AMERICAN UNIVERSITY OF BEIRUT

EFFECTS OF MUSIC THERAPY TO ENHANCE VERBAL SKILLS IN
CHILDREN WITH AUTISM SPECTRUM DISORDER

by
NAYLA MOHAMAD ALI ATTAR

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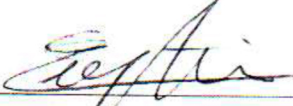of the Faculty of Arts and Sciences
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AN ABSTRACT OF THE THESIS OF

Nayla Attar   for   Master of Arts
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Title: Effects of Music Therapy to Enhance the Verbal Skills in Children with Autism Spectrum Disorder

The purpose of this study was threefold (a) it examined the differential effect of three different music interventions, namely the Interaction music singing ("singing"), Interactive music playing ("music and singing") and Receptive Music Therapy ("listening") studying the varying latency periods in the response time it took three children diagnosed with ASD to vocally elicit the target word, (b) assessed the index of happiness of children with autism after the implementation of the three music interventions which can in turn be used to influence their overall quality of life through this specific intervention; and (c) measured the social validity in regards to meeting satisfaction with goals, procedures and outcomes. The three musical approaches to be used consisted of both active and passive methods (Prakash, 2015) including Music Interaction Therapy ("singing"), (Wimpory & Nash, 1999), Interactive music playing ("music and singing"), (Kaplan & Steele, 2005) and Receptive music therapy ("listening"). The basic research questions for this study were: (a) How do the three music interventions compare in their impact on decreasing the latency period preceding a vocal response in three children with ASD? (b) Do children with ASD show different levels of happiness from participation in the three music interventions?; and (c) How do teachers and parents measure the social validity in regards to meeting outcomes, goals, and procedures of this particular intervention for verbal expression? The participants included three children ages 6 years old diagnosed with ASD from the Lebanese Autism Society (LAS), a non-governmental organization, located in Beirut, Lebanon, which educationally caters for children with autism. This study used the multielement design, also known as the alternating treatment design, to compare the effects of each of the three different music therapy techniques on the child's latency to respond to target words during the playback of a practiced song. The researcher carried out 20-minute music therapy sessions for each of the three children 2 times a week for two months. The intervention sessions were video recorded during implementation of the music therapies. The recorded videos were then used to measure the latency period for each child's response time in a playback after the music sessions were over. Latency data were then collected using pen and paper. Findings from the present study demonstrated that there was a differential effect among the three musical interventions regarding latency periods for all participants. Additionally, the happiness levels of the students varied from neutral to happy, signifying an overall positive experience while they were participating in the music ABA intervention.

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CHAPTER I

INTRODUCTION

Communication and social skill deficits are two critical impairments characterizing children with the Autism Spectrum Disorder (ASD) along with restricted and repetitive behaviors, interests or activities (APA, 2013). ASD usually manifests in early childhood and persists through life (APA, 2013). Applied behavior analysis (ABA) is a behavioral intervention based on strong coherent science and supported by extensive empirical research (Reschke-Hernández, 2011) developed to teach commonly deficient skills such as complex communication, social, play and self-help skills (Leaf & McEachin, 1999). Because children with autism have difficulties completing common tasks, ABA breaks down skills into manageable tasks then builds on them so that a child is able to learn in the natural environment. When ABA is delivered in a fun, playful and positive way it can be an ideal means to help a child learn functional skills (Hall & Issacs, 2011). Because the aim of ABA is to analyze and modify a child's behavior (Alberto & Troutman, 2009; Fisher, Groff, & Roane, 2011), music can provide the stimulation for the positive reinforcement of a desired behavior (Liao, 2013). Given the therapeutic impact it has on individuals with communication and social skill deficits, music is an ideal intervention to use for children with ASD (Mendelson et al., 2016).

Statement of the Problem

Despite the abundance of research on autism worldwide, the Eastern Mediterranean Region is lagging behind in research on autism in general (Chaaya, Saab, Maalouf, Boustany, 2016). A look at current published research since 2008 in BAP yields 13 studies revolving around autism spectrum disorders were all conducted in the United States of America (e.g., Hoch, Taylor, & Rodriguez, 2009; Parsons, Reid, Bentley, Inman, & Lattimore, 2012).

Research published in JABA between the years 2007 and 2012, out of 112 studies on autism spectrum disorders only one was conducted in a developing country (UlkeKurkcuoglu & Kircaali-Iftar 2010). The findings from these reviews indicate that ABA, music therapy, and other intervention programs tailored to autism need be implemented to developing countries including Lebanon where autism is reported as high prevalence among the few small-scale studies conducted (Chaaya et al., 2016).

Although ABA has been the most top most supported and recommended treatment for autism spectrum disorders since the turn of the century (Department of Health 1999; Department of Health and Human Services, 1999; Gill, 2001; Jacobson 2000; Rosenwasser & Axelrod 2001) it is hardly available in Lebanon (Daou, 2014). Even the most well established non-profit organization (NGO) in Lebanon dedicated to autism advocacy and awareness has only recently introduced ABA to select classes amongst other services (Arwa El Amine Halawi, personal communication, May 7, 2012 in Daou, 2014). Other noted helpful and popular interventions for autism of which include music therapy are also rare to find in Lebanon (Autism Learning Institute for ABA, as presented on the Facebook page ALI for ABA autism Lebanon, 2017). Yet, the greatest evidence that stands for the lack of ABA application is the little research that has been published regarding the use of ABA in Lebanon (Daou, 2014), and on the use of music therapy. Not only are there not enough music therapy and ABA publications in Lebanon but there are also very few controlled studies about the efficacy and feasibility of music-based interventions in combination with ABA in a classroom setting in general. Music has been highly supported for its ability to facilitate engagement therefore, it would be informative to observe if it could facilitate learning through an intervention context (Simpson & Keen, 2011).

Purpose

The aims of this study were threefold: (a) examine the differential effect of three different music interventions, namely the Interaction music singing, Interactive music playing and Receptive Music Therapy (RMT). The researcher examined the varying latency periods in the response time it takes three children with ASD to vocally elicit the target word, (b) assessed the index of happiness of children with autism after the implementation of the three music interventions, which can in turn be used to influence their overall quality of life through this specific intervention; and (c) measured the social validity in regards to meeting satisfaction with goals, procedures and outcomes.

Research Questions

The basic research questions that guided this study were:

1. How do the three music interventions compare in their impact on decreasing the latency period preceding a vocal response in three children with ASD?

2. Do children with ASD show different levels of happiness from participation in the three music interventions?

3. How do teachers and parents measure the social validity in regards to meeting outcomes, goals, and procedures of this particular intervention for verbal expression?

Rationale

The choice of topic for this study addresses the facts behind why children with autism may benefit from a combined type of ABA and music therapy to address verbal expression rather than traditional forms of therapy. By this intervention, this study tackled issues such as why the measure of the index of happiness and social validity of this intervention and future interventions

are important to measure. Lastly, this study highlighted the use of and need for this particular

intervention in Lebanon.

Children with autism are unmotivated from communicating their needs because of the aid

they are always receiving from caregivers and others. However, children with autism are not

incapable of doing things themselves. If children with autism remain dependent on their

caregivers, it will result in complete reliance and a reduced social responding very early in life

holding the child back. Children will learn that their responses are not earning them anything that

they are not already receiving from being helped, which thereby depresses their social initiations

and lowers their motivation. Communication is one of the areas that suffer. Because

communication is difficult for children with autism, instead of communicating their desires

through verbal behavior that would reduce problem behavior, they may revert to problem

behaviors such as tantrums or crying to meet their needs (Madzharova, Sturmey, & Jones, 2012;

Gutierrez et al., 2007). Using an intervention however, that teaches responding with an

immediate and high reinforcement even at attempts at speech may demonstrate the connection

between responding and reinforcement, reducing avoidance behavior (Koegel, Koegel, &

McNerney, 2001.

In the past 5 decades of its documentation through single-subject methodology, applied

behavior analysis procedures repetitively showed improvement in the behaviors of children with

autism (Sambandam, Rangaswami, & Thamizharasan, 2014). The effects of ABA interventions

for autistic children including teaching individual target behaviors have been showed to work,

but may take up to years to show effective success. Motivational improvements incorporated into

treatment programs like language or teaching programs have been evidenced to increase

socialization such as verbal interaction for autistic children with social interaction deficits

(Grove, Roth, & Hoekstra, 2015; Koegel, Vernon, Koegel, Koegel, & Paullin, 2012). Results of multiple studies show that when children were consistently reinforced for their attempts at speech rather than for accuracy of speech production, they made more rapid and consistent progress, which were maintained over time (Koegel et al., 2001).

The goal is to make motivation something that the child self-initiates so that he is always learning in the environments around him (Koegel et al., 2001). Therefore, an important intervention goal should concentrate on motivation, which will in turn be more likely to receive a response from the child so that the child later self-initiates responses to receive self-motivation from everyday learning experiences from social, linguistic, and academic interactions. This can increase the number of stimuli input for potential learning opportunities to the child throughout the day.

The intervention used in this study integrated music to teach verbal expression in children with autism. It is a unique technique designed to motivate the child with autism using musical reinforcement while simultaneously targeting speech attempts at target words throughout unfamiliar songs. Using a combination of behavioral methods, motivation, and music, all three proven highly rewarding and successful for children with autism by research sets the stage for potentially productive and fun learning sessions.

Most children with autism do seem to have a strong preference for music according to research; however, to uncover which is most enjoyable for each child, one would have to observe affective behavior (Parsons, Reid, Bentley, Inman, & Lattimore, 2012). Children with profound multiple disabilities (PMDs) have some deficits similar to those of children with autism such as communication deficits. This makes it difficult for caregivers, teachers, and others that interact with these individuals to know their likes and dislikes when it comes to therapeutic interventions.

To address this problem researchers have observed and measured affective behavior otherwise known as indices of happiness and unhappiness to aid with the effects of different interventions. Studying happiness indices is a reflection of the emotional experience of happiness (Parson, Reid, Bentley, Inman & Lattimore, 2012). A benefit of using the index of happiness measure during activities for children with autism is that researchers/teachers/parents can use the best techniques to increase the happiness level of students, which can in turn be used to influence their overall quality of life (Bobzien, 2014). The quality of life or happiness of individuals with disabilities has not been as much researched as the other variables, like for example skill acquisition (Davis et al., 2004).

An intervention, treatment or program can be proven effective, and may even supply high index of happiness measures, but that does not necessarily mean it is appropriate for implementation (Carter, 2010). Social validation is one of the main reasons behind the successful implementation of intervention programs because they are then used more effectively in homes, schools, and clinics. Especially for the use of programs with autism, it can be argued that social validity is a necessary additional consideration when selecting and adopting effective use of EBPs (Callahan et al., 2017). Because of its importance towards proper EBP implementation, direct inclusion of social validity was reviewed in research articles and was only found in 27%. The findings demonstrate that the overall evidence for social validity is limited. Social validation inclusion can provide important evidence to support use of specific evidence based practices (EBPs) for children with ASD across the life span. Therefore, more of it is needed in research.

There is a lack of research on ABA and music therapy in Lebanon. Studying the effectiveness of merging the top behavioral intervention, ABA, with different music therapy interventions to teach kids diagnosed with the ASD communication skills in the special

education classroom will add to the literature on autism, ABA, and music therapy in the classroom as well as on happiness and social validity research.

Significance

This study is important in Lebanon where a lack in research has indicated that not many autism-targeted interventions such as ABA are being applied with students with Autism Spectrum Disorders (ASD), specifically with verbal expression. There is a need to study the usefulness of potential interventions to help children in Lebanon affected by this disorder strengthen their universal weaknesses in communication so they can lead fulfilled lives. Researchers should conduct more controlled studies about the efficacy and feasibility of different helpful interventions targeting verbal expression, such as this one, that others can later help develop, expand and improve in their future research.

The results of this study are significant to practice because they offer alternate or more efficient methods to what teachers or therapists in schools are currently using to enhance the verbal expression of children with ASD. The results may allow special education teachers, ABA therapists, or parents living in Lebanon implement the best technique for targeting verbal expression in their children with efficient knowledge about the emotional experience the particular intervention can bring. In this way, satisfactory interventions can be replaced with fulfilling and enjoyable ones. The results will contribute to this research study and further research studies about understanding the effects of this specific intervention (Kennedy, 2005).

CHAPTER II

LITERATURE REVIEW

This chapter defines the autism spectrum disorder and covers its prevalence and how its effects impact the daily routine of affected children with a focus on communication. Different studies are referenced to provide evidence about the useful therapies that have been frequently used with autistic children including specific forms of music therapy and applied behavior analysis (ABA). Overlaps are drawn between music therapy, (ABA) and communication throughout.

The Autism Spectrum Disorder

The autism spectrum disorder is a lifelong neurodevelopmental disorder characterized by impaired social communication and interactions, repetitive behaviors, restricted interests and persistence on sameness (American psychiatric Association 2013a; Nursing Standard, 2015). It is a pervasive condition meaning that symptoms present themselves during early development and are likely to persist over time (Freitag, 2015).

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM 5) classifies these symptoms into two domains. The first domain being social communication and interaction including verbal and nonverbal communication deficits, and the repetitive behaviors domain (Khalifeh, Yassin, Kourtian, & Boustany, 2016). To diagnose ASD, a child must exhibit at least three symptoms in the social communication and interaction domain, and two symptoms in the repetitive behaviors domain. Symptoms vary across children ranging from mild to severe (Nursing Standard, 2015) and in the same person at different ages (Mercati & Chaste, 2015).

The current definition of autism in the DSM5 has expanded from the previous definition in the DSM4. The Asperger disorder, childhood disintegrative disorder, pervasive development

disorder not otherwise specified (PDD-NOS) are currently all under the autism spectrum

disorders (ASD) umbrella (Khalifeh et al., 2016).

Characteristics of Autism

It is not how much but rather the manner in which an autistic child is able to

communicate that is deficient in autism (Smith, 2011). Individuals with autism are very able to

capture someone's attention but the difficulty lies in sustaining a back-and-forth interaction. All

children with autism share this common difficulty with back-and-forth interactions, which is the

hallmark of autism. Thus, the communication difficulty that persists with ASD children is one-

sided rather than back-and-forth leaving them to struggle to socialize and to communicate with

others.

Other features of autistic children include engaging in repetitive activities with objects

like arranging pencils into neat rows, touching every locker in the hallway, turning light switches

on and off, or staring as water winds down the drain. Their routines and rigidities make it hard

for them to adapt to changes and they may react extremely by throwing temper tantrums lasting

for hours. Along with repetitive activities and difficulties in back-and-forth communication,

individuals with autism may be either over-sensitive or under-sensitive to sensory events (Smith,

2011). Their perception in the way things taste, look, smell, feel or sound is distorted (Khalifeh

et al., 2016).

In summary, the three defining features of autism are difficulty with back and forth

conversing, social communication, and engagement with repetitive activities or routines. Many

other characteristics exist however; they are not universal to the disorder. It is estimated that

about 70% of individuals have an accompanied mental or physical health problem that are often

unrecognized like problems with eating and sleeping, epilepsy, anxiety, depression, attention

deficit hyperactivity disorder and dyspraxia (Nursing Standard, 2015). Additionally about 75% of individuals with autism have developmental delays like slow language acquisition or skill performance in the range of intellectual disability on standardized tests (American Psychiatric Association, 2000). About 10% however show remarkably higher intellect than their overall developmental level and are in possession of 'savant skills'. Children with 'savant skills' may demonstrate rapid mathematical calculations or possess a very strong memory (Smith, 2011).

Prevalence

Autism is increasing in prevalence. The Center for Disease Control and Prevention (CDC) in 2010 has estimates of autism as being 1 in 68 children, which is markedly two times higher than the CDC's estimate made in 2000 (Chaaya et al., 2016). Data from CDC estimates come from health and special education records of 8-year-old children from 11 areas in the United States in 2010 through the Autism and Developmental Disabilities Monitoring (ADDM) network (CDC 2014a). According to the National Autistic Society, about four times as many boys as girls are diagnosed (Nursing Standard, 2015). Factors contributing to this increase may include attributes such as a growth in autism awareness, the expanded definition of autism or a true increase in incidence of autism (NIMH, 2012). Persico and Merelli (2015) have also reported a real increase in ASD. However, ASD increase appears to be controversial. Despite reports of dramatic increases in autism, there are suggestions that the actual rise in its prevalence may not be entirely true. A variety of factors may contribute to what mistakenly appears to be a rise like changes in the symptoms classified as autism, increasing referrals, and a tendency to misdiagnose other conditions as autism (Nursing Standard, 2015). Either way, this study focuses on the prevalence of autism in Lebanon.

A recent cross-sectional study conducted in Lebanon by Chaaya et al. (2016) examined the prevalence of Autism spectrum disorder (ASD) in 998 toddlers (16-18 months) across 177 nurseries in Beirut and Mount-Lebanon. Results showed the prevalence to be 153 per 10,000 (1 in 66) children similar to CDC's estimate of 147 per 10,000 (1 in 68 children) (CDC 2014a). The prevalence of autism in Lebanon showed to be higher than rates of other Arab nations such as the United Arab Emirates (29 per 10,000), Bahrain (4.3 per 10,000), the Sultanate of Oman (1.4 per 10,000).

