided the researcher the ability to evaluate the effect of the VM intervention.

Single-subject designs are quantitative and experimental in nature. In this research project, a single-subject design was used in order to determine significant change occurring before and after video intervention in demonstration of reciprocal social communication amongst adolescent boys, diagnosed with an ASD, in a community setting. Single-subject designs require that behavior be

continuously assessed, beginning with the acquisition of baseline functioning prior to intervention (Lane & Gast, 2014). Behavior is then observed and recorded during an intervention phase, and eventually the behavior is observed and recorded, post-intervention, to determine if efficacy is consistent over time.

This study used a multiple-baseline, across-participants design, featuring an ABA design. ABA designs assess a target behavior during a baseline session and then introduces the treatment for the first time. After the criterion of ability is achieved, the treatment is withdrawn and the baseline is assessed again. The ABA design provides two opportunities to assess effectiveness of a treatment condition (Manolov, Gast, Perdices, & Evans, 2014). Observed changes in behavior can increase confidence in the efficacy of the treatment. In addition, ABA designs may address the unlikely assumption that natural or environmental conditions may have impacted the change in behavior detected by observing the baseline after the intervention has been removed (Purswell & Ray, 2014).

Research Participants

Participants for this study were identified by the clinical supervisors in a licensed Developmental Disability Agency (DDA) in Western Idaho. Participants identified were diagnosed with ASD as evidenced by assessment by a licensed professional, aged between 11-17 years old, and enrolled in developmental services where VM is used to address social deficits as an evidenced-based option for intervention. All participants in the DDA services were identified as having an ASD, with a 50% deficit in overall function as identified by parent report on the

Scales of Independent Behavior-Revised, and must have a -21 General

Maladaptive Index score to be eligible for the intervention services. Participants

selected by the clinical supervisor had an identified social skills goal on their

individual service plan for developmental services. Participants were generally

similar in functioning as identified by the clinical supervisor for data to be

considered in this study.

Procedures for Gaining Access to Participant Data

After receiving approval from Walden University's Institutional Review

Board (IRB) to collect data and conduct the research, I contacted the DDA in

Western Idaho, Region 4. Arrangements were made with the clinical supervisor

for developmental services of the DDA to obtain de-identified data based on the

participant criteria. The IRB approval number is 08-21-18-0260916.

<div align="center">

Research Sample

</div>

Data for the current study consisted of information collected by the DDA

that was providing habilitative intervention services which was authorized by the

State of Idaho's Department of Health and Welfare. Habilitative intervention is a

one-on-one service provided in Idaho to children diagnosed with ASD to help

them learn new functional skills for managing behavior and interacting

successfully in daily life. For this single-subject case design, three participants

were identified within the agency. According to Purswell and Ray (2014), small

sample designs may be viewed as less reliable or credible creating an underlying

pressure to obtain higher number of cases for therapeutic designs to provide

support for efficacy. For this study the DDA was able to identify three participants who met the specified criteria who currently receive services from the DDA. Larger samples would have improved the ability of results to be generalized to the targeted population, however results obtained can still be considered in support of the growing evidence of VM as an evidenced-based intervention (Lanovaz & Rapp, 2016).

Research Setting

All of the data collection and intervention phases were conducted in community based social settings as identified on their individual service plans (ISP). Specific community settings were obtained and identified individually upon review of the data available. Community settings included local parks, YMCA, libraries, and after school centers where participants would naturally interact with other peers their age.

Independent and Dependent Variable

For the purposes of this study the independent variable was the implementation of VM demonstrating reciprocal interaction skills. The dependent variable had three components to measure: greeting, receptive/expressive response, and salutation. These skills in the natural social setting comprise first steps to initiating social interactions with peers (Nikopoulous & Nikopoulous, 2007). Vocal scripts developed were determined ahead of time for the video model to match age and developmental equivalency for the participant set (Sancho, Sidener, & Reeve, 2010). VM has been used to

effectively model, teach, and increase socially acceptable behaviors in children

with more research focused on early intervention or primary aged children

(Nikopoulous & Keenan, 2008).

Instrumentation and Materials

The developmental disability research sites used a Samsung Galaxy Tab 2,

which captures video at a 1280 x 720 resolution to record the video model. Video

Editing Software on the tablet converted the video to be used on multiple video

devices including phone or other tablets based on the access of the administering

provider.

To maximize the similarity between the study participants and the video

model, the models selected for the target skill video are a similar age and

relatable to the research participants. Providing models similar to the target

population has the ability to draw attention especially when used in a social

interaction model (Van Gog, Verveer, & Verveer, 2014). The video featured the

targeted skill set and was used by all clinicians administering the intervention.

During the intervention phase the same video was shown to each participant

during each day of the treatment/intervention phase via a portable device prior to

entering the identified community, social setting.

The social validity of this study was measured by administration of the

Behavior Intervention Rating Scale (BIRS) and the Children's Intervention

Rating Profile (CIRP; Elliott & Treuting, 1991; Cowan & Sheridan, 2003). Social

validity was measured to explore the extent to results obtained by the study can

be used to guide the selection of interventions and evaluation of outcomes for VM with adolescents diagnosed with ASD (Elliot, Gresham, Frank, & Beddow, 2008). A modified version of the BIRS featured 24 questions that are rated on a six-point Likert scale with scores ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The BIRS assessment is designed to measure the perception of treatment acceptability and perceived effectiveness by the rater (Ingersoll, Waltong, Carlsen, & Hamlin, 2013). The BIRS has been used to assess social validity in several VM studies (Liu, Moore, & Anderson, 2015). High scores are associated with higher acceptability leaving lower scores to be associated with lower acceptability perception of the intervention (Elliot & Treuting, 1991)

The CIRP was used to measure the participants' and peers' perception of acceptability related to the VM intervention. The CIRP has been used in various studies in order to explore the acceptability of intervention methods and the ability to be generalized into targeted settings including schools and community settings (Turco & Elliott, 2016). Possible scores range from 1 to 6, where the higher score indicates more acceptability (Von Brock & Elliott, 1987). Modifications may be made to the CIRP in order to specifically address the social skill VM intervention. The CIRP contains seven items related to fairness, acceptability, and harmful effects of the intervention. Items are rated on a 6-point Likert-type scale, with the ability to report between 1(I agree) to 6 (I do not agree). The CIRP was administered to the participant with the ASD during the intervention treatment.

