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Stimulus Pairing to Condition Novel Reinforcers for Bermudian Participants with Autism

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Reinforcement is crucial to an individual's quality of life and acquisition/maintenance of novel skills, but a limited bank of reinforcers could lead to a reduction in engagement with pre-established reinforcers, reducing the motivational strength to contrive teaching opportunities, and increase maladaptive behaviors, self-stimulatory behaviors, or idle time. Though the stimulus-stimulus paring (SSP) method has been effective in establishing novel reinforcers for individuals who are diagnosed with autism, there is a gap in the literature on cross-cultural variations seen among responses when using SSP. This study was conducted to determine the generalizability of the effect when using the method of SSP with Bermudian participants, as Bermuda's culture is influenced by several cultures. This study used secondary data collected at a local intervention center that utilizes applied behavior analysis in their behavior plans and interventions. The results for all three participants demonstrated (a) an increase in engagement with the targeted stimuli, (b) ascending data trends within their overall SSP intervention, and (c) a percentage of nonoverlapping data points between the pre-intervention baseline and post-intervention baseline were 80% or greater. These findings can assist therapists by equipping them with culture-specific evidence-based strategies, which can be socially significant for their clients, their client's families, and the community as a whole.

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Dedication

I dedicate this research to the memory of my brother and my family members who have offered an abundance of support and inspiration, in particular, my mother, especially through providing an extra level of assistance with my son to aid in me reaching this goal. You have always encouraged me and pushed me to my limits.

Acknowledgments

I would like to extend much gratitude to my dissertation committee who has provided me with guidance throughout the dissertation process, especially my chair, Dr. Steven Little. As a board-certified behavior analyst, you have helped me complement my practical skills by assisting me in enhancing my scholarly voice while striving to be a pioneer in the field of applied behavior analysis on the island of Bermuda. Thank you.

I would also like to thank the local Bermuda Autism Early Intervention Center that provided me with the data that was used in this dissertation. You spend your days working hard for the population of Bermuda. As an Autism Early Intervention Center on the island of Bermuda, you continue to maintain internationally recognized standards while improving the quality of life for many individuals and spreading awareness of autism and the field of ABA within the island of Bermuda.

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Chapter 1: Introduction to the Study

The diagnosis of autism spectrum disorder (ASD) has increased substantially, with a 121% increase in the diagnosis of ASD from 2002–2012 (Makrygianni et al., 2018). Thus, it is important to be aware of effective therapeutic approaches appropriate for this diagnosis. Meta-analytic studies have demonstrated that applied behavior analysis (ABA) is an effective evidence-based intervention for individuals who have autism (Makrygianni et al., 2018). ABA therapists work one-on-one, using theories such as operant conditioning or classical conditioning to influence an individual's behavior. However, cultural differences, such as different values, beliefs, and priorities, can lead to cross-cultural response variation (Watson et al., 2002). This study was conducted to address a research gap regarding a potential response variation regarding the effectiveness of ABA strategies for establishing novel reinforcers pertaining to the Bermudian culture.

Background

Behavior and how individuals respond to stimuli relates to how and whether they deem the stimulus to be reinforcing or motivating. Reinforcement is a key element to learning and retaining information and plays a role in future responses (Cooper et al., 2020). Individuals who have a wide bank of reinforcers can find sources of reinforcement all around them in their everyday environments. However, individuals who have a limited bank of reinforcers, such as those diagnosed with autism, may not be presented with an abundance of occurring natural reinforcers that they can find in their everyday environment, or they may be reinforced by socially inappropriate or repetitive

items/activities. Keeping in mind reinforcement's role in acquiring new skills and future responding, those with a limited bank of reinforcers are presented with a disadvantage for being reinforced and learning from their environment.

Establishing novel reinforcers can be crucial in skill acquisition and skill maintenance (Akpan, 2020). It is also essential to the quality of life (i.e., leisurely activities/engagement). Research has demonstrated the method of stimulus-stimulus paring (SSP) to be effective in establishing novel reinforcers when implemented with individuals who have autism (Axe et al., 2017; Cló & Dounavi, 2020). However, there is a lack of cultural support for the generalization of such a method.

Autism and Reinforcement

Some individuals diagnosed with autism demonstrate a lack of engagement with social stimuli, as social engagement does not often function as a source of reinforcement for some individuals of this population (Rodriguez & Gutierrez, 2017). In addition, some individuals diagnosed with autism have been known to demonstrate a lack of intrinsic interest in stimuli that their neurotypically developing pairs would be interested in (Axe et al., 2017). The diagnosis of autism is also associated with restrictive interest (Cló & Dounavi, 2020). Restrictive interest in addition to a limited bank of established reinforcers can mean individuals become satiated or bored with their current reinforcers, reducing their effectiveness in the process of teaching and acquiring new skills (Cooper et al., 2020).

Brief History on the Successful Use of SSP

As some individuals diagnosed with autism tend to have a limited bank of reinforcers, they may need an intervention to condition/establish novel reinforcers (Cló & Dounavi, 2020). Three behavioral principles are used to condition reinforcers: classical conditioning, operant conditioning, and observational learning (Cló & Dounavi, 2020). However, respondent (pairing/SSP) procedures result in stronger and longer-lasting effects (Rodriguez & Gutierrez, 2017). Classical conditioning, such as SSP, is when a neutral stimulus is paired with a pre-established reinforcer (either a primary or secondary reinforcer). For example, many neurotypically developing children tend to be reinforced by social stimuli. However, this is not always the case for children diagnosed with autism (Axe et al., 2017). Contingent pairing of primary reinforcers successfully establishes praise as a novel form of reinforcement for their participants diagnosed with autism.

Filling the Gap

Although SSP has been identified as an effective method to be used with those diagnosed with autism, cultural sensitivity must be considered when applying any method in another culture (Guest, 2014). Research acknowledges that the design of behavioral interventions does not sufficiently address cultural differences (Wright, 2019). But there is a lack of research outlining how to overcome barriers in working with individuals from cultures that differ from the dominant U.S. culture (Dennison et al., 2019). With no published peer-reviewed ABA articles specific to the Bermuda population, this study addressed the generalizability of the effectiveness of SSP when utilized with Bermudian participants.

Problem Statement

Being satiated (bored) with items that were typically identified as reinforcing leisure activities can lead to an increase in idle time and maladaptive behaviors. For individuals with autism who tend to present with a subset of delays (such as social delays, communication delays, academic delays) being satiated on previously reinforcing items/activities removes incentive that would motivate them to work hard to learn/acquire a task. This can create a more significant delay gap.

Purpose of the Study

The purpose of this study was to explore the effectiveness of SSP as an intervention method for tackling the identified problem. Although SSP does have research that speaks to its effectiveness, this study aims to explore the generalization of such effectiveness across cultures. Specifically, this study addressed the effectiveness of SSP within the Bermudian Culture.

Research Question and Hypotheses

This study addressed the following quantitative research question: “Is the SSP method of classical conditioning successful in conditioning novel reinforcers to Bermudian individuals with autism?”

$H_0$1: The SSP method of classical conditioning will not have an effect on autistic Bermudian participants’ engagement during a 5-minute interval with a novel reinforcer.

H_a1: The SSP method of classical conditioning will lead to 80% or greater engagement during a 5-minute interval with a novel reinforcer for Bermudian individuals diagnosed with ASD.

$H_0$2: The method of SSP will not influence the trends of responding from individuals who have a limited bank of reinforcement and therefore will result in a graph that has a visual representation of no-trend or an inconsistent trend.

H_a2: The method of SSP will lead to ascending trends from individuals who have a limited bank of reinforcement, those who are likely to exhibit consistent baselines of 10–15% of engagement with a novel reinforcer during a 5-minute interval prior to any intervention.

$H_0$3: The percentage of overlapping data points will be 80% or greater as it is anticipated that the range of data points identified at the pre-intervention baseline levels will have a great deal of overlap with the range of data points within the post-intervention baseline phase.

H_a3: The percentage of nonoverlapping data points will be 80% or greater as it is anticipated that the range of data points identified at the pre-intervention baseline levels will not have much overlap with the range of data points within the post-intervention baseline phase.

Theoretical Framework

Classical conditioning is a learning theory that Ivan Pavlov first studied (Akpan, 2020). The theoretical framework of classical conditioning guided this study as this study is behavioral in nature. Behaviorists define learning as a response under the control of a particular stimulus (Clark, 2018). With that said, the classical conditioning theory explains a behavioral procedure in which a pre-established reinforcer (primary or secondary) is paired with novel stimuli that do not hold any reinforcement value

(Newman & Newman, 2016). Through this pairing procedure/association of the pre-established reinforcer with the novel stimuli, the novel stimuli are taught to have reinforcement value.

Nature of the Study

The nature of this study is quantitative with a single-case design. As the study focused on a vulnerable population, archival data were relied on for ethical reasons. Although group designs dominate research in the field of psychology (Kazdin, 2011), the use of single-case designs was most appropriate for this study and its target population, as individuals diagnosed with autism can present vastly different (American Psychiatric Association, 2013). In using a single case study to explore the effectiveness of the classical conditioning method of SSP, the dependent variable was the participants responding, and the independent variable was the passing of time across intervention sessions. The data were analyzed using a visual display of time series line graphs (Kubina et al., 2017).

Operational Definitions

Conditioned reinforcer: "A stimulus change that functions as a reinforcer because of prior pairing with one or more other reinforcers. (Sometimes called secondary or learned reinforcer.)" (Cooper et al., 2020, p. 789).

Conditioned stimulus (CS): "The stimulus component of a conditioned reflex; a formerly neutral stimulus change that elicits respondent behavior only after it has been paired with an unconditioned stimulus (US) or another CS" (Cooper et al., 2020, p. 789).

Intervention: The implementation of a behavioral procedure.

Reinforcer: “A stimulus change that increases the future frequency of behavior that immediately precedes it” (Cooper et al., 2020, p. 798).

Reinforcement: “A basic principle of behavior describing a response consequence functional relation in which a response is followed immediately by a stimulus change that results in similar responses occurring more often” (Cooper et al., 2020, p. 798).

Satiation: “Decrease in the frequency of operant behavior presumed to be the result of continued contact with or consumption of a reinforcer that has followed the behavior; also refers to a procedure for reducing the effectiveness of a reinforcer” (Cooper et al., 2020, p. 799).

Stimuli/Stimulus: “An energy change that affects an organism through its receptor cells” (Michael, 2004, p. 7).

Stimulus-stimulus pairing (SSP): A classical conditioning method when a neutral stimulus is paired with a pre-established reinforcer (Cló & Dounavi, 2020).

Scope and Delimitations

This behavior analytic study focused on the effectiveness of the classical conditioning method of SSP when implemented with children diagnosed with autism. Leisure experiences can promote children’s intellectual, social, and psychological development (Craig & Mullan, 2012). In addition, children are in the initial phases of brain development. Therefore, children are at a critical stage for acquiring new skills (Wood, 2020). Keeping in mind reinforcement’s role in acquiring new skills and future responding with children being in a critical stage for acquiring new skills, they were the target population of this study. Further, because culture can influence response, this study

focused explicitly on Bermudians to explore the generalization of the effectiveness of SSP across cultures. However, because all the data were from one ABA-focused early intervention center, the generalizability of the results may be limited.

Limitations

One limitation of this study is that there is a lack of research, in general, specific to Bermudian culture and Bermudian participants. This lack of research limits the feedback on a cross-cultural baseline of responding seen with Bermudians in regard to the potential similarities and differences when compared on an international level. Given that autism is a wide spectrum disorder, individuals with autism can present differently. A limitation of this study is the individual differences in responding that may not necessarily attribute to cultural differences. Additionally, Bermuda is a small island that is still in the early phases of intervention and support for individuals with developmental disabilities. Having all participants come from the same center can be seen as a study limitation.

Significance

With the field of ABA, there is a reliance on research-based practices, especially because ABA methods are often used as intervention strategies for individuals who are diagnosed with autism. Ethically, any strategy intended for individuals should be evidence-based. With this said, it is essential to resort to both current and culturally sensitive research when exploring intervention strategies. Cultural sensitivity should be considered when applying a method across cultures to avoid the potential for aversive effects (Guest, 2014). The significance of this study is that it offers a contribution to the

cultural sensitivity of ABA research through exploring Bermudian participants. This study provides feedback about considering cultural adaption of ABA services, specifically when establishing novel reinforcers.

Summary

Individuals diagnosed with autism can have a limited bank of reinforcers, or they could be reinforced by socially inappropriate or repetitive items/activities. SSP has been identified as an intervention that has strong and longer-lasting effects for conditioning reinforcers (Gutierrez, 2017). However, despite this acknowledgment in research, practitioners still need to consider cultural variations when implementing programs with clients, as considering culture could provide insight into intervention outcomes (Dennison et al., 2019). This quantitative study was conducted to examine the effectiveness of the method of SSP to condition novel reinforcers among Bermudian participants. The following chapter goes into detail about the pre-established literature on the background of autism, ABA, SSP, and the cross-cultural dynamic.

Chapter 2: Literature Review

It is not uncommon for some individuals with autism to have a limited bank of reinforcers or for them to be reinforced by socially inappropriate items/activities. Having a limited bank of reinforcers can minimize the activities that can be used to acquire new skills as well as hinder an individual's quality of life, as over engagement with a small range of items/activities can lead to a state of satiation (boredom). The purpose of this quantitative study was to examine whether the stimulus pairing method of classical conditioning is successful in conditioning novel reinforcers to Bermudian individuals with autism. This area is socially significant because research demonstrates that an increase in reinforcers could lead to a decrease in maladaptive behaviors and self-stimulatory behaviors (Cló & Dounavi, 2020).

This chapter includes a review of the literature regarding the method of SSP using classical conditioning to establish novel reinforcers for individuals who have autism. SSP stems from the theoretical framework of classical conditioning, which is a principle of ABA. After discussing the theoretical framework, the literature review begins with an overview of autism and how individuals with autism present. As the chapter continues, it will detail ABA, which is an evidence-based methodology used to teach skills systematically. Due to cultural differences in beliefs and values, this chapter also outlines the cultural sensitivity in the field of ABA and elaborates on Bermuda's culture due to the participants in the current study.

Literature Search Strategy

In order to conduct a comprehensive review of the literature Google Scholar, PsycINFO, PubMed, EBSCO host, and ProQuest were used with a filter in place searching peer-reviewed articles within the past 5 years to ensure the literature under review was current. But historical research on the subject matter was also explored to develop a well-rounded picture and see the trajectory of the subject matter in aim to present clarity to the gap and need for future research. To obtain articles on the subject matter, key terms searched included *stimulus-stimulus paring/S.S.P.*, *classical conditioning, Autism, Applied Behavior Analysis/A.B.A., Early Intervention, reinforcement, motivation,* and *culture*. This study also utilized content from published books. Research could be found on the method of SSP; however, limited research could be found on the cultural effectiveness of SSP.

Theoretical Framework

A theoretical framework means the study's direction is formulated based on an existing theory or theories. For this dissertation topic, this study was guided by the theory of classical conditioning, which is a learning theory. The theory of classical conditioning involves pairing a neutral stimulus with a conditioned stimulus in aim for the neutral stimulus, over time, to function as a conditioned stimulus by eliciting a conditioned response (Newman & Newman, 2016). A behaviorist would define learning as the acquisition of new behaviors as a result of an individual responding to an external stimulus, specifically measurable and observable behaviors (Clark, 2018). Behaviorism is often referred to as the stimulus-response theory, which has a great interest in the

association between the stimulus and the response and its strength maintained (Clark, 2018). Behaviorists classify learning that results in the response under the control of a particular stimulus as conditioning (Clark, 2018). Classical conditioning and operant conditioning are the two main types of conditioning methods. Classical conditioning is socially significant, as effective reinforcers are key to skill acquisition (Cló & Dounavi, 2020).

Literature Review Related to Key Concepts and Variables

Some individuals with autism can engage in stereotypy that may interfere with their daily functioning, but using differential reinforcement or using a competing reinforcing activity as a replacement behavior can reduce stereotypical behaviors (Akers et al., 2020). Reinforcement is also crucial in skill acquisition and skill maintenance and is essential to life quality (Akpan, 2020). However, some individuals with autism do not have a wide bank of reinforcers. Although there is research on establishing novel reinforcers, I found a gap in research on establishing novel reinforcers regarding the Bermudian population. As there is a focus on Western culture in research, exploring Bermudian participants is a way to aid in the internationalization of research with the field of psychology.

Intro explaining autism

Autism, also known as ASD due to the variation in presentation, is a developmental disability recognized in the American Psychiatric Association (2013) in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition as one of the most commonly diagnosed neurodevelopmental disorders, with no differences seen across

racial, ethnicity, or socioemotional groups, individuals who have autism engage in restricted/ repetitive behaviors and have communication and social impairments (Campisi et al., 2018). An early sign of autism is a lack of engagement with social stimuli. Social stimuli do not appear to function as reinforcement for individuals with autism as they do for their neurotypically developing peers (Rodriguez & Gutierrez, 2017). For some, praise effectively serves as a reinforcer; however, social recognition does not often function as an effective form of reinforcement for some individuals with autism (Axe et al., 2017). Individuals with autism have been known to demonstrate a lack of intrinsic interest in stimuli that their neurotypically developing pairs would be interested in, such as people/social interactions and toys. This is problematic as reinforcement is essential in teaching new skills (Axe et al., 2017). Therefore, a limited range of effective reinforcers can result in limited learning. The diagnosis of autism is also associated with restrictive interest (Cló & Dounavi, 2020). Restrictive interest in addition to a limited bank of established reinforcers can become problematic.