Causes of Autism

There are several factors environmental, biological and genetic that have been associated with autism (Khalifeh et al., 2016). Environmental risk factors indicate that the likelihood of biological causes underlying ASD are effective very early on during neuronal development, possibly as early during the first trimester of pregnancy (Freitag, 2015). Yet, this has not been fully proven. Some environmental risk factors include environmental pollutants, which are not proven associations of increased autism prevalence but are implied as a cause (Khalifeh et al., 2016).

In a study of 86 Lebanese children with autism, significant correlations were made between autism and advanced parental age, maternal unhappiness during pregnancy, living close to industrial zones and previous childhood infection. Having an older sibling with ASD is also a definite risk factor. Because children with autism have certain behaviors that may interfere with their daily functioning (Khalifeh et al., 2016), therapy can be provided to help.

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Applied Behavior Analysis (ABA)

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ABA is an applied science that has evolved in scientific research (Dillenburger & Keenan, 2009). Research has provided a wealth of evidence-based intervention procedures derived from the more basic behavioral principles, which have been considerably successful in

the treatment of autism. However, ABA is not a "therapy for autism" (Chiesa, 2005). It is a science with a broad range of techniques that have been used to help people with an assortment of behaviors and diagnoses, including autism (Dillenburger & Keenan, 2009). Behavior encompasses anything an individual does when interacting with the physical environment (Catania, 2007; Skinner, 1938) such as speaking, crying, running, jumping and even thinking (Fisher et al., 2011). Skinner (1938) introduced a broader definition for behavior in developing the concept of the three-term pattern: antecedent—behavior—consequence. This pattern of events defines what is known as operant behavior. Behaviorists are concerned with general principles surrounding the function of the behavior, or the purpose of why a particular behavior occurs (Fisher et al., 2011). They believe that the function of the response is largely due to the environmental events that occur both in close physical and temporal vicinity to the behavior.

ABA targets to treat a wide variety of areas including deficient language, which is the target of this study. Interventions based on applied behavior analysis techniques focus on either problem solving or skill-based interventions, like communication, and can be applied at any age and range in intensity levels based on the child's individual needs (Courtney et al, 2013).Positive effects in favor of ABA include expressive and receptive language and daily communication skills apart from others (Reichow, Barton, & Hume, 2012). Other areas include imitation, pre-academics, self-help and social interaction skills (Sturmey & Fitzer, 2007) all of which are broken down into discrete components and taught on a one-to-one basis in school and/or at home, typically using discrete trial teaching, reinforcement, backward chaining, shaping, extinction, prompting and prompt fading (Duker, Didden, & Sigafoos, 2004). Seeking early intervention between the ages of 18 to 48 months is key for major positive effect on outcome (Khalifeh et al., 2016).

In order to achieve proper generalization and maintenance, parental participation is considered essential (Peters-Scheffer, Didden, Korzilius, Sturmey, 2011). ABA focuses on consistent behavior within home, school and community settings (Sambandam et al., 2014). When formulating an intervention, the behaviors to be changed are called target behaviors. Depending on the target behaviors, efforts to change them by either decreasing or increasing them based on whether the problem being addressed involves a deficit or an excess of the behavior can be implemented accordingly (Sarafino, 2012).

Previous research has indicated that applied behavior analysis is a successful evidence-based method for teaching behavioral and language skills to children with Autism in the school context (Martin, 2012). In a meta-analysis done on 1 randomized and 4 clinically controlled studies reported medium to large effect sizes for expressive and receptive language and communication skills after 3 years of therapy along with adaptive behavior and IQ (Reichow, et al., 2012).

Applied behavior analysis (ABA), Music Therapy and Autism

Music therapy is well established as an intervention for children with communication disorders, including Autistic Spectrum Disorders (Wetherick, 2014). Music therapy enables those who do not have language to participate in social interaction and to express themselves non-verbally (Kalyva, 2011). Music is a universal language consisting of components similar to spoken language such as notes equating to letters/syllables arranged to form larger units or phrases known as chords/chord progressions or words/sentences (Srninivasan & Bhat, 2013). Another likeness of music to language is the participation between two individuals in communication whether it is singing or playing an instrument. It can lead to the increase of interpersonal synchronization and reciprocal joint play, turn taking, listening and responding to

another individual, rather than one-sided communication; being their universal difficulty. Children with ASD may perceive sounds easier than verbal approaches. Awareness of music and of the relationship between music and children's actions can mobilize communication (Kalyva, 2011). Eventually ASD children learn to change and adjust to way that they communicate.

Individualized needs for each autistic child can easily be incorporated in music therapy protocols due the predictability and structure of music itself (American Music Therapy Association [AMTA], 2015). Through collaborative service delivery, music therapy can include embedding music therapy principles and strategies into children's routines, although not yet systematically studied (Kern, Wolery & Aldridge, 2007).

In a study by Kaplan and Steele (2005), researchers gathered and analyzed data goals and outcome data over 2 years for 40 music therapy clients diagnosed with autism ranging from 2-49 years of age. Because many individuals on the autism spectrum disorder have significant language deficits, one of the primary and most frequently targeted goal areas selected by the music therapists was language/communication. From the music interventions selected by the music therapists it was reported that under language/communication two of the most frequently chosen were interactive music playing and interactive singing followed by musical instrument instruction, and song choices in that order. An impressive 100% of clients reached their initial objective in the language/communication category assigned by the music therapists in one year.

Children with ASD have a unique attraction to music and may have special musical abilities (Carpente & LaGasse, 2015) especially in pitch perception (Heaton, 2004). With this being said Stanutz, Wapnick, and Burack (2014) demonstrated that children with ASD particularly excelled in better pitch discrimination abilities and had better long-term memories for melody without any previous musical training compared to peers of the same age. Furthermore, advancements in

brain imaging studies also suggest that there are physical differences in how the brain perceives music versus speech (Lai, Pantazatos, Schneideer, & Hirsch, 2012). The brain responds to speech differently than to music (Lai et al., 2012). While speech is focused to specific parts of the brain, music is perceived on a more global scale. Because children with ASD have core difficulties in communication and social skills, therapists may be able to use music to their advantage as a form of language to capture their attention and improve their communication and social skills. Research has supported positive affect concerning the use of music as a therapeutic technique for children with social and communication deficits (Mendelson et al., 2016).

Internationally, using music therapy with children who have ASD is a major area for practice in music therapy (Rickson, Molyneux, Ridley, Castelino, Upjohn, 2015). It has been reported that this is the client group with which music therapy has the highest reputation (Dimitriadis & Smeijsters, 2010). In a recent survey of 328 professional members of the American Music Therapy Association about 27.3% of respondents reported that of all their clients, children with ASD made up between a quarter and one-half (Kern, Rivera, Chandler, & Humpal, 2013).

There have been varieties of approaches in music therapy, which have developed over the course of time for children with autism (Reschke-Hernández, 2011). Multiple reviews about music therapy practice with children with autism have been published including a meta-analysis of articles by Whipple, (2004), Gold, Wigram and Elefant, (2006) published a review of three articles entitled Cochrane Review: Music Therapy for autistic spectrum disorder, Simpson and Keen (2011) published 20 articles between 2009 and 2010 which were included in their narrative review entitled Music Interventions for Children with Autism: Narrative review of the literature, Geretsegger, Elefant, Moessler and Gold (2014) updated their review from 2006, entitled Cochrane review Music therapy for people with autism spectrum disorder which included 10

studies with a total of 165 participants. The conclusion from all of these reviews was that music therapy was overall beneficial for this population however, greater amounts of research encapsulating a larger number of participants was needed (Oldfield, 2016).

A recent comprehensive meta-analysis was conducted by Li (2016) to support that music therapy is an effective treatment for children with autism spectrum disorder. She reviewed research studies conducted on the topic of music therapy interventions for the ASD population accounting specifically for these variables: social skills, verbal and nonverbal communication skills, and secondary skills including cognition, emotion, and parent-child relationships. Li (2016) searched for articles published in the time period of 2004–2016. After eliminating unsuitable articles, 11 articles were finally included in the meta-analysis. Results from the meta-analysis by Li (2016) found that music therapy is an effective treatment for ASD children. Specifically, the verbal communication group had a medium effect size (d = 0.55) signifying that music therapy is a valuable treatment in improving verbal communication for children with ASD.

Applied Behavior Analysis and Music Therapy

Applied behavior analysis is a strategy that works particularly well with music therapy. Because the aim of ABA is for a child to analyze and modify a child's behavior (Alberto & Troutman, 2009; Bailey & Burch, 2002; Fisher et al., 2011), music becomes the stimulation to positively reinforce a desired behavior (Liao, 2013). A child responding positively in music therapy may enjoy singing music with the therapist, playing an instrument with the therapist, or listening to music with the therapist. In order for the child to produce the desirable behavior the therapist can pause the music source to teach the child the next correct word in the song to produce the desirable behavior. Only when the desirable behavior has been produced correctly

will the continuation of music resume (Liao, 2013). In this way, music is being used as positive reinforcement, which the child resumes to enjoy only when he or she achieves the desired behavior.

The importance of a child and caregiver's relationship lies in the development of language (Honig, Davidson, & Davidson, 1996; Stringer, 2004). Children and caregivers develop language through the way they respond to one another which was the conclusion of a study explored by Stringer (2004). Therefore, children with special needs who have weak communication skills need to address these issues to build successful relationships and to achieve better success in school (Honig et al., 1996). Although many studies have explored music therapy and ABA studies separately, hardly any exist about ABA and Music therapy techniques being used together apart from the study done by Lim and Draper (2011).

Lim and Draper's (2011) study explores how the function of language itself provides positive reinforcement for children with autism and referred to this process in the study as Applied Behavior Analysis Verbal Behavior (ABA VB). Language can be sorted into four different categories based on function including mand (requesting), tact (labeling), echoic (imitating), and intraverbal (used in social interaction or conversation). The ABA VB approach explores how each verbal operant is associated with independent functional control (Lim & Draper, 2011). This study used various musical instruments as effective antecedent variables for reinforcement in ABA VB language training. Furthermore, the study findings revealed the link music had on children with ASD in language development. The evidence in this study points out that singing did serve as an effective antecedent variable and automatic reinforcer with applied behavior analysis verbal behavior (ABA VB) training in verbal enhancement (Lim & Draper, 2011). This study reveals insight on the similarities between music and language as perceived by

children with ASD as shown by their production of words (Lim, 2010).

Although Lim and Draper's (2011) study does tie together music therapy, ABA VB, and communication, it does not show how music therapy and ABA can decrease the response time a child may take to speak after the given musical reinforcement.

Positive reinforcement.

Among the operant methods, positive reinforcement has been proven the most effective in ASD (Frietag, 2015). When a behavior increases because of any caregiver behavior, peer behavior or environmental situation it is called reinforcement (Leaf & McEachin, 1999). Positive reinforcement is a stimulus added to the situation in order to increase the likelihood that the behavior will repeat. For example, a child gets to hear music after saying the target word to the intraverbal chain: "twinkle, twinkle, little…" A negative reinforcement is a stimuli removed from the situation in order to increase the likelihood that the behavior will repeat. For example, a child gets to leave class early because he or she followed the teacher's directions.

Music Therapy Techniques

Studies conducted on children diagnosed with the autism spectrum disorder (ASD) receiving music therapy have been successful in 7 broad areas: communication, behavior, motor, emotional, undertaking activities of daily living, social skills, and preacademic skills (Mcferran, Thompson, & Bolger, 2016). Music therapists can work on language systematically through verbal activities that have a musical style (Kalyva, 2011).

There are five total types of music therapy (Accordino et al., 2007). In practice, a music therapist may use a combination of therapy types of a specific form that do not necessarily fit into one of these categories. Research has been conducted on different music techniques such as Music Interactive Therapy (MIT) or interactive singing, Interactive music playing, and Receptive

Music Therapy (RMT) and have all proved to assist autistic children achieve better language acquisition.

Interactive singing or music interaction therapy (MIT). MIT is an active technique in which songs are set within a familiar and predictable framework for the child, one in which children with autism are more drawn to (Wimpory & Nash, 1999). The songs in MIT are repetitive and the language is clear. Also in response to the child the tempo, volume, pausing, and wording can all be changed. Because singing is an exaggerated form of speech, pauses in the music and song is less threatening than pausing during speech with the child is more likely to respond. As the therapist pauses in dramatic ways it helps the child anticipate responses during an interactive musical melody. When the child is able to anticipate points in a song and respond to it there becomes a shared social playing experience between the child with autism and the adult that speech would less likely enable (Wimpory & Nash, 1999).

In a study by Edgerton (1994), Music Interaction Therapy (MIT) proved to be beneficial on the communicative behavior of eleven children aged six to nine years with autism (Joseph, 2011). These children engaged in individual MIT sessions for a total of ten weeks and the researcher measured the subjects' musical and non-musical communicative behaviors. The results showed the efficacy of MIT by an increased level of communication behaviors in these children (Joseph, 2011). While this study uses MIT and does show an improvement in communicative behaviors, it does not demonstrate how the music from this technique is used as positive reinforcement, a component of ABA, to generate these communicative outcomes in these eleven children.

MIT establishes a framework for communication skills (Joseph, 2011). The singing used during this intervention mimics regular conversation like in an everyday statement-response

pattern. Additional communication skills contributed from MIT address gesture and eye contact, features of preverbal conversation skills (Wimpory & Nash, 1999) that some autistic children lack. MIT is similar to a specific music intervention known as interactive singing. Interactive singing is defined as "the use of singing to promote social interaction or communication between the therapist and client or between clients and/or peers" (Kaplan & Steele, 2005, p. 10). The singing used during this intervention mimics regular conversation like in an everyday statement-response pattern. Interactive singing was the second most preferred intervention for language/communication in the comprehensive study review by Kaplan and Steele (2005) after interactive music playing. Singing is a medium that is highly engaging, expressive, and inclusive to the individual making it advantageous in supporting vocalization and speech development (Rickson et al., 2015), which is what this study is targeting. According to Kalyva (2011), the speech of children with ASD can be supported through songs with simple words, or even repeated syllabi with no meaning. Finally, Bradshaw (2014) notes that songs can even provide the motivation to use language.

In a review of 12 studies done by James et al. (2015), the use of music therapy was appraised for certainty of evidence. One of the factors considered was increasing communication. The use of specific songs with lyrics related to target skills and the use of Improvisational Music Therapy were noted (James et al., 2015). Outcomes were positive for 58% of the studies and mixed for 42% and certainty of evidence was obtained at 58% (James et al, 2015).

Improvised music therapy (IMT). Improvised Music Therapy (IMT) believes that each child has his or her own way of expressing themselves through music (Reschke-Hernández, 2011). IMT is one of the most prominent contemporary techniques, which includes the creative

music therapy model established by Nordoff and Robbins (Finnigan & Starr, 2010; Reschke-Hernández, 2011). This spontaneous and unstructured process is most suitable for children with special needs especially students with autism having speech delays and inabilities to reciprocate verbal interactions (Finnigan & Starr, 2010; Joseph, 2011). IMT is an active form of therapy that involves the child making music, which increases the child's attention and engages them with the therapist (Finnigan & Star, 2010). The processes that occur during IMT may help people with ASD to develop communication and social skills (Gold, et al., 2006). Improvisational music therapy is not structured (Finnigan & Star, 2010). The process uses improvised musical instruments and vocal music through songs spontaneously composed on the spot prompted from the child's actions. Imitating or responding to a child's actions or sounds encourages interaction from the child (Joseph, 2011).

Similar to IMT is a specific intervention, known as interactive music playing, and defined as the "use of playing of various musical instruments to promote social interaction or communication between the therapist and client or between clients and/or peers" (Kaplan & Steele, 2005, p. 10). In practice, a music therapist may use a combination of therapy types of a specific form that do not necessarily fit into one of these categories. This study requires the use of previously composed and structured familiar and unfamiliar songs rather than unstructured and spontaneously composed songs as in IMT. However, parts of IMT will be adopted including the spontaneous use of an instrument during song that the child gets to play with the musical accompaniment of the researcher alongside him or her.

Interactive music playing is an appropriate intervention for this study since the use of instruments was cited as a way to engage in a meaningful activity with others, develop relationships, and to promote inclusion (Rickson et al., 2015). In the comprehensive study

review by Kaplan and Steele (2005) interactive music playing was the most preferred intervention for language/communication. Instruments can reinforce the awareness and the functional use of lips, tongue, jaw and teeth that must be used to produce speech (Kalyva, 2011). Interventions that incorporate music making with others like playing instruments or singing may offer a promising approach for facilitating expressive language in nonverbal children with autism (Wan, Demaine, Zipse, Norton & Schlaug, 2010). Specifically speaking, learning how to play a musical instrument promotes reciprocal interaction and provides opportunities for expressive communication (Rickson et al., 2015).