Treatment

      The treatment approach for this study was VM. The treatment phases for each of the participants were conducted by their certified HIP, certified by the State of Idaho's Department of Health and Welfare, authorized to work specifically with children diagnosed with an ASD. The HIP were responsible for delivering instruction during the baseline phase, intervention treatment, and used their own media equipment to deliver video demonstrations to the participants during the treatment session.

      During baseline phase, the HIP provided up to 5 minutes of verbal instruction featuring the expectation for social interaction including a greeting, on topic response and reciprocation, and farewell. This was explained to be the introduction of the expectation prior to the introduction of the VM prompt. Multiple baseline data were obtained during this phase including up to 5 trials per session over 5 days. After baseline phase each participant were introduced to the video model of the social behavior.

      The video for the intervention phase was modeled by two similar aged adolescent males. The video model demonstrated how to perform the expected social exchange. In a single-subject design and in this study the student served as their own control. The baseline data were obtained during scheduled habilitation intervention services with their developmental disability agencies over five days with five trials per day in a single 2-hour session. The intervention data were data were recorded during a second five-day period with five trials per day in a single

2-hour session, followed by a third five day period where maintenance data were obtained.

Dependent Variable

The dependent variable in this study was scored for responses based on scripted verbalizations included in the video treatment, scripted social actions, and spontaneous reciprocal verbal interactions chains (MacDonald, Sacramone, Mansfield, Wiltz, & Ahearn, 2009). For the VM peer models followed a script to greet their peer saying hello, to wave hello, shake hands, make an on-topic comment, and then say goodbye and wave as they left. These measurements occurred over five days of baseline, five days of treatment, and five days maintenance. The social reciprocal verbal responding was measured in natural interactions with known peers to attend to the occurrence of new learned behaviors. Participants were observed and data recorded when the participant encountered a peer when visiting a park, library, YMCA, or after school center naturally.

The video model provided included a live model of scripted reciprocal verbal communication example performed by two adolescent male peers. The interaction demonstrated the social conversation skills without error. The interaction included a greeting, question to initiate a social activity, and response to the denial or acceptance of the request, followed by a salutation.

To assess fidelity of data recording of the VM prompt and core objectives of the study, habilitative interventionists took data on non-participants to be

reviewed by their individual clinical supervisors prior to recording data for active participants (Corbett, Qualls, Valencia, Fecteau, & Swain, 2014). Inter-rater reliability was addressed by having a minimum of two raters for each participant recording data during individual therapy sessions where the dependent variable is being practiced and performed in baseline and treatment sessions.

Treatment Fidelity

Treatment fidelity was attended to by requesting the HIP provider to keep a daily log of VM implementation. In order to increase fidelity of treatment in this study, a common chart was developed to collect data on the days when video models were used, how much of the model was viewed, if prompting was required, and if targeted behavior was shown without the video model. Treatment fidelity is important to intervention studies in order to provider a measure of reliability and validity in consideration of evidenced-based treatment specification (Hinkley & Douglas, 2013).

Data Collection

This researcher contacted the DDA provider by, phone initially to make face-to-face appointments with the Clinical Supervisor at the organization. During the face-to-face meeting, criteria for participants were discussed providing the opportunity for the Clinical Supervisor to identify specific participants appropriate to this research study. Detailed instructions were provided to the Clinical Supervisor regarding how to de-identify documentation leaving only demographic and raw data available for this researcher to review.

The data collection procedure completed by the agency was reviewed to create a chart to highlight and organize the information establishing baseline, VM treatment, and Post Treatment recording. The treatment phase data were used to determine if the initial hypothesis is to be accepted. The data collection procedure is presented in the following chart to highlight and organize the information.

Table 1

Data collection procedure

Establishing the Baseline	1. The HIP introduced the target skill and provided direct instruction to the participant on the targeted skill for no more than 5 minutes. 2. The HIP introduced the social environment probe to the participant. 3. Participant's probes were scored and documented appropriately. 4. Baseline schedule: a) Each participant began VM treatment after 5 days of baseline.
VM Treatment	1. Immediately following completion of the baseline data collection for the VM treatment began. a) Participant sessions began after 5 days of baseline instruction and continued for 5 days. 2. During the treatment phase the HIP played the modeled video prior to entering a social environment. HIP only provided prompts to redirect the student's attention when it was necessary. 3. After viewing the video the HIP provided participants with trial opportunities in a social setting.
Post Treatment Data Collection Procedure	1. After treatment, data were data were collected two weeks after last intervention model. 2. Each participant completed 5 days of post treatment sessions.

H_a1: The Habilitative Intervention Participant will demonstrate at least 80% achievement on demonstrating reciprocal social behaviors over their baseline, as measured by the daily trials.

H_01: The Habilitative Intervention Participant will demonstrate less than 80% achievement on demonstrating reciprocal social behaviors over their baseline, as measured by daily trials.

Maintenance Phase

Maintenance for the VM intervention was measured one month after the data collection dates of the original treatment. The maintenance phase will remain identical to the post treatment procedure. Each participant completed a minimum of five trials addressing the targeted skill. Results obtained were used to accept or reject hypotheses 2.

H_a2: The habilitative intervention participants will maintain an achievement level of 60% or more on demonstrating reciprocal social behavior, as measured by the maintenance phase trials.

H_02: The habilitative intervention participants will not maintain an achievement level of at least 60% on demonstrating reciprocal social behaviors, as measured by the maintenance phase trials.

Social Validity

The social validity of this study was measured using a modified version of the BIRS and the CIRP. Both data inventories were completed by the HIP and the adolescent participants after the conclusion of the maintenance phase. The

results obtained from these inventories were used to accept or reject hypotheses 3 and 4.

H_a3: The average rating of the HIP's modified BIRS will be a 4 or above indicating that they believe the VM intervention is acceptable for community use.

H_03: The average rating of the HIP's modified BIRS will be less than 4 indicating that they believe the VM intervention is not acceptable for community use.

H_a4: The average rating of the adolescent participants modified CIRP will be 4 or above indicating that they believe the VM intervention is acceptable

H_04: The average rating of the adolescent participants modified CIRP will not be 4 or above indicating that they believe the VM intervention is not acceptable.