Gender differences and autism

Much of the historical research surrounding autism stems from predominantly male samples, and there are mixed findings regarding sex/gender differences in autistic symptoms (Evans et al., 2020). Some research indicates that boys with autism display higher rates of repetitive behaviors, whereas other studies conclude that there are no gender differences seen across this characteristic (Evans et al., 2020). Further, autism is more frequently diagnosed in boys than in girls (Evans et al., 2020), with a male to female prevalence of 4:1 (Zhang et al., 2020). This diagnostic gender gap could result

from influences of sex/gender biases in clinical diagnosis and the potential for assessment tools and diagnostic criteria to contain sex/gender biases (Evans et al., 2020).

Autism and Bermuda versus United States statistics

In Bermuda, the focus of the current study, it is common for individuals to be diagnosed with autism via behavioral screenings in America. Therefore, individuals in Bermuda refer to America's diagnostic statistic. The statistics for individuals with autism is 1 in 68 children in the United States (Campisi et al., 2018). But there are no readily available statistics on autism specific to the Bermudian population.

ABA/Early Intervention

As there is no cure for autism, early detection is important, with the average age of diagnosis being 55 months (Campisi et al., 2018). This detection can help with early intervention such as ABA therapy, which is a research-based teaching method that utilizes the principles of behavior to teach socially significant skills to the individual and their family (Cooper et al., 2020). Individuals who receive ABA services at earlier ages and in more intensive manners are more likely to have reduced ASD (Campisi et al., 2018). Insurance providers have globally recognized ABA overseen by a BCBA as an early intervention to assist clients, though in Bermuda, the coverage of ABA services by insurance providers is still minimal and has only recently been implemented. Bermuda is also still in the early phases of development surrounding ABA early intervention for individuals with autism; historically it was not uncommon for parents seeking ABA services in Bermuda to fly down their therapist, pay their salary, housing, and insurance, which is an expensive venture.

Cultural Sensitivity in the Field of ABA

The design of behavioral interventions does not sufficiently address cultural differences (Wright, 2019). Additionally, there is a lack of research on successfully working with individuals who are from cultures that differ from the dominant U.S. culture, which may be due to lack of diverse practitioners and biases (Dennison et al., 2019). However, practitioners should consider cultural variations when implementing programs with clients (Dennison et al., 2019). Taking culture into consideration is essential for social welfare, as cultural sensitivity can explain how behaviors change and the meaning of those changes within the individual's society (Miller et al., 2019). Accounting for the cultural needs of the client is essential to the ethical code of ABA, and therefore, BCBA's code of ethics ensures that they consider the role of culture in service delivery. But although many behavior analysts communicate that they feel competent in working with a diverse range of cultures, behavior analysts commonly communicate that they have received little to no training in cultural competence (Wright, 2019).

When using classical conditioning to establish novel reinforcers, culture can play a role. Thus, the field of ABA strives to be more culturally sensitive to promote equity in the distribution of care (Wright, 2019). In reviewing cultural differences in the application of ABA services, although there is limited research comparing intervention practices between Western and Chinese interventions, Liao et al. (2018) found cultural differences when comparing interview responses of professionals and parents from the UK and China. Cultural practices and ideologies are not seamlessly generalizable across

cultures. Applying a method within another culture can create an unhealthy environment (Guest, 2014).

Bermudian Culture

With the cultural differences seen in the application of ABA services, it is important to consider Bermudian culture when reviewing the application of ABA. Bermuda is a small island, which leads to a close-knit community-orientated island. Bermuda's culture is also commonly referred to as a "melting pot" of cultures, as the Bermudian culture is influenced by American, British, and Caribbean cultures (Pinckney, 2000). Although Bermuda culture is influenced by the Caribbean culture because of its island nature, Bermuda's culture differs from the Caribbean islands (Krannich & Krannich, 2006). As a British overseas territory, many of Bermuda's governing laws derive from the British culture. Additionally, with America being the closest country to Bermuda, it is common for Bermudians to frequently travel to America for pleasure or shopping (Krannich & Krannich, 2006). This increase in travel to the United States and consumption of U.S. brands/supplies increases the cultural influence that America has on the island. Likewise, Bermuda gets access to both UK and U.S. television channels. Finally, as the highest form of education provided locally is a community college where one can access an associate's degree, it is common for Bermudians to travel overseas for higher education, either directly after high school or after obtaining their associates degree at Bermuda College, as higher levels of education are commonly needed in Bermuda to obtain job security. For proximity reasons, it is common for some Bermudians to attend university in America/Canada, and from a financial stance as a

British overseas territory it is common for some Bermudians to attend university in the UK as they are eligible for benefits and to work/receive a source of income while in school.

Another consideration of Bermudian culture is that Bermuda prioritizes the use of manners and social interactions (Krannich & Krannich, 2006). For individuals who find social engagement challenging, such as those diagnosed with ASD, they may find it challenging to integrate in such a social environment or they may be preserved as "rude" for not demonstrating the level of social engagement culturally expected. Therefore, cultural norms can influence their socioemotional characteristics and exposure in early childhood significantly impacts them as adults (Guest, 2014).

Reinforcement

A reinforcer is a stimulus that increases the future likelihood of a behavior. Basri et al. (2020) explain that primary reinforcement is a stimulus that fulfills physiological needs, while secondary reinforcement is a stimulus that has been learned to be a reinforcer. A portion of learning is dependent on basic needs (primary reinforcers- stimuli that are not learned. In contrast, the other portion of learning is dependent on secondary reinforcers (stimuli that have been learned to be reinforcing) (Herrnstein, 1964). Herrnstein notes that any neutral stimuli can be conditioned as a secondary reinforcer if it is repetitively paired with a pre-established reinforcer. Establishing effective reinforcers is essential to behavior analytic interventions as effective reinforcements are needed for skill acquisition (Cló & Dounavi, 2020). Cló and Dounavi state that with a developmental disability such as autism, the older the individual gets, the more apparent

their differences become, making the need for effective reinforcers more significant to teach necessary skills. Xu et al. (2021) indicate that motivation is a predictor of achievement. However, they explain that the effects of motivation on achievement is subject to cultural variation. For example, it is indicated that pervasive or motivational based behaviors tend to be positively associated with achievement for East Asian individuals and negative associations seen in this area for Western individuals.

As individuals with autism may have a limited bank of reinforcers, they may be in need of conditioning novel reinforcers (Cló & Dounavi, 2020). When an individual has a limited bank of reinforcers, they can become satiated with their current reinforcers. Axe et al. (2017) explain that the process of simultaneously presenting an established reinforcer with either a neutral or an aversive stimulus is known as paring, often used to condition reinforcers. In the 1960s and 1970s, the pairing was used to establish reinforcers among individuals with psychiatric disorders. This pairing was done by simultaneously removing an aversive stimulus or simultaneously presenting a primary reinforcer or a secondary reinforcer (Axe et al., 2017). More recent studies on establishing novel reinforcers involve observational learning, discrimination training, non-contingent pairing, and contingent pairing (Axe et al., 2017; Rodriguez & Gutierrez, 2017). Being aware of these various methods to establish reinforcers, Rodriguez and Gutierrez emphasize that the effectiveness of operant (discriminative stimulus) procedures does not hold as much strength, nor is it as long-lasting when compared to the respondent (pairing/S.S.P.) process.

Cultural Differences seen Among Reinforcers/Motivation

An essential goal of cross-cultural studies is to determine if the phenomenon under review is measured or operates similarly (Roozen et al., 2020). Motivation and reinforcement are crucial elements to an individual's quality of life. Eastern cultures demonstrate a high level of motivation as it is a sign of moral virtue (Xu et al., 2021). Xu et al. notes that as a result of the differences seen between individualistic versus collectivistic views, certain motivational orientations may be considered maladaptive in the West that are not considered to be maladaptive in Asian cultures (Xu et al., 2021). Although not all types of motivations show cultural variability, collectivistic individuals experience more extrinsic forms of motivation that have an emphasis on the expectation of others (Xu et al., 2021). Roozen et al. note that the concept of quality of life differs culturally due to the differences in culture and value systems. Being aware of this is vital when evaluating any mental health treatment (Roozen et al., 2020). In addition to the cultural differences in the concept of quality of life, there are also cultural differences in the baseline levels of how individuals present pertaining to personality traits, general happiness, quality of life, and cultural satisfaction (Roozen et al., 2020). For example, individuals from Spain exhibit more traits of depression, while US individuals exhibit more traits of anxiety (Roozen et al., 2020).

In scientific terms, Cooper et al. (2020) indicate that a reinforcer increases the future frequency of a behavior. Therefore, Cooper et al. define reinforcement as a basic principle of behavior that describes a consequence contingent on a response. In layman's terms, a reinforcer is a stimulus that any individual enjoys, something that makes them

happy and motivates them enough to want to engage in the behavior again in aim to seek access to that stimulus again. Cultural differences are likely to exist in terms of motivation (Xu et al., 2021). In some cultures, family engagement serves as reinforcement (i.e., something motivates the people of that culture; or something that makes them happy). Although family engagement can serve as reinforcement in some cultures, other cultures may prioritize materialistic items or have a different set of priorities for what they classify as reinforcement. There can be both similarities and differences in values and beliefs across cultures (Watson et al., 2002). This concept can also apply to how universal reinforcement is and how cross-cultural differences influence reinforcement.

In reviewing cultural differences, Ger and Belk (1996) indicated a difference in a cultural hierarchy of the reinforcement value seen pertaining to materialistic items. They were able to identify a most to least materialistic cultural mentality in the following cultures in the order listed: Romania, the USA, New Zealand, Ukraine, Germany, and Turkey. There are multiple influences of happiness. According to Veenhoven (2010), two influences of happiness are: 1) the differences in conditions of happiness and 2) how we seek happiness. Certain conditions can elicit feelings of happiness in some individuals, while those same conditions can evoke feelings of unhappiness for others. Some examples of living conditions could include freedom, marriage, social rank, and personality (Veenhoven, 2010). For example, Vennhoven explains that there are lower levels of happiness in areas that demonstrate gender discrimination (i.e., those societies that discriminate against women). Bermuda's unique living conditions can include its

small size, its island climate and structure, and its close proximity to America while being a British overseas territory, just to name a few.

According to Veenhoven (2010), happiness differs across nations, with people in modern countries overtly displaying more happiness related behaviors. Veenhoven indicates that an individual's level of happiness is influenced based on how they met their culture's standards of success. One's culture is critical in determining the values of community members (Watson et al., 2002). With this said, cultural differences could influence one's perception of happiness and reinforcement and may alter how people prioritize concepts.

What is identified or prioritized as a behavior worthy of being rewarded, based on social values, can have social control within the society (Dennis, 1957). With this said, Dennis explains that if an individual is provided with information regarding what behaviors children are being rewarded for in their society, they would be able to develop a hypothesis on those children's values and future behaviors. Dennis evaluated what types of behaviors are reinforced in three Eastern cultural groups of children compared to an American group of children and found highly significant differences in what behaviors are reinforced. This cross-cultural comparison provided feedback regarding the children's future socialization.

Although Bermuda's culture is influenced by American, British, and Caribbean cultures, one of the few unique cultural elements that Bermuda has is its legislation system. In Bermuda there is a lack of legislation for individuals with developmental disabilities on the island, which presents the obstacle of a lack of funds made available

for this population to secure the resource needed to provided evidence-based services. This lack of legislation impedes the ability to govern the resources, services, happiness, and quality of life for individuals with developmental disabilities in Bermuda.

The one ABA Centre on the island is a not-for-profit charity that was founded by a mother of an individual with autism. With the lack of legislation or government support, this charity survives through hosting fundraising events and through the support of local and international grants. In 2018, this charity brought international individuals, Lorri Shealy Unumb and Daniel Unumb, who are well-known for assisting with insurance coverage in various parts of Unities States of America, to the island of Bermuda. This charity scheduled meetings with insurance providers to spread awareness of the international recognized CPT Codes that could be used to cover ABA services under the guidance of a BCBA. As a result, this increase in awareness led to Bermudian insurance providers starting to cover ABA services on island. This initial increase in awareness led to resources in the form of insurance coverage. Like this, having legislation on island, could also aid in providing resources as seen within other cultures who have legislation which grants further resources. Considering the social problem of there being no current legal legislation for individuals with developmental disabilities and lack of awareness/support for individuals with autism in Bermuda, this study will focus on the research problem of some individuals with autism having a limited variety of established reinforcers.

Classical Conditioning

Conditioning is a learning theory that emphasizes the importance of practicing a skill (Basri et al., 2020). This theory explains learning to be a change of behaviors as a result of an interaction between a set of conditions. Therefore, learning through conditioning is a behavioral change through repetitive exposure to a stimulus (Basri et al., 2020). Basri et al. note that throughout history, there have been various conditioning learning theories. Basri et al. provide examples such as, the initial work of Ivan Pavlov to John B. Watson, the first person in the United States to develop a theory based on Pavlov's theory. With classical conditioning theory, behavior is altered through simultaneous associating an established reinforcer with a novel stimuli. This simultaneous pairing process differs from operant conditioning, founded by B.F. Skinner. With the operant conditioning theory, the association of the established reinforcer and the novel stimuli is not simultaneous. When using the operant conditioning method, the established reinforcer is presented after (contingent) the individual engages with the novel stimuli (Basri et al., 2020).

Three behavioral principles that are used to establish reinforcers: classical conditioning, operant conditioning, and observational learning (Cló & Dounavi, 2020). In comparing the effectiveness of operant (discriminative stimulus procedures) and respondent (pairing/SSP) procedures Rodriguez and Gutierrez (2017) noted that respondent (pairing/SSP) procedures result in stronger and longer-lasting effects. Classical conditioning, such as stimulus-stimulus pairing (SSP), is when a neutral stimulus is paired with a pre-established reinforcer (either a primary or secondary

reinforcer). Cló and Dounavi (2020) note from the literature on the topic of SSP, four pairing procedures fall under the umbrella of SSP (1. simultaneous; 2. trace; 3. delay presentations that do not require a response from the participant; and 4. discrimination training that does involve a response from the participant).

Summary

In addition to reviewing the relevance of the single case design methodology of the study, this chapter provided a comprehensive review of both current and historical literature on the method of SSP, the population under review (autism), the cultural dynamics, as well as the relevance of the subject matter of SSP in relation to its theoretical framework, classical conditioning. From reviewing the literature, it was noted that there is a lack of ABA research on how to overcome barriers that will aid in successfully working with individuals from cultures. The literature also identified that there are cultural differences that can be seen amongst motivation and reinforcement. With this information, it is important to remember that practitioners should consider cultural variations when implementing programs with clients because applying a method within another culture can create an unhealthy environment.

In reviewing the cultural dynamics of this phenomenon, a gap in the research, specific to culture, was identified. As there is research on establishing novel reinforcers, there is a lack of research on establishing novel reinforcers across various cultures. This study aims to address this cultural gap regarding the Bermudian population by exploring the effectiveness of SSP in establishing novel reinforcers with Bermudian participants.

In presenting a well-rounded review and identifying the research trajectory of the subject matter, this literature was used to provide insight into the proposed problem. This chapter allows one to review the literature alongside the problem that it is not uncommon for some individuals with autism to have a limited bank of reinforcers or be reinforced by socially inappropriate items/activities. Having a limited bank of reinforcers could minimize an individual's pool of items/activities that they find motivating, which could, in turn, be used to modify their behaviors and acquire new skills. Understanding this, the upcoming chapter, Chapter 3, will detail the methodology of single-case design, which can be used to review the effectiveness of establishing reinforcers when using the classical conditioning method of SSP.

Chapter 3: Research Method

The purpose of this research was to determine the effectiveness of SSP to establish novel reinforcers for Bermudian individuals who have autism. This study used secondary trial-by-trial data collected at a local Bermudian autism early intervention center. Participants were Bermudian children diagnosed with a Level 3 diagnosis of autism (requiring very substantial support) who have a minimal bank of reinforcers, making them eligible candidates for an SSP method to be socially significant in establishing novel reinforcers. This chapter will outline the research question and hypotheses. This chapter will continue by providing details about the single-case design methodology. It will also outline the study's procedures and explain data analysis, validity, and ethical considerations.

Research Design and Rationale

In examining the effectiveness of the classical conditioning method of SSP among Bermudian participants with autism, this study uses a single study design across multiple participants. Because single case designs encompass controlled conditions, objective measures, and scientific rigor, they involve one participant (Kazdin, 2011). Most of the research demonstrating the use of ABA are single case designs, meaning there is a need for there to be a higher volume of single case design research to evaluate a larger number of participants to demonstrate generalizability across participants. Within research, in any field, there is a need for generalization across participants to indicate effectiveness of the phenomenon/strategy under review.

Research Question and Hypotheses

The research question for this study is: “Is the stimulus: stimulus pairing method of classical conditioning successful in conditioning novel reinforcers to Bermudian individuals with autism?”

$H_0$1: The SSP method of classical conditioning will not have an effect on Autistic Bermudian participants’ engagement during a 5-minute interval with a novel reinforcer.

H_a1: The SSP method of classical conditioning will lead to 80% or greater engagement during a 5-minute interval with a novel reinforcer for Bermudian individuals diagnosed with ASD.

$H_0$2: The method of SSP will not influence the trends of responding from individuals who have a limited bank of reinforcement and therefore will result in in graph that has visual representation of a no-trend or an inconsistent trend.

H_a2: The method of SSP will lead to ascending trends from individuals who have a limited bank of reinforcement, those who are likely to exhibit consistent baselines of 10-15% of engagement with a novel reinforcer during a 5-minute interval prior to any intervention.