       Receptive music therapy (RMT). Receptive music therapy (RMT) is not an active but a passive approach (Prakash, 2015). Receptive music therapy (RMT) involves listening to live or recorded music (Accordino, Comer, Heller, 2007). Another descriptor that refers to receptive music therapy is interactive listening (Black, 2013). Black (2014) defines interactive listening as an approach in which the music therapist provides music in some form while the client listens. The therapist and client may interact non-verbally or verbally during the music, creating a joined bond between them referred to as intersubjective space during a formal therapy session. This shared bond is one that is held much like in conversation, which promotes a stimulating and interesting interaction between speakers. Listening to live or recorded music is considered a passive method since the children are not directly engaged or involved in active music participation like in MIT or IMT. While social contact may not be encouraging enough for children with autism to take part in interactions and form relationships, listening to music may motivate them enough with others who share similar musical interests and helps satisfy their emotional needs (Heaton & Allen, 2009). Listening to music can yield improvement in both mood and arousal, which influence learning performance (Schellenberg & Weiss, 2013).

Autism and Communication

The Intraverbal Relation

Our daily interactions involve many intraverbal relations. The ability to answer questions, to talk on the phone, and to tell stories all involve use of the intraverbal (Sundberg & Sundberg, 2011). An intraverbal is one of many other elementary verbal operants. Skinner (1957) has described in his book *Verbal Behavior* (i.e., echoic, mand, tact, textual, transcriptive). In general, Skinner (1957) describes, a verbal operant as a type of response that is preceded by a discriminative stimulus and is followed by a reinforcing consequence from another person's behavior. He identified an intraverbal relation as a type of verbal behavior where the response is verbal and is controlled by an antecedent verbal stimulus that lacks point-to-point correspondence between the stimulus and the response (Skinner, 1957). An example, when someone says "animal" and someone else responds with "dog". As seen in the example, the antecedent stimulus "animal" and the verbal response "dog" do not match neither in letters nor in sound. This form of verbal behavior is what facilitates a regular conversation to continue (Sundberg & Michael, 2001).

Relative to the other verbal operants, the intraverbal has received the least amount of recognition both conceptually and empirically over the past 54 years (Sundberg & Sundberg, 2011). However, this has recently changed as demonstrated by the increasing number of empirical studies on intraverbal behavior published over the last couple of years. In a historical review of intraverbal research, Sutter and LeBlanc (2006) mentioned studies that examined the use of intraverbals among other human verbal behavior (e.g. mand, tact, echoic etc.) with autistic children (none of which use music to teach intraverbal behavior). They mention that the

intraverbal relation has the most diverse group of responding accounts of all the operants because of its ability to be used in almost all social events.

Advantages of using intraverbals. For typically developing children, early intraverbal responses may start simple, but build the foundation for more complex intraverbal interactions. Intraverbal chains are important components of any normal repertoire such as reciting the alphabet or providing one's home address or phone number (Sundberg & Michael, 2001). A young child around 1 to 2 years old for example, starts to learn how to sing songs, correctly make the sounds that animals and objects make (e.g. "a puppy says…" or "a train goes…") to complete missing words to common phrases like (e.g. "one, two, …") and to even finish reinforcing phrases like "mommy and …" (Sundberg & Sundberg, 2011). Younger children may not have developed the capacity to engage in regular conversation yet, however they do have strong listener vocabulary and strong speaking vocabulary (Sundberg, 2008). The verbal development that follows by the age of 3 and 4 years starts to integrate more intraverbal behavior leading to better acquisition of conversation making and answering questions.

A common problem for children with autism or other developmental disorders is the failure to attain a proper intraverbal repertoire despite learning how to functionally use other verbal operants relatively well (Sundberg & Sundberg, 2011). These children are able to achieve simple intraverbal behavior like providing their name when asked or answering simple questions, but their weak intraverbal skills may impact their social and academic skills due to the frequency of use that intraverbal behavior is applied to everyday contexts. Language is a central part in any kind of learning experience and because it is defective in children with autism, developing language skills is seen as imperative in training programs (Sundberg & Michael, 2001).

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Teaching intraverbals to children with autism. Teaching children with autism language training approaches should begin with separating the different modes of verbal behavior defined by Skinner (i.e., intraverbal, echoic, mand, tact, textual, transcriptive etc.) into their own functional units like building blocks. Once learned separately they can be combined to build more advanced language behavior. In each situation, the emphasis on speaker and listener behaviors as independent sources of communication is important to consider. However beginning learners will not receive strong reinforcement from the social occurrence of an intraverbal interaction as a typically developing child would indirectly. They must instead be directly taught intraverbal behavior using additional methods of positive reinforcement that a typically developing child would not need (Sundberg & Michael, 2001).

Index of Happiness

A study reviewed by Dillon and Carr (2007) demonstrated how individuals with PMD demonstrate different affective behaviors across a variety of activities showing implications for the use of indices of happiness to help in identifying preferred activities for individuals with PMD. Research has shown that children with autism were more motivated, had greater interest, enthusiasm and happiness for speech production when they were reinforced for all speech attempts by researchers (Koegel et al., 1988). Happiness measures show that although speaking is difficult for children with autism the use of communication reinforcement exhibited an enjoyment in speech production in these children. This frequent reinforcement, which showed happiness in these children, could now be used in place of previous interventions, for example, in other learning situations to promote speech.

A relatively recent study by Bobzien (2014) measured the index of happiness by using frequency event recording. Event time was broken into 15-second blocks in which researchers

observed and recorded frequency of happiness behaviors as defined in their study. Data for each participant during each session was then collected. However, this study did not measure the degradation of emotional states including neutral behaviors or behaviors displaying unhappiness, which are both defined in the rating scale used in the study by Dunlap and Koegel (1980) along with happiness target behaviors. By defining happiness on a scale exhibiting levels from unhappiness to happiness, a more accurate distinction between behaviors of happiness will be noted rather than a general tally on the frequency of happiness behaviors like in Bobzien (2014). However, the index of happiness in this study does observe specific target behaviors as defined in the scale by Dunlap and Koegel (1980) and because the movement cycles of each behavior are short, use of frequency event recording is both logical and systematic (Maag, 2016) for this study.

Social Validity

The effectiveness of using evidence-based practices (EBP), like ABA, has been supported by recent large-scale, systematic research reviews (Callahan et al., 2017). Although research in this field is developing for multiple areas like special education, applied behavior analysis (ABA), and other therapeutic practices, effectiveness is not enough to guarantee that use of these interventions is entirely successful. EBPs are being used quite profusely and have been mandated by federal regulations and through local education policies (Bodfish, 2004) but a variety of factors to those using EBPs like high costs, lack of time, planning and preparation, and difficulties with some interventions negatively affect EBPs performance. Social validity which is defined as "consumer satisfaction with goals, procedures, and outcomes of programs and interventions" (Callahan et al., 2017, p. 189) can improve the performance of EBP practices, like ABA.

Summary

In summary, children with autism do have weaknesses specifically in communication that may interfere with their daily lives. Communication is a common part of daily living that must be specifically introduced and taught in steps, a strength of ABA therapy. ABA can be further enhanced if used alongside music therapy, which, although not proven to be evidence based, has motivated children to communicate as seen in the multitude of studies above. Children with autism prefer music and this advantage should be implemented in teaching communication. Therefore, this study will examine which approach of musical intervention is preferable by those students. As seen in multiple studies reviewed above, specific and simple musical techniques like singing, playing, and listening to music have the potential to be reinforcing when taught alongside a structured therapy like ABA.

CHAPTER III

METHODOLOGY

For this study, music was used as a mode to stimulate communicative vocal efforts from the autistic child. Music through either song, instrumentation and song, or receptive listening acted as a stimulus to evoke a vocal response from the child and afterwards as reinforcement upon emittance of a vocal response. This interplay of events mimics the exchange of everyday social conversation. Leading with the research questions, this section will orient the study beginning with the design and will thoroughly describe the method taken during running these intervention sessions. The chapter will terminate in describing the tools and data collection procedures after commencement of the study.

Research Aims and Questions

The aims of this study were threefold: (a) examine the differential effect of three different music interventions, namely the Interaction music singing, Interactive music playing and Receptive Music Therapy (RMT), by studying the varying latency periods in the response time it takes three children with ASD to vocally elicit the target word, (b) assessed the index of happiness of children with autism after the implementation of the three music interventions, which can in turn be used to influence their overall quality of life through this specific intervention; and (c) measured the social validity in regards to meeting satisfaction with goals, procedures and outcomes. The basic research questions that guided this study were:

1) How do the three music interventions compare in their impact on decreasing the latency period preceding a vocal response in three children with ASD?

2) Do children with ASD show different levels of happiness from participation in the three music interventions?

3) How do teachers and parents measure the social validity in regards to meeting outcomes, goals, and procedures of this particular intervention for verbal expression?

Definitions of Target Behaviors

The three target behaviors that will be measured to answer the three research questions include verbal expression, social validity, and index of happiness.

Verbal Expression

The operational definition for verbal expression that will be used in this study is defined in relation to two other variables for both verbal and nonverbal children:

Verbal expression for non-verbal children is measured when the child opens his or her mouth to produce a vocalization approximately mimicking the target word. Mimicking the target word includes either pronouncing the same number of syllables and/or producing similar vowel tones to that of the target word. (Example, if the target word is "star" and the child expresses "ta", it is one syllable and also embodies similar vowel tones to the original target word, "star".) Verbal expression is counted following a pause directly after a musical stimulus. Therefore, in ABA terminology, the antecedent is the different musical stimulus being played, the target behavior is the verbal expression as defined by the child, and the consequence is the continuation of music in accordance with the type of behavior displayed. The time between the antecedent variable and the emitted target word/sound will vary and is significant to this study.

Verbal expression for verbal children is measured when the child correctly articulates the target word following a pause directly after a musical stimulus. Therefore, in ABA terminology, the antecedent is the different musical stimulus being played, the target behavior is the verbal

expression as defined by the child, and the consequence is the continuation of music in accordance with the type of behavior displayed. The time between the antecedent variable and the emitted target word/sound will vary and is significant to this study.

Social Validity

Social validity is defined is defined as "consumer satisfaction with goals, procedures, and outcomes of programs and interventions" (Callahan et al., 2017, p. 189), with consumers being the parents and teachers of the children participants undergoing the intervention since they are too young to answer themselves.

Index of Happiness

The adopted definition that makes taking the index of happiness measurements applicable for this study is taken from Dunlap and Koegel's (1980) scale which defines the observational code for happy as, "smiles, laughs appropriately, seems to be enjoying self, neutral as may smile or frown occasionally but does not appear to be decidedly happy or particularly unhappy, and unhappy as cries, pouts, tantrums, appears to be sad, angry, or frustrated child seems not to be enjoying self" (p. 622).

<div align="center">Research Design</div>

Why Multielement Design?

A quantitative multiple-case design experiment known as the multielement design, also known as the alternating treatment design was the preferred choice for this experiment. A multielement design or an alternating design in single-case research allows researchers to analyze two or more experimental conditions using a single participant (Kennedy, 2005). This sort of control allows researchers to compare and contrast multiple conditions, not permitted in other single-case designs. The multielement design is used to compare two or more differing

interventions, or one or more interventions and a baseline condition (Roane, Rihgdahl, Kelley, & Glover, 2011). Including a baseline is helpful for researchers to study the effects prior to introducing the independent variables. The multiple experimental conditions are presented to an individual during the same phase and alternate in some manner. In an alternating treatment design there is a predetermined schedule in which conditions are applied in an alternating manner, which helps to efficiently select the treatment of choice with the highest effectiveness when selecting from several treatment options (Playnick & Ferreri, 2014). The order in which the conditions are presented is usually randomized so that they are not associated with any particular time of day for example.

Variables like the time of day should be controlled or counterbalanced. (Byiers, Reichle & Symons, 2012). The results may be influenced beyond the effect of the independent variables. For this reason, all conditions must be kept identical except for the variables of interest. Using a multielement design is especially advantageous for examining behaviors that are unlikely to reverse back to the baseline level (Kennedy, 2005; Roane et al., 2011).

A multielement design type was suitable for this study because of the three independent variables being investigated for each of the three children partaking in the study. The three different forms of music therapy were compared in terms of the dependent variable, the latency period. The three musical interventions were presented to each child individually during the same phase and alternated each day, which allowed the most effective intervention to be discovered for each case. The differences between conditions exhibited by the varying lengths of the latency period will show experimental control. Establishing a baseline condition to measure the length of the latency period before introducing the intervention will highlight any effect the three different music techniques has on the latency period.

This design type was more suitable for this study than other single-case study designs like the A-B-A-B design type or its extension, the A-B-A design, because of the inability to reverse the baseline. For this study, once the verbal expression was reinforced and learned and the latency period shortened it was unlikely that the latency period would be reversed back to the baseline level. Additionally, this design does not allow the comparison of a large number of conditions, which is necessary for this experiment. Therefore, an A-B-A-B design or any extension is not appropriate. The multiple baseline design introduces one intervention across either behaviors, people, settings, stimuli or times. It is not suitable for answering the experimental question because it is difficult to conduct comparative analysis of multiple independent variables. The chosen design type, the multiple treatment design, evaluated the effects of the treatments by comparing the response patterns in the separate conditions to one another (Roane et al., 2011). Since the researcher compared the latency period between three music interventions, the alternating treatment design is most appropriate for comparing results across different observational sessions.

Limits of the multielement design included the possibility of the intervention subjecting its effects to other conditions (Kennedy, 2005) termed as *interaction effects*. There are two methods to control the carry-over effects from one condition to another; one of them being randomization and the other counterbalancing.

Study Site

This study was conducted at The Lebanese Autism Society (LAS), a non-governmental organization, located in Beirut, Lebanon, which educationally caters for children with autism. The organization currently has more than 500 members (Lebanese Autism Society, 2016). A classroom at the LAS will be used to conduct the research study. The LAS provides educational

services for autistic students who speak English, which is one of the primary focuses of the study.

Method

Participants

This study used a purposive sample including children diagnosed with the autism spectrum disorder from the Lebanese Autism Society (LAS) aged 6-7 years old.

Inclusion criteria. Three inclusion participation criteria were taken into consideration for this study as follows:

(a) Three students all 6-7 years old to exclude the maturity/age factor. Given the nature of the social communication skills that are targeted in this study, children in this age range were preferred. In addition, this target age shares similar daily experiences in the school setting for a broader generalization of the results. Verbal and non-verbal children were included.

(b) *Diagnosis of autism spectrum disorder:* The participants had a formal diagnosis of the autism spectrum disorder specified by a certified pediatrician, psychiatrist or psychologist.

(c) *Understanding of the English language:* The participants were able to understand the English language, the language of communication, and will be chosen from those enrolled in the English section of LAS.

Exclusion criteria. Four exclusion participation criteria were considered for this study as follows:

(a) Serious sensory disorder: The children chosen for this study did not have a sensory disorder such as blindness or deafness because it would limit and change the implementation and results of the study.

(b) Previous experience of music therapy: In order to link effects from the study purely to implementation of the study alone participants included did not have previous experience in music therapy.

(c) Intellectual disability: Participants should relatively have the same intellectual ability. Children with intellectual deficits were excluded from the study.

(d) Speech disorder: Participants with speech disorder were excluded. Speech-language disorders prevent language from developing.

In accordance to the above criteria, questions regarding first language, the primary language used at home, speech problems, speech therapy, hearing problems, visual problems, and intellectual ability were addressed, in the form of a questionnaire, so that the conditions for all children are more so identical before initiating the study.

Five participants were selected by the school administrator contact after she was given the set of criteria set by the researcher. From the five, the researcher selected the three most identical cases in order to better generalize results.

Youssef. Youssef was a 6-year old verbal male in KG3 with a diagnosis of autism from a neurologist. Youssef had speech problems and benefited from speech therapy. He had a shadow teacher that stays beside him during the day. The main languages spoken at home were reported to be Arabic and English while his primary language is English. He had no prior experience with music therapy.

Andy. Andy was a 6-year old nonverbal male in KG3 with a diagnosis of autism from a neurologist. Andy attends a multi-disciplinary approach including speech, ABA, and psychomotor sessions. He had a shadow teacher at school that always stayed by his side. The main languages spoken at home were reported to be Arabic and English, and Andy's primary language is English. He had no prior experience with music therapy.

Alex. Alex was a 6-year old nonverbal male in KG3 with a diagnosis of autism from a neurologist. Alex used to be verbal and later became nonverbal. He received a diagnosis of autism by a neurologist. Andy attends a multi-disciplinary approach including speech, ABA, and psychomotor sessions. The main languages spoken at home were reported to be Arabic and English, and Andy's primary language is English. He had no prior experience with music therapy. Approval was granted from the Institutional Review Board before the study commenced. Approval of the study was also gained from the school principal for the research site.

The Three Music Interventions

The three musical interventions designed for this study were freestyle forms taken from three central music therapies crafted to suit the purpose of study including Music Interaction Therapy (MIT), Improvised Music Therapy (IMT), and Receptive Music Therapy (RMT). Since a musical intervention is permitted to incorporate music therapy principles (Kern et al., 2007) certain elements from classical music therapies were incorporated into the intervention designs for the study. They consist of both active and passive methods (Prakash, 2015) including Interactive Singing (Kaplan & Steele, 2005), Interactive Music Playing (Kaplan & Steele, 2005) and Receptive Music Therapy (Accordino et al., 2007).