Data Analysis

Descriptive data for each participant included age, gender, ethnicity, and diagnoses. De-identified raw data for trials and service plans were available to be used to inform further research and add to support for internal validity. Christ 2007, suggested data obtained in a single subject case design may be influenced by any number of factors not controlled for. Therefore, he offered the suggestion that the gathering and analysis of thorough information may provide the researcher the opportunity to rule out impact of other non-measured variables in order to inform or achieve internal validity. Horner et al. (2005), similarly suggested the ability to achieve internal validity in single-subject research designs

by acquiring detailed information about the treatment and treatment conditions so future researchers could be replicated. Additionally, by providing participants from two different DD agencies and of varying ages identified as adolescents the external validity of this study was also increased.

The achievement data collected on the daily trials provided visual analysis via line graphs. According to (Richards, Taylor, & Ramasamy, 1997), the researcher on visual inspection of graphed data can interpret the trend and the variability of performance in the data collected. This research study used double line graphs to aid in data analysis. These graphs provided visual comparisons across several conditions throughout the baseline and intervention phases of treatment impact (Horner et al., 2005). Excel, a Microsoft software program, was used to develop the graphs.

The effect sizes of changes were measured using a confidence interval of 95% and Cohen's *d*. Cohen's *d* is defined as the difference between two means divided by a standard deviation for the data. The larger the effect size the higher level of statistically significant results. In this study Cohen's *d* was used between the participant's baseline and post treatment phases and then between the baseline and maintenance phase.

Parker and Hagan-Burke (2007) suggest additionally to Cohen's d the use of nonoverlapping data points (PND) to analyze treatment effectiveness. The PND of the study was calculated by counting the number of intervention points that exceed the highest baseline point (nonoverlapping) in order to create a ratio

between the higher points and the total points (Parker, Hagan-Burke, & Vannest, 2007). The ratio of the nonoverlapping points were then divided and multiplied by 100 in order to create a percentage.

Research Limitations

Limitations included the sample size. Participants were randomly identified by the Developmental Disability Agency providing Habilitative Intervention Services as authorized by the State of Idaho's Health and Welfare Department. There were a limited number of individuals who met the criteria for this study and therefore there continues to be difficulty generalizing the results of this study to a larger population.

This study proposed to observe and explore data related to a single skill set in one area of socialization. Social skills often build on each other and this study examined the initiation of social interactions and not sustained social interactions in settings where the individual was comfortable and familiar. Future research could focus on expanding social skills and connecting those skills to the development of social relationships.

Another limitation considered in preparing this study, was the short duration of the data collection phase. It was anticipated data samples including the original baseline, intervention data, and the maintenance phase were completed over sessions occurring in a single month. This will not address the long-term effects of using the intervention or assess regression of skill.

Protection for Participants

This study was guided by and adhered to the American Psychological Association's ethical principles and standards with the intent to protect all participants involved in the research from harm. Individuals with developmental disabilities are considered to be a vulnerable population. Therefore, methods were reviewed prior, during, and after to protect the identity of individuals selected for this study.

As data obtained was secondary in nature, the researcher only received de-identified raw data with all personal or identifying information about the participant removed prior to review. Participant data were identified in a numeric format. All data were and is kept in the secured office of the researcher where the office has a lock and the data is stored in a locked filing cabinet. Documents obtained for each participant was only labeled and identified in a numeric categorization, with no personal or identifying information.

The staff members at the research sites were provided with the contact information of all the individuals on the research committee to address any concerns or questions before, during, and after the completion of the research. Agencies and staff choosing to participate in this research were not offered any compensation. A final copy of the dissertation will be provided to those participating in the research to provide further opportunity of consideration for future intervention plans.

Summary

In Chapter 3, I discussed each aspect of the proposed research project including the sample, data collection, VM intervention, community intervention settings, and the assessments. The sample subjects in this study were identified by clinical supervisors at the research sites. Each subject had identified social skill goals identified on their authorized plan of service, were within the age of 11-17, male, and had been diagnosed with ASD.

Additionally, the study's potential limitations were discussed. Careful attention was devoted, insuring adherence to the APA ethical codes in order to protect and safeguard the protected population considered for this study. Main limitations in the research were in the ability to generalize the results to larger and diverse populations, diversity in community settings, and varied abilities of the individual specifically. The researcher was aware of these limitations and may use them to inform future research opportunities.

Chapter 4: Results

Introduction

The purpose of this study was to determine if VM was able to increase the proficiency of adolescent boys with ASD in demonstrating social behavior, including eye contact, greeting, on-topic commenting, and a closing salutation. The dependent variable was targeted social behavior in the natural setting as listed above, and the independent variable was the administration of the VM example. The dependent variable was measured in daily sessions, including a baseline period, intervention, and maintenance phase. The study evaluated the social validity of VM to identify if the habilitative interventionist and the adolescent participants perceived the VM intervention as an effective and functional strategy for increasing social behaviors. Chapter 4 includes a description of the study's sample, analysis of secondary data, and a discussion of the identified research questions and hypotheses.

Description of Sample

The research site, where the sample of participants was obtained, provides developmental and behavioral services to children between the age of 3 and 18 years, who have diagnosed with a developmental diagnosis, including autism. HIPs are all required to have a bachelor's degree in psychology or education with an emphasis in behavior modification and child development. They must also have completed at least 1 year of employment after graduation working with children with a developmental disability in order to qualify to provide habilitative

interventions. The clinical supervisor at the research site selected adolescent, male participants from their current participants who were receiving developmental disability services with a HIP. She chose participants who had received services between June and December of 2018. The three participants chosen had to (a) be a male between 11 and 18 years of age, (b) have been diagnosed by a licensed professional with ASD, (c) have a Scales of Independent Behavior-Revised (SIB-R) maladaptive score of -21 or below, (d) receives habilitative intervention from a certified professional, (e) have a social behavior goal on their IAP, and (f) be able to attend to video and direct instruction for up to 2 minutes.

The sample selected included three, White, male adolescents all between the age of 15 and 17. The demographics of participants are provided in Table 1. All three participants were eligible and received habilitative intervention services through a disability agency authorized by the Idaho department of Health and Welfare. All three participants received treatment with the same HIP and clinical supervisor.

Table 2

Participant Demographics

Participant	Gender	Age	Ethnicity
Participant 1	Male	15	white
Participant 2	Male	16	white
Participant 3	Male	17	white

Analysis of the Data

This research project used a quantitative, single-subject, multiple baseline-design based on secondary data with three participants. Data collection was completed with each participant for five baseline data sessions, five treatment sessions, and five maintenance sessions. All participants completed five trials each in the 15 total sessions presented for collection of data. Each participant's data are presented on the following graphs. On each graph the y-axis represents the score of each trial for the combination of social behaviors and the x-axis represents the individual trial and session section.