$H_0$3: The percentage of overlapping data points will be 80% or greater as it is anticipated that the range of data points identified at the pre-intervention baseline levels will have a great deal of overlap with the range of data points within the post-intervention baseline phase.

H_a3: The percentage of nonoverlapping data points will be 80% or greater as it is anticipated that the range of data points identified at the pre-intervention baseline levels

will not have much overlap with the range of data points within the post-intervention baseline phase.

Methodology

This study was conducted to examine the cultural generalizability of classical conditioning and applied behavior analytic methods. It is essential for parents and practitioners who live internationally and rely on evidence-based treatments to know the cross-cultural effects and generalizability. Cultural practices and ideologies are not seamlessly generalizable across cultures. With this said, applying a method within another culture can create an unhealthy environment, hence the importance of internationalization of the field of psychology (Stout, 2004). Local research may also serve as a teaching tool that could potentially grow applied behavior analysis in Bermuda.

The study involved exploration of archival data that consisted of an A-B-A design—a pre-intervention baseline (A), the intervention phase(s) (B), and the post-intervention baseline phase (A) (Cooper et al., 2020). This study included a time-series analysis involving multiple single designs to compare the effectiveness and generalizability of SSP across multiple participants. With the single study design across participants, the study analyzed different clients who demonstrate to be at the same level functioning, in the same clinical setting, engaging in the same behavior (watching a novel show). This study had continuous assessment periods (prior to the intervention, during the intervention, and after the intervention).

The pre-intervention baseline phase evaluated the participant’s level of responding/engagement with the novel reinforcer before experiencing the intervention

(Cooper et al., 2020). This initial phase (a) indicates the participant's current level of responding, which is vital in meeting the participant where they are when developing the initial steps of an intervention; (b) identifies whether there is a need for an intervention; and (c) is also used as a benchmark to determine if the participant has demonstrated growth after the implementation of the intervention.

The intervention phase demonstrates the data of the participants' levels of responding when a pre-established reinforcer is paired with the novel stimuli (novel stimuli in isolation: initially analyzed in the pre-intervention baseline phase; Cooper et al., 2020). When utilizing the principles of ABA to systematically create individualized intervention plans, it is common for there to be various levels among the intervention phase, depending on the participant's response. Various stages of the intervention phase would speak to the variability in the level of prompting needed. In utilizing ABA strategies, it is typical to utilize some form of prompting. The level of prompting can vary on a hierarchy from either most to least intrusive or vice versa. In addition to various levels of prompting, this would also refer to potential program changes or strategies that have been identified to either address the learner's motivation, prerequisite skill, or a program change/strategy that is deemed to align with how the learner is responding. For example, if a learner's data indicates that it is going in a downward path (descending) or not moving (not trending), this may warrant a program change or a new intervention stage.

In the field of ABA, the intervention phase is typically referred to as the phase where a particular method is in place (i.e., a specific method or level of prompting). After

the intervention, the next phase, the post-intervention phase (where the method or level of assistance is faded out). The post-intervention phase is the phase that measures the amount of learning that took place. With an SSP intervention program, in this phase, learning would be operationally defined as the client independently demonstrating their ability to perform the skill in isolation of the intervention (the method/assistance/or prompt).

Participants

Autism, also known as Autism Spectrum Disorders (ASD), due to the variation in presentation, is a developmental disability recognized in the American Psychiatric Association in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5; APA, 2013) as one of the most commonly diagnosed neurodevelopmental disorders, with no differences seen across racial, ethnicity, or socioemotional groups, individuals who have autism engage in restricted/ repetitive behaviors and have communication and social impairments (Campisi et al., 2018).

As a British colony, Bermuda is a small 21 square mile island in the middle of the North Atlantic Ocean. Although a British overseas territory, Bermuda is heavily influenced by America due to its close proximity. It is common for individuals in Bermuda to be diagnosed via behavioral screenings (such as the Autism Diagnostic Observation Schedule (ADOS)) facilitated by a medical professional (pediatrician, physician, or psychologist) in America (i.e., Boston Children's Hospital, Kennedy Krieger Institute, and Nemours Alfred Hospital, to name a few). Therefore, individuals in Bermuda refer to America's diagnostic statistic. The statistics for individuals with autism

is 1 in 68 children in the U.S. (Campisi et al., 2018). Campisi et al. note that this statistic is 30% higher than reports in 2012 (1 in 88). There are no readily available statistics on autism specific to the Bermudian population.

Autism is more frequently diagnosed in boys than in girls (Evans et al., 2020), with a male to female prevalence of 4:1 (Zhang et al., 2020). Evans et al. (2020) state that this diagnostic gender gap could result from influences of sex/gender biases in clinical diagnosis and the potential for assessment tools and diagnostic criteria to contain sex/gender biases. Outside of looking at gender biases and focusing on DNA and DNA mutations, Zhang et al. (2020) suggest that a higher genetic load is needed for females to reach the threshold for a diagnosis. Zhang et al. speak to the genetic component that indicates female protective effects regarding autism. There is no known cause of autism; however, this diagnostic gender gap is noted as a critical element to a future explanation of the underlying cause of autism (Zhang et al., 2020).

Participants for this study were Bermudian individuals who have autism. The level of the participants for this study had a level 3 diagnosis of autism: requiring very substantial support. The participants were nonverbal learners, or those who had a limited vocal repertoire, who demonstrated the need for more than minimal assistance. Other inclusion criteria for participants were that the participants have a minimal bank of reinforcers, making them eligible candidates for an SSP method to be socially significant in establishing novel reinforcers. As this study focuses on participants of a vulnerable population, this study relies on archival data. Therefore, participants will also have to have SSP archival data on file at the local Bermuda Autism Early Intervention Centre.

The study relied on archival data via a request specific for SSP interventions. The pool of data did not include any cases where the researcher had collected data and data entered the selection pool only span a time period before the researcher was a BCBA. Given these criteria, the data used for this study was randomly selected from that pool of data.

Setting

In Bermuda's community, there is one Early Autism Intervention Centre. This Centre, has a number of programs: Clinical In-house Program, Saturday Social Skills Program, Summer Program, In-school/In-home consulting, and a Bi-monthly community training schedule. This Centre practices Applied Behavior Analysis (ABA) with an onsite Board-Certified Behavior Analysts (BCBA). As Bermuda is a small community, it is common for this Centre to be mentioned by name in the client's overseas diagnostic reports in the recommendation section for services. As the field of ABA is research based and data-driven, this Centre collects data daily to analyze the interventions that their therapist put in place. Archival data obtained via this local Bermuda Autism Early Intervention Centre's Clinical In-house program is a plausible source to explore the research question of this study.

A behavioral intervention can be implemented in various settings (home, school, university-based Center, and/or a clinic-based Center). Services in multiple environments with a well-trained professional can allow for generalization. Leaf et al. (2018) explain that a clinic-based ABA service model is classified differently from a school-based behavioral intervention. There are advantages of ABA services when administered in either setting. In a clinical setting, staff connectivity can foster fidelity and effectiveness

of behavioral interventions as a result of staff closely working in a community that allows them to observe and learn from one another (Leaf et al.,2018). A clinical setting also allows for intensive and ongoing supervision (Leaf et al.). An onsite BCBA in a clinical setting can allow for more hands-on contact and oversite of clients and clinical programs. A clinical environment also has the potential to foster a social network for parents who may feel in silos for various reasons.

The local Bermuda Autism Early Intervention Centre that data for this study was obtained from is a registered charity on the island of Bermuda. The Centre is categorized in the island's health sector as they are registered as a health care provider with the Bermuda Health Council. As the Centre is a clinical environment, opposed to a school environment, clients that access services from the local Autism Early Intervention Centre attend clinical therapeutic sessions which is differentiated from classroom instruction. The Centre is not attached to the Bermuda education system, as clients attend their medically recognized sessions prescribed through overseas and/or local diagnostic assessments (e.g., Boston Children's Hospital, Kennedy Krieger, etc.) and services are facilitated by their parents and insurance providers. As a charity, the Centre fundraises and actively engages in grant writing to subsidized parents' fees by 80%, allowing parents the ability to pay $20 an hour for 1:1 services in their In-house Program.

As the local Autism Early Intervention Centre's In-house program is not a full-time placement, clients in that program attend 3-hour sessions (either from 9:00am-12:00pm or from 1:00pm-4:00pm) for a set number of hours per week (i.e., 12 hours a week, 18 hours a week, 24 hours a week…). For clients who happen to have two sessions

that consecutively fall on the same day, the Centre does provide them with a one-hour complimentary lunch supervision between their two sessions. The number of hours that clients are granted with varies across each client, as weekly hour allotment is indicated by several variables. The weekly number of hours offered to a client is based on the following: recommendations outlined in their diagnostic report, observation notes from the Centre's therapists, current availability at the Centre when hours are offered, and parents' feedback. The Centre caters to individuals who have autism and/or other developmental disabilities. As it is common for individuals with autism to have language delays, the Centre does service clients who are both verbal and non-verbal.

As mentioned, the local Autism Early Intervention Centre's In-house service is not a full-time program, therefore, clients attend their clinical sessions with the Centre as well as their other placements, whether that be a nursery setting, a school setting, or a vocational placement, since the Centre's services are not specific to school aged clients. The Centre services clients from 2 years old to 20 plus years old, with the recent addition of their adult client day program in 2021. The Centre also offers other programs in addition to their In-House Autism Early Intervention Services throughout the year. However, their main program is their In-House Autism Early Intervention Service. With this program they provide research-based one-on-one services overseen by an onsite Board-Certified Behavior Analysis (BCBA). The program has a heavy reliance on data collection to create individualized plans for each client. The Centre utilizes several assessment tools such as the Assessment of Basic Language and Learning Skills-Revised (ABLLS-R), the Assessment of Functional Living Skills (AFLS), the Verbal Behavior

Milestones Assessment and Placement Program (VB-MAPP), guides that stem from developmental milestone documents, a relational development intervention guide, and various play and executive functioning assessment tools.

The Centre's In-house program is currently servicing 16 clients across 10 clinical staff members. The clinical staff breakdown for the In-House program is one Senior Verbal Behavior Therapist who is the onsite BCBA, six Verbal Behavior Therapists who function at the intermediate clinical level who are all Registered Behavior Technicians (RBTs), and four junior staff who are also RBTs or in the process of obtaining their RBT designation.

At the Centre, teaching is facilitated through both natural environment teaching (NET) and intensive tabletop teaching (ITT). NET skills for older learners, as well as younger learners, daily living activities would be a part of their natural environment. For example, toileting skills, grooming skills, safety skills… For younger learners, specifically, play activities would be a part of their natural environment. With natural environment teaching (NET), specifically related to play, there are two separate teaching objectives that this local Autism Early Intervention Centre therapists would focus on, either teaching the client through play or teaching the client how to play. With teaching through play the therapist teaches the learner a variety of academic or leisure skills by engaging the client in active responding. When encouraging active responding from clients, the therapist at the Centre ensure to expose clients to a range of verbal behavior. In addition to utilizing ABA strategies, the therapists at the Centre use a Verbal Behavior (VB) approach by encouraging clients to demonstrate skills across Skinner's verbal

operands (mands, tacts, intraverbals, echoics, receptive/non-verbal/listener skills, and motor imitation). Regarding teaching individuals how to play, this can range from the therapist at the Centre teaching a learner how to functionally play, how to engage in symbolic play, parallel play, pretend play, the ability to accept others manipulating items during play, structured/rule governed play (i.e., board games), conditioning/establishing novel items as reinforcers for clients who may have a limited bank of reinforcers…

With intensive tabletop teaching (ITT) the therapists also go across skills that span the above listed verbal operants. However, this teaching is done at a table setting. To ensure to contrive motivation, the therapist at the Centre use token boards and reinforce clients accordingly for their responses. As the ITT style of teaching is done at the table, this allows the therapist to cover a larger number of skills in a shorter span of time, which increases the client's ability to practice certain skills. As individuals with autism tend to engage in restricted or repetitive behaviors and may fixate on certain items/activities, these behaviors may lead them to miss certain teaching opportunities that naturally occur in their environments. Therefore, the exposure to covering a larger number of skills in a shorter span of time, such as with an ITT session can be beneficial.

Therapists at this Centre explain that the two above stated teaching methods (NET and ITT) compliments one another. For example, the ultimate goal is for a client to be able to engage in a targeted skill in their natural environment, however, they may need to work on the skill in an ITT capacity to allow for ample practice. Therefore, the therapist at this local Autism Early Intervention Centre program for generalization to take place across client's skills between both their NET sessions and their ITT sessions.

With both teaching methods (NET and ITT) therapists at the Centre engage in various levels of prompting, shaping, and chaining. The therapists at the Centre also ensure to intersperse both easy and difficult targets to establish a behavioral momentum. The data collection element is essential to ensure that the therapists are systematically able to meet the clients where they are. The data collection process also allows the therapist to objectively monitor client gains.

The therapists at this Centre engage in a variety of data collection methods. They collect trial by trial data, cold probe data, task analysis (TA) data, frequency and duration data. After each session, parents get a copy of their child's Daily Data Sheet, which outlines their current targets and the raw data from that session. Daily Data Sheets are accompanied with daily session notes.

Procedure

Before examining the archival data utilized within this study, the first step undertaken was to secure IRB approval for the study after the proposal defense approval (IRB approval number for this study is 03-21-22-1016458). After IRB approval, the local Autism Early Intervention Centre was contacted for permission to access and utilize archival data that they had on file. Once granted consent, the data was collected and analyzed.

The Researcher's Role

As a Bermudian Board-Certified Behavior Analysts (BCBA) who works in a clinical environment overseeing and delivering applied behavior analytic (ABA) services to individuals who have autism and other developmental disabilities, the researcher has

an interest in exploring the cross-cultural generalizability of research in the field of ABA. As a BCBA implementing ABA strategies, the researcher emphasized evidence-based strategies when selecting or implementing any behavioral intervention. With there historically being a heavy influence from Western culture on the field of psychology, internationalization is essential to the future direction of the field of psychology (Van de Vijver, 2013). All of the strategies that the researcher utilize are evidence-based; however, there is not much research from Bermuda's cultural lens. Cross-cultural research indicates that cultures could have similarities and differences regarding beliefs and values, influencing priorities and responses (Warson et al. 2002).

Data Analysis

Kubina et al. (2017) explain that visual displays of data have historically been instrumental in the field of psychology. More specific to the field of ABA, time series line graphs are recognized as the primary visual for presenting behavioral data and is commonly utilized to analyze data (Kubina et al., 2017). As this study explores the use of ABA principles to be in alignment with research on the data analysis of ABA, this study utilized line graphs to analyze its data. Kubina et al. (2017) identifies that time-series line graphs in the field of ABA, have graphs that comprise of a vertical axis labeled with the quantitative measure and the horizontal axis labeled with the time unit. These graphs also include clearly visible data points, data pathways, and each condition/phase is labeled (Kubina et al., 2017). A time-series line graph is appropriate to analyze the proposed research question, as time-series line graphs show a visual representation of a behavioral change (participants with a novel reinforcer) over a period of time

(intervention session dates). A review of non-overlapping data points from the pre-intervention baseline and post-intervention baseline phase were utilized to determine effectiveness of the SSP method.

Threats to Validity

The Center that the archival data was collected for this study implemented several methods for increasing trustworthiness amongst their data. At this Centre, to plan for generalization across participant's responses, clients work with more than one therapist. To ensure consistent implementation across therapists, programs are operationally defined and written down on each client's daily datasheet. Senior therapists conduct frequent and ongoing competencies to gather data and provide feedback to the therapist regarding their service delivery. Observations across therapists during these competencies also allow for communication regarding the consistency of the program. In addition, the therapist periodically collects interobserver agreement (IOA) data.

Ethical Considerations

Working with a vulnerable population can present ethical concerns, however, using archival data can alleviate some of those concerns. Despite using archival data and maintaining confidentiality within a small island like Bermuda, which is 21 miles long/ 1-mile wide, archival data of even 10+ years could still be identifiable if the proper protocols are not implemented. With a small island, small population, and one local ABA clinic, community members could potentially compare ages to individuals who present to be the same age and live within the community. To reduce this limitation, this study had parameters outlining how to utilize the data and maintain client confidentiality (i.e., using

participant initials or pseudonyms). According to the Government of Bermuda, as a British overseas territory, the Personal Information Protection Act (PIPA) fulfilled all the UK parliament stages in both houses, providing Bermuda with received Royal Assent to instate PIPA on July 27, 2016. However, the Government of Bermuda website explains that PIPA did not come into full effect until the end of 2021, to give organizations time to prepare for its implementation. To protect participant confidentiality, before the data was collected the data was deidentified. In addition, the year that the data was collected was not presented in the study to reduce the likelihood of community members identifying clients age or time spans of services accessed at the local ABA Centre. Finally, the IRB approval number for this study is 03-21-22-1016458.

Summary

Chapter 3 outlines the specific procedures of this quantitative research study. This study analyzed secondary data provided by a local Bermudian Early Autism Intervention Centre that specializes in the use of the principles of ABA. The archival data intended for this study utilized single-case designs. Participants explored during this study were Bermudian children diagnosed with a level 3 diagnosis of autism: requiring very substantial support. The participants were nonverbal learners, or those who have a limited vocal repertoire, who demonstrate the need for more than minimal assistance and have a limited bank of reinforcers. The following chapter, Chapter 4, will outline the identified sample and results of the study. This study met Walden University's ethical standards and received Institutional Review Board (IRB) confirmation, to analyze data provided to the

researcher by the local Autism Early Intervention Centre as collected under their oversight.