Interactive Singing ("Singing")

Interactive singing is the first music intervention that will be implemented in this study. Throughout this study, it will be referred to only as "Singing". Familiar and non-familiar songs will be set within a predictable framework. The songs will be made to be repetitive and use clear language. The tempo, volume, pausing and wording can all be changed during song in response to the child. Dramatic pauses during song offer opportunities for the child to respond during an interactive musical melody. Soon the child may anticipate the pauses in the song as a pattern posing a higher likeliness for him or her to respond. In this way, the child and researcher mimicked an everyday state-response conversation.

Interactive music playing ("Music and Singing")

Interactive music playing involved the researcher and child playing different selected musical instruments such as the keyboard, the drum, the maracas, or rhythm sticks while singing familiar and non-familiar songs set in a predictable framework. Pauses throughout the songs accompanied by the instruments will be made for the child to anticipate pauses and respond during the interactive melody. Previously composed and structured unfamiliar songs were used for this musical intervention. It will be referred to as "Music and Singing" throughout this study.

Receptive music therapy ("Listening")

Receptive music therapy (RMT) involves listening to live or recorded music (Accordino et al., 2007). Previously recorded unfamiliar music set with words were played on a radio to enable opportunities for the child to listen and respond following a pause in the music. It will be referred to as "Listening" throughout this study.

Session Structure

Length of Sessions

The length of a typical music therapy session depends on the needs of the individual typically lasting between 30 and 60 minutes on a weekly basis, normally (Nordoff Robins Scotland, 2016). Sessions took place individually on a one-on-one basis with the researcher who is also an ABA therapist. Since the researcher in this study used music as an interventional method to enhance verbal expression, to measure the index of happiness, and to measure social validity, the session length was 20 minutes long and took place two times a week for two months. The researcher aimed to come 15 times but actually came a total of 14 times over a period of 8 weeks approximately 38 days. The sessions took place during the same time of day for each individual to control for environmental conditions of the experiment (Byiers et al., 2012). Each music intervention during the 20-minute session was conducted for a period of 6-minutes each. The order of the interventions was structurally rotated to control for preference. Table 1.3 below illustrates the structural order of intervention as an example over three days. The entire length of the intervention was planned to be rotated over 39 days, which is a multiple of 3 so that the allotted time can be rotated fairly, but in actuality was rotated over 38 days.

Table 1.3

Example of Intervention Order Given over Three Days

Day1	Day2	Day 3
Singing 10min	Listening 10min	Music and Singing 10 min
Music and Singing 10min	Singing 10 min	Listening 10 min
Listening 10min	Music and Singing 10 min	Singing 10 min

Pre-baseline. A phase known as the pre-baseline took place before the actual baseline. Through the intervention participants learned unfamiliar songs therefore a phase was necessary to teach, familiarize, and acclimatize them with the target words and melodies before baseline measures were taken. The researcher conducted this phase by playing the songs in their entirety without any pauses in the music so that the child participants become familiar to all the words, target words included. In this way, they were familiarized with the words used in the baseline phase and later in the intervention. It was kept in mind that each child differed when it came to the ability to carry a tune or to learn words (Honig, 1995).

Baseline. The baseline for the latency period was measured before formal implementation of the study in order to compare the effects of the intervention. The researcher will measure the baseline by pausing the music before target words in the song played on the laptop. Latency period was timed with a stopwatch after the musical antecedent stimuli were played to the children and was stopped after giving the child a maximum latency for response of 6 seconds, with 6 seconds corresponding to no response. Any correct response of the target word elicited before 6 seconds was recorded. Incorrect answers were also recorded at the 6 second mark as no response.

Session Structure

The goal of the intervention was for the child to elicit the target behavior, a vocal response following the presentation of an antecedent variable stimulus signified by the researcher purposely pausing one of three ongoing musical techniques. The researcher, who is a practicing ABA therapist, conducted the joint ABA and music sessions. The researcher had beforehand

highlighted the stimuli or the words/phrases that will be used to target verbal responses from the children during the interventions. Six minutes were dedicated to each musical technique for a total session time of 20 minutes. Each time the researcher began conducting "singing", "singing and music" or "listening" and paused the intervention, the stimulus signaling the child to elicit the target word, was considered a trial. There were 2 trials per song or 2 missing target words per song. There were 6 songs total with each song being approximately 2 minutes in length. Each day the intervention was run, the same songs were used to allow equal opportunities for target behaviors to be exhibited across the three different music techniques. Song choice included six unfamiliar songs in order to omit possibly biased responses from previously learned songs.

The structure of this intervention followed Applied Behavior Analysis techniques assuming music as the reinforcement. Trial 1: The researcher began playing the first song. Upon approaching the target word, she sang the stimulus and paused the music allowing time for the child to fill in the target word. Usually a 2-3 second delay prompt is given for a child to respond in ABA (Leaf & McEachin, 1999). However, according to one certified music therapist, Ryan Judd, plenty of time should be given during music therapy for a child to process the information and respond (The Rhythm Tree, 2014). Therefore a 6-second delay prompt was given. If the child was successful in the trial for eliciting a verbal response, the researcher resumed the music, which acted as the reinforcement and commenced a brand new trial for the next target word. However, if the child was not successful after 6 seconds or does not respond the researcher gave a prompt (Leaf & McEachin, 1999), which was singing the target word aloud for the child to hear. The same musical strategy was then repeated for the second target word. Incorrect answers were recorded at the 6-second mark as no response.
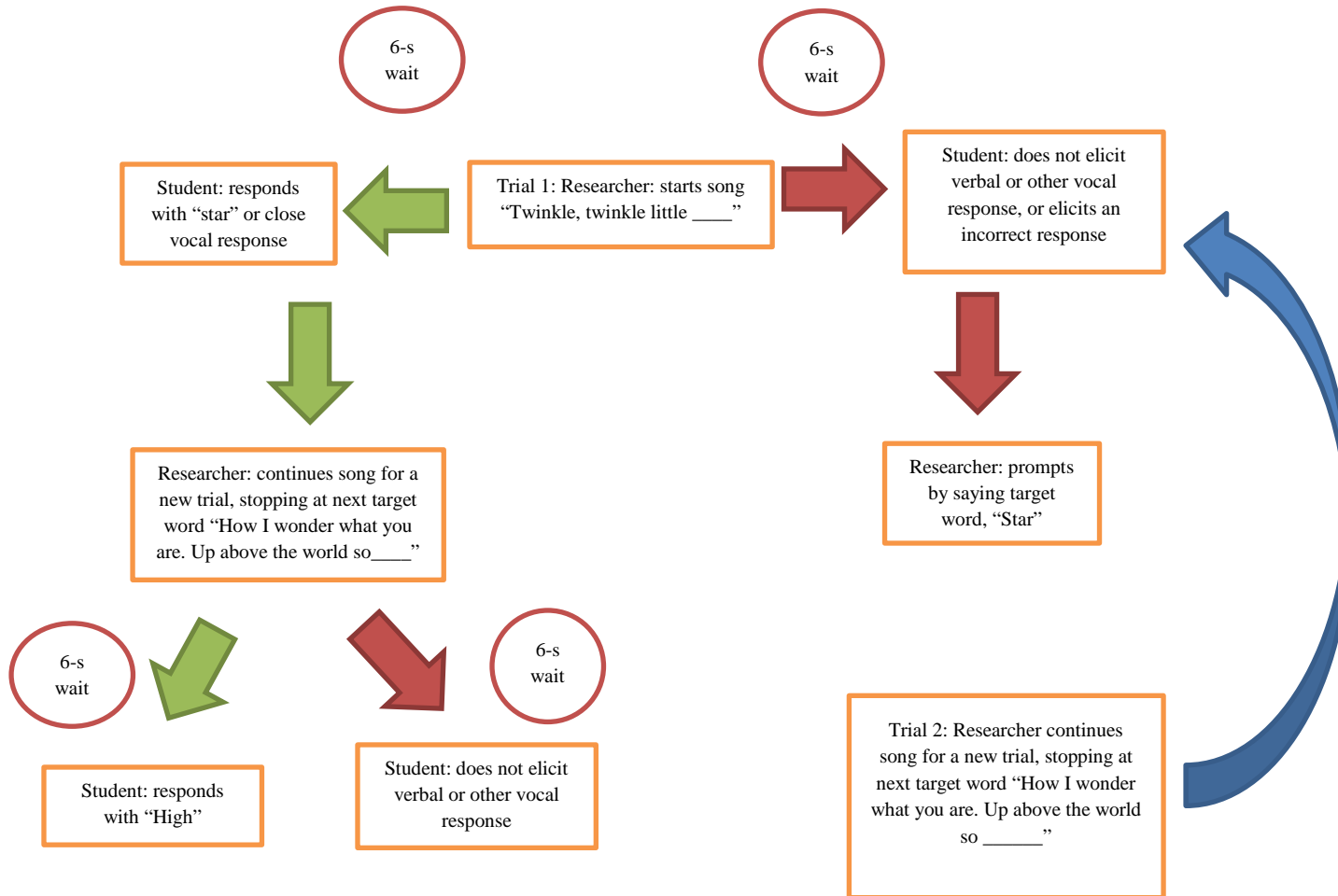
Figure 1.3 Diagram for the ABA/Music Intervention

Suppose the first 6 minutes of the intervention had been spent on "Singing", the researcher would have sung all 6 songs, the length of each song around 2 minutes or less in length. Around 2 minutes were spent running through each song to allow the child one separate trial to achieve each of the 2 target words in each song. During "Singing", since singing/use of voice is the sole part of this technique, songs may incorporate movement to keep interest levels high. (Example: researcher sings "the wheels on the bus go round and round" while moving her arms in circular motion).

During the next 6 minutes for either intervention ("music and singing" or "listening"), the same six songs from the previous music technique were repeated. Presume the next therapy in line was "music and singing". With the use of an instrument, the researcher involved the student in playing the keyboard, a drum, maracas, or a tambourine while she simultaneously sang, pausing during play to give the student an opportunity to fill in the target word of a specified intraverbal song phrase.

If this were the presumed order of intervention for a day, the following 6 minutes of the session would conclude with "listening". For this music technique, the researcher turned on her laptop, which played the lyrics of the same 6 songs used in the previous two techniques. The researcher manually paused the music right before a target word to allow the student to fill it in. In order to compare and contrast characteristics of the three music therapies they are listed below in Table 2.3.

Table 2.3

Characteristics of Three Music Interventions

Interactive Singing	Interactive Music Playing	RMT
- active approach - can incorporate movement - songs are set within a familiar and predictable framework - tempo, volume, pausing, and wording can all be changed in response to child - provides a shared social playing experience	- active approach - playing various musical instruments during song - playing various musical instruments to promote social interaction or communication - provides opportunities for expressive communication	- receptive approach - non-verbal or verbal interaction during music - improvements in arousal and mood which influence learning performance (Schellenberg & Weiss, 2013) - calms the listener yielding positive effects (Gold et al., 2004)

Tools and Procedures

Instruments

For the current study, three tools were used for the collection of data: video recording, The Rating Scales for Child Affect (Interest and Happiness) and General Behavior by Dunlap and Koegel (1980), and the social validity evaluation.

Recording medium. Videotaping was the recording medium selected for this study. The researcher conducted the sessions for the study. Hence, video recording enabled direct observations of the sessions later while simultaneously allowing the collection of necessary data.

Rating Scales for Child Affect (Interest and Happiness) and General Behavior (Dunlap & Koegel, 1980). Although this tool is not very current, it has been adapted in current studies by other authors like Koegel, Singh, Koegel, Hoolingsworth, and Bradshaw (2013). It has also been referred to in various recent works such as Lang, Hancock, and Singh (2016), and Carr, Horner, Koegel, Sailor, Clarke, and James (2010).

The rating scale is a 6-point Likert scale composed of four areas including enthusiasm, happiness, and general behavior (Dunlap & Koegel, 1980). For this study, only the scale for happiness is relevant. The categories of the scale are divided into 2 points each. Depending on the adapted scale's definitions of happiness, the observers will rate either a 4 or 5 accordingly depending on the observed intensity. Marking a neutral rating would be recognized as the occasional smile or frown in which the observers will rate either a 2 or 3 depending on the extent of happiness. Rating unhappiness would be either a 0 or 1 depending on if the intensity of the child's behavior reflected as crying, pouting, or screaming. A 2-min recording segment was withdrawn from previously recorded material of the sessions and rated. From the 2-min recording segment, 40-second intervals from each intervention were scored. The total agreement approach interobserver reliability was calculated based on the following formula for total agreement, S ÷ L X 100% where S is the smaller total and L is the larger total.

Social validity tool. To assess the goals, procedures, and/or outcomes of an experiment a social validity scale constructed by the researcher was distributed to the teachers and parents of the children partaking in the study following the termination of the experiment because the children in this study may not have the capabilities to answer themselves. The researcher developed a rating scale that focused on the three dimensions of social validation (i.e., goals, procedures, and outcomes) to assess the parents' and teachers' perspectives about any changes in verbal expression they received after the intervention (see Appendix A). The development of a social validity tool specific to this study was required. Social validity tools can be constructed by the author to assess the goals, procedures, and outcomes of their intervention among individuals with ASD and other developmental disabilities (Groeneweg et al., 2002; Groeneweg et al., 2006; Stahmer & Schreibman, 2006).

Questionnaire for parents. Parents of the selected students were given a list of songs prior to the intervention and the researcher will then base the selection of songs or music on it. Parents were asked to circle the songs that are familiar to the child before commencement of the study. From the songs that were circled, the researcher chose the non-familiar songs. The researcher selected the non-familiar songs for the intervention, in order to attribute any learned responses strictly to the intervention, not to familiarity.

Recording medium. The researcher used the partial-interval recording tool to score the occurrence of happiness of participants during the use of each intervention for each 2-minute period (See Appendix G). Partial-interval recording was suitable for measuring the index of happiness because there were three different independent variables being used separately for 2 minutes each that needed to be scored using the criteria listed in the observational code of the rating scale. If the display of happiness occurred throughout any period of the interval, the interval was scored as an occurrence of the stimulus or response.

This study was an instance where resources did not permit observers to watch footage of the two-month long time period scheduled for study. Therefore, according to Kennedy (2005) selective sampling is necessary. In line with Interobserver agreement, observers watched 30% of the total video recordings for each child to account for correct IOA measurements. This logical sampling strategy was adequate to address the experimental question.

Latency recording. The chosen target behavior for this study was the spoken word/sound following the antecedent variable as previously defined. The antecedent variable differed depending on the type of independent variable (music technique) being used. The time between the antecedent variable or the stimulus, and the emitted target vocal response from the student is significant. For that reason, the most suitable method for event recording was latency

recording. Latency was measured utilizing the timer on the video recording starting directly after

the stimulus and stopping either when the target behavior was displayed or after a maximum of 6

seconds. In the case when the child failed to pronounce the target word, the researcher gave a 6-

second delay prompt (Leaf & McEachin, 1999) and then preceded to trial the next target word in

the song. An incorrect response was also recorded as 6-seconds, as well as a late response. The

observer then timed the new trial to measure the latency period for the next target word. The

observed data for each video-recorded session on the latency period was then collected using pen

and paper. The latency periods for each individual were collected and compared. Latency

recording during each music practice helped determine the most preferable practice for

promoting verbal expression for each child individually answering the first experimental

question.

<div align="center">**Data Analysis**</div>

The data collected by pen and paper for latency period was extracted from the recorded

time from the video unit then compared using the interobserver agreement (IOA). The index of

happiness was calculated separately to obtain an IOA between two observers.

Researchers traditionally interpret single-subject study results by using visual analysis to

understand single-case study results (Reutebuch, El Zein, Kim, Weinberg, & Vaughn, 2015).

Line graphs using Microsoft Excel were created for each student with each of the three

independent music interventions (See Figure 2.4). In Figure 2.4, sessions are represented on the

x-axis. The y-axis represents the latency period, or the response time preceding verbal

expression. Figure 2.4 allowed for a visual inspection of performance on the occurrences of

verbal expression in order to observe a differential experimental effect on the students' response

time across three musical interventions each. Each dependent variable was analyzed based on

visual inspection of the graphs using (a) level, (b) variability, (c) trend, and (d) overlap (Kratochwill et al., 2010, 2013) to estimate the effect of the changes between baseline and intervention. Each child's mean scores or levels within the two phases (baseline and intervention) were used to compare the effect of each intervention on the quickness of the response time. The line of best fit for the intervention data was used to describe weather the data had an ascending, descending, or neutral pattern.

Lastly, overlap was calculated using a procedure called "percentage of non-overlapping data" (PND) for quantitative analysis of the data (El Zein, 2014). The PND was found by identifying the number of intervention data points that are lower than the lowest data point in baseline, divided by the total number of intervention data points, times 100. According to Scruggs and Mastropieri (1998), a highly efficient treatment has a PND score equal to or larger than 90%, when it is equal to or larger than 70% but smaller than 90% it is an effective treatment, between 50 to 70% is a questionable treatment, and below 50% is an ineffective treatment (Heyvaert, Saenen, Maes, & Onghena, 2015). This technique was chosen because it illustrated the consistency of each child's response time with each of the interventions as compared to their original response times at the baseline level.

Interobserver agreement. When recording data, integrity is an important dimension to keep. Collecting interobserver agreement data allows researchers to estimate the degree to which two separate people using the same recording procedure agree on what occurred or did not occur (Watkins & Pacheco, 2000). It is prime that the two individuals collecting data be trained on the use of the same behavioral code and recording system.