Variables

The dependent variable for the study was the production of the identified social skill set and the independent variable was the application of the VM treatment. Data were collected in three phases including baseline, treatment, and maintenance. Each of the three phases included five sessions each with five trial opportunities a day. Each day's trials were converted into a percentage score by dividing the number of positive scores (display of social behavior) by the number of trials presented for the day. Double line graphs were completed to provide ability to visually analyze the three stages of the research.

Research Questions 1 and 2

The first research question proposed the participant would need to reach at least 80% achievement over baseline. The second research question proposed

that the participant would maintain at least a 60% achievement in performance over their initial baseline performance. The differences in each participant's achievements, trends, percentage of nonoverlapping data, and the effect size are examined as part of a visual and statistical approach to the analysis of data. Statistical analysis of the PND was calculated by identifying the intervention points that did not overlap with the highest baseline data point. In analyzing PND scores for significance of effect, scores between 70 and 90% would be considered effective, scores between 50 and 70% would be indicate caution in suggesting effect, while scores below 50% would indicate ineffectiveness (Heyvaert, Saenen, Maes, & Onghena, 2015).

Effect sizes (ES) were also calculated to provide statistical support for secondary data. Cohen's d was used to examine the impact of the VM treatment. Effect sizes were calculated by dividing the difference of the observation means by the average standard deviation. To be considered a large effect, effect size would need to be above .8, .2 would be considered a small effect size and .5 would be a medium effect size (Campbell, 2004).

Participant 1's Data

Participant 1 was a 15-year-old, white male. Data for participant one is shown in Figure 1 and in Table 2 and 3. Participant 1 had five baseline sessions, five treatment sessions, and five maintenance sessions each consisting of five trials per session.
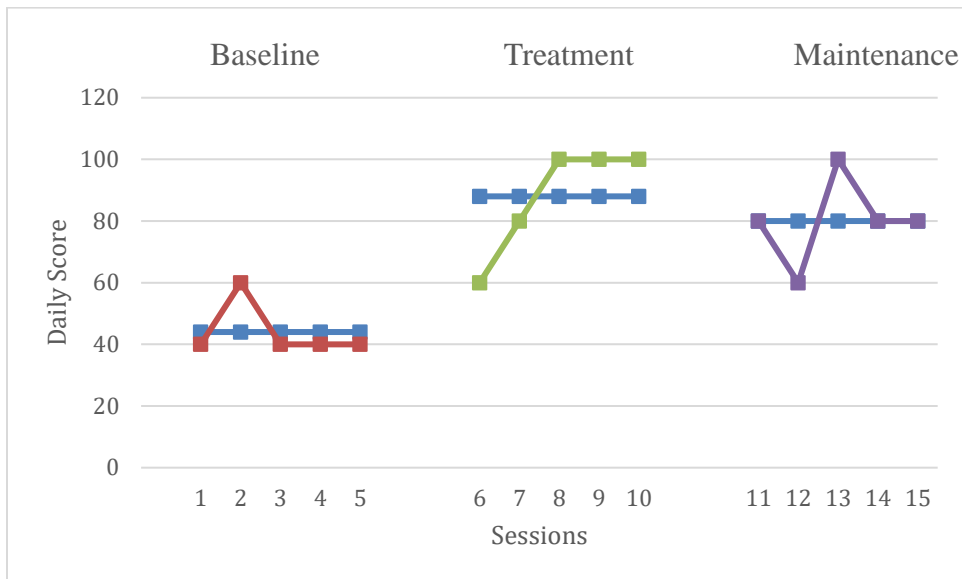
Figure 1. Participant 1's achievement levels on daily trials.

Table 3

Participant 1's Percentage of Nonoverlapping Data Points (PND)

Participant	DV	PND (Intervention)	PNG (Maintenance)
Participant 1	Trial Score	80%	80%

Table 4

Participant 1's Cohen's d Effect Sizes

Participant	Baseline-Intervention	Baseline-Maintenance
Participant 1	3.28	3.12

Participant's scores in each phase is shown in Figure 1. Participant 1's

baseline level of performance (mean) was calculated to be 44%. The baseline was

found to be generally stable over the five trial sessions. During intervention phase

of treatment participant 1's average achievement level was calculated to be 88%.

In comparing baseline to intervention data there is a pattern of increased

achievement. To accept the hypothesis in Research Question 1, participant 1

would need to increase his achievement by at least 80% over baseline. Participant

1's PND found in Table 2 is 80%. This suggests that the treatment is effective for

Participant 1. Participant 1/s baseline to intervention achievement was

calculated to have an effect size of 3.28. An effect size above 0.8 is considered to

have a large effect, therefore based on calculations Participant 1's effect would be

considered large.

Research Question 2 proposed that the participant would maintain at least

a 60% level of performance during a third maintenance phase. Participant 1's

maintenance achievement is shown in Figure 1. Participant 1's baseline level of

performance (mean) was 44%. His maintenance level of performance was 80%.

Participant 1's baseline-maintenance PND was 80% and considered to be an

effective treatment while the effect was maintained over time. Participant 1's

baseline-maintenance performance had an effect size of 3.12 falling within the

large effect range.

Participant 2's Data

Participant 2 was a 16-year-old, White Male. Data for participant one is

shown in Figure 2 and in Table 4 and 5. Participant 2 had five baseline sessions,

five treatment sessions, and five maintenance sessions each consisting of five

trials per session.

Figure 2. Participant 2's achievement levels on daily trials.

Table 5

Participant 2's Percentage of Nonoverlapping Data Points (PND)

Participant	DV	PND (Intervention)	PNG (Maintenance)
Participant 2	Trial Score	80%	100%

Table 6

Participant 2's Cohen's d Effect Sizes

Participant	Baseline-Intervention	Baseline-Maintenance
Participant 1	2.49	2.60

Participant 2's scores in each phase is shown in Figure 2. Participant 2's baseline level of performance (mean) was calculated to be 48%. The baseline was found to be generally stable over the five trial sessions. During intervention phase of treatment participant 2's average achievement level was calculated to be 84%. In comparing baseline to intervention data there is a pattern of increased achievement. To accept the hypothesis in Research Question 1, participant 2 would need to increase his achievement by at least 80% over baseline. Participant 2's PND found in Table 4 is 80%. This suggests that the treatment is effective for Participant 2. Participant 2's baseline to intervention achievement was calculated to have an effect size of 2.49. An effect size above 0.8 is considered to have a large effect, therefore based on calculations Participant 2's effect would be considered large.