Chapter 4: Results

Some individuals with autism may repetitively engage in a limited array of behaviors or they may have a restricted bank of reinforcers, which can lead to an increase in self-stimulatory or maladaptive behaviors. It can also lead to a decrease in the number of choices that an individual can engage in during leisure time, which can in-turn lead to a reduction in one's quality of life. SSP is a behavioral method that stems from the theoretical framework of classical conditioning, which is acknowledged for establishing novel reinforcers. The purpose of this research was to determine whether SSP is an effective method for establishing novel reinforcers when used with Bermudian children who have autism. The goal was to discover if the effects of SSP can be generalized across cultures, in this case whether SSP is culturally applicable to individuals of the Bermudian culture.

A review of the findings can be found in this chapter, where the results will be discussed both in isolation and in relation to the identified hypotheses. The specific methods of the data collection process and descriptive demographics of the sample will be outlined in this chapter. This chapter will provide a time frame for data collection, along with providing clear definitions of all components, such as time durations of each scored interval, error margins that the therapists used when scoring, and systematic prompting levels provided to each client, along with visual representations in the form of tables and line graphs. In addition to the error margin used for scoring, this chapter will operationally define the behavior being scored in each trial and outline the measure of the

reliability of the administration of the intervention within the study to determine treatment fidelity.

Description of Sample

Through contacting the local Autism Early Intervention Centre in pursuit of archival data specific to SSP interventions, three Bermudian children diagnosed with autism were identified. Each of these clients demonstrated to have a limited bank of reinforcers, specifically pertaining to watching leisure films/movies. The three identified clients fit the following inclusion criteria (a) Bermudian, (b) a child (between 2 and 21 years old), (c) Level 3 diagnosis of autism: requiring very substantial support, (d) having a minimal bank of reinforcers, (e) nonverbal learners or those who have a limited vocal repertoire, and (f) exposure to SSP interventions. In addition to the above-stated inclusion criteria, there was also an exclusion criterion to ensure that the pool of selected data did not include any cases where the researcher had collected data. The exclusion criteria also ensured that the data that entered the selection pool only span a time period before the researcher was a BCBA. Given these criteria, the data used for this study were randomly selected from the pool outlined. See Table 1 for an outline of participant details.

Table 1

Participant Demographics

Pseudonym	Gender	Age at Intervention 1	Age at Intervention 2	Ethnicity
Participant #1	Male	*Peppa Pig Show* 4 years old	*Super Why Show* 5 years old	Bermudian
Participant #2	Male	*Lion King Movie* 7 years old	*Monsters Inc. Movie* 8 years old	Bermudian
Participant #3	Male	*High School Musical* 16 years old	*Glee Movie* 17 years old	Bermudian

Note. For Participant #1, SSP was utilized to condition the TV show "Peppa Pig" when the participant was three years old and the SSP method was in place when the participant was 4 years old to condition the TV show "Super Why." This method was also used with Participant #2 to condition the movie "Lion King" when the participant was 9 and the SSP method was utilized with Participant #2 to condition the movie "Monsters Inc" when the participant was 10 years old. In addition, this method was used to condition the movie "High School Musical" when Participant #3 was 16 years old and the movie "Glee" when he was 17 years old.

Data Collection

The observation and intervention took place in an ABA clinical setting under the supervision of an onsite BCBA. In this setting, clients work at a 1:1 client-therapist ratio, systematically ensuring exposure to a novel therapist on a rotational schedule to allow for generalization across people, materials, and various rooms (different therapy rooms, library setting, sensory room, and outdoor exposure). With this SSP intervention, novel videos were conditioned across these three clients.

For each movie/TV show, the therapists first took a baseline observation of the participant's level of engagement. The initial baseline phase for each client, indicated by Phase A on the graphs, consisted of a 5-minute observation session where the learner had free access to a variety of reinforcers naturally available in their environment (i.e., toys, iPad, the ability to leave the area of the video, etc.). During the 5-minute baseline-observation phase, data were collected in 60 consecutive 5-second intervals. Partial interval recording was used to indicate if engagement, elopement, or self-stimulatory behavior took place during each 5-second interval. If an engagement level of 90%, or above, was not noted within the initial baseline observation, the SSP intervention was implemented to reach 90% engagement with the film.

The SSP method involved interspersing between paired and independent trials of watching the film. For example, interspersing between trials that consisted of simultaneously pairing a pre-established reinforcer with client engaged video watching for 5 seconds, and a 5-second independent client engaged video. These independent trials (trials that were not paired with an established reinforcer) were systematically increased to a long-term objective of watching the designated video/TV show for five consecutive minutes. Progression in independent viewing engagement for each client and designated video/TV show was determined based upon mastery of shorter durations of viewing. Based on the rate of mastery, each client has their own trajectory of progressing through each phase of their intervention toward the long-term objective of 5 consecutive minutes of independent video engagement. Each client's trajectory of progressing through their intervention phases toward the long-term objective of 5 consecutive minutes of independent video engagement can be found in the Results section.

SSP Conditioning Procedure

Each graphing point (data point) consisted of 20 learn-units, and five data pathways that were allowed before making a decision to implement a program change or extend the intervention for an additional five pathways if the data demonstrated an ascending trend, unless the criterion of 90% across two consecutive data points was met before the five pathways. Learn units were scored as a successful trial if the client was engaged with the video for a portion of the interval without eloping or engaging in self-stimulatory behaviors. As the participants progressed in the expected amount of time to engage with the video (i.e., 5 seconds, 10 seconds, 45 seconds, 5 minutes) data were

consistently scored in 5-second partial interval recording intervals. For example, if the target was watching for 45 seconds, eight 5-second partial interval recording intervals would equal the whole trial/one learn-unit (45 seconds).

Graphing decisions for each phase of the intervention were made as a result of the trends noted in the graph. Potential graphing trends could include an ascend (an upward trajectory in the line graph), a decent (a downward trajectory in the direction of the line graph), and a no trend (either a flat line or a line that on average is not moving in an upward or downward direction). The trend of the graph provided insight to the therapist's anecdotal notes of the potential reason for the trend of the graph (e.g., motivation, prerequisite skill). This information was vital in identifying an appropriate program change (antecedent or consequence strategy) to meet the learner at their current level of proficiency, in aim to systematically assist them in evolving to performing mastery level at the long-term objective state.

All participants engaged in the SSP procedure. The therapist started with a paired interval, which involved the therapist pairing the show with a pre-established reinforcer during this time interval. If the client successfully watched the movie for the paired interval, the therapist moved to an independent trial (of the same duration of time) where the client was to independently watch the movie for 80% of the interval. If the client did not successfully watch the movie during the independent interval, the therapist went back into a paired trial and reinforced the client for watching the movie during the paired interval. Success during the paired interval was required before moving to an independent trial. If the client stopped watching the movie for any time during the independent

interval this was scored as an incorrect trial (-), and if so, the therapist stopped the trial and went back to a pairing interval. If the client did not watch the movie during the paired interval, the therapist did not move to an independent trial until a paired interval had been successfully accomplished.

Analysis of the Data

Secondary data were collected by the staff at the local Autism Early Intervention Centre and used for the analysis of this study. The archival data under review and analyzed for this study were quantitative single-subject designs based on the SSP intervention from two separate time periods of the three Bermudian children diagnosed with autism. For a visual analysis of the data, this study relied on time-series line graphs, which are commonly used in the field of ABA (Kubina et al., 2017). The graphs used in this study have clearly visible data points, data pathways, each condition/phase is labeled, a vertical axis labeled with the quantitative measure (i.e., “percentage correct”), and the horizontal axis labeled with the time unit. The data from each intervention included an initial baseline stage that indicated the client’s current engagement level with the novel reinforcer, the implementation of the SSP procedure with various prompt levels specific to each client, and a final baseline phase that demonstrated the clients’ level of engagement independent of the SSP procedure after they had undergone systematic exposure to the procedure. All program changes and stages of each intervention were identified based on the learner’s data and trend of their graph. For example, if the level of engagement with the novel reinforcer was going down (descending) or not moving (not trending), this may warrant a program change or a new stage of the intervention, whereas

data points that were going up (ascending) warranted the client to successfully move one step closer to the long-term objective.

Variables

The aim of this study was to identify the level of effect that the SSP method has on establishing novel reinforcers via assessing the participants' level of independent engagement with the stimuli. Therefore, the primary dependent variable was movie/TV watching. The three behaviors observed were looking at the video, self-stimulatory behaviors, and elopement. Looking at the video was operationally defined as the client's eyes orienting toward the video (with an error margin of gazing away for a duration that exceeded 10 consecutive seconds). Self-stimulatory behaviors consisted of inappropriate vocalizations (i.e., vocal clicking), elopement was identified as the learning moving more than 3 feet from the area hosting the video, and disengagement from the video was identified as eyes not orientating to the screen for longer than a 10-second interval. The independent variable was the passage of time/sessions of implementation of the SSP intervention.

Results

Participant 1

Participant 1 was a Bermudian boy who was 4 years old at the start of the data collection for the first SSP program displayed within this study and 5 years old at the start of the second SSP program noted in this study. He was diagnosed at age 23 months with autism using the ADOS-2 assessment tool. At the time of diagnosis, he did not use words nor word approximations to communicate, however, he did demonstrate the ability to

engage in high-pitched sounds when either happy or frustrated. At the time of diagnosis, he relied on pulling others toward an item to communicate the things that he wanted, as he had not yet mastered pointing or gestures. At the time of diagnosis, he would engage in intermittent eye contact and had a low frequency of responding to his name. He did not functionally play with toys as intended; instead he was often reinforced by engaging in repetitive actions with items (i.e., lining items up in a single line). It was recommended that he receive at least 20-25 hours of ABA services a week under the guidance of a BCBA that would provide discrete trial interventions, intense teaching opportunities, structured teaching plans, contrived social and communication opportunities to improve his communication, social interactions, and play skills. Participant 1 had received his autism diagnosis 9 months prior to his start of ABA services at the local Autism Early Intervention Centre, and it had been 19 months from his diagnosis of autism before the onset of his exposure to his first SSP program outlined within this study.

Participant 1: Intervention #1 (SSP for watching Peppa Pig TV Show)

Participant 1 was exposed to the SSP procedure to increase his engagement with watching the novel stimuli of *Peppa Pig*. The trajectory of his SSP intervention for *Peppa Pig* is outlined in Figure 1. Figure 2 indicates that the participant was exposed to a pre-intervention baseline phase in Phase A where the therapist probed/assessed the participant's level of engagement when watching *Peppa Pig* independently with no pre-established reinforcer for 5 minutes. In this phase, the data were scored in 5-second intervals (60 5-second intervals equals the 5-minute baseline phase) score a "+" for correct watching, a "-" for not watching, "S" for stereotypy, and "P" for passivity. Each

trial or learn-unit for the pre-intervention baseline phase in Phase A was scored as one trial equals 5 seconds of independent watching using a partial-interval recording method. The criterion for Phase A of Participant 1's SSP intervention for *Peppa Pig* was 90% correct/active engagement (operationally defined within the pre-intervention baseline phase) of watching *Peppa Pig* on the first data point. The assessment phase of this program demonstrated a 45% level of engagement when watching *Peppa Pig*.

In Phase B of Participant 1's SSP intervention for *Peppa Pig*, the therapist targeted the participant watching *Peppa Pig* for 5 seconds independently using the SSP method by alternating a 5 second paired interval (using head massage as the pre-established reinforcer) with 5-second independent intervals. The therapist scored each trial/learn-unit as one trial equals 5 seconds of independent watching using a partial-interval recording method. The criterion for Phase B was 90% correct/active engagement (operationally defined within the pre-intervention baseline phase) of watching *Peppa Pig* across two consecutive data points. The data within this phase indicated 60%, 70%, and 75% levels of engagement when watching *Peppa Pig*. Although this phase demonstrated an ascending trend, the anecdotal notes attached with this phase indicated that the pre-established reinforcer used in the SSP trial was not as strong of a reinforcer as other pre-established reinforcers in the participant's bank of reinforcers. Due to a lack of motivation identified within the clients during this phase was discontinued in aim to address this breakdown in motivation by switching to a stronger pre-established reinforcer.

As a result of needing to switch the pre-established reinforcers, the therapist felt it was necessary to re-probe/re-assess the client watching *Peppa Pig* for 5 minutes independently similar to Phase A to identify if there has been any effect of teaching from the SSP method using the head massage before moving on with a different pre-established reinforcer during the SSP intervention for this participant. This was done in Phase C and the data indicated an 85% level of engagement when watching *Peppa Pig*. Once this re-assessment had been completed the pre-established reinforcer head massage was replaced with the pre-established reinforcer of edibles in Phase D of Participant 1's SSP intervention for watching *Peppa Pig*. Phase D is where the therapist targeted the participant watching Peppa Pig for 30-second intervals, using the SSP procedure (edibles in the paring trials as the pre-established reinforcer). In this phase, one trial was scored per 30-seconds of independent responding. The therapist ensured to move away from the participant to allow for the 30-second independent interval during this phase. The criterion for Phase D was 90%, or above, across two consecutive data points. The data within this phase were 80%, 80%, 90%, 80%, 90%, 80%, 90%, and 90% levels of engagement before meeting criterion with 90% across two consecutive data points. Although this phase visually presented a no trend, the data point of the trend was hovering around the criterion level before the participant met the criterion.

In Phase E the therapist targeted the participant watching *Peppa Pig* for 1 min intervals using SSP (edibles were used in the paring trials as the pre-established reinforcer). For this phase, one trial equaled 1 minute of independent watching, and data was still scored in 5-second partial interval recording trials (i.e., 10 5-second partial

interval recordings, where if the participant looked at some point during the ten 5-second partial interval, it equaled the whole trial of 1 minute). In this phase Participant 1 demonstrated 60%, 20%, 80%, 80%, 20%, 100%, 80%, 100%, and 100% levels of engagement before meeting the criterion of 90%, or above, across two consecutive data points for this phase. This phase displayed an ascending trend.

Based on the client's level of responding in Phase E, the therapist increased the target in Phase F. In this phase the participant targeted watching Peppa Pig for 5-minute intervals using SSP (edibles used as a pre-established reinforcer) in Phase F. Five minutes of independent watching was identified as 1 trial, although data was still collected in partial 5-second intervals recording as noted above in Phase E. For this phase 90%, or above, across two consecutive data points was noted as the criterion. The data from the participant within this phase were 0% and 100%. However, as a result of a long break in services, due to a 2-month break/suspension in services during the summer months, the therapist discontinued this phase and re-engaged the intervention after the summer months to ensure that the connected data points were a reflection of their teaching.

After returning from a 2-month break/suspension in services, the therapist discontinued this phase and re-engaged the intervention after the summer months via Phase G. In an aim to identify the client's current level of responding prior to re-engaging the intervention, Phase G was used to garner assessment data on Participant 1's engagement of independently watching Peppa Pig for 5 minutes. The data for this phase indicated a 75% level of engagement with independently watching Peppa Pig. During this

trial, as with all phases of this program, a partial-interval recording method was used. The criterion level for this assessment phase was 90% on the first data point.

Given therapist feedback and anecdotal notes of the participant's behaviors during Phase G's assessment, Phase H, re-probe/re-assessed the participant's ability to independently watch Peppa Pig (with no exposure to the SSP procedure) when using a laptop, in full screen (opposed to an iPad) so the participant was not tempted, by the YouTube Side Listings, to change what he was watching. In STO G, the participant was using his personal iPad, which auto-populated a list of suggested films to watch, which encouraged the participant to constantly switch what he was watching, not staying with a set film for an extended duration of time, such as 5 minutes. In Phase H, 1 trial equaled 5 minutes of independent watching using partial-interval recording and the criterion was 90% of engagement on the first data point. The data from this phase demonstrated 36% of engagement. This drastic reduction in the level of engagement could be a reflection of this participant being sensitive to an initial change in people, places, and stimuli (i.e., change in stimuli from iPad to computer), which was noted in this participant's pupal profile.

To address the results seen within Phase H, Phase I targeted the participant watching Peppa Pig across a variety of stimuli (computer, iPad, phone…) for 5-minute intervals using SSP (with edibles as the pre-established reinforcer). In this phase, 1 trial equaled 5 minutes of independent watching with a criterion of 90%, or higher, level of engagement across two data points. The data from this phase produced 85%, 92%, and

93% levels of engagement before meeting the criterion. This phase displayed an ascending trend.

Phase J, the post-intervention baseline phase, assessed the participant's ability to independently (with no exposure to the SSP procedure) watch Peppa Pig for 5 minutes. In this phase, 1 trial equaled 5 minutes of independent watching using partial interval recording, with a criterion of 90% of engagement on the first data point. The data from this phase produced a 95% level of engagement.