To best calculate interobserver agreement for frequency data, researchers use the total agreement approach. Using this method, a researcher sums the total number of responses

recorded by each observer, divides the smaller total by the larger total, and multiplies the amount by 100%. The formula for total agreement is S ÷ L X 100% where S is the smaller total and L is the larger total (Kennedy, 2005).

To account for the interobserver agreement the researcher had two different observers review the video recordings for the latency period and for happiness measures. The observer who watched the latency period video recordings was a psychology professor at a university who had completed her PhD in special education with emphasis in ABA. Her professional previous experience in the field of research along with specific direction from the researcher allowed her to record the latency period for each child. The training including explaining the procedures to the observer: waiting 6 seconds before recording the child's latency period. If the target word was said anytime before 6 seconds the observer was to mark the length of time prior to the child's verbal expression. The same definitions for verbal expression defined in the current study were used for the IOA. To satisfy the IOA the observer reviewed 30% of the total number of videos for both the baseline and intervention period. From the total videos, the observer reviewed 4 videos out of 12 for baseline, and 10 videos out of 34 for intervention. She was originally given 6 total baseline videos and 22 total intervention videos. The observer was free to randomly select which ones to score. Using the total agreement approach interobserver reliability was calculated based on the following formula for total agreement, S ÷ L X 100% where S is the smaller total and L is the larger total. For baseline the IOA score for Youssef was 96% and for Andy 100%. For Youssef's intervention, IOA scores for "singing and music" was 81%, "singing" was 100% and "listening" was 90%. For Andy's intervention, IOA scores for "singing and music" was 100%, "singing" was 90% and "listening" was 93%. For Alex's intervention, IOA scores for "singing and music" was 98%, "singing" was 99% and "listening" was 99%.

An interobserver agreement was also calculated for the index of happiness. The observer who watched these video recordings was a graduate student in neuroscience at a university. To satisfy the IOA, 30% of videos needed scoring. The observer was given a scale from 0-5 specifically describing levels of happiness overtly. The overt descriptions of the behavior were adapted from the Index of Happiness scale by Dunlap and Koegel (1980) (See Appendix D). The observer watched and rated 10 videos out of 34 for happiness. Partial interval recording was used to measure happiness for each participant during each intervention. Each standard music intervention session lasted around 5/6 minutes. Because the researcher is only interested in measuring this behavior, only viewing a brief part of the video would signify the happiness level. Therefore the observer watched each child's behavior during each intervention for 40 seconds each (e.g., 40 seconds watching "singing and music", 40 seconds watching "singing", and 40 seconds watching "listening). Based on the first 40 seconds depending on the overt behavior of the child that correlated with the scale, the observer marked the level of happiness accordingly. Using the total agreement approach interobserver reliability was calculated based on the following formula for total agreement, $S \div L \times 100\%$ where S is the smaller total and L is the larger total. Overall, the IOA happiness agreement score for Youssef was a 100%, the IOA happiness agreement score for Andy was 92% and for Alex a 96%.

CHAPTER IV

FINDINGS

This chapter focuses on the results obtained from the three different music interventions. Specific attention to the latency period illustrates the differential effect of the three different music interventions, Music and Singing, Singing, and Listening, for each of the three children. Additionally, the Index of Happiness measures, and social validity data will be examined.

Music Intervention

Results from the music intervention indicated that Youssef achieved a decrease in the latency period, with number 1 being the intervention yielding the quickest response: (1) "Singing", (2) "Singing and Music" (3) "Listening". Andy's latency in response decreased the quickest during: (1) "Singing", (2) "Singing and Music", (3) "Listening". As for Alex's latency in response, it was shown to decrease the quickest during: 1) "Singing" while "Singing and Music" and "Listening" equally showed no effect in decreasing his response time.

Three Music Interventions

Youssef. Youssef's latency of responding to target words had a mean of 5.5 seconds during baseline, as displayed in Table 3.4. His mean score decreased to 5 seconds during the musical intervention phase. Visual analysis of his latency of responding graph showed a decrease in his response time upon implementation of both the "Singing and Music" intervention and the "Singing" intervention. Youssef's mean scores were 4.6 seconds during the "Music and Singing" intervention and 4.5 seconds during the "Singing" intervention. However, during the "Listening" intervention Youssef's latency of responding remained at 6 seconds, where 6 seconds corresponds to "no response". During baseline, Youssef's scores on latency of responding ranged

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from 6 to 5 seconds with 6 seconds being the most frequent latency of responding. His responding time during the "Music and Singing" intervention varied from 6 seconds to 2 seconds with 6 seconds being the most frequent latency of response time. His responding time during the "Singing" intervention varied from 5 seconds to 4 seconds with the frequency of latency response being equal for both 5 and 4 seconds. During the "Listening" intervention his response time did not vary, but stayed constant at 6 seconds throughout. Additionally, visual inspection of Youssef's latency for response graph reveals clear descending trends during the "Singing and Music" and "Singing" interventions demonstrating a quicker response rate to the target words during these musical interventions. However, a neutral trend is displayed during the "Listening" intervention.

Youssef completed the intervention by learning all the target words to the songs and was observed to be restless by the end of the intervention. He exhibited behaviors such as trying to exit the room. The researcher felt the need to end the intervention early since all the target words had been mastered with quick response time.

Andy. Andy's latency of responding to target words had a mean of 6 seconds during baseline as displayed in Table 3.4. His mean score slightly decreased to 5.6 seconds during the musical intervention phase. Visual analysis of his latency for response graph showed a decrease in his response time upon implementation of both the "Singing and Music" intervention and the "Singing" intervention. Andy's mean scores were 5.7 seconds during the "Music and Singing" intervention and 4.7 seconds during the "Singing" intervention. During the "Listening" intervention, Andy's latency of responding was 5.9 seconds. During baseline, Andy's latency for response stayed constant at 6 seconds, with 6 seconds corresponding to "no response". His responding time during the "Music and Singing" intervention varied from 6 to 5 seconds with 6

seconds being the most frequent latency for response time. His responding time during the "Singing" intervention varied from 3 to 6 seconds with 5 seconds being the most frequent latency for response. During the "Listening" intervention Andy's response time similarly varied from 6 to 5 seconds with 6 seconds being the most frequent latency for response time. Visual inspection of Andy's latency for response graph reveals increasing trends for "Music and Singing", "Singing" and "Listening". It is clear that Andy was able to achieve the lowest latency period average during "Singing" at 4.7 seconds however, the increasing trend line indicates that his response pattern during "Singing" was not consistent enough to yield a decreasing trend line.

Alex. Alex's latency of responding to target words had a mean of 6 seconds during baseline as displayed in Table 3.4. His mean time slightly decreased to 5.8 seconds during the musical intervention phase. Visual analysis of his latency responding graph showed a decrease in his response time upon implementation of only the "Singing" intervention. Alex's mean scores were 6 seconds during the "Music and Singing" intervention and 5.6 seconds during the "Singing" intervention. During the "Listening" intervention Alex's latency of responding remained unchanged at 6 seconds. During baseline, Alex's latency of responding stayed constant at 6 seconds. His responding time during the "Music and Singing" intervention did not vary, but remained at 6 seconds all throughout. His responding time during the "Singing" intervention varied from 6 to 4 seconds with 6 seconds being the most frequent latency of response time. During the "Listening" intervention Alex's response time did not vary, but remained constant at 6 seconds. Visual inspection of Alex's latency for response graph reveals an increasing trend for "Singing", but showed no trends for neither "Music and Singing" nor "Listening". Alex's lowest latency period average was 5.6 seconds during "Singing" however, the trend line illustrates that his response pattern during "Singing" was not consistent enough to yield a decreasing trend line.

For "Music and Singing" and "Listening", Alex's unresponsiveness illustrates this consistency as neutral trend lines.

Regarding overlap, all three participants attained a PND score below 50 for each intervention except Andy who during "Singing" achieved a PND of 85% suggesting that this form of music produced positive effects for him; due to the fact that Andy responded at a more consistent rate than either of the other children.

Table 3.4

Average Latency Periods of Participants by Seconds

Student	Baseline	Music and Singing	Singing	Listening	Overall
Youssef	5.5	4.6	4.5	6	5
Andy	6	5.7	4.7	5.9	5.6
Alex	6	6	5.6	6	5.8

Latency for Response
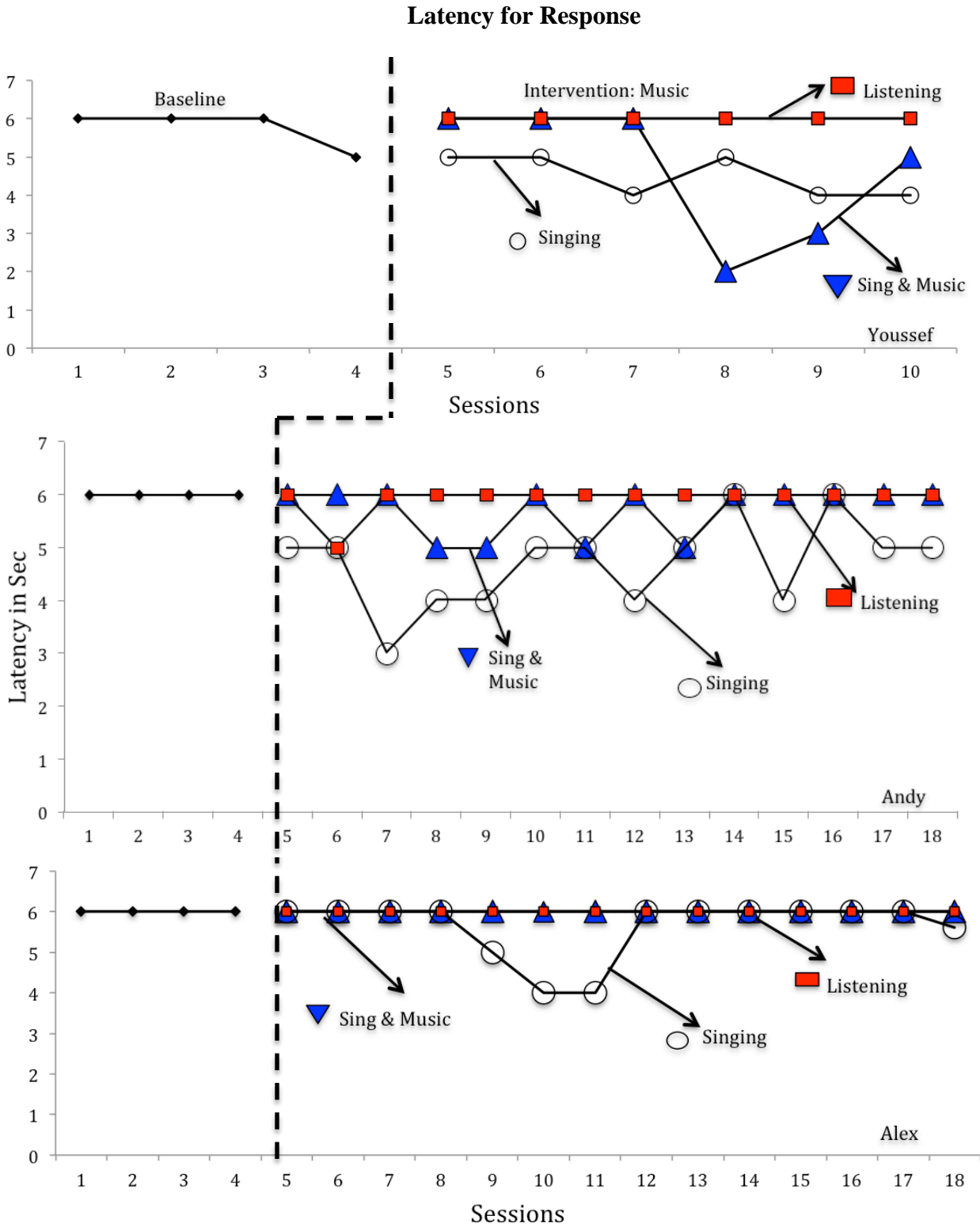
Figure 2.4 Latency of response scores reported in number of seconds.

Index of Happiness

Youssef

Figure 2 shows Youssef's index of happiness data. It can be observed that Youssef was happiest during the "Singing" intervention averaging 4 out of 5. According to the Index of Happiness scale by Dunlap and Koegel (1980), a 4 corresponds to Youssef being overall "Happy" during his sessions with "Singing". Both "Singing and Music" and "Listening" interventions scored around an average of 3, corresponding to Youssef being "Neutral" during these interventions.

Andy

Figure 2 represents Andy's index of happiness data. It can be seen that Andy almost equally enjoyed "Singing and Music" to "Listening" with "Singing" being enjoyed to a slightly higher degree. His happiness scores for "Singing and Music" to "Listening" are a 3 corresponding to a "Neutral" on the Index of Happiness Scale (Dunlap & Koegel, 1980). "Singing" can be seen as being the most enjoyable for Andy averaging to a 4, corresponding to "Happy" on the Index of Happiness Scale.

Alex

According to Figure 2, Alex was the happiest while partaking in "Singing and Music" sessions. His scores averaged to 4 for this intervention corresponding to being "Happy" on the Index of Happiness scale by Dunlap and Koegel (1980). "Singing" and "Listening" scores are approximated at a 3, corresponding to a "Neutral" level of happiness on the Index of Happiness scale.

In summary, each child showed a different preference while they participated in each of the three musical interventions. For Youssef and Andy more smiles and laughter were observed during their sessions with "Singing" while Alex was observed to be more happily engaged

during "Music and Singing". Not one child scored in the unhappiness range (0-2) for this intervention making this intervention an overall enjoyable experience.

Index of Happiness
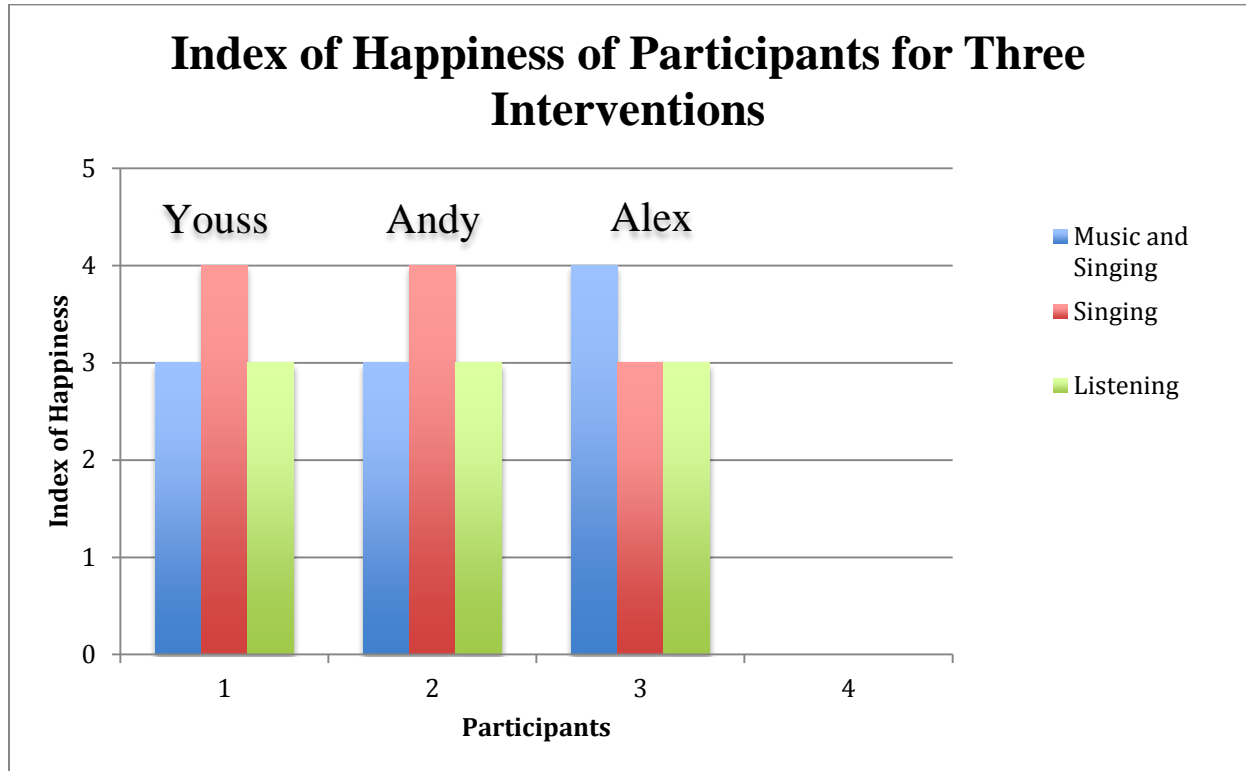
Figure 3.4 Index of Happiness scores

Social Validity

After termination of the intervention, parent and teacher opinions towards the intervention outcomes, goals, and procedures were collected to measure the social validity for verbal expression. A rating scale was administered to teachers and parents of the three participants. The rating scale was administered at the end of the two-month and a half implementation period. It contained twelve questions that were answered by selecting to what degree, from unacceptable to very acceptable, the teachers found various aspects of the intervention in terms of meeting

certain outcomes, goals and procedures. The possible answer choices included "not at all acceptable", "moderately acceptable", and "very acceptable".