Research Question 2 proposed that the participant would maintain at least a 60% level of performance during a third maintenance phase. Participant 2's maintenance achievement is shown in Figure 2. Participant 2's baseline level of performance (mean) was 48%. His maintenance level of performance was 84%. Participant 2's baseline-maintenance PND was 100% and considered to be an effective treatment. Participant 2's baseline-maintenance performance had an effect size of 2.60 falling within the large effect range.

Participant 3's Data

Participant 3 was a 17-year-old, White Male. Data for participant one is shown in Figure 3 and in Table 6 and 7. Participant 3 had five baseline sessions,

five treatment sessions, and five maintenance sessions each consisting of five
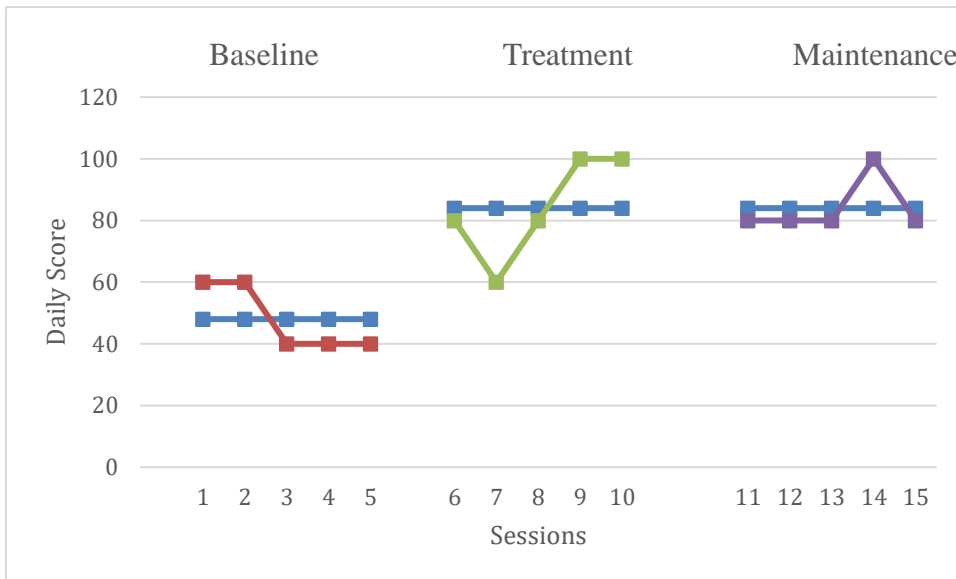
trials per session.

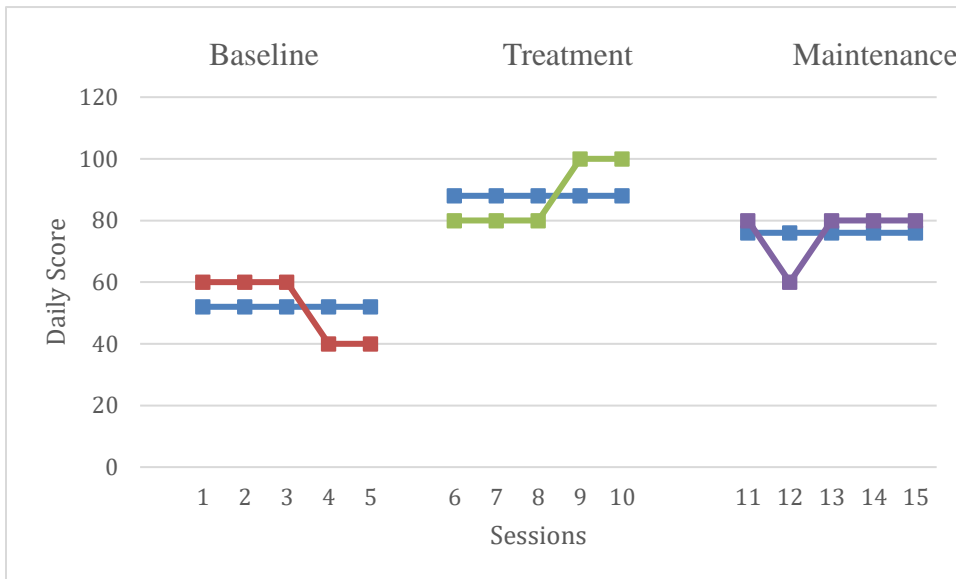*Figure 3.* Participant 3's achievement levels on daily trials

Table 7

Participant 3's Percentage of Nonoverlapping Data Points (PND)

Participant	DV	PND (Intervention)	PNG (Maintenance)
Participant 3	Trial Score	100%	80%

Table 8

Participant 3's Cohen's d Effect Sizes

Participant	Baseline-Intervention	Baseline-Maintenance
Participant 3	2.13	1.62

Participant 3's scores in each phase is shown in Figure 3. Participant 3's baseline level of performance (mean) was calculated to be 52%. The baseline was found to be generally stable over the five trial sessions. During intervention phase of treatment participant 3's average achievement level was calculated to be 88%. In comparing baseline to intervention data there is a pattern of increased achievement. To accept the hypothesis in Research Question 1, participant 3 would need to increase his achievement by at least 80% over baseline. Participant 3's PND found in Table 6 is 100%. This suggests that the treatment is effective for Participant 3. Participant 3's baseline to intervention achievement was calculated to have an effect size of 2.13. An effect size above 0.8 is considered to have a large effect, therefore based on calculations Participant 3's effect would be considered large.

Research Question 2 proposed that the participant would maintain at least a 60% level of performance during a third maintenance phase. Participant3's maintenance achievement is shown in Figure 3. Participant 3's baseline level of performance (mean) was 52%. His maintenance level of performance was 76%. Participant 3's baseline-maintenance PND was 80% and considered to be an effective treatment. Participant 3's baseline-maintenance performance had an effect size of 1.62 falling within the large effect range.

Social Validity

The social validity of this study was evaluated using a modified version of the Behavior Intervention Rating Scale (BIRS) and the Children's Intervention

Rating Profile (CIRP). Both data inventories were completed by the HIP and the adolescent participants after the conclusion of the maintenance phase. Research Questions 3 and 4 explored the social validity of the treatment to identify whether the teacher and the participant found VM to be an acceptable treatment to support development of social behaviors in natural social settings.