Figure 1

Participant 1, Intervention 1 Program Sheet

Name: Participant #1 (Intervention #1) Program: Watches Movie SSP – Peppa Pig

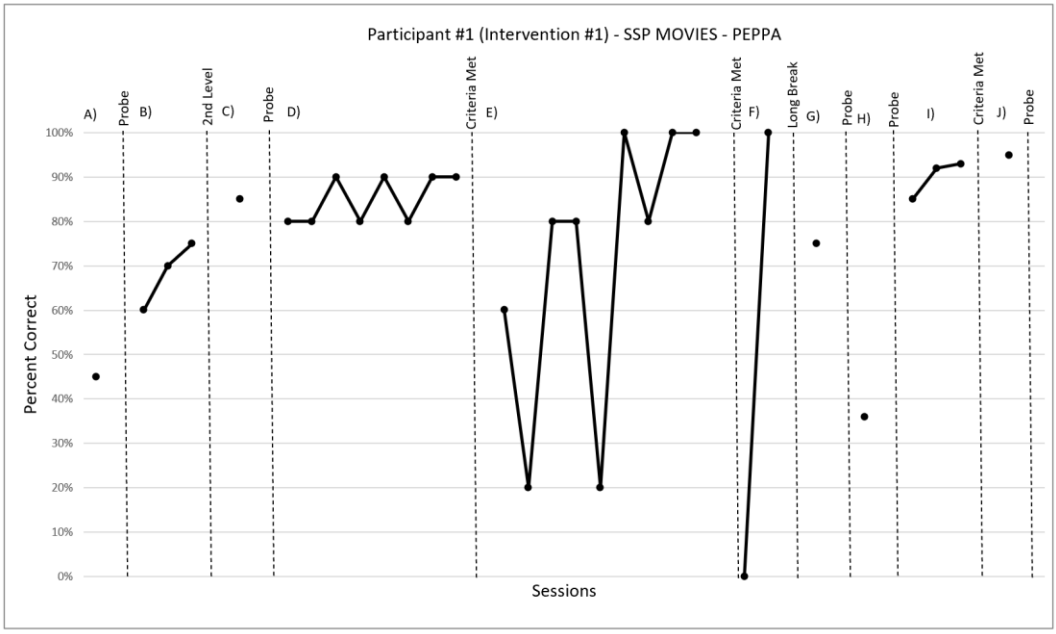
Long-term objective (LTO): The child will be able to sit and watch the Peppa Pig show without eloping or engaging in socially inappropriate behaviors for 5 minutes with 90% accuracy across two consecutive sessions.

SSP procedure: Start with a paired interval; pair the show with a pre-established reinforcer during this time interval. If the client successfully watches the movie for the paired interval, move to an independent trial (of the same duration of time) where the client must independently watch the movie for 80% of the interval. If the client successfully watches the movie during the independent interval, go back into a paired trial and reinforce the client for watching the movie during the paired interval. If the client stops watching the movie for any time during the independent interval, stop the trial and go back to a pairing interval. If the client does not watch the movie during the paired interval, do not move to an independent trial until a paired interval has been successfully accomplished.

Short-term objective (STO)	**Reason**
A) ***Probe*** the client ***watching*** Peppa Pig ***independently with no pre-established reinforcer*** for 5 minutes, score in 5-second intervals (***sixty 5-second intervals equals the 5-minute baseline phase***) score a '+' for correct watching, a '-' for not watching, 'S' for stereotypy & 'P' for passivity. Score each trial/ learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording, criteria= 90% on the first data point **(Pre-intervention Baseline Phase)**	Probe
B) ***Target*** the client ***watching*** Peppa Pig for **5 seconds independently *using SSP*** alternating a 5 second paired interval (***using head massage as the pre-established reinforcer)*** and 5-second independent intervals. Score each trial/learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recoding; criteria= 90% x2	Motivation- Switch to a stronger pre-established reinforcer of edibles
C) ***Re-probe*** the client ***watching*** Peppa Pig for ***5 minutes independently*** (without using a pre-established reinforcer), score in 5-second intervals, and score a '+' for correct watching, a '-' for not watching, 's' for stereotypy & 'p' for passivity. 1 trial equals 5-second interval of watching independently using partial-interval recording, criteria= 90% on the first data point	Probe
D) ***Target*** the client **watching** Peppa Pig for ***30-second intervals***, using the SSP procedure. Use edibles in the paring trials as the pre-established reinforcer. 1 trial/30-second independent response. Ensure therapist moves away for the 30-second independent interval; criteria= 90% x 2	Criteria Met
E) ***Target*** the client ***watching*** Peppa Pig for ***1 min intervals*** using SSP. Use edibles in the paring trials as the pre-established reinforcer. 1 trial equals 1 minute of independent watching; criteria= 90% x 2	Criteria Met
F) ***Target*** the client ***watching*** Peppa Pig for ***5-minute intervals*** using SSP. Use edibles in the paring trials as the pre-established reinforcer. 1 trial equals 5minutes of independent watching; criteria= 90% x 2	Long break- 2-month break in sessions to attend Summer Program
G) ***Probe STO F*** (as above) ***independently (with no exposure to the SSP procedure)*** 1 trial equals 5 minutes of independent watching using partial-interval recoding; criteria= 90% on the first data point	Probe
H) ***Re-probe independently (with no exposure to the SSP procedure)*** using a ***laptop, in full screen*** (opposed to an iPad) so the client is not tempted, by the YouTube Side Listings, to change what he is watching. (In STO G, the client was using his personal iPad, which auto populated a list of suggested films to watch). 1 trial equals 5 minutes of independent watching using partial-interval recording; criteria= 90% on the first data point	Probe
I) ***Target*** the client ***watching*** Peppa Pig across a variety of stimuli (computer, iPad, phone…) for ***5-minute intervals*** using SSP. Use edibles in the paring trials as the pre-established reinforcer. 1 trial equals 5 minutes of independent watching; criteria= 90% x 2	Criteria Met
J) ***Probe*** the client ***independently (with no exposure to the SSP procedure) watching*** Peppa Pig for ***5 minutes*** 1 trial equals 5 minutes of independent watching using partial interval recording: criteria= 90% on the first data point **(Post-intervention Baseline Phase)**	Probe **LTO Met**

Figure 2

Participant 1, Intervention 1 Time-Series Line Graph



From reviewing Participant 1's data for intervention 1, the SSP method of classical conditioning led to 95% of engagement during the 5-minute interval with the novel reinforcer, which is in alignment with Ha1, which hypothesized that the intervention would lead to 80% or greater engagement. Four of the phases from Participant 1's intervention 1 demonstrated trends (Phase B, an ascending trend; Phase D, a no trend that hovered around the criterion level; Phase E, an ascending trend; and Phase I, an ascending trend). The remainder of the phases that did not demonstrate a trend was either a one data point probe (Phase A, C, G, H, and J) or did not gather enough data to develop a trend (Phase F). From reviewing the data, although 25% of the tending phases started within the range of criterion level and remained there, the remaining 75% of the

trending phases demonstrated an ascending trend. These results are in alignment with Ha2, which hypothesized that the method of SSP will lead to ascending trends. The percentage of non-overlapping data points between the pre-intervention baseline phase (45%) and the post-intervention baseline phase (95%) resulted in 100% of non-overlapping data points between the pre-intervention baseline phase and the post-intervention baseline phase. Therefore, the data from Participant 1, intervention 1 was in alignment with the alternative hypothesis 3 (Ha^3) which read "The percentage of nonoverlapping data points will be 80% or greater as it was anticipated that the range of data points identified at the pre-intervention baseline levels will not have much overlap with the range of data points within the post-intervention baseline phase."

Participant 1: Intervention #2 (SSP for watching Super Why TV Show)

Participant 1 was also exposed to the SSP procedure to increase his engagement with watching the novel stimuli of Super Why. The trajectory of his SSP intervention for Super Why is outlined in Figure 3. "Participant 1, intervention 2, program sheet". The visual representation displayed in Figure 4. "Participant 1, intervention 2, time-series line graph" for his SSP intervention for Super Why indicates that the participant was exposed to a Pre-intervention Baseline Phase in Phase A where the therapist probed/assessed the participant's level of engagement when watching Super Why independently with no pre-established reinforcer for 5 minutes. In this phase, the data were scored in 5-second intervals (sixty 5-second intervals equals the 5-minute baseline phase) scoring a '+' for correct watching, a '-' for not watching, 'S' for stereotypy & 'P' for passivity. Each trial or learn-unit for the pre-intervention baseline phase in "Phase A" was scored as 1 trial

equals 5 seconds of independent watching using a partial-interval recording method. The criterion for Phase A of Participant 1's SSP intervention for Super Why was 90% correct/active engagement (operationally defined within the pre-intervention baseline phase) of watching Super Why on the first data point. The assessment phase of this program demonstrated a 50% level of engagement when watching Super Why.

In Phase B of Participant 1's SSP intervention for Super Why the therapist targeted the participant watching Super Why for 1 minute independently using SSP (edibles were used as the pre-established reinforcer). For this phase, 1 trial equaled 1 minute of independent watching, and data were still scored in 5-second partial interval recording trials (i.e., ten 5-second partial interval recordings, where if the participant looked at some point during the ten 5-second partial interval, it equaled the whole trial of 1 minute). The data within this phase indicated 80%, 80%, 100%, and 95% levels of engagement when watching Super Why. This phase displayed an ascending trend.

Phase C, the post-intervention baseline phase, assessed the participant's ability to independently (with no exposure to the SSP procedure) watch Peppa Pig for 5 minutes. In this phase, 1 trial equaled 5 minutes of independent watching using partial interval recording, with a criterion of 90% of engagement on the first data point. The data from this phase produced a 100% level of engagement.

Figure 3

Participant 1, Intervention 2 Program Sheet

Name: Participant #1 (Intervention #2) Program: Watches Movie SSP – Super Why

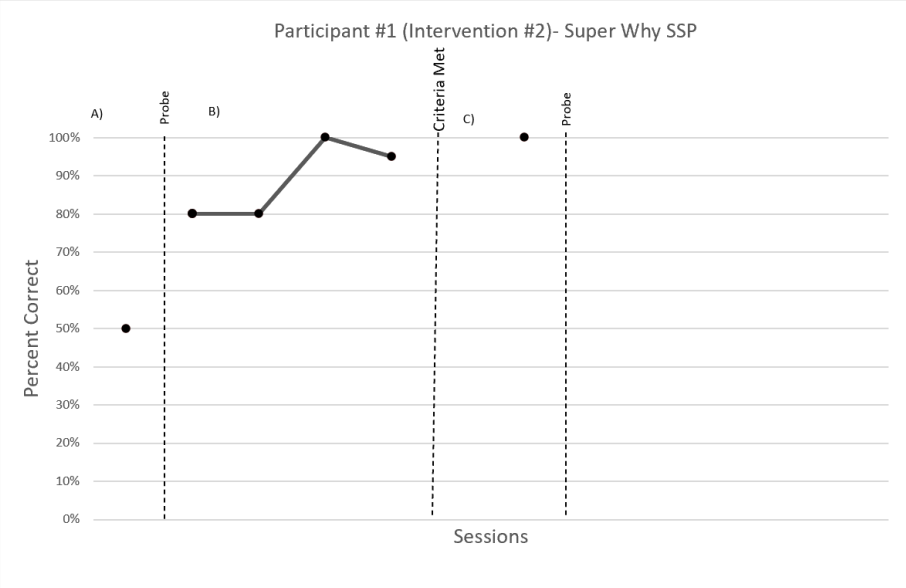
Long-term objective (LTO): The child will be able to sit and watch Super Why appropriately for 5 minutes with 90% accuracy across 2 consecutive sessions.

SSP procedure: Start with a paired interval; pair the show with a pre-established reinforcer during this time interval. If the client successfully watches the movie for the paired interval, move to an independent trial (of the same duration of time) where the client must independently watch the movie for 80% of the interval. If the client successfully watches the movie during the independent interval, go back into a paired trial and reinforce the client for watching the movie during the paired interval. If the client stops watching the movie for any time during the independent interval, stop the trial and go back to a pairing interval. If the client does not watch the movie during the paired interval, do not move to an independent trial until a paired interval has been successfully accomplished.

Short-term objective (STO)	**Reason**
A) ***Probe*** the client ***watching*** Super Why ***independently with no pre-established reinforcer*** for 5 minutes, score in 5-second intervals (***sixty 5-second intervals equals the 5-minute baseline phase***) score a '+' for correct watching, a '-' for not watching, 'S' for stereotypy & 'P' for passivity. Score each trial/ learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording, criteria= 90% on the first data point **(Pre-intervention Baseline Phase)**	Probe
B) ***Target*** the client ***watching*** Super Why for ***1 minute and 40 seconds*** **independently** ***using SSP*** alternating a 1 minute and 40 second paired intervals (***using edibles as the pre-established reinforcer)*** and 1 minute and 40 independent intervals. Score each trial/learn-unite as: 1 trial equals 1 minute and 40 of independent watching; criteria= 90% on the first data point	Criteria Met
C) ***Probe*** the client ***independently (with no exposure to the SSP procedure) watching*** *Super Why* for ***5 minutes*** 1 trial equals 5 minutes of independent watching using partial interval recording: criteria= 90% on the first data point **(Post-intervention Baseline Phase)**	Probe **LTO Met**

Figure 4

Participant 1, Intervention 2 Time-Series Line Graph



From reviewing Participant 1's data for intervention 2, the SSP method of classical conditioning led to 100% of engagement during the 5-minute interval with the novel reinforcer, which is in alignment with Ha1, which hypothesized that the intervention would lead to 80% or greater engagement. For intervention 2 for Participant 1, the data indicated an ascending trend, in alignment with Ha2. Participant 1's data for intervention 2 indicated 100% non-overlapping data points between the pre-intervention baseline phase (50% of engagement) and the post-intervention baseline phase (100% engagement).

Summary of Participant 1

In summary of Participant 1's data from both intervention 1 and intervention 2, it was noted that there was a shorter span of time/lower number of learn-units before the

participant met the mastery criterion for the long-term objective. Intervention 2 demonstrated the ability to jump in the expectation of watching engagement (i.e., intervention 1 had to be more systematic in starting with targeting 5 seconds to 30 seconds, to 1 minute, however with the second intervention Phase 1, after the pre-intervention baseline was able to target 1 minute. There was also a slight increase in the level of engagement across the pre-intervention baseline for intervention 1 (45% level of responding) to the pre-intervention baseline for intervention 2 (50% level of responding).

Participant 2

Participant 2 was a Bermudian boy who was 7 years old at the start of the data collection for the first SSP program outlined within this study and 8 years old at the start of the second SSP program noted in this study. He was diagnosed from Boston Children's Hospital at age 3 years with autism, using the ADOS-2 assessment tool. At the time of diagnosis, he made frequent speech sounds over the span of a day including some words and phrases; however, the adult form words and phrases rarely were emitted in an appropriate situational context. This participant did not functionally play with toys as designed, he often found time on task on engaging with set stimuli for a set duration to be challenging and was often reinforced by socially inappropriate actions (i.e., a peer falling or getting hurt…). Outside of socially inappropriate forms of reinforcement, he had a limited bank of reinforcers which included toys that made loud noises and independent ball play. It was recommended that this participant receive intensive behavioral therapy utilizing the principles of Applied Behavior Analysis (ABA) services a week under the guidance of a BCBA. Participant 2 had received his autism diagnosis 12 months prior to

his start of ABA services at the local Autism Early Intervention Centre and it had been 4 years from his diagnosis of autism before the onset of his exposure to his first SSP program outlined within this study.

Participant 2: Intervention #1 (SSP for Watching the Movie Lion King)

Participant 2 was exposed to the SSP procedure to increase his engagement with watching the novel stimuli of Lion King. The trajectory of his SSP intervention for Lion King is outlined in Figure 5. "Participant 2, intervention 1, program sheet". The visual representation is displayed in Figure 6. "Participant 2, intervention 1, time-series line graph" for his SSP intervention for Lion King indicates that the participant was exposed to a Pre-intervention Baseline Phase in Phase A where the therapist probed/assessed the participant's level of engagement when watching Lion King independently with no pre-established reinforcer for 5 minutes. In this phase, the data were scored in 5-second intervals (sixty 5-second intervals equals the 5-minute baseline phase) scoring a '+' for correct watching, a '-' for not watching, 'S' for stereotypy & 'P' for passivity. Each trial or learn-unit for the pre-intervention baseline phase in "Phase A" was scored as 1 trial equals 5 seconds of independent watching using a partial-interval recording method. The criterion for Phase A of Participant 2's SSP intervention for Lion King was 90% correct/active engagement (operationally defined within the pre-intervention baseline phase) of watching Lion King on the first data point. The assessment phase of this program demonstrated a 65% level of engagement when watching Lion King.

In Phase B of Participant 2's SSP intervention for Lion King, the therapist targeted the participant watching Lion King for 5 seconds independently using the SSP

method by alternating a 5 second paired interval (using head massage as the pre-established reinforcer) with 5-second independent intervals. The therapist scored each trial/learn-unit as one trial equals 5 seconds of independent watching using a partial-interval recording method. The criterion for Phase B was 90% correct/active engagement (operationally defined within the pre-intervention baseline phase) of watching Lion King across two consecutive data points. The data within this phase indicated a 95% level of engagement when watching Lion King. Due to his demonstrating a level of engagement above the set criterion on the first data point he probed out of the criterion. The criterion to probe out of a phase was 90%, or above, on the first data point.

In Phase C of Participant 2's SSP intervention for Lion King, the therapist targeted the participant watching Lion King for 10 seconds independently using the SSP method by alternating a 10 second paired interval (using head massage as the pre-established reinforcer) with the 10-second independent intervals. Although the target for this phase was 10 seconds, the therapist still used a 5-second partial-interval recording method, therefore 1 trial of 10 seconds as noted within this phase, consisted of two 5-second partial-interval recordings to equal the whole trial of 10 seconds. The data within this phase indicated 85%, 65%, 90%, 85%, 95%, 85%, 90%, and 95% levels of engagement when watching Lion King before reaching the criterion. This phase displayed an ascending trend.