Teacher's Responses

During regular school hours, each shadow teacher is assigned to a child, spending time with him on a daily basis. In terms of outcomes and goals for this music intervention in general, all three shadow teachers rated "very acceptable" overall in terms of how acceptable they found this treatment for teaching verbal behavior, how much they liked this form of treatment. Furthermore, all three teachers rated "acceptable" if they were to carry out this procedure themselves to help various children with verbal behavior difficulties." The teachers all agreed that undesirable effects were unlikely by rating it "highly acceptable". Overall, teachers regarded this intervention "very acceptable", would suggest it to other special education or music teachers, and would even include it in the school's current curriculum.

Individually, Youssef's shadow teacher rated that his performance with this intervention was moderately beneficial. In contrast, Andy's shadow teacher rated that his performance with this intervention proved to be beneficial, as was the case for Alex. All three teachers commented that their children are inclined to music and singing and are always highly engaged when participating during music time at school. Andy's shadow teacher commented how Andy loves to shake maracas, while Alex's shadow teacher reported an increase in his motivation towards the piano when he was not participating in the intervention.

Parent's Responses

All three parents of the children who underwent the intervention supported this intervention technique stating that they would generally be willing to try anything that may help

their child improve, especially when it came to speech. The parents encouraged the use of this music intervention with their child especially if their child was responding to the music during the sessions. The parents all stated that music is an activity their child enjoys in general.

Individually, Youssef's parents stated that he had always had a keen ear for music since he was a baby. His love of music motivated his parents to use it with him during difficult tasks that he would otherwise not accomplish without music. His mother states that he has an incredible musical memory and would fill in words to songs that he had heard once or twice. She is sure this intervention would help him acquire new words because it was the case at home. His mother approves of this intervention because she has seen the positive effect music has on her child and because he genuinely enjoys it.

Andy's parents reported that he has always loved music and dancing. However, his father stated that because his son is enlisted in a multidisciplinary program at school consisting of ABA, speech therapy, special education etc. and the length of the music intervention was short, that he cannot accredit improvement singularly to this intervention. He has stated that Andy has shown improvement. His father supports interventions and mentions that it is going to help him. He encourages the use of this intervention at Andy's school and he would be willing to use this intervention at home with Andy. In his opinion, he does not have experience with music therapy but he conjectures that it would help Andy. He has loosely used music like singing with Andy, but has not focused on it as a meaningful tool to enhance his son's speech.

Alex's parents state that they would be willing to encourage anything to help him, especially for speech enhancement. Regarding this particular intervention, his mother comments that the timespan was too short to be able to tell if it helped him. She stated that Alex is fond of

music and if there is an intervention that involves music, she is on board as long as he is enjoying the sessions. Alex's mother does not sing with him at home, but if she was coached on the procedures of this intervention, she would definitely it with Alex to see if they would yield any improvements towards enhancing his speech in any way.

In summary the intervention period was too short to prove what the long-term outcome concerning verbal behavior would be, however the teachers and parents separately agreed that the procedures used in this intervention were easy and doable if they were to implement it themselves. Teachers and parents recommend the use of this intervention in the school curriculum since they have separately observed in the home and school setting that music is an activity that excites their children and makes them happier overall. What better way to learn than when one is happy.

CHAPTER V

DISCUSSION AND CONCLUSION

From the visual analysis in Chapter IV, some consistent patterns surfaced across participants for this intervention. This chapter discusses the possible reasons for why "singing" emerged as the most successful mode of musical intervention for verbal expression, why there may be differences in the responses across participants, and how future research could support the results in this area.

Implications of Findings

Findings from the present study demonstrated that there was a differential effect among the three musical interventions regarding latency periods for all participants. Additionally, all three participants were observed as occasionally smiling and even laughing during certain interventions making it an overall enjoyable experience.

A finding from this study is that "singing" was the most successful intervention among either of the three in terms of lowering the latency period across all three participants. Participants achieved the lowest mean scores during "singing" in terms of responding among the three ("music and singing" or "listening") as shown in figure 3 for all three of the participants. The success of this intervention agrees with findings from Quinn (2016). The study by Quinn (2016) explored whether singing could motivate auditory attentiveness in children on the spectrum as compared to regular speech. A finding from this study was that some children on the spectrum did have increased attention and increased engagement when information was presented through singing as opposed to speaking (Quinn, 2016). In both studies, singing was shown to be a motivating stimulus for children towards achieving a response. Yet, determining on an individualized basis whether singing or other musical techniques can help towards

attaining verbal expression will definitely differ depending on each child's personal preference (Iovannone et al., 2003).

Another finding from this study is that children may respond differently to various musical strategies based on their inherent skills (Figure 3.5). In this study, Youssef's lower overall mean score and decreasing trend lines for all but one intervention ("listening") in contrast to the other two children suggests that Youssef benefited the most from this intervention. This could be attributed to the fact that Youssef was verbal while the other two participants were nonverbal. Besides this, Youssef's mother commented in the survey about how he uses his incredible music memory to fill in words to songs that he had heard only once or twice, perhaps having to do with the musical pitch of the words. This agrees with Stanutz, Wapnick, and Burack (2014) who demonstrated that children with ASD particularly excelled in better pitch discrimination abilities and had better long-term memories for melody without any previous musical training compared to peers of the same age. Youssef excelled beyond the other two participants. Although he began the intervention at the same time as the two other children, he finished first learning all the words to the songs and completing the intervention.
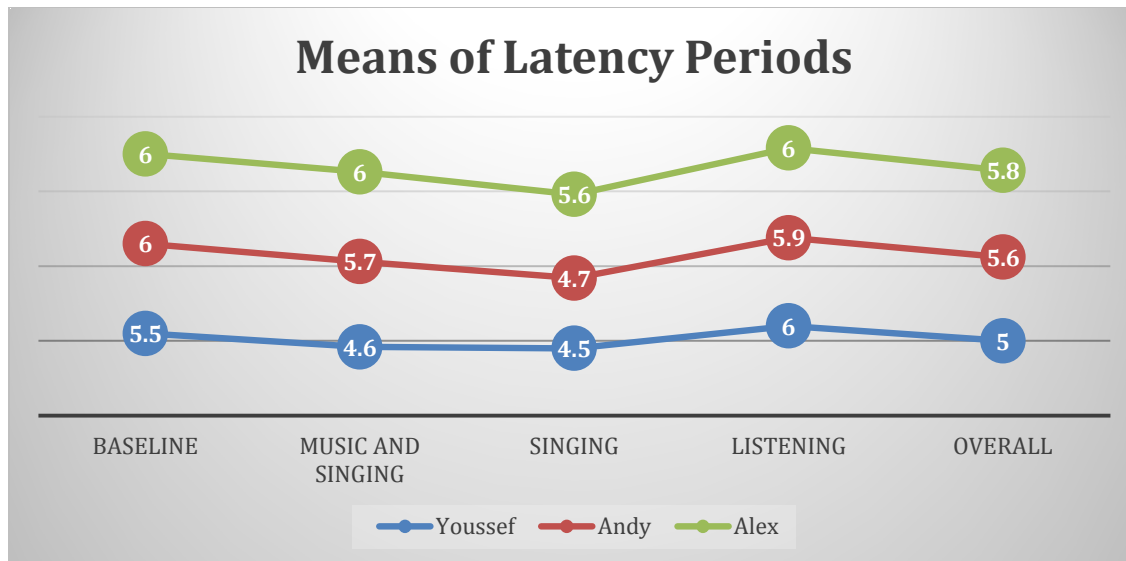
Figure 3.5 *Means of latency periods for each of the participants during each of the musical interventions.*

One more finding from this study is that all three children were found to be either neutral or happy during the music intervention. Because children with ASD were found to enjoy leisure activities that require less demanding social interaction (Eversole et al., 2016), perhaps participation in this music activity was not particularly demanding.

An implication that can be drawn from this study is that teaching verbal expression through a musical strategy rather than through plain speech will be more favored by children with ASD. Not only do children with ASD show limited processing of social and more complex sounds like connected speech (Ouimet et al. 2012), but children on the autism spectrum neurologically do not perceive human speech as socially rewarding as children not on the autism spectrum (Chevallier et al., 2012). Due to this fact, children on the spectrum are not as attentive or responsive to human speech (Abrams et al., 2013; Kana, Libero, & Moore, 2011; Senju, 2013). This signifies that speech by itself is not interesting enough to children with autism. Another study by Kuhl, Coffey-Corina, Padden, and Dawson (2005) found that children on the

autism spectrum demonstrated a preference for non-speech sounds in contrast to children not on the spectrum. Like the teaching via this intervention, melodically delivered speech can be generalized to more settings when non-verbal children with ASD were taught words to elicit (Sandiford, Mainess & Daher 2013).

Conclusion

While all children have their own preferences, learning about activities that bring enjoyment to children with ASD or speech difficulties can provide better intervention planning (Eversole et al., 2016). Using this music approach as a technique to encourage verbal expression supported the fact that using an intervention that teaches responding with an immediate and high reinforcement even at attempts at speech may demonstrate the connection between responding and reinforcement (Koegel, Koegel, & McNerney, 2001). "Singing" was seen to be both motivational and reinforcing enough to produce responses from the children lowering the overall latency periods preceding verbal expression. Because communication is a troublesome area for children on the spectrum, there is a need for creative and enjoyable interventions in this field. The flexibility of this intervention allows it to be used in many environments with many different people, among those parents, therapists, music teachers, and special education teachers.

Results from the current study found that "singing" proved to be the most successful in terms of producing the quickest responses. Although the effect of the "singing" intervention varied among participants with some achieving lower mean scores than others, the effect of the intervention exists. The happiness levels of the students varied from neutral to happy, signifying an overall positive experience while they were participating in the music ABA intervention. Using activities preferred by children has been shown to be valuable in motivating children especially in areas of difficulty (Eversole et al., 2016).

Findings from the intervention show that teaching verbal expression through a musical strategy is an overall positive experience for children on the spectrum. Children may have different strengths including musical pitch-discrimination, which may enhance their performance through musical interventions. However, it is important that the musical preference of each child be always considered.

Limitations of the Study

Because this study used applied research in a natural environment, certain limitations impacted the study. The current study was implemented at school where the participants all attended. One of two settings was used each time depending on room availability: the stage, which included a piano, and the classroom. Certain extraneous variables sometimes occurred during sessions (e.g., teachers interrupting the session, children interrupting the session, and distracting noises) were beyond the control of the researcher.

Another limitation was the implementation. Because the researcher was conducting the music sessions, if one of the participants engaged in an inappropriate behavior (e.g., playing with equipment on the stage, getting up during sessions) the researcher would have to interrupt the trial, bring the child back, and continue. These interruptions would have been less likely if a shadow teacher accompanied the children during the sessions.

Another limitation was attributed to the fact that only six songs were repeated throughout the two and a half month long intervention. Even though the participants did respond to the intervention, their responses were inconsistent overall as seen in the overall inconsistency in the graphs across interventions. This repetition may have resulted in habituation. The children may have responded at a higher frequency if the variety and variability of the music had changed.

Lastly, there was not a large pool for selecting participants. Although the selection was criterion-based, it was not possible to select a homogeneous group, as the ASD population is heterogeneous (Kuschke, Vinck, & Geertsema, 2016).

Recommendations for Future Studies

Because this study was able to show that using a structured combination of ABA and music with verbal and non-verbal children on the spectrum could teach verbal expression, further research should be conducted in this area. Considering that, "singing" produced the best responses between "singing and music" and "listening", further research conducted using music with children on the spectrum should focus on the engagement of children with different musical approaches and verbal expression. Perhaps using a single-subject design such as a multiple-baseline design for "singing" for multiple participants would reassure that the effects from this treatment are true to the intervention, not the children's preferences.

Furthermore, research should test weather this approach works as well for other children not on the spectrum e.g., children with ADHD, intellectually disabled, and children with speech and communication disorders who could also benefit from this intervention. While this study focused on a younger age group (6 years old), future studies could examine the effect on other age groups.

A recommendation for future studies is to have two people conducting these sessions. The sessions should include somebody actively playing the music and somebody situated beside the child in order to alleviate multitasking on one individual. This will keep the sessions running smoothly and keep the child on task throughout the entire intervention session.

Recommendations for Practice

The results may help special education teachers, ABA therapists, or parents living in Lebanon implement the best technique for targeting verbal expression in their children with efficient knowledge about the emotional experience the particular intervention can bring. In this way, satisfactory interventions can be replaced with fulfilling and enjoyable ones.

APPENDICES

Appendix A

A. Teacher Questionnaire

Please rate this music-ABA intervention technique from 1-8 with, 1 corresponding to "not at all acceptable" and 8 being "very acceptable". Thank you ☺

1. How acceptable do you find this treatment to be for the student's verbal behavior?

_____   _____   _____   _____   _____   _____
_____
Not at all   moderately   very
acceptable   acceptable   acceptable

2. How willing would you be to carry out this procedure yourself if you had to change the student's verbal behavior?

_____   _____   _____   _____   _____   _____
_____
Not at all   moderately   very
acceptable   acceptable   acceptable

3. How much do you like the procedures used in this treatment?

_____   _____   _____   _____   _____   _____
_____
Not at all   moderately   very
acceptable   acceptable   acceptable

4. How likely is this treatment to make permanent improvements in the student?

_____   _____   _____   _____   _____   _____
_____
Not at all   moderately   very
acceptable   acceptable   acceptable

5. To what extent or undesirable side effects likely to result from this treatment?

_____   _____   _____   _____   _____   _____
_____
Not at all   moderately   very
acceptable   acceptable   acceptable

6. Overall, what is your general reaction to this form of treatment?

_____   _____   _____   _____   _____   _____
_____

Not at all	moderately	very
acceptable	acceptable	acceptable

7. I would suggest the use of this intervention to other special education or music teachers

_____   _____   _____   _____   _____   _____
_____

Not at all	moderately	very
acceptable	acceptable	acceptable

8. Most special education or music teachers would find this intervention suitable for problem behaviors.

_____   _____   _____   _____   _____   _____
_____

Not at all	moderately	very
acceptable	acceptable	acceptable

9. I would be willing to use this intervention in the special education setting

_____   _____   _____   _____   _____   _____
_____

Not at all	moderately	very
acceptable	acceptable	acceptable

10. This intervention would be appropriate for a variety of children

_____   _____   _____   _____   _____   _____
_____

Not at all	moderately	very
acceptable	acceptable	acceptable

11. Overall, this intervention was beneficial for the child

_____   _____   _____   _____   _____   _____
_____

Not at all	moderately	very
acceptable	acceptable	acceptable

12. How important do you think it is that you child's school incorporate this intervention into their curriculum?

_____   _____   _____   _____   _____   _____

_____

Not at all   moderately   very
acceptable   acceptable   acceptable

Thank you ☺

Appendix B

B. Parent Questionnaire

How old is your child? _____

What grade is your child in? _____

What is your child's IQ range?_____

Does the child have any speech problems?

_____

Does your child benefit from speech therapy?

Does the child have any visual problems? _____

If so how severe are they? _____

Does the child have hearing problems? _____ If so, how severe are his hearing problems?

_____

Is the child receiving any special school services such as special education, reading services, tutoring etc.? If yes, can you please mention them? _____

_____

_____

What is the main language spoken at home? _____

If it is a language other than English, describe the extent to which it is spoken
_____

What is the child's primary language? _____

Does your child have educational difficulties? _____If so, in what?
_____

Has your child had previous experience in music therapy? _____

Appendix C

C. List of Songs

Please circle the song your child knows from the list of songs below!

(Note: If you are unsure about the song name, feel free to make sure by listening to the songs on

YouTube first before circling)

Alphabet Song

And The Green Grass Grows (Barney)

Animal Sounds Song

A-Tisket A-Tasket

Baa Baa Black Sheep

Brahms' Lullaby (Go to sleep little baby)

B-I-N-G-O

Brushing My Teeth (Barney)

Clean Up, Clean Up (Barney)

The Farmer in the Dell

Five Little Monkeys

Frere Jacques

Here We Go Round the Mulberry Bush

Hey Diddle Diddle

Hickory Dickory Dock

Hot Cross Buns

The Hokey Pokey

Hush Little Baby

If You're Happy and You Know It

If I Lived Under the Sea (Barney)

I Love You, You Love Me (Barney)

I know My Shapes (Baby Einstein)

I'm a Little Teapot

Itsy Bitsy Spider

It's Raining It's Pouring

It's Cold (Barney)

I've Been Working on the Railroad

Jingle Bells

Kookaburra

London Bridge is Falling Down

Mister Sun (Barney)

One Two Buckle My Shoe

One Two Three Four Five, Once I Caught a Fish Alive (Barney)

Pat-A-Cake

Ring Around the Rosy

Rock-a-Bye Baby

Row, Row, Row Your Boat

Say Hello (Dragon Tales)

Seven Days in a Week Song (Barney)

Skip to My Lou

Shribabadinkadinkadaink Shribadakinkadoo I Love You

This Old Man

The Rainbow Song (Barney)

Twinkle, Twinkle, Little Star

The Muffin Man

Wheels on the Bus

Where is Thumbkin

You are My Sunshine

Appendix D

D. Rating Scale

Rating Scales For Child Affect (Interest and Happiness) and General Behavior

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INTEREST

Disinterested

Child looks bored, noninvolved, not curious or eager to continue activity. May yawn or attempt to avoid (or escape) situation. Spends much time looking around and little time attending to task. When child does respond, there may be a long response latency (score 0 or 1, depending on extent of disinterest).