Research Question 3 focused on the HIP's perceptions of the use of VM in a community setting. The clinical supervisor within the program administered the modified BIRS to the HIP. The modified BIRS contained 24 line items and used a Likert based system with ratings from 1-6 ranging from strongly disagree-strongly agrees. The total score on the profile can range from 24-144, with the higher the score indicating higher acceptability for the intervention. For the purposes of this research project the mean score out of all 24 items was used to explore the validity of the VM treatment. Mean scores equal to or above 4 indicated acceptability of treatment. The data from the HIP's modified BIRS can be found in Table 8.

Table 9

Modified Behavior Intervention Rating Scales (BIRS)

Reviewer	Raw Score	Mean Score
HIP #1	117	4.875
HIP #2	105	4.375
HIP #3	111	4.625
Average	111	4.625

The raw score for HIP 1 was 117 with a mean score of 4.88. The mean scores is above the acceptability mean of 4, which indicates that the HIP professional found the VM treatment to be acceptable in a community use setting. HIP 2's raw score of 105 and mean score of 4.38 were also within the acceptable range as were the HIP 3's raw score of 111 and mean score of 4.63. An overall average raw score of the HIP's was calculated to be 111 with a mean score of 4.63 still falling within the acceptable range and allowing us to accept the hypothesis of acceptability proposed in Research Question #3. Specific interpretations of the HIP's scores will be included in Chapter 5.

Research Question 4 examined whether the participant would score the modified Children's Intervention Rating Profile (CIRP) at an acceptability level of 4 or higher. The clinical supervisor within the developmental disability agency administered the modified CIRP to the three participants upon completion of data collection in the maintenance phase. The modified CIRP contained seven items and utilized a Likert-style scale to rate social validity of the VM intervention using a rating scale of 1-6 again ranging from strongly disagrees to strongly agree. Total scores therefore would range from 7-42, with the higher score being indicative of stronger acceptability in the intervention. This reach used the mean scores of all rated items to identify treatment validity. Mean scores equal to or above 4 were considered acceptable. The results from the modified CIRP are found in Table 9.

Table 10

Modified Children's Intervention Rating Profile (CIRP)

Reviewer	Raw Score	Mean Score
Participant 1	29	4.14
Participant 2	34	4.85
Participant 3	36	5.14
Average	33	4.71

Each of the three participant's scores on the modified CIRP were above the mean of 4 indicated that the participants found the VM treatment to be acceptable in the community setting. Participant 1 scored the modified CIRP raw score of 29 and mean score of 4.14. Participant 2 was slightly higher with a raw score of 34 and mean score of 4.85. Participant 3's raw score was 36 with mean score of 5.14. An overall average of the three participant raw scores was 33 with a mean score of 4.71. Further interpretation of the participant's scores will be included in Chapter 5.

Treatment Fidelity

Treatment fidelity was addressed in the data collection process. For each trial in the treatment phase the clinical supervisor or HIP recorded if the participant viewed the entire video and if any cueing was required. Daily comments were also included if the HIP or clinical supervisor felt it necessary to include as impacting the recording of data. Treatment intervention sessions for each of the participants were recorded in sessions 6-10.

Table 11

Participant 1's Treatment Fidelity Chart

Session	Video Watched	Prompts	Comments
Session 6	Yes	One	Indirect Verbal
Session 7	Yes	None	No prompts needed
Session 8	Yes	One	Gestured
Session 9	Yes	None	No prompts needed
Session 10	Yes	None	No prompts needed

Table 12

Participant 2's Treatment Fidelity Chart

Session	Video Watched	Prompts	Comments
Session 6	Yes	None	No prompts needed
Session 7	Yes	None	No prompts needed
Session 8	Yes	One	Gestured
Session 9	Yes	One	Gestured
Session 10	Yes	None	No prompts needed

Table 13

Participant 3's Treatment Fidelity Chart

Session	Video Watched	Prompts	Comments
Session 6	Yes	None	No prompts needed
Session 7	Yes	None	No prompts needed
Session 8	Yes	None	No prompts needed

Session 9	Yes	None	No prompts needed
Session 10	Yes	None	No prompts needed

Treatment fidelity data collected revealed that each of the participants watched the presented video model during each of the treatment sessions. Participant 1 in session 6 and 8 required some minimal prompting in order to redirect attention to the video. Participant 2 in session 8 and 9 required only gestured prompting to redirect attention to the video and Participant 3 required no prompting during any sessions.

Conclusion

The analysis of collected data provided within this chapter support the acceptance of the hypotheses in each of the Research Questions in this project. The results of each of the participant's level of achievement identified an increase with all three reaching the 80% PND having a large effect range. The data also indicated that each participant was able to maintain the achievement through the measured maintenance phase with PND equal to or above 80%.

Each of the three participants indicated acceptability in the VM treatment through scores obtained on the modified CIRP. Acceptability of the VM treatment as delivered by HIP's was also identified through the scores of the modified BIRS falling above the designated cutoff of 4 or above with an average of 4.63.

Treatment fidelity data indicated generally positive feedback with a minimal to almost absence of need for extra prompting during administration of the VM prompt. This may be considered additionally favorable in support of acceptability for VM treatment in the community setting.

Chapter 5

Discussion

The main objective of this study was to determine if VM would have a positive impact on the social behavior skills of adolescent boys diagnosed with autism. The participants' achievement in the research was measured by multiple daily probes in natural social settings. The targeted skills included greeting, on-topic commenting, and a closing or salutation. The second objective of this study was to explore social validity in the use of VM as an effective method of intervention in natural social environments with peers.

This chapter provides a complete summary of data reported in Chapter 4. The summary data include the difference in achievement levels across each phase of intervention for each of the participants in this study as evidenced by the results of PND and ES. This chapter also explores the results of the social validity results obtained through reporting on the BIRS and the modified CIRP. The limitations of the study and suggestions for future research are also included. Finally, the chapter includes conclusions on how VM VM has an impact on social change.

Interpretations

This research project used a multiple-baseline design to identify if adolescent boys between the age of 11 and 18 could improve their social skills and contribute to positive social interactions in a natural setting. Research questions focused on the impact of treatment and the acceptance of the treatment

by participants and HIPs. The data were visually analyzed and analyzed using PND, ES, and levels of performance. Treatment or maintenance scores that exceeded the highest baseline score were counted to calculate PND scores for each participant. This score was converted to a percentage, allowing the researcher to accept or reject the null hypotheses for Research Questions 1 and 2. Cohen's *d* was used to calculate ES and reported in order to provide evidence of the effectiveness of the intervention treatment for each participant.