As a result of the participant's consistent high levels of engagement in watching Lion King for 10 seconds in Phase C, the therapist used Phase D as an opportunity to re-assess the participant's ability to independently watch Lion King for 5 minutes, identical

to the pre-intervention baseline in Phase A. Re-running a baseline as seen in Phase A allowed the therapist to get a sense of the duration of how long the client would independently sustain watching the movie. The duration data were essential for meeting the participant where they were and identifying an appropriate STO E duration (i.e., could the STO E duration jump significantly from 10 seconds or if it should gradually move from the 10-second duration in STO C).

Phase E was conducted in the same manner as Phase C/Short Term Objective C. However, Phase E targeted 15 seconds of independent watching, interspersed with 15 seconds of SSP trials. Although the target for this phase was 15 seconds, the therapist still used a 5-second partial-interval recording method, therefore 1 trial of 15 seconds as noted within this phase, consisted of three 5-second partial-interval recordings to equal the whole trial of 15 seconds. The data within this phase indicated 65%, 50%, 65%, 85%, 95%, and 90% levels of engagement when watching Lion King before reaching the criterion. This phase displayed an ascending trend.

Phase F was conducted in the same manner as Phase B/Short Term Objective B. However, Phase F targeted 30 seconds of independent watching, interspersed with 30 seconds of SSP trials. As a result of the participants responding in Phase E, Phase F jumped from targeting 15 seconds of independent watching to 30 seconds of independent watching, instead of gradually increasing from 15 seconds to 20 seconds of independent watching. Although the target for this phase was 30 seconds, the therapist still used 5-second partial-interval recording, therefore 1 trial of 30 seconds as noted within this phase, consisted of six 5-second partial-interval recordings to equal the whole trial of 30

seconds. The data within this phase indicated 45%, 60%, 40%, 50%, 50%, and 55% levels of engagement when watching Lion King. This phase displayed a no-trend.

Due to the visual representation of Phase F being a no trend, Phase G was used to implement a program change via the addition of an anteceded strategy (a strategy put in place before the presentation of the stimulus) to address this no trend. The antecedent strategy was to allow the client to have access to a fine motor activity (pipe cleaners) while watching in the independent trial. Phase G/short Term Objective G targeted the participant watching Lion King for 30 seconds where the participant had access to pipe cleaners as a fine motor activity during the independent trials and during the paired trials the participant had access to both head massage and access to pipe cleaner fine motor play while watching. The therapist continued to use a 5-second partial-interval recording. The data within this phase indicated 75%, 80%, 70%, 85%, 90%, and 90% levels of engagement when watching Lion King before reaching the criterion of 90%, or above, across two consecutive data points. This phase displayed an ascending trend.

Phase H focused on fading out the antecedent program change of a fine-motor activity (pipe cleaners) that was implemented in Phase G. Therefore, Phase H, targeted the participant watching Lion King for 30 seconds (scored using 5-second partial-interval recording), however, he had access to a fine-motor activity (pipe cleaners) only while watching the paired trial (i.e., this phase faded the fine motor activity from the independent trial only). In the paired trials of Phase H, he had access to a head massage and pipe cleaner fine motor play while watching. This phase produced 90% of engagement with watching Lion King. Due to the participant demonstrating a level of

engagement at the set criterion level on the first data point, the participant probed out of the criterion. The criterion to probe out of a phase was 90%, or above, on the first data point.

The next phase, Phase I, faded out the additional layer of reinforcement (the fine-motor activity) that was offered in the paired trials of Phase H, leaving head massage as the sole pre-established reinforcer to be used in the paired trials. In addition to fading out the additional layer of reinforcement offered in the paired trials, this phase also simultaneously increased the duration of time watching Lion King, to 45 seconds. With the data scored using a 5-second partial-interval recording method, this phase indicated 85%, 90%, and 90% levels of engagement when watching Lion King before reaching the criterion of 90%, or above, across two consecutive data points. This phase reached the criterion level before displaying a full trend.

Phase J increased the duration of time watching Lion King to 1 minute. With the data scored using a 5-second partial-interval recording method, this phase indicated 85%, 80%, 91%, and 90% levels of engagement when watching Lion King before reaching the criterion of 90%, or above, across two consecutive data points. This phase reached the criterion level before displaying a full trend.

Phase K, the post-intervention baseline phase, assessed the participant's ability to independently (with no exposure to the SSP procedure) watch Lion King for 5 minutes. In this phase, 1 trial equaled 5 minutes of independent watching using partial interval recording, with a criterion of 90% of engagement on the first data point. The data from this phase produced a 92% level of engagement.

Figure 5

Participant 2, Intervention 1 Program Sheet

Name: Participant #2 (Intervention #1) Program: Watches Movie SSP – Lion King

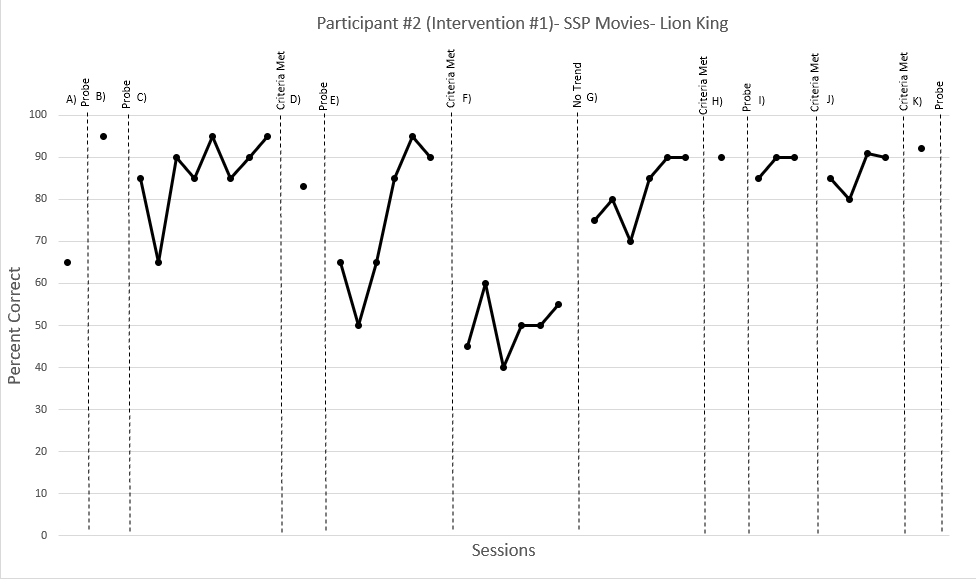
Long-term objective (LTO): The child will be able to sit and watch the Lion King movie appropriately for 5 minutes with 90% accuracy across 2 consecutive sessions.

SSP procedure: Start with a paired interval; pair the show with a pre-established reinforcer during this time interval. If the client successfully watches the movie for the paired interval, move to an independent trial (of the same duration of time) where the client must independently watch the movie for 80% of the interval. If the client successfully watches the movie during the independent interval, go back into a paired trial and reinforce the client for watching the movie during the paired interval. If the client stops watching the movie for any time during the independent interval, stop the trial and go back to a pairing interval. If the client does not watch the movie during the paired interval, do not move to an independent trial until a paired interval has been successfully accomplished.

Short-term objective (STO)	**Reason**
A) ***Probe*** the client ***watching*** Lion King ***independently with no pre-established reinforcer*** for 5 minutes, score in 5-second intervals (***sixty 5-second intervals equals the 5-minute baseline phase***) score a '+' for correct watching, a '-' for not watching, 'S' for stereotypy & 'P' for passivity. Score each trial/ learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording, criteria= 90% on the first data point **(Pre-intervention Baseline Phase)**	Probe
B) ***Target*** the client ***watching*** Lion King for **5 seconds independently *using SSP*** alternating a 5 second paired interval (***using head massage as the pre-established reinforcer)*** and 5-second independent intervals. Score each trial/learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording; criteria= 90% x2	Probed Out *Criteria to probe out of a phase=90% or above on the first data point*
C) ***Target*** the client ***watching*** Lion King for ***10* seconds independently *using SSP*** alternating a 10 second paired interval (using head massage as the pre-established reinforcer) and 5-second independent intervals. Score each trial/learn-unite as: 1 trial equals 10 seconds of independent watching using partial-interval recording; criteria= 90% x2	Criteria Met
D) **Re-run baseline as STOA to get an updated duration of how long the client would independently sustain watching the movie.** *This duration data is essential for meeting the client where they are and identifying an appropriate STO E duration (i.e., could the STO E duration jump significantly from 10 seconds or if it should gradually move from the 10-second duration in STO C*	Probe
E) **Target** STOC but use intervals of **15 seconds**. criteria= 90% x2	Criteria Met
F) **Target** STOB but use intervals of **30 seconds**. criteria= 90% x2	No Trend *(Implement antecedent strategy)*
G) **Target** STO F (watching for **30 seconds**) **however**, allow the client to have access to a ***fine motor activity*** (pipe cleaners) while watching when in BOTH the ***paired and independent trial*** (paired trial in this phase- both head massage **AND** access to pipe cleaner fine motor play while watching)	Criteria Met
H) ***Fade out fine-motor activity*** *(pipe cleaners)*- **Target** STO F (watching for 30 seconds); however, allow the client to have **access to a fine-motor activity** (pipe cleaners) while watching **ONLY** in the **paired trial** (paired trial in this phase- both head massage **AND** access to pipe cleaner fine motor play while watching) criteria= 90% x2	Probed Out *Criteria to probe out of phase=90% or above on the first data point*
I) ***Target as STOB*** but use ***intervals of 45 seconds*** criteria= 90% x2	Criteria Met
J) ***Target as STOB*** but use ***intervals of 1 minute***. criteria= 90% x2	Criteria Met
K) ***Probe*** the client ***independently (with no exposure to the SSP procedure) watching*** Lion King for ***5 minutes*** 1 trial equals 5 seconds of independent watching using partial interval recording: criteria= 90% on the first data point **(Post-intervention Baseline Phase)**	Probe **LTO Met**

Figure 6

Participant 2, Intervention 1 Time-Series Line Graph



From reviewing Participant 2's data for intervention 1, the SSP method of classical conditioning led to 92% of engagement during the 5-minute interval with the novel reinforcer, which is in alignment with Ha1, which hypothesized that the intervention would lead to 80% or greater engagement. Six of the phases from his intervention 1 demonstrated trends (Phase C, an ascending trend; Phase E, an ascending trend; Phase F, a no trend; Phase G, an ascending trend; Phase I, an ascending trend; and Phase J, a no trend that hovered around the criterion level). The remainder of the phases that did not demonstrate a trend were one data point probes (Phase A, B, D, H, and K). From reviewing the data, although 12.5% of the phases that indicated a trend (i.e., ascending trend, descending trend, or no trend) started within the range of criterion level and remained there and 12.5% resulted in a no trend, the remaining 75% of the trending

phases demonstrated an ascending trend. These results are in alignment with Ha2, which hypothesized that the method of SSP will lead to ascending trends. ‘His data for intervention 1 indicated 100% non-overlapping data points between the pre-intervention baseline phase (65% of engagement) and the post-intervention baseline phase (92% engagement).

Participant 2: Intervention #2 (SSP for Watching the Movie Monsters Inc.)

Participant 2 was also exposed to the SSP procedure to increase his engagement with watching the novel stimuli of Monsters Inc. The trajectory of ‘his SSP intervention for Monsters Inc is outlined in Figure 7. “Participant 2, intervention 2, program sheet”. The visual representation is displayed in Figure 8. “Participant 2, intervention 2, time-series line graph” for Participant 2’s SSP intervention for Monsters Inc. indicates that he was exposed to a Pre-intervention Baseline Phase in Phase A where the therapist probed/assessed his level of engagement when watching Monsters Inc. independently with no pre-established reinforcer for 5 minutes. In this phase, the data were scored in 5-second intervals (sixty 5-second intervals equals the 5-minute baseline phase) score a ‘+’ for correct watching, a ‘-’ for not watching, ‘S’ for stereotypy & ‘P’ for passivity. Each trial or learn-unit for the pre-intervention baseline phase in “Phase A” was scored as 1 trial equals 5 seconds of independent watching using a partial-interval recording method. The criterion for Phase A of his SSP intervention for Monsters Inc. was 90% correct/active engagement (operationally defined within the pre-intervention baseline phase) of watching Monsters Inc. on the first data point. The assessment phase of this program demonstrated a 0% level of engagement when watching Monsters Inc.

In Phase B of Participant 2's SSP intervention for Monsters Inc., the therapist targeted 'his ability to watch the movie for 5 seconds independently using the SSP method by alternating a 5 second paired interval (using head massage as the pre-established reinforcer) with a 5-second independent interval recording method (1 trial equals 5 seconds of independent watching using a partial-interval recording method) with a criterion of 90% active engagement of watching Lion King across two consecutive data points. The data within this phase indicated 67%, 86%, 63%, 75%, 92%, and 100% levels of engagement when watching Monsters Inc. before reaching the criterion of 90%, or above, across two consecutive data points. This phase demonstrated an ascending trend.

In Phase C of Participant 2's SSP intervention for Monsters Inc., the therapist targeted his watching the movie for 10 seconds independently using the SSP method by alternating a 10 second paired interval (using head massage as the pre-established reinforcer) with the 10-second independent intervals (5-second partial-interval recording method). The data within this phase indicated 63%, 88%, 100%, and 92% levels of engagement when watching Monsters Inc. before reaching the criterion. This phase displayed an ascending trend.

The next phase, Phase D, targeted the participant watching Monsters Inc. for 15 seconds independently using the SSP method by alternating a 15 second paired interval (using head massage as the pre-established reinforcer) with the 15-second independent intervals (scored in 5-second partial-interval recording method). As a result, he demonstrated a 100% level of engagement when watching Monsters Inc. on the first data point. Due to the participant demonstrating a level of engagement above the set criterion

on the first data point he probed out of the criterion. The criterion to probe out of a phase was 90%, or above, on the first data point.

Phase E targeted 20 seconds of movie watching with the data score in 5-second partial intervals (alternating between both paired and independent trials). The data within this phase indicated 57%, 75%, 100%, 86%, 67%, 100%, and 100% levels of engagement when watching Monsters Inc. before reaching the criterion.

The therapist targeted 30 seconds of movie watching with the data score in 5-second partial intervals (alternating between both paired and independent trials) in Phase F. The participant demonstrated a 100% level of engagement when watching Monsters Inc. on the first data point. As a result, he demonstrated a level of engagement above the set criterion on the first data point, the participant probed out of the criterion.

The therapist targeted 45 seconds of movie watching with the data score in 5-second partial intervals (alternating between both paired and independent trials) in Phase G. As a result, he demonstrated a 100% level of engagement when watching Monsters Inc. on the first data point. Therefore, he probed out of the criterion.

One minute of movie watching, with the data score in 5-second partial intervals (alternating between both paired and independent trials), was targeted in Phase H. As a result, he demonstrated a 100% level of engagement when watching Monsters Inc. on the first data point. Therefore, he probed out of the criterion.

Phase I, the post-intervention baseline phase, assessed his ability to independently (with no exposure to the SSP procedure) watch Monsters Inc. for 5 minutes. In this phase, 1 trial equaled 5 minutes of independent watching using a partial interval recording

method, with a criterion of 90% of engagement on the first data point. The data from this phase produced a 100% level of engagement.

Figure 7

Participant 2, Intervention 2 Program Sheet

Name: Participant #2 (Intervention #2) Program: Watches Movie SSP – Monsters Inc.

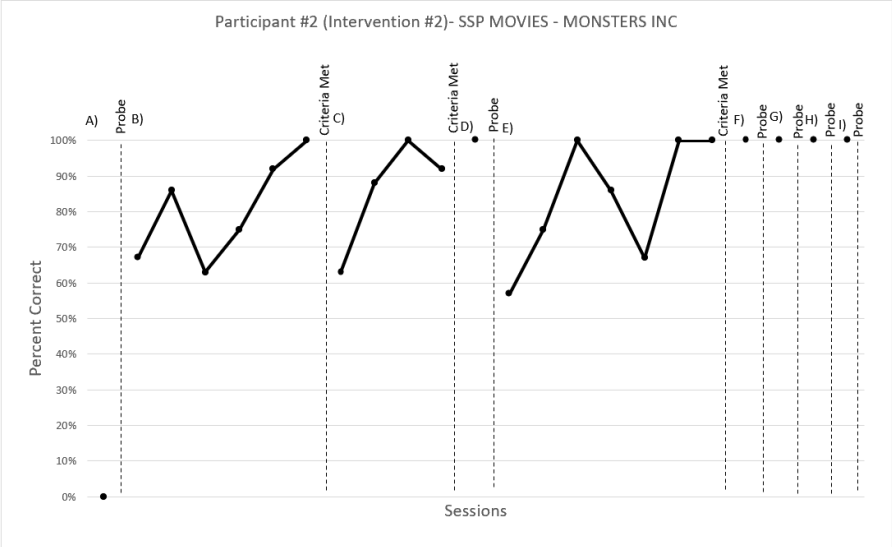
Long-term objective (LTO): The child will be able to sit and watch Monsters Inc. movie appropriately for 5 minutes with 90% accuracy across 2 consecutive sessions.

SSP procedure: Start with a paired interval; pair the show with a pre-established reinforcer during this time interval. If the client successfully watches the movie for the paired interval, move to an independent trial (of the same duration of time) where the client must independently watch the movie for 80% of the interval. If the client successfully watches the movie during the independent interval, go back into a paired trial and reinforce the client for watching the movie during the paired interval. If the client stops watching the movie for any time during the independent interval, stop the trial and go back to a pairing interval. If the client does not watch the movie during the paired interval, do not move to an independent trial until a paired interval has been successfully accomplished.