Neutral Interest

Neither particularly interested nor disinterested. Child seems to passively accept situation. Does not rebel but is not obviously eager to continue (score 2 or 3, depending on extent of interest).

Interested

Attends readily to task: responds readily and willingly. Child is alert and involved in activity (score 4 or 5, depending on level of alertness and involvement).

HAPPINESS

Unhappy

Cries, pouts, tantrums, appears to be sad, angry, or frustrated. Child seems not to be enjoying self (score 0 or 1, depending on extent of unhappiness).

Neutral

Does not appear to be decidedly happy or particularly unhappy. May smile or frown occasionally but, overall, seems rather neutral in this situation (score 2 or 3, depending on extent of happiness).

Happy

Smiles, laughs appropriately, seems to be enjoying self (score 4 or 5 depending on extent of enjoyment).

GENERAL BEHAVIOR

Poorly Behaved

Child is disruptive—may tantrum, attempt to leave chair or room, interrupt teacher's instructions and/or show aggression towards teacher, self or objects. Child is generally off task—may fidget and squirm, show inappropriate vocal behavior (e.g., off-task laughter and noises) or motor behavior unrelated to task. Shows little attention to task, and may be noncompliant (score 0 or 1, depending on extent of disruptiveness).

Neutral Behavior

Child is neither very disruptive nor exceptionally attentive. Child may fidget and appear inattentive, but is not aggressive or rebellious. Generally complies with instructions, but may not do so readily (score 2 or 3, depending on extent of attentiveness).

Well Behaved

Child sits quietly, attends to teacher and to task. Responds to instructions; is compliant and appears to try to perform successfully. May laugh or show other emotional behavior under appropriate circumstances (score 4 or 5, depending on extent of attention and compliance).

Appendix E

E. Institutional Review Board Approval

AUB — Institutional Review Board | لجنة الأخلاقيات   www.aub.edu.lb
1866
American University of Beirut
الجامعة الأميركية في بيروت

- Parent questionnaire (English version, received March 19,2018),
- Recruitment letter for parents (English and Arabic versions, received March 19,2018),
- Recruitment letter for teachers (English and Arabic versions, received March 19, 2018).

Only these IRB approved documents can be used for this research study.

Thank you.

The American University of Beirut and its Institutional Review Board, under the Institution's Federal Wide Assurance with OHRP, comply with the Department of Health and Human Services (DHHS) Code of Federal Regulations for the Protection of Human Subjects ("The Common Rule") 45CFR46, subparts A, B, C, and D, with 21CFR56; and operate in a manner consistent with the Belmont report, FDA guidance, Good Clinical Practices under the ICH guidelines, and applicable national/local regulations.

Sincerely,

Lina El-Onsi Daouk, MSc
Senior Regulatory Analyst/ IRB Co-administrator
Social & Behavioral Sciences

Cc: Michael Clinton, PhD
        IRB Vice Chairperson
        Social & Behavioral Sciences

        Fuad Ziyadeh, MD, FACP, FRCP
        Professor of Medicine and Biochemistry
        Chairperson of the IRB

        Ali K. Abu-Alfa, MD, FASN, FASH
        Professor of Medicine
        Director, Human Research Protection Program
        Director for Research Affairs (AUBMC)

Appendix F

F. Parent Consent Forms (English and Arabic)

AUB Social & Behavioral Sciences Parental Permission Template

Permission for Child to Participate in Research

Study Title: Effects of Music Therapy to Enhance Verbal Skills in Children with Autism Spectrum Disorder.

Researcher: Anies Al-Hroub & Nayla Attar

This is a permission form for your child for whom you are legal guardian to participate in a research study. It contains important information about this study and what to expect if you decide to permit your child/child for whom you are legal guardian to participate.

Your child's participation is voluntary.

Please consider the information carefully before you decide to allow your child to participate. If you decide to permit participation, you will be asked to sign this form and will receive a copy of the form.

Purpose: This research study aims to compare which three different music interventions best motivates your child to speak the fastest. We will be testing the speed at which they respond when music is being played in three different ways. The first way is through singing, the second through singing and playing a musical instrument, and the third is listening to music being played on a CD. The music techniques will be played individually and stopped until your child responds and depending on which technique they like the most, the speed of their response may differ. We also want to see which music intervention makes your child the happiest by watching to see if they are laughing or smiling anytime during the music intervention. Lastly, we want you and your child's teacher's responses to see whether or not the intervention has made a difference in their verbal expression after a two month and two week time frame by filling out the social validity scale. Two weeks will be exclusively devoted to familiarize the children with the songs that will be used in the intervention so that they do not hear them for the first time during the music intervention.

Procedures/Tasks:

Recruitment:
1. A typed invitation letter will be sent by an administrative staff who works in the LAS-CCA to parents of eligible children to attend an introductory meeting done by the research team to further explain the purpose of the study and invite parents to allow their children to participate in the study

2. After your consent, you will need to fill out two documents.
3. The first document you need to fill out is a parent questionnaire to know more about your child before continuing with the intervention. The questionnaire includes questions like age, grade level, IQ range etc. so that the researcher can determine whether or not your child meets the criteria for the study. After this questionnaire is filled out, there is a possibility that your child may be excluded from the study based on the answers.
4. The second document you will need to fill out is a list of songs your child may be familiar/unfamiliar with. We wish for you to circle the songs your child is familiar with.
5. Next, the researcher will contact you to set the date and time in order to start the one-on-one sessions with the researcher who works as an applied behavior analysis (ABA) therapist at AUBMC special kids clinic. She will come to where your child's CCA-En program is located (Adduha high school in Beirut) and sit with your child for two phases. In the first phase, which consists of 2 weeks, she will meet with your child five times a week for 30 minutes to familiarize your child with the songs to be used during the music sessions in the second phase.
6. In the second phase directly following the first phase, the researcher will come to where your child's CCA-En program is located and sit with your child only two times a week for 30 minutes each in order to devote 10 minutes to each of the three different interventions.
7. All the music sessions will need to be recorded in order to time how fast your child's responses are after playing each music technique. Also, the researcher needs to watch which music technique makes your child the happiest by watching if he or she is smiling or laughing and rating their happiness levels on a scale from 0-5 with 0-1 being unhappy (frowning), 2-3 being neutral (no smile, no frown), and 4-5 being happy (smiling, laughing).
8. Your child's name will be changed for the purpose of the study.
9. Only the Co-Principal researcher and the principal investigator leading the study, Dr. Anies Al-Hroub, will have access to the videos to analyze the data.
10. After three years, all the questionnaires and information recorded on video will be permanently destroyed and deleted respectively.
11. You will fill out the social validity scale to see whether or not the intervention has made a difference in your child's verbal expression. The counselor's office at the Adduha high school will be reserved to provide a quiet and comfortable area to complete the social validity scale and will ensure privacy of data.

Duration:
If involved in the study, your child will be sitting for phase 1 everyday for 2 weeks for 30 minute per day and then for phase 2 fifteen sessions over 2 months; 2 times a week for 30 minutes per day. 30 minutes are needed in order to devote 10 minutes to each of the three different interventions. After 2 months and 2 weeks are over the researcher will terminate the child from the study. However, your child may leave the study at any time. If you decide to stop your child's participation in the study, there will be no penalty to you, or your child and you will not lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship, or that of your child, with AUB.

Risks and Benefits: Students' participation in this study does not involve any physical risk or emotional risk to them beyond the risks of their daily life. Participants have the right to withdraw

your consent or discontinue participation at any time for any reason. Parents' decision to withdraw will not involve any penalty or loss of benefits to which you are entitled. Discontinuing participation in the study will in no way affect your relationship with the school or with AUB. In addition, refusal to participate in the study will involve no penalties of any kind or affect the principals', teachers' or student's relationship with AUB. You may or may not receive direct benefits from this study. For example, you may learn that this kind of intervention particularly helps your child learn how to express him/herself better through music! You can then apply it at home in order to motivate him/her to speak. Your consent will help researchers better understand if music influences speech and future interventions that may stem from this research targeting speech.

Confidentiality:

Data will be treated in a highly confidential manner. All data from this study will be maintained in a secure locked drawer in a locked office or on a password protected computer. Data will only be reported in the aggregate. No names of individual children will be disclosed in any reports or presentations of this research. However, there may be circumstances where this information must be released. For example, personal information regarding your child's participation in this study may be disclosed if required by law. Data may be audited by the IRB while assuring confidentiality. Also, your child's research data may be reviewed by the following group:

- The AUB Institutional Review Board or Office of Human Research Protections

More information about the safety and confidentiality of your child in this study:
- Consent from you is needed to video tape your child after which footage will be completely erased after the study is over
- The findings of this study will be shared with you personally

After the conclusion of the study, the Principal Investigator will retain all original study data in a secure location for at least three years to meet institutional archiving requirements. After this period, data will be responsibly destroyed.

Participant Rights:

You may refuse to allow your child to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you are a student or employee at AUB, your decision about whether or not you allow your child to participate in this research will not affect your grades or employment status.

If you choose to allow your child to participate in the study, you may discontinue his/her participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights you or your child may have as a participant in this study.

The Social & Behavioral Institutional Review Board responsible for human subjects research at AUB has reviewed this research project and found it to be acceptable, according to applicable Lebanese and U.S. federal regulations and AUB policies designed to protect the rights and welfare of participants in research.

Contacts and Questions:
For questions, concerns, or complaints about the study you may contact Dr. Anies Al-Hroub at 01-350000 ext. 3064 or by email: aa111@aub.edu.lb or Ms. Nayla Attar at 76-988343 or by email: nma67@aub.edu.lb.

For questions about your child's rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact the AUB Social & Behavioral Science Institutional Review Board at 01- 350000 or 01-374374, Ext: 5445 or by email: irb@mail.aub.edu.

Signing the consent form

I have read (or someone has read to me) this form and I am aware that I am being asked to give permission for my minor child (or child under my guardianship) to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to give permission for my child/child under my guardianship to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form**.**

_____   _____
Printed name of subject

    _____

_____   _____
Printed name of person authorized to give permission for minor subject/participant   **Signature of person authorized to give permission for minor subject/participant (when applicable)**

       AM/PM
_____   _____
Relationship to the subject   **Date and time**

Investigator/Research Staff

I have explained the research to the parent or legal guardian of the child subject/participant before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the parent/legal guardian of the child participant/subject.

_____   _____
Printed name of person obtaining permission   **Signature of person obtaining permission**

_____ **AM/PM**
          Date and time

Principal Investigator: Dr. Anies Al-Hroub
Address: American University of Beirut (AUB)
          Associate Professor of Educational Psychology & Special
          Education
          Phone: (01) 350 000 Ext: 3064
          Email: aa111@aub.edu.lb

Co-Investigator: Nayla Attar
Address: American University of Beirut (AUB)
          Beirut – Lebanon
          Phone: (76) 988343
          Email: nma67@aub.edu.lb

الجامعة الأمريكية في بيروت

العلوم الاجتماعية والسلوكية

نموذج موافقة الأهل لمشاركة طفلهم او طفلتهم في الدراسة

عنوان الدراسة: تاثيرات العلاج بالموسيقى لتحسين المهارات اللفطية للأطفال ذوي اضطراب طيف التوحد

الباحثان: أنيس الحروب ونايلة عطار

هذا نموذج موافقة لابنكم الذي أنتم الوصي القانونيّ عليه للمشاركة في هذه الدراسة البحثيّة. يتضمّن النموذج معلومات مهمّة حول هذه الدراسة وما الذي يجب أن تتوقّعوه في حال قرّرتم السماح لابنكم/ابنتكم بالمشاركة.

مشاركة ابنكم هي محض طوعيّة.

يرجى أن تقرأوا المعلومات بعناية قبل أن تقرّروا السماح لابنكم/ابنتكم بالمشاركة. سنطلب منكم أن توقّعوا على هذا النموذج، وسنزودكم بنسخة منه في حال قررتم أن تسمحوا لهم بالمشاركة.

الهدف: تهدف هذه الدراسة إلى المقارنة بين أي من أنواع التدخل الثلاثة الأكثر قدرة على زيادة دافعية طفلكم للكلام بشكل أسرع. سنقوم بدراسة سرعة استجابة الطفال في حال استماعهم للموسيقى بثلاث طرق مختلفة.

تكون الطريقة الأولى عبر الغناء، والطريقة الثانية عبر الغناء إلى جانب العزف على آلة موسيقية، أما الطريقة الثالثة فهي الإصغاء إلى الموسيقى وهي تُعزَف على قرص مدمج CD. سيتم عزف الطرق الموسيقية بشكل منفرد وسيتم إيقافها حينما يستجيب طفلكم، وبحسب الطريقة التي ستعجبه، فإن سرعة استجابته ستتفاوت. نود كذلك أن نحدد أيًا من طرق التدخل الموسيقية ستجعل طفلكم يشعر بالسعادة عبر مشاهدته وهو يضحك أو يبتسم خلال العلاج بالموسيقى. أخيراً، نود أن نحصل على استجاباتكم واستجابات معلمي طفلكم حول مدى كون التدخل قد ترك تأثيراً على التعبير الشفهي/اللفظي لطفلكم بعد مرور فترة زمنية تصل إلى شهرين وأسبوعين. سيتم تخصيص أسبوعين بشكل تام لجعل طفلكم يألف تلك الأغاني التي ستستخدم في التدخل كي لا يكون الاستماع إليها أثناء التدخل هي المرة الأولى بالنسبة لهم.

الأجراءات / المهام

الالتحاق بالدراسة

1. سيتم ارسال دعوة من خلال الهيئة الادارية للجمعية اللبنانية للتوحد – صفوف الاطفال ذوي التوحد، وذلك لأهالي الاطفال الذي تنطبق عليهم معايير الدراسة، وذلك لحضور اجتماع تحضيري يقدمه فريق الباحثين ويتم فيه شرح هدف الدراسة، وتوجيه دعوة للاهالي للمشاركة في الدراسة والسماح لأطفالهم بالمشاركة في الدراسة.
2. بعد الحصول على موافقتكم، يتوجّب عليكم ملء مستندين اثنين.
3. المستند الأول الذي يجب عليكم ملؤه هو استبيان للأهل الخاص بجمع معلومات عن ابنكم/ابنتكم قبل البدء بالتدخل. يتضمن الاستبيان أسئلة حول العمر، الصف، مدى حاصل الذكاء ... إلخ، ما يمكّن الباحث من تحديد ما إذا كان طفلكم يستوفي شروط الالتحاق بالدراسة. بعد إتمام ملء الاستبيان، هناك احتمال أن يتم استبعاد طفلكم من المشاركة في الدراسة بالاستناد إلى إجاباتكم.
4. المستند الثاني الواجب عليكم ملؤه، هو لائحة بالأغاني المألوفة/ أو غير المألوفة بالنسبة لطفلكم/طفلتكم. نأمل منكم أن تضعوا دائرة حول الأغاني المألوفة بالنسبة لطفلكم/طفلتكم.
5. سيقوم الباحث بالتواصل معكم لتحديد تاريخ وموعد البدء بالجلسات الفردية مع الباحثة التي تعمل كمعالجة التحليل السلوكي التطبيقي في مستشفى الجامعة الأمريكية في بيروت- عيادة الأطفال الخاصة. ستحضر المعالجة إلى صفوف الأطفال ذوي التوحد- اللغة الإنكليزية الموجودة في ثانوية الضحى- بيروت وتجلس مع طفلكم على مرحلتين. في المرحلة الأولى، والممتدة على مدى أسبوعين، ستلتقي بطفلكم خمس مرات أسبوعياً ولمدة 30 دقيقة لكي تجعله يألف الأغاني التي سيتم استخدامها في الجلسات العلاجية في المرحلة الثانية.

6. في المرحلة الثانية والتي تلي مباشرة المرحلة الأولى، ستحضر المعالجة إلى صفوف الأطفال ذوي التوحد وتجلس مع طفلكم/طفلتكم مرتين أسبوعياً لمدة ثلاثين دقيقة وتخصّص 10 دقائق لكل نوع من أنواع التدخل الثلاثة.

7. كافة جلسات العلاج بالموسيقى ستكون مسجلة كي يتم مدى سرعة استجابة طفلكم بعد الاستماع إلى طريقة موسيقية. أيضا، يحتاج الباحث إلى أن يراقب أيا من الطرق تجعل طفلك أكثر سعادة، عبر مشاهدة إن كان يضحك أو يبتسم وتحديد مستوى السعادة على مقياس من 0 إلى 5 بحيث تكون 0 إلى 1 غير سعيد (مقطب الحاجبين)، 2-3 (محايد (لا باتسامة ولا تقطيب الحاجبين)، (4-5) سعيد (مبتسم، ضاحك).

8. سيتم تغيير اسم طفلكم لضرورات الدراسة.