Research Question 1 explored whether the VM intervention would increase the level of achievement in probes targeting reciprocal social behaviors. In order for the null hypothesis to be rejected, the PND for each participant's treatment scores must have been at least 80% when compared to baseline scores for each of the other participants. Research Question 2 investigated if participants would maintain an improvement score of at a minimum 60%. In order for the null hypothesis to be rejected, maintenance levels must have been at least 60%, as measured by the PND analysis, when compared to their baseline.

Participant 1 made significant progress as a result of the VM treatment. Participant 1's baseline achievement was calculated at 44% after treatment; his performance level was calculated at 88%. Participant 1's PND from baseline to intervention was calculated at 80% and the ES was 3.28. The PND results and the large effect size from baseline to treatment were an indication that the VM treatment was successful at increasing the achievement level for the participant

on targeted reciprocal social skills. Therefore, the null hypothesis for Research Question 1 for this participant was rejected.

Similarly, in the post treatment phase, Participant 1 had success in achievement levels. His baseline performance of 44% was maintained at 80% during the maintenance phase. His ES, calculated using Cohen's *d*, although slightly lower than the intervention phase was 3.12, still indicating a large effect size. These results indicate that Participant 1 was able to maintain his success with the targeted skills. Consequently, the null hypothesis for Research Question 2 was also rejected for this participant.

Participant 2 made significant progress as a result of the VM treatment. Participant 2's baseline achievement as calculated at 48% after treatment his performance level was calculated at 84%. Participant 2's PND from baseline to intervention was calculated to 80% and the ES was 2.49. The PND results and the large effect size from baseline to treatment are an indication that the VM treatment was successful increasing the achievement level for the participant on targeted reciprocal social skills. Therefore, the null hypothesis for Research questions 1 for this participant was rejected.

In the post treatment phase, Participant 2 had success in achievement levels. His baseline performance of 48% was maintained at 84% during the maintenance phase. His ES, calculated using Cohen's *d*, in the intervention phase was 2.60 again indicating a large effect size. These results indicate that Participant 2 was able to maintain his success with the targeted skills.

Consequently, the null hypothesis for Research Question number 2 was also rejected for this participant.

Participant 3 made significant progress as a result of the VM treatment. Participant 3's baseline achievement was calculated at 52% after treatment his performance level was calculated at 88%. Participant 3's PND from baseline to intervention was 100% and the ES was 2.13. The PND results and the large effect size from baseline to treatment are an indication that the VM treatment was successful increasing the achievement level for the participant on targeted reciprocal social skills. Therefore, the null hypothesis for Research questions 1 for this participant was rejected.

Similarly, in the post treatment phase, Participant 3 had success in achievement levels. His baseline performance of 48% was maintained at 76% during the maintenance phase. His ES, calculated using Cohen's d, although falling slightly in the maintenance phase was 1.62, again indicating a large effect size. These results indicate that Participant 3 was able to maintain his success with the targeted skills. Consequently, the null hypothesis for Research Question number 2 was also rejected for this participant.

Based on the PND percentages of all participants, there is evidence to support a positive impact with visual analysis, positive increasing trends of achievement, and large effect sizes for each of the participants.

Levels of performance for all of the participants combined indicated a positive impact of the VM treatment. The baseline mean across all participations

was 48%, the treatment mean was 87%, and the maintenance mean was 80%. The

levels of performance reveal the VM treatment resulted in an overall increase of

successful performance. The ES for all participants from baseline to treatment

was 2.6 and for baseline to maintenance was 2.13, providing further confirmation

of the treatment impact.

Social Validity

The next purpose of this study was to obtain additional validation for the

efficacy of VM in use in natural social settings. The third and fourth research

questions more specifically investigated whether the participant and their HIP

found the VM treatment to be an acceptable intervention for increasing social

skills in their natural social environments. Modified rating scales using a Likert

scaled response technique administered to obtain responses from participants

and HIPs concerning questions of acceptability as an intervention strategy. The

HIP score was obtained from a modified Behavior Intervention Rating Scale

(BIRS) and participant score was obtained from a modified Children's

Intervention Rating Profile (CIRP) using similar scale descriptors. To reject the

null hypotheses proposed in both research Question 3 and 4, the HIP and the

Participant had to receive a mean score off at least a 4 on the modified BIRS and

modified CIRP.

The overall HIP's average score on the modified BIRS was a 4.625, which

fell within the needed range to reject the null hypothesis. As a result, the null

hypothesis was rejected for Research Question 3. An item analysis of the HIP's

scale revealed that each generally enjoyed the use of the Video Behavior

Intervention (VBI) and found it to be effective in providing instruction, however

there was some report that social behavior would still be noticeably different than

more natural social interactions of peers. The HIP's indicated that the presence of

the technological component can be distractive to participants initially. Results of

the participant's scales revealed mean scores on the modified CIRP to be 4.71.

This was above the cutoff average of 4 and indicated that the participants found

the treatment to be acceptable in natural social environments. Consequently, the

null hypothesis for Research Question 4 was rejected.

Individuals with ASD have deficits in social and communication skills that

are often addressed through the use of adult or peer supports that provide models

for acceptable or successful behavior. Often the presence of aids may have a

stigmatizing impact on the participant with the limitations. VM is an evolutionary

intervention method which allows for skill modeling, acquisition, and increased

social acceptance based on Bandura's theory of observational learning. Diverse

populations including individuals with autism have benefitted from the use of

video behavior interventions as supported by this research and an abundance of

other research with similar results (Brooks, 2009; Choi, 2007: Qi, Barton, Collier,

&Lin, 2018).

Outcomes of this project were consistent with the increasing large body of

literature suggesting that VM intervention are effective in improving deficit skill

areas of individuals impacted by autism (Bellini & Akullian, 2007, Mason et al.,

2013; Wang & Koyama, 2014, Wynkoop, Robertson, &Schwartz, 2018.). In this project each of the three participants clearly improved their ability to demonstrate targeted social skills as well as reporting satisfaction in the intervention method of the video model. Further each of the participants commented on being able to access the model with ease due to its digital format.