Short-term objective (STO)	**Reason**
A) ***Probe*** the client ***watching*** Monsters Inc. ***independently with no pre-established reinforcer*** for 5 minutes, score in 5-second intervals (***sixty 5-second intervals equals the 5-minute baseline phase***) score a '+' for correct watching, a '-' for not watching, 'S' for stereotypy & 'P' for passivity. Score each trial/ learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording, criteria= 90% on the first data point **(Pre-intervention Baseline Phase)**	Probe
B) ***Target*** the client ***watching*** Monsters Inc. for **5 seconds independently *using SSP*** alternating a 5 second paired interval (***using head massage as the pre-established reinforcer)*** and 5-second independent intervals. Score each trial/learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording; criteria= 90% x2	Criteria Met
C) ***Target*** the client ***watching*** Monsters Inc. for ***10* seconds independently *using SSP*** alternating a 10 second paired interval (using head massage as the pre-established reinforcer) and 5-second independent intervals. Score each trial/learn-unite as: 1 trial equals 10 seconds of independent watching using partial-interval recording; criteria= 90% x2	Criteria Met
D) **Target** STOC but use **intervals of 15 seconds.**	Probed Out *Criteria to probe out of phase=90% or a above on the first data point*
E) **Target** STOB but use **intervals of 20 seconds**.	Criteria Met
F) **Target** STOB but use **intervals of 30 seconds.**	Probed Out *Criteria to probe out of phase=90% or a above on the first data point*
G) **Target** as STOB but use **intervals of 45 seconds.**	Probed Out *Criteria to probe out of phase=90% or a above on the first data point*
H) **Target** as STOB but use **intervals of 1 minute**.	Probed Out *Criteria to probe out of phase=90% or a above on the first data point*
I) ***Probe*** the client ***independently (with no exposure to the SSP procedure) watching*** Monsters Inc. ***5 minutes*** 1 trial equals 5 seconds of independent watching using partial interval recording: criteria= 90% on the first data point **(Post-intervention Baseline Phase)**	Probe **LTO Met**

Figure 8

Participant 2, Intervention 2 Time-Series Line Graph



From reviewing Participant 2's data for intervention 2, the SSP method of classical conditioning led to100% engagement during the 5-minute interval with the novel reinforcer, which is in alignment with Ha1, which hypothesized that the intervention would lead to 80% or greater engagement. Three of the phases from his intervention demonstrated trends (Phase B, C, and E). The remainder of the phases that did not demonstrate a trend were one data point probes (Phase A, D, F, G, H, and I). 100% of the trending phases demonstrated an ascending trend. These results are in alignment with Ha2, which hypothesized that the method of SSP will lead to ascending trends. In intervention 2 for Participant 2, the percentage of non-overlapping data points between the pre-intervention baseline phase (0%) and the post-intervention baseline phase (100%) resulted in 100% of non-overlapping data points between the pre-

intervention baseline phase and the post-intervention baseline phase and was therefore in alignment with the alternative hypothesis 3 (Ha3).

Summary of Participant 2

The following things stood out when comparing intervention 1 and intervention 2 for Participant 2: Intervention 1 had fewer program changes, there were more phases in intervention 2 that the participant probed out, and the second intervention required a slightly lower number of learn-units, before the entire intervention was deemed completed. The number of learn-units from the raw data was visually identified through the number of data points. The first intervention had 38 data points, while the second intervention had 23 data points. On the other hand, there was actually a decrease in the level of engagement across the pre-intervention baseline for intervention 1 (a 65% level of responding) to the pre-intervention baseline for intervention 2 (a 0% level of responding).

Participant 3

Participant 3 was a Bermudian boy who was 16 years old at the start of the data collection for the first SSP program within this study and 17 years old at the start of the second SSP program outlined in this study. He was diagnosed from Boston Children's Hospital at age 3 with autism, using the ADOS-2 assessment tool. At the time of diagnosis, he did occasionally engage in 2-word combinations and could occasionally follow one-step instructions. He had a limited bank of reinforcers. His reinforcers included lining items up, flipping through the pages of books to see the pictures, and simple ball play with peers. When presented with items, he was more likely to engage in

self-stimulatory behaviors with the item. The recommendations in his medical diagnostic report read that he should be in a placement where he can receive one-to-one Applied Behavior Analytic therapy overseen by a Board-Certified Behavior Analysts (BCBA). He received his autism diagnosis 15 years prior to his start of ABA services at the local Autism Early Intervention Centre and it had been 16 years from his diagnosis of autism before the onset of his exposure to his first SSP program outlined within this study.

Participant 3: Intervention #1 (SSP for Watching the Movie High School Musical)

Participant 3 was exposed to the SSP procedure to increase his engagement with watching the movie High School Musical, which was a novel stimulus for him. The trajectory of his SSP intervention for High School Musical is outlined in Figure 9. "Participant 3, intervention 1, program sheet." The visual representation is displayed in Figure 10. "Participant 3, intervention 1, time-series line graph" for his SSP intervention for High School Musical indicates that he was exposed to a Pre-intervention Baseline Phase in Phase A where the therapist probed/assessed the participant's level of engagement when watching High School Musical independently with no pre-established reinforcer for 5 minutes. In this phase, the data were scored in 5-second intervals (sixty 5-second intervals equals the 5-minute baseline phase) score a '+' for correct watching, a '-' for not watching, 'S' for stereotypy & 'P' for passivity. Each trial or learn-unit for the pre-intervention baseline phase in "Phase A" was scored as 1 trial equals 5 seconds of independent watching using a partial-interval recording method. The criterion for Phase A of Participant 3's SSP intervention for High School Musical was 90% correct/active engagement (operationally defined within the pre-intervention baseline phase) of

watching High School Musical on the first data point. The assessment phase of this program demonstrated a 47% level of engagement when he watched High School Musical.

After the baseline, that was taken in Phase A, the participant had a suspension in services for the two months of summer. Due to this long delay between the data collected in Phase A and the onset of Phase B, the therapists identified the need to do a re-assessment identical to phase one as Phase B to get an accurate reflection of his engagement in watching the novel stimulus of High School Musical. There was not much difference in his level of engagement as the assessment data of this phase demonstrated a 42% level of engagement when watching High School Musical.

In Phase C of Participant 3's SSP intervention for High School Musical the therapist targeted the participant watching the movie for 5 seconds independently using the SSP method by alternating a 5 second paired interval (using a high level of social engagement as the pre-established reinforcer) with 5-second independent interval (1 trial equals 5 seconds of independent watching using a partial-interval recording method) with a criterion of 90% active engagement of watching the High School Musical across two consecutive data points. For the implementation of the social engagement, the program sheet indicated that the therapist would sit with the participant and give social reinforcement throughout watching the video. The data within this phase indicated 55%, 90%, and 95% levels of engagement when watching High School Musical before reaching the criterion of 90%, or above, across two consecutive data points. This phase demonstrated an ascending trend.

In Phase D of his SSP intervention for High School Musical the therapist targeted the participant watching the movie for 10 seconds independently using the SSP method by alternating a 10 second paired interval (using a high level of social engagement as the pre-established reinforcer) with the 10-second independent intervals (using a 5-second partial-interval recording method). The data within this phase indicated 55%, 85%, 85%, 100%, and 90% levels of engagement when watching High School Musical before reaching the criterion. This phase displayed an ascending trend.

Phase E targeted 15 seconds of movie watching with the data score in 5-second partial intervals (alternating between both paired and independent trials) using a high level of social engagement as the pre-established reinforcer. The data within this phase indicated a 95% level of engagement when watching High School Musical. Therefore, the participant probed out of the criterion.

The therapist targeted 20 seconds of movie watching with the data scored in 5-second partial intervals (alternating between both paired and independent trials) using a high level of social engagement as the pre-established reinforcer in Phase F. The participant demonstrated a 90% level of engagement when watching High School Musical on the first data point. With this said, the participant probed out of the criterion.

The next phase, Phase G, targeted the participant watching the High School Musical for 30 seconds independently using the SSP method by alternating a 30 second paired interval (using a high level of social engagement as the pre-established reinforcer) 30-second independent intervals (scored using a 5-second partial-interval recording method). As a result, he demonstrated a 100% level of engagement when watching High

School Musical on the first data point. Due to the participant demonstrating a level of engagement above the set criterion on the first data point, he probed out of the criterion. The criterion to probe out of a phase was 90%, or above, on the first data point.

Given that the participant probed out of the criterion for the last three phases, it was deemed appropriate for a re-assessment of his level of engagement at the 5-minute mark. A re-assessment after a number of consecutive phases where the participant probed out of the criterion would give the therapist a sense of the duration of how long he would independently sustain watching the movie. Re-assessing at this point and garnering duration data on engagement when the participant was presented with the long-term objective of 5 minutes would provide the therapist with feedback regarding if the next phase should target a time duration that gradually increases from Phase G, should significantly jump in duration from phase G, or if the long-term objective of 5 minutes of engagement had been met. When presented with watching High School Musical for 5 minutes with no exposure to the SSP procedure (1 trial equaled 5 minutes of independent watching using partial interval recording), the data from this phase produced a 100% level of engagement. With criterion for the long-term object of independently watching High School Musical was 90% of engagement on the first data point, this phase (Phase H) served as the post-intervention baseline phase.

Figure 9

Participant 3, Intervention 1 Program Sheet

Name: Participant #3 (Intervention #1) Program: Watches Movie SSP – High School Musical

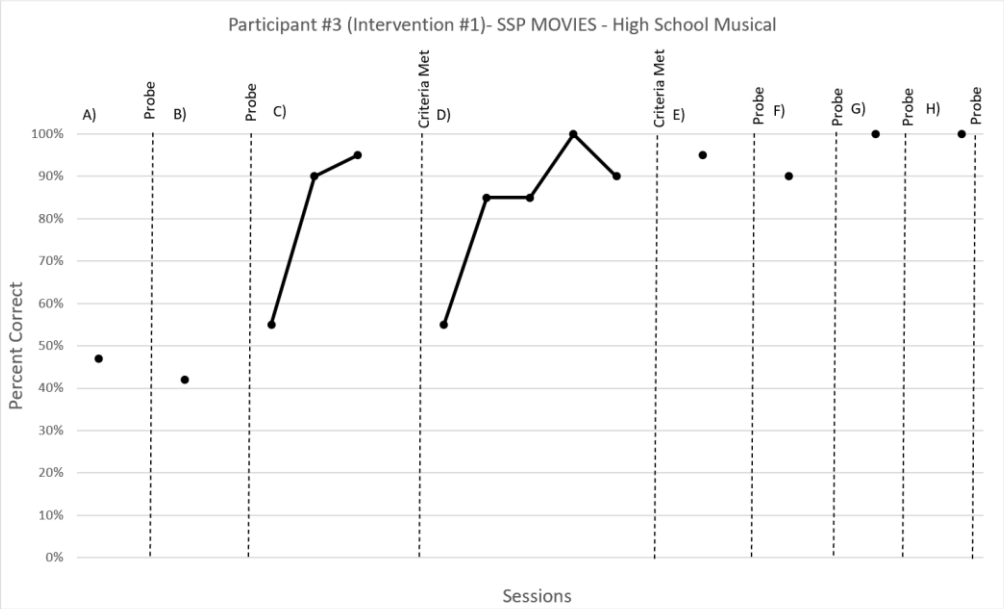
Long-term objective (LTO): The child will be able to sit and watch High School Musical appropriately for 5 minutes with 90% accuracy across 2 consecutive sessions.

SSP procedure: Start with a paired interval; pair the show with a pre-established reinforcer during this time interval. If the client successfully watches the movie for the paired interval, move to an independent trial (of the same duration of time) where the client must independently watch the movie for 80% of the interval. If the client successfully watches the movie during the independent interval, go back into a paired trial and reinforce the client for watching the movie during the paired interval. If the client stops watching the movie for any time during the independent interval, stop the trial and go back to a pairing interval. If the client does not watch the movie during the paired interval, do not move to an independent trial until a paired interval has been successfully accomplished.

Short-term objective (STO)	**Reason**
A) ***Probe*** the client ***watching*** High School Musical ***independently with no pre-established reinforcer*** for 5 minutes, score in 5-second intervals (***sixty 5-second intervals equals the 5-minute baseline phase***) score a '+' for correct watching, a '-' for not watching, 'S' for stereotypy & 'P' for passivity. Score each trial/ learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording, criteria= 90% on the first data point **(Pre-intervention Baseline Phase)**	Probe
B) **Re-probe** as in STO A (long delay sessions suspended for the two months of Summer) 1 trial/5-second interval IND.	Probe
C) ***Target*** the client ***watching*** High School Musical for **5 seconds independently *using SSP*** alternating a 5 second paired interval (***using a high level of social engagement as the pre-established reinforcer-*** *Therapist is to sit with the client and give social reinforcement throughout watching the video*) and 5-second independent intervals. Score each trial/learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording; criteria= 90% x2	Criteria Met
D) ***Target*** the client ***watching*** High School Musical for **10 seconds independently *using SSP*** alternating a 10 second paired interval (***using a high level of social engagement as the pre-established reinforcer*** and 10-second independent intervals. Score each trial/learn-unite as: 1 trial equals 10 seconds of independent watching using 5 second partial-interval recording; criteria= 90% x2	Criteria Met
E) **Target** LTO using **15 seconds** intervals with SSP -paired interval – therapist interaction (scored in 5 second intervals). 1 trial/ 15 seconds interval IND	Probed Out Criteria to probe out of a phase= 90% or above on the first data point
F) **Target** LTO using **20 seconds** intervals with SSP -paired interval – therapist interaction (scored in 5 second intervals). 1 trial/ 20 seconds interval IND	Probed Out Criteria to probe out of a phase= 90% or above on the first data point
G) **Target** LTO using **30 seconds** intervals with SSP -paired interval – therapist interaction (scored in 5-second intervals). 1 trial/ 30 seconds interval IND	Probed Out Criteria to probe out of a phase= 90% or above on the first data point
H) ***Probe*** the client ***independently (with no exposure to the SSP procedure) watching*** High School Musical for ***5 minutes*** 1 trial equals 5 seconds of independent watching using partial interval recording: criteria= 90% on the first data point **(Post-intervention Baseline Phase)**	Probed Out Criteria to probe out of a phase= 90% or above on the first data point **LTO Met**

Figure 10

Participant 3, Intervention 1 Time-Series Line Graph



Participant 3's data for intervention 1 indicated that the SSP method of classical conditioning led to 100% of engagement during the 5-minute interval with the novel reinforcer, which is in alignment with Ha1. Two of the phases from intervention 2 demonstrated trends (Phase C, and D). The remainder of the phases that did not demonstrate a trend were one data point probes (Phase A, B, E, F, G, and H). Both of the trending phases demonstrated an ascending trend; therefore, these results are in alignment with Ha2. The percentage of non-overlapping data points between the pre-intervention baseline phase (47%) and the post-intervention baseline phase (100%) resulted in 100% of non-overlapping data points between the pre-intervention baseline phase and the post-

intervention baseline phase. Therefore, the data from Participant 3, intervention 1 was in alignment with Ha3.

Participant 3: Intervention #2 (SSP for Watching the Movie Glee)

Participant 3 was exposed to the SSP procedure to increase his engagement with watching the movie Glee, which was a novel stimulus for him. The trajectory of his SSP intervention for Glee is outlined in Figure 11. “Participant 3, intervention 2, program sheet.” The visual representation is displayed in Figure 12. “Participant 3, intervention 2, time-series line graph” for his SSP intervention for Glee indicates that the participant was exposed to a Pre-intervention Baseline Phase in Phase A where the therapist probed/assessed his level of engagement when watching Glee independently with no pre-established reinforcer for 5 minutes. In this phase, the data were scored in 5-second intervals (sixty 5-second intervals equals the 5-minute baseline phase) the therapist scored a ‘+’ for correct watching, a ‘-’ for not watching, ‘S’ for stereotypy & ‘P’ for passivity. Each trial or learn-unit for the pre-intervention baseline phase in “Phase A” was scored as 1 trial equals 5 seconds of independent watching using partial-interval recording. The criterion for Phase A of Participant 3’s SSP intervention for Glee was 90% correct/active engagement (operationally defined within the pre-intervention baseline phase) of watching Glee on the first data point. The assessment phase of this program demonstrated 30% level of engagement when watching Glee.

In Phase B of Participant 3’s SSP intervention for Glee the therapist targeted the participant watching the movie for 5 seconds independently using the SSP method by alternating a 5 second paired interval (using block building and crashing as the pre-

established reinforcer) with 5-second independent interval (1 trial equals 5 seconds of independent watching using a partial-interval recording method) with a criterion of 90% active engagement of watching the Glee across two consecutive data points. The data within this phase indicated 53%, 38%, 3%, 92%, 57%, 62%, and 20% levels of engagement when watching Glee. This phase demonstrated no-trend. The anecdotal notes listed on the datasheet indicate motivation to be the reason for the no-trend seen in Phase B.

To address this lack of motivation, Phase C transitioned from using the pre-established reinforcer of block building and crashing to using a high level of social engagement as the pre-established reinforcer. For the implementation of the social engagement, the program sheet indicated that the therapist would sit with the participant and give social reinforcement throughout watching the video. Phase C targeted 5 seconds of movie watching with the data scored in 5-second partial intervals (alternating between both paired and independent trials). Although the participant demonstrated 70%, 23%, 68%, 72%, and 75% levels of engagement when watching Glee, there was a long break in sessions due to a suspension in services over the summer months. Phase D, reintroduced Phase C (targeting 5 seconds of movie watching as seen above). The data within this phase indicated 60%, 90%, 60%, 80%, 90%, and 95% levels of engagement when watching Glee before reaching the criterion of 90%, or higher, across two consecutive data points.