Limitations

There continued to be limitation of this study in the restricted ability to generalize results to other populations and settings. This limitation is most specifically related to the study's restricted co-variables. The second limitation specific to this study was related to the ability to eliminate the impact of distractions occurring in natural social environments.

The first purpose of this study was to analyze the impact of VM on the performance of adolescent boys diagnosed with autism to participate in reciprocal social interactions. The study identified only three participants who fit the minimum criteria for participation from the licensed Developmental Disability Agency, currently receiving support to improve social skills. Being limited to a single agency in Western Idaho the number of adolescents and professional interventionists was limited and made it difficult to generalize treatment effects to other adolescents who may have similar diagnoses and deficits.

The discrete skill set chosen from the innumerable social skills and the limited number of individuals who met the criteria placed limitations to

generalize final results to a larger population. Recent studies that have documented successful implementation of VM have highlighted the need to focus on restricted covariables to find support for VM as an evidenced-based practice (Apple, Billingsly, &Schwartz, 2005; Plavnick, 2012; Boudreau & Harvey, 2013).

Those implementing the VM technique and recording data were blind to the purpose of the study. The HIP's utilize VM as an evidenced-based technique in teaching new social skills to participants they deliver services to. The delivery of the technique and data recording were completed as part of their routine duties. Their awareness of the study being conducted was presented by the clinical supervisor when being asked to complete the BIRS. This may have helped to minimize bias in recording data and its resulting outcomes.

This study did reveal success with each participant as evidenced by the ES, however these results may not be directly transferrable to similar or other populations of students. Participants in this study had participated in developmental services for longer than a year which may have included other methods of learning social skills. Without ability to control for prior learning or experience it is impossible to specify VM as the only reason for the success in performance.

The second limitation to the study was the inability to eliminate effects of distractions in natural social settings. Buggey and Ogle (2012) suggest focus on the model and desired targeted outcome; however, there are a number of outside distractions when working in a natural setting that cannot be controlled for. In a

natural social setting, there may be others in the environment interacting, movement of objects, sensory distractions, and the inability to anticipate change. However, upon visual analysis of the baseline sessions the results for each of the participants appeared to be stable. Therefore, it is further hypothesized that the PND and ES were accurate to representing the impact of VM intervention treatment on the participant's social skill development.

Future Research Suggestions

Future research suggestions for this area of study are recommended to consider longer periods of time in the baseline, treatment, and maintenance phases. Continued research could also include a wider variety of social skills or at minimum progressive target skills within the scope of the study. This study was able to identify large effect sizes in each participant, which could suggest progressive targets over time would provide additional support and information about the long-term ability of VM in natural social settings. Continuing to observe and record data related to consistent use of behaviors to initiate, reciprocate, and close a social setting in daily interactions until the participant demonstrated mastery of skill as evidenced by at least an 80% success rate over a month's time without prompting of any kind may provide evidence of effectiveness.

Another suggestion for research would be to explore the VM treatment impact when being used independent of a secondary support aid. Many adolescents may feel that having an aid or professional support with them in a

social setting may interrupt their ability to interact. It may be interesting to explore the use of self-delivery as well as the addition of videoed self-models and its impact on demonstration of effective and acceptable social skills in a natural setting. This study used a transportable option either with a tablet or a smart phone. Each of the participants had their own tablets or phones as well which may indicate that self-prompting may be a viable area for research in the future. This line of research may contribute to the positive support through social validity and acceptance as an evidenced-based intervention model.

Social Change

Deficits in social communication are an identifying characteristic of individuals diagnosed with an ASD. These deficits often isolate individuals in a number of natural social opportunities. By incorporating technology-based learning techniques, such as VM, there is hope that the need for more stigmatizing forms of intervention may be replaced (Bellini, Akullian, & Hopf, 2007).

There is also a shortage of professionals qualified to deliver intervention and support to children with autism as they attempt to acquire skills to improve socialization and communication. This along with high costs of treatment continues to weigh heavily on many societies. Assisting participants to learn in a variety of mediums aims to validate VM as an evidenced-based treatment, which in turn may reduce barriers to delivering interventions.

In this study habilitative intervention professionals are trained by clinical supervisors on the administration of the VM treatment and method for recording data. During the study the clinical supervisor described how participants were often motivated by the technological components of the VM treatment. I believe as our world continues to advances technologically that treatment in the field of ASDs embraces those tools to reduce stigmatization and allows for promotion of independent learning and redirection.

Conclusion

Bandura's Social Learning theory is the basis for all video-based treatment modalities and research as it is for this study. His theory suggested that children most effective learn by mimicking what they see modeled by peers and others in their life. When a model is presented behavior could and should change under this theory. Bandura further suggested that if the model is performed by someone they know or have connection with efficacy would be improved (Bandura, 1977). For this research study the VM treatment used a peer model that was videotaped performing the targeted skills within the same age group and similar community setting.

The overall purpose of this research project was to explore if VM could positively impact the demonstration of social skills in natural social settings for adolescent boys diagnosed with ASD. The outcome of the study indicated that all of the three participants increased their achievement levels from baseline to treatment, measured by having at least 80% PND. All three participants also

maintained their performance in the maintenance phase obtained from PND scores of at least 60%. Each of the three participant's results produced large effect sizes in baseline to treatment and baseline to maintenance phases. Therefore, the VM treatment was success with increasing the participant's achievement in social skills.

The second purpose of this research project was to explore social validity in the use of VM within natural social settings. According to the results the habilitative intervention professionals and participants found the treatment to be acceptable. Scores used for these conclusions were acquired from results of modified BIRS and CIRP. The mean level of social validity scale for the HIP was 4.6 and for the participants was 4.7, which indicated significant treatment acceptability.

Other positive findings were obtained through treatment fidelity forms that each HIP completed for each participant. Each of the participants was observed to attend to the videos almost independent of any further prompting. Additional prompting was related to noise or movement occurring close to the participant during the intervention video (ball kicked close to the child in the park or someone calling the child's name).

This research project demonstrated incorporating technology to deliver instructional guidance to individuals can be successful to improving reciprocal social communication with same aged peers. This approach could be effective as the participant learns to independently administer VM, especially when

professionals and other prompting sources cannot be present (Nikopoulos &

Nikopoulou-Smyrni, 2008).

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Appendix A: Treatment Fidelity Form

Participant #_____

Week_____

Day	1	2	3	4	5	Comments
Video was shown						
Entire video was watched						
Prompting needed (gesture, indirect verbal, direct verbal)						
List community setting in comments						