Due to the level of responding in Phase D, the therapist reassessed the participant's ability to independently (with no exposure to the SSP procedure) watch Glee

for 5 minutes, the post-intervention baseline phase. In this phase, 1 trial equaled 5 minutes of independent watching using partial interval recording, with a criterion of 90% of engagement on the first data point. The data from this phase produced a 90% level of engagement.

Figure 11

Participant 3, Intervention 2 Program Sheet

Name: Participant #3 (Intervention #2) Program: Watches Movie SSP – Glee

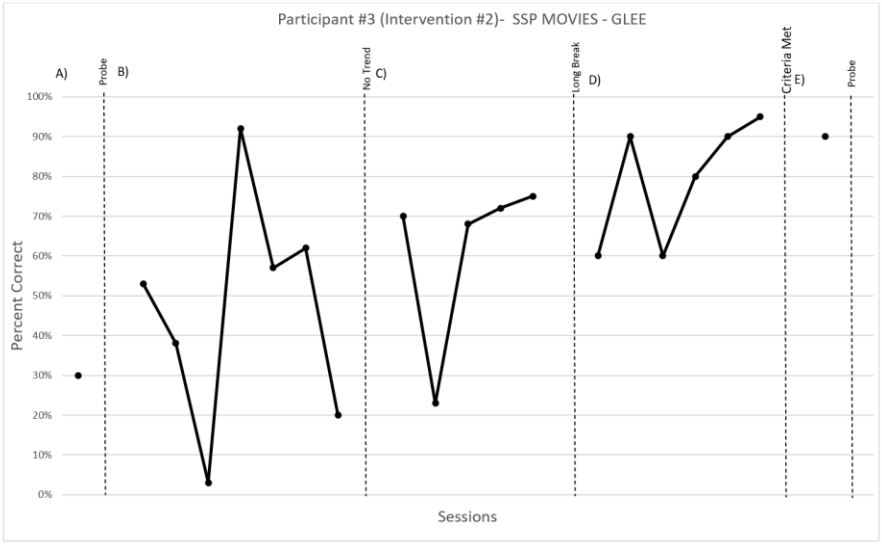
Long-term objective (LTO): The child will be able to sit and watch Glee movie appropriately for 5 minutes with 90% accuracy across 2 consecutive sessions.

SSP procedure: Start with a paired interval; pair the show with a pre-established reinforcer during this time interval. If the client successfully watches the movie for the paired interval, move to an independent trial (of the same duration of time) where the client must independently watch the movie for 80% of the interval. If the client successfully watches the movie during the independent interval, go back into a paired trial and reinforce the client for watching the movie during the paired interval. If the client stops watching the movie for any time during the independent interval, stop the trial and go back to a pairing interval. If the client does not watch the movie during the paired interval, do not move to an independent trial until a paired interval has been successfully accomplished.

Short-term objective (STO)	**Reason**
A) ***Probe*** the client ***watching*** Glee ***independently with no pre-established reinforcer*** for 5 minutes, score in 5-second intervals (***sixty 5-second intervals equals the 5-minute baseline phase***) score a '+' for correct watching, a '-' for not watching, 'S' for stereotypy & 'P' for passivity. Score each trial/ learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording, criteria= 90% on the first data point **(Pre-intervention Baseline Phase)**	Probe
B) ***Target*** the client ***watching*** Glee for **5 seconds independently *using SSP*** alternating a 5 second paired interval (***using block building and crashing as the pre-established reinforcer)*** and 5-second independent intervals. Score each trial/learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording; criteria= 90% x2	No Trend *(Due to lack of motivation Implement antecedent strategy of changing the pre-established reinforcer)*
C) ***Target*** the client ***watching*** Glee for **5 seconds independently *using SSP*** alternating a 5 second paired interval (***using a high level of social engagement as the pre-established reinforcer-*** *Therapist is to sit with the client and give social reinforcement throughout watching the video*) and 5-second independent intervals. Score each trial/learn-unite as: 1 trial equals 5 seconds of independent watching using partial-interval recording; criteria= 90% x2	Long break- sessions suspended for the two months of Summer
D) Reintroduce STO C. ***Target as STOB*** (Client **watching for 5-second intervals.** Expose the client to a 5 second paired interval and follow successful paired intervals (paired intervals where the client watched during the trial) follow that interval with a 5-second independent interval. Ensure to only graph the independent intervals. 1 trial equals 5 seconds of independent watching using partial-interval recording; criteria= 90% x2	Criteria Met
E) ***Probe*** the client ***independently (with no exposure to the SSP procedure) watching*** Glee for ***5 minutes*** 1 trial equals 5 seconds of independent watching using partial interval recording: criteria= 90% on the first data point **(Post-intervention Baseline Phase)**	Probe **LTO Met**

Figure 12

Participant 3, Intervention 2 Time-Series Line Graph



Participant 3's data for intervention 2 indicated that the SSP method of classical conditioning led to 90% of engagement during the 5-minute interval with the novel reinforcer, which is in alignment with Ha1. Two of the phases from intervention 2 demonstrated trends (Phase B, and D). The remainder of the phases that did not demonstrate a trend was either a one data point probe (Phase A and E) or did not gather enough data to develop a trend (Phase C). One of the trending phases demonstrated a no-trend and the other phase demonstrated an ascending trend. In intervention 3 the percentage of non-overlapping data points between the pre-intervention baseline phase (30%) and the post-intervention baseline phase (90%) resulted in 100% of non-overlapping data points between the pre-intervention baseline phase and the post-

intervention baseline phase and was therefore in alignment with the alternative hypothesis 3 (Ha3).

Summary of Participant 3

In reviewing both intervention 1 and intervention 2 for Participant 3 side by side it was apparent that intervention 2 had more interruptions, which may have led to an increase of learn units. However, despite the increase of learn-units seen in intervention 2, that intervention demonstrated fewer phases needed before the participant demonstrated mastery in the post-intervention baseline.

Conclusion

The data contained within this chapter were archival data provided to the researcher via a local Early autism Intervention Centre in Bermuda. The data of this study were collected by the local Autism Early Intervention Centre staff and pre-dated the researcher having BCBA credentials. Changes in the level of engagement with a novel reinforcer were measured per learn-unit. Each learn-unit/ teaching trial was operationally defined per phase, indicating the duration of engagement with the novel reinforcer required per trial, the behavioral strategies, and the criterion utilized per phase. Data for each participants' intervention were organized in a pre-intervention phase, various intervention phases, and a post-intervention phase. The various stages of the intervention phase spoke to the variability in the level of prompting needed for each participant. Proficiency was evaluated via participants' level of engagement with the novel reinforcer. Levels of engagement were assessed prior to the intervention, during the intervention,

and after the intervention, with a 90%, or above, level of engagement identified as mastery level.

The results of the data summarized in Chapter 4 supported the research questions and hypotheses that were outlined for this research paper. The results for all three participants demonstrated an increase in engagement with the targeted stimuli, as all participants demonstrated 80% or greater engagement during a 5-minute interval with a novel reinforcer after being exposed to the SSP method of classical conditioning. Even though there were some instances where there was a no-trend seen within the data, there were no instances of descends in the study. All participants demonstrated ascending data trends within their overall SSP interventions. In addition, all participants percentage of nonoverlapping data points between the pre-intervention baseline and post-intervention baseline were 80% or greater.

Chapter 5: Discussion, Conclusions, and Recommendations

The main goal of this study was to identify whether the SSP method of classical conditioning was effective in conditioning novel reinforcers for Bermudian children who have autism. To reach this goal, secondary data were garnered from the local Autism Early Intervention Centre, a clinical Centre on the island of Bermuda that specializes in ABA as an intervention method. Chapter 5 provides a summary and an explanation of the results outlined in the previous chapter. In addition to providing a summary and interpretation of the results, Chapter 5 will outline the social validity of the study and the effects of the results. Chapter 5 will also discuss the limitations, recommendations for future research, and implications for social change.

Summary of Results with Interpretations

Overview of the Results

Secondary analyses of data supported the research question and hypotheses outlined. Three participants (Participant 1 at age 4 and at age 5; Participant 2 at age 7 and at age 8; and Participant 3 at age 16 and at age 17) were randomly identified through the local Autism Early Intervention Centre's archival data based on the following criteria, the participant (a) possess Bermudian status, (b) is a child (between 2 and 21 years old), (c) has level 3 diagnosis of autism: requiring very substantial support, (d) has a minimal bank of reinforcers, (e) is a nonverbal learner or an individual who have a limited vocal repertoire, and (f) has exposure to SSP interventions were data was collected before the researcher was a BCBA.

The archival data were collected until a stable level of responding was seen at 90%, or higher, engagement with the novel reinforcer. In an aim to reach such levels of engagement, a variety of prompts via the SSP procedure and program changes were implemented. Before implementing the SSP intervention, baseline data were collected for each participant. Once the SSP intervention was implemented, the results of all three participants led to ascending trends in the participants' time-series line graphs, which served as a visual representation of participants' responses. With the ascending trends, the data indicated that the SSP method of classical conditioning was successful in establishing novel reinforcers for Bermudian children, leading to an 80% or higher level of engagement post-intervention.

Interpretation of the Results

In examining the results of this study, it seems that the classical conditioning method of SSP is effective in establishing novel reinforcers for Bermudian children who have autism. This study showed significant improvement from the pre-intervention baseline to the post-intervention baseline. There were similar levels of engagement with the novel reinforcer after the intervention across all participants. Some individuals with autism have been known to demonstrate a lack of natural interest in stimuli that their neurotypically developing peers would be interested in (e.g., people/social interactions, toys; Axe et al., 2017). In reviewing the results in the study, the concept that some individuals with autism may have a limited bank of reinforcers was apparent in the level of engagement with the novel stimuli seen in the pre-intervention baseline phase. The findings of this study were in alignment with previous research that used a single study

design across two participants who were both children diagnosed with autism (Axe et al., 2017; Nuzzolo-Gomez et al., 2002). The results from both this study and previous research led to higher levels of responding/engagement with the novel stimuli.

In looking at the results of the post-intervention baseline phases in comparison to the trajectory and number of learn-units of the interventions for each participant, the results of this study appear to be in alignment with the definition of conditioning, as being a learning theory that emphasizes the importance of practice, where learning is explained as a change of behaviors as a result of an interaction between a set of conditions (Basri et al., 2020).

The textbook definition of a reinforcer is a stimulus that increases the future likelihood of a behavior (Basri et al., 2020). Although this study was to condition novel reinforcers, in evaluating the results, the application of the pre-established reinforcer indeed increased the forthcoming engagement/interaction with the novel movie/TV show. Although the process of simultaneously presenting an established reinforcer with either a neutral or aversive stimulus has a rich history dating back to the 1960s (Axe et al. 2017), this study identified that the classical conditioning method of SSP is still currently an effective strategy in establishing reinforcers and this method can be generalized to the Bermudian culture.

Limitations

There were three identified limitations found within this research. The first limitation was the similarity across participants (i.e., age, culture, and diagnostic details). Another limitation is the similarity in the type of reinforcement explored throughout the

study (movie/TV watching). The limitation seen across participants and type of reinforcer led to this data being restrictive in its demonstration of generalizability with these areas. A third limitation of this study was the extrinsic factors identified within the data (i.e., long breaks due to a pause in services). When reviewing if a particular intervention or strategy demonstrates control over a participant's responding, the limitation of extrinsic factors could aid in the influence (i.e., the intervention in connection with the extrinsic factors) the participant's responding and in-turn, influence the data. As the archival data collected comprised of baseline data, most of which was collected on the same day, a limitation of this study is that the baseline phases did not produce sufficient data to calculate an effect size using Cohen's D. To address this limitation, non-overlapping data points from the pre-intervention baseline and the post-intervention phase were compared to examine the amount of amount of effectiveness demonstrated as a result of the interventions.

Recommendations for Future Research

The limitations discussed above would serve as a great starting point in outlining ways that future research could expand on the finding of this study. Given that this study has great similarity in participants (i.e., all children under the age of 21, limited verbal repertoire, and diagnosed with a level 3 diagnosis of autism: requiring very substantial support), future research can explore participants across a broader range of levels of autism. Future research can also explore participants across a wider range of developmental disabilities, outside of autism. In addition to similarities seen across participants, this study only explored movie/TV watching as a reinforcer across all three

participants. Future research could benefit from exploring the cross-cultural effects across a more diverse span of reinforcers (i.e., toys, books, sensory play…).

Replicating this study using participants from a different culture would also be a vital avenue in future research as it could assist in further development in the internationalization of the field of psychology. It is necessary for parents and practitioners who live internationally and rely on evidence-based treatments to know the cross-cultural effects and generalizability of the services they are seeking and receiving because cultural practices and ideologies are not seamlessly generalizable across cultures. Although the results of this study indicate that the classical conditioning method of SSP, which falls under the umbrella of ABA, is effective and generalizable to Bermuda's culture, applying a method within another culture can create an unhealthy environment. With this said, from an ethical stance, it is crucial that research aid in the internationalization of the field of psychology, especially as there has historically been a heavy influence from Western culture on the field (Van de Vijver, 2013).

Implications for Social Change

This research sought to aid in the cultural diversity of psychology, which is vital for the future direction of the field. Vijver (2013) explained that in the years of striving for internationalization within research, researchers have identified many challenges associated with conducting cross-cultural research. Three major obstacles to conducting cross-cultural research include translation issues, financial constraints, and bias.

An implication of social change is that the finding of this study speaks to the cultural generalizability of the use of classical conditioning as well as of the Applied

Behavior Analytic method. For individuals who live internationally and rely on evidence-based treatments, it is essential to be aware of the cross-cultural effects and generalizability. The field of ABA has a heavy reliance on research, this study ensures its generalizability to the Bermudian culture for Bermudian parents, practitioners, and clients, giving them informed knowledge on the evidence-based effectiveness of certain ABA strategies, specific to SSP and conditioning novel reinforcers.

This study is also socially significant as it aims to grow awareness within the Bermudian community of the Autistic population, how they present, and strategies that can assist them, specifically pertaining to the area of reinforcement, as this is key for leisure activities and skill acquisition. This study also aims to bring awareness to the Bermudian community about the importance of research.

A large portion of the research is focused on skill acquisition or various behaviors. However, as a researcher, this topic was selected as a way to continue to add to the pool of research that focuses on reinforcement specifically, as reinforcement is the core variable that is essential to the quality of life, and which is in-turn instrumental in the acquisition/maintenance of skills. Therefore, this study contributes to positive social change as it evaluates the effectiveness of a behavioral intervention, SSP, to condition novel reinforcers.

Conclusion

Reinforcement is more than how an individual fills their idle time, it is a crucial role in one's daily performance. According to Cooper et al., (2020,) a reinforcer is "a stimulus change that increases the future frequency of behavior that immediately

precedes it" (p. 798). Therefore, reinforcement plays a vital role in our behavior and how we respond to the stimuli around us. Reinforcement is directly related to how/if we respond, based on if we deem the stimulus to be reinforcing/motivating. With this said, reinforcement is a key element to learning and retaining information. Reinforcement is also essential to how an individual spends their leisure time, which in turn affects one's quality of life.

Although reinforcement plays a crucial role in one's daily operations, reinforcement or reinforcers are not always naturally or incidentally learnt. The majority of reinforcers are secondary reinforcers and therefore have been established as reinforcers through learning (Cooper et al., 2020). Although social stimuli, is a secondary reinforcer for many, they do not appear to function as reinforcement for some individuals with autism as it does for their neurotypically developing peers (Rodriguez & Gutierrez, 2017). With this said, a number of traditionally reinforcing stimuli for neurotypically developing individuals may not be reinforcing to their counterparts who have autism. Some individuals with autism demonstrate to have a limited bank of reinforcers.

Having a limited bank of reinforcers can lead to a number of challenges. For example, having a narrow bank of reinforces can result in the individual over-exhausting the pool of stimuli that they find reinforcing. This can lead to being satiated (bored) with the items that were typically identified as reinforcing, resulting in the item losing its reinforcement strength. A reduction in reinforcement strength seen with an individual who has a limited bank of reinforcers can be viewed as problematic, as this reduction in reinforcement strength could interfere with the individual's level of motivation to work

hard or learn/acquire new skills. Having a limited bank of reinforcers could also lead to an increase in idle time, stimulatory behaviors, and/or maladaptive behaviors. The obstacles that arise as a result of having a limited bank of reinforcers, noted above, can be unfavorable for individuals diagnosed with autism, as they tend to present with a subset of delays (such as social delays, communication delays, academic delays). Being satiated on previously reinforcing items/activities removes incentives that would motivate them to work hard to learn/acquire a task, which can create a more significant delay gap.

With the above information in consideration, there are many benefits to establishing novel reinforcers. As a majority of one's reinforcers are learned reinforcers (secondary reinforcers; Cooper et al., 2020), it is evident that the institution of novel reinforcers happens often and is a normal occurrence in one's day-to-day operations. Although the process of incidental learning to acquire novel reinforcers is not always the case, especially for individuals who have autism, this study demonstrates the effectiveness of a method (the SSP method of classical conditioning) that has shown to be successful as a process to intensively teach novel reinforcers, particularly for individuals who have autism. Not only did this study demonstrate the SSP method of classical conditioning as being effective in establishing novel reinforcers for individuals with Autism, but it also demonstrated to be generalizable across cultures, specifically the Bermudian culture.

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