9. فقط الباحث الميداني والدارس الرئيسي الذي يقود هذه الدراسة، الدكتور أنيس الحروب، سيكونان قادرين على الاطلاع على التسجيل المرئي لتحليل المعطيات .

10. بعد انقضاء ثلاث سنوات بعد الانتهاء من الدراسة، سيتم اتلف كافة الاستبيانات والمعلومات المسجلة على الفيديو بشكل تام.

11. ستقوم بتعبئة مقياس الصدق الاجتماعي وذلك لمعرفة فيما إذا كان التدخل قد كان له أثر على قدرة ابنك في التعبير اللفظي. سيتم حجز غرفة مكتب المرشدة التربوية في مدرسة الضحى الثانوية، لما تشكله من مساحة مريحة وهادئة تستطيع فيها تعبئة المقياس، والمحافظة على خصوصية المعلومات.

مدة الدراسة:

في حال شاركم ولدكم في الدراسة، فإنه سيشترك في المرحلة الأولى كل يوم على مدى أسبوعين ولمدة 30 دقيقة في اليوم، بعدها سيشارك في المرحلة الثانية في خمس عشرة جلسة ولشهرين اثنين، مرتان في الأسبوع ولمدة 30 دقيقة في اليوم. هناك حاجة لثلاثين دقيقة ليتم تخصيص 10 دقائق لكل نوع من أنواع التدخل الثلاثة. بعد مرور شهرين وأسبوعين، سيوقف الباحث الطفل عن المشاركة في الدراسة. لكن بمقدور الطفل أن يترك الدراسة في أي وقت كان. في حال قرّرت أن توقف مشاركة ابنكم في الدراسة، فلن يترتّب عليكم أو على أبنائكم أي جزاء ولن تخسروا المنافع التي حصلتم عليها. قراركم لن يؤثّر على علاقتكم أو علاقة أبنائكم المستقبلية مع الجامعة الأميركيّة في بيروت.

المخاطر والفوائد:

مشاركة التلاميذ في هذه الدراسة لا تتضمن أي مخاطر جسدية أو نفسية تصيبهم تزيد عما قد يتعرضون له في الحياة اليومية. يحق للمشاركين سحب موافقتهم أو التوقّف عن المشاركة فأي وقت ولأي سبب. إن قرارة الأهل بالانسحاب لن يعرّضهم لأي عقاب أو خسارة منافع يحق لهم بها. التوقف عن المشاركة في هذه الدراسة لن يؤثر على علاقتكم بالمدرسة بأي شكل من الأشكال أو مع الجامعة الأمريكية في بيروت. كما أن رفض المشاركة في هذه الدراسة لن يتضمّن أي عقاب من أي نوع ولن يؤثر على علاقة المدير، أو المعلمين أو التلاميذ بالجامعة الأمريكية في بيروت. قد تحصل أو لا تحصل على منافع مباشرة من هذه الدراسة. فعلى سبيل المثال، قد تتعلم نوعا من التدخل والذي سيفيد بشكل خاص في تعلم طفلك كيفية التعبير عن ذاته/ ذاتها بشكل أفضل عبر الموسيقى. بإمكانك أن تطبقها مع الموسيقى في المنزل لزيادة دفاعية طفلك على الكلام. إن موافقتك ستساعد الباحثين على أن يدركوا بشكل أفضل أثر الموسيقى على الكلام، والتدخلات المستقبلية التي قد تنشأ مستقبلاً عن هذا البحث الموجه نحو الكلام.

السرية

سيتم التعامل مع البيانات بطريقة سرية. كافة بيانات هذه الدراسة سيتم الاحتفاظ بها في درج مقفل في غرفة آمنة أو على جهاز حاسوب محمي بكلمة مرور. سيتمّ عرض البيانات فقط بشكل جمعيّ. لن يتم إفشاء أي أسم في أي من التقارير أو العروض المتعلقة بهذه الدراسة. ولكن، قد تحصل ظروف معيّنة تستدعي عرض المعلومات. على سبيل المثال، قد تنشر المعلومات الشخصيّة المتعلّقة بمشاركة ابنكم/ابنتكم في الدراسة إذا طلبت منّا قانونيّا. قد يتم التدقيق بالبيانات من قبل مجلس مراجعة دراسات العلوم الإنسانية والسلوكية وفي الوقت نفسه يتم المحافظة على السرية. أيضا، قد يتم مراجعة البيانات المتعلقة بطفلكم من قبل المجموعة التالية:

مجلس المراجعة المؤسساتي في الجامعة الأمريكية في بيروت أو مكتب حماية البحث الإنساني.

معلومات إضافية حول الأمان والسرية المتعلقة بطفلكم في هذه الدراسة:

- موافقة من قبلكم على تصوير طفلكم ومن بعدها سيتم مسح الفيديو بشكل تام بعد انتهاء الدراسة.
- نتائج الدراسة سيتم إطلاعكم عليها بشكل شخصي.

بعد اختتام الدراسة، سيقوم الباحث الرئيسي بالاحتفاظ بالبيانات الأساسية في مكان آمن لمدة ثلاث سنوات على الأقل بحسب متطلبات الأرشفة المؤسساتية. من بعد انقضاء تلك المدة، سيتم إتلاف البيانات بطريقة مسؤولة.

حقوق المشاركين

بإمكانكم رفض السماح لطفلكم بالمشاركة في هذه الدراسة من دون تعرضكم لأي عقوبة أو خسارة أي منافع تعد حقا من حقوقكم. إن كنتَ طالبا أو موظفا في الجامعة الأمريكية في بيروت، فإن قراركم حول السماح لطفلك بالمشاركة من عدمها في هذه الدراسة لن يؤثّر على علاماتك أو وضعك كموظف. إذا قررت أن تسمح لطفلك بالمشاركة في الدراسة، فبإمكانك أن توقف مشاركة طفلك/ طفلتك في أي وقت من دون أي جزاء أو خسارة لمنافع. بتوقيعك على هذا النموذج، فإنك وبتوقيعكم لهذا النموذج، فإنّكم لا تتخلون عن أي حقوق قانونيّة شخصيّة لكم ولابنكم/ابنتكم كمشارك في هذه الدراسة. مجلس المراجعة المؤسسيّة للاجتماعيات والسلوكيات المعني بالبحث الإنساني في الجامعة الأميركيّة في بيروت قد راجع هذا المشروع ووافق عليه، وفقا لقرارات لبنانية وقرارات اميركية فيدرالية معمول بها، وسياسات الجامعة الأميركية في بيروت الهادفة إلى حماية حقوق ورفاه المشاركين في البحث.

جهات التواصل والأسئلة:

لأي أسئلة أو استفسارات أو شكوى حول الدراسة يمكنك الاتصال ب:

الدكتور أنيس الحروب، البريد الالكتروني: aa111@aub.edu.lb ، رقم الهاتف 350000-01 مقسم: 3064/3060، أو التواصل مع الآنسة نايا عطار على رقم الهاتف 76-988343 أو على البريد الالكتروني nma67@aub.edu.lb.

لأسئلتكم حول حقوق ابنكم كمشارك في الدراسة ومن أجل مناقشة الشواغل المتعلقة بالدراسة أوالشكاوى مع شخص ليس من ضمن فريق البحث، يمكنك الاتصال بمجلس مراجعة الدراسات الاجتماعيّة والسلوكيات على رقم 350000-01 مقسم: 5445 أو عبر البريد الإلكتروني: irb@mail.aub.edu.

توقيع نموذج الموافقة:

لقد قرأت (أو أحدهم قد قرأ لي) هذا النموذج وأنا واع أنّه طُلب منّي أن أعطي موافقتي على مشاركة ابني/ابنتي الصغير(ة) (أو الطفل الذي تحت وصايتي) في دراسة بحثيّة. لقد كانت لدي فرصة طرح أسئلة تمّ الإجابة عليها. وأوافق طوعيّا على أن أعطي الموافقة على مشاركة ابني/ابنتي أو الطفل الذي تحت وصايتي في هذه الدراسة.

لا أتخلّى عن أيّة حقوق قانونيّة بتوقيعي لهذا النموذج. وسأحصل على نسخة منه.

اسم المشارك	اسم الشخص المعني بإعطاء الموافقة على مشاركة ولده/ابنته

الشخص المعني بإعطاء الموافقة على مشاركة ولده /ابنته

علاقته مع المشارك/الأمر: _____ التاريخ والوقت: _____ صباحا مساء

فريق الباحثين

لقد قمت بشرح البحث لأهل المشارك أو الوصي القانوني عليه قبل طلب التوقيع أعلاه. لا وجود لأي أمور خالية في هذه الوثيقة. لقد تم إعطاء نسخة عن هذه الوثيقة لأهل/الوصي القانونيّ على الطفل المشارك.

صباحا مساء

اسم مَن حصل على الموافقة   توقيع مَن حصل على التوقيع   التاريخ والوقت

الباحث المساعد: الانسة نايلة عطار	الباحث الرئيسي: الدكتور أنيس الحروب
العنوان: الجامعة الامريكية في بيروت	العنوان: الجامعة الامريكية في بيروت

تلفون: 988343 (76) بريد الكتروني: nma67@aub.edu.lb	استاذ مشارك في علم النفس التربوي والتربية الخاصة تلفون: 3064 :Ext 000 350 (01) بريد الكتروني aa111@aub.edu.lb

Appendix G

G. Teacher Consent Form

American University of Beirut

Department of Education

Teachers Semi-structured Interview Consent Form

Direct Approaching

Study Title: Effects of Music Therapy to Enhance Verbal Skills in Children with Autism Spectrum Disorder

Principal Investigator:	Dr. Anies Al-Hroub
Address:	American University of Beirut (AUB)
	Chairman of Educational Psychology & Special Education
	Phone: (01) 350 000 Ext: 3064
	Email: aa111@aub.edu.lb
Co-Investigator:	Nayla Attar
Address:	American University of Beirut (AUB)
	Beirut – Lebanon
	Phone: (76) 988343
	Email: nma67@aub.edu.lb

Dear Teacher,

We are asking for your participation in a **research study**. Participation is completely voluntary. Please read the information below and feel free to ask any questions that you may have.

A. Project Description
1. This study is being conducted for the purpose of a Master's thesis study in Educational Psychology - School Guidance and Counseling at the American University of Beirut. No The purpose of this study is to identify and compare the impact of three different types of music therapy interventions, derived from classical music therapy techniques, each combined with applied behavior analysis (ABA) on the verbal expression of children diagnosed with ASD. The three musical approaches that are going to be used include, Music Interaction Therapy (MIT) (Wimpory & Nash, 1999), Interactive music playing (Kaplan & Steele, 2005) and Receptive music therapy (RMT). The basic research questions for this study are: (a) How do the three music interventions compare in their

impact on decreasing the latency period preceding a vocal response in three children with ASD? (b) Do children with ASD show different levels of happiness from participation in the three music interventions?; and (c) How do teachers and parents measure the social validity in regards to meeting outcomes, goals, and procedures of this particular intervention for verbal expression? In order to answer the questions, the music sessions will be video recorded. This study is being conducted for the purpose of a Master's thesis study in Educational Psychology - School Guidance and Counseling at the American University of Beirut. The estimated time to complete this study is two months and two-weeks long. The expected numbers of participants are 3 secondary-aged gifted students (2 boys and 1 girl) as well as teachers and parents of the students. The results of video analysis will be published in the form of a thesis report. No personal or sensitive questions will be asked as part of this study. Ratings scales will be given to a few teachers to measure how strong the outcomes of the study are. The results will be published in the form of a thesis report and will be available by the AUB Library electronically and in printed form.

2. A typed invitation letter will be sent by the administrative coordinator who works in the LAS-CCA to teachers of the selected children to attend an introductory meeting done by the research team to further explain the purpose of the study and invite teachers to participate in the study

3. The administrative coordinator will then send an invitation by email to teachers of the selected children to attend an introductory meeting done by the research team to further explain the purpose of the study and invite teachers to participate in the study. Teachers who agree to participate in the study will be given the teacher consent forms and will then fill out the social validity scale. The counselor's office at the Adduha high school will be reserved to provide parents and teachers a quiet and comfortable area to complete the social validity scale and will ensure privacy of data

4. Teachers that are teaching the three selected students will be asked if they accept to participate in filing out a rating scale.

5. Rating scales will be given individually. The counselor's office at the Adduha high school will be reserved to provide a quiet and comfortable area to complete the social validity scale and will ensure privacy of data. Teacher's responses will be collected afterwards.

6. The rating scale will take around 10 minutes.

7. If you agree to participate, you will receive a copy of this signed informed consent as well as the semi-structured interview either in Arabic or in English (according to your preference)

8. Participants will receive the survey on **mm/dd/yy** and have the duration of one week to complete it.

B. Risks and Benefits

Your participation in this study does not involve any physical risk or emotional risk to you beyond the risks of daily life. You have the right to withdraw your consent or discontinue participation at any time for any reason. Your decision to withdraw will not involve any penalty or loss of benefits to which you are entitled. Discontinuing participation in the study will in no way affect your relationship with the school or with AUB. In addition, refusal to participate in the study will involve no penalties of any kind or affect the teachers' relationship with AUB or the school. You receive no direct benefits from participating in this research; however, the outcome of this study is expected to have theoretical and practical implications. First, the theoretical implication This study is important in Lebanon where a lack in research has indicated that not many autism-targeted interventions such as ABA are being applied with ASD students, specifically with verbal expression. There is a need to study the usefulness of potential interventions to help children in Lebanon affected by this disorder strengthen their universal weaknesses in communication so they can lead fulfilled lives The results of this study are significant to practice because they may offer alternate or more efficient methods to what teachers or therapists in schools are currently using to enhance the verbal expression of kids with ASD. The results may allow special education teachers, ABA therapists, or parents living in Lebanon implement the best technique for targeting verbal expression in their kids with efficient knowledge about the emotional experience the particular intervention can bring. In this way, satisfactory interventions can be replaced with fulfilling and enjoyable ones.

C. Confidentiality

If you agree to participate in this research study, the information will be kept confidential. Records will be monitored and may be audited without violating confidentiality. Your name and/or the school's name will never be attached to your answers. Data provided will not be shared neither by another teacher, nor the school principal. The data is only reviewed by the Principal Investigator and the Co-Investigator working on this project. Participants' contact information will be shredded as soon as data analysis is completed.

D. Contact Information

1) If you have any questions or concerns about the research, you may contact Dr. Anies Al-Hroub at 01-350000 ext. 3064 or by email: aa111@aub.edu.lb or Ms. Nayla Attar at 76-988343 or by email: nma67@aub.edu.lb

2) If you feel that your questions have not been answered, or if you have any questions, concerns or complaints about your rights as a participant in this research, you can contact the following officer at AUB: social & Behavioral Sciences Institutional Review Board at 01- 350000 or 01- 374374, Ext: 5445 or by email: irb@mail.aub.edu.

E. Participant Rights

Participation in this study is voluntary. There are no monetary rewards for participation in the study. You are free to leave the study at any time without penalty. Your decision not to participate is no way influences your relationship with AUB. A copy of this consent form will be given to you. You may skip any questions that you may wish not to answer. Your decision will not result in any penalty or loss of benefits. If you have any questions regarding your rights, you may call: Institutional Review Board (IRB) on 01- 350000 ext. 5445.

Teacher's signature: _____

Date: _____

Time:_____

Location: _____

Co-Investigator's Signature: _____

Appendix H

H. Intervention Songs Used with Keywords

THE MUFFIN MAN

TRADITIONAL
Arranged by DAN COATES

89

Pat-a-Cake

Where is Thumbkin?

Key words:
am
well

Where is Thumb-kin? Where is Thumb-kin? Here I am. Here I am.

How are you to-day sir? Ve-ry well, I thank you. Run and play. Run and play.

Verse 2:
Where is Pointer?
Where is Pointer?
Here I am.
Here I am.
How are you today, sir?
Very well, I thank you.
Run and play.
Run and play.

Verse 3:
Where is Tall Man?
Where is Tall Man?
Here I am.
Here I am.
How are you today, sir?
Very well, I thank you.
Run and play.
Run and play.

Verse 4:
Where is Ring Man?
Where is Ring Man?
Here I am.
Here I am.
How are you today, sir?
Very well, I thank you.
Run and play.
Run and play.

Verse 5:
Where is Pinky?
Where is Pinky?
Here I am.
Here I am.
How are you today, sir?
Very well, I thank you.
Run and play.
Run and play.

Barney KeyWords:
apple
rainbow

A Tisket A Tasket

Appendix I

I. Recording Sheet for Index of Happiness

What you have:

a) One USB with 22 videos total

b) 10 scoring charts

General information:

There are three children.

Each video is about 15 minutes long.

Each child in the 15 minute video gets around 5 minutes of intervention.

Each intervention consists of 3 different music techniques which are: 1)singing, 2)playing music AND singing, 3) listening to music

HOWEVER!!! *Each video is different because I rotate the interventions meaning, sometimes I start the session with singing, sometimes I start with playing music AND singing, and sometimes I start with listening to music.*

****

What you have to do:

1. You open the videos on the USB.
2. There you will see the videos labeled by letter starting with "video **A**" and ending with "video **I**"
3. You find the label written on the scoring sheet (video **A**) that matches the videos on the USB (video **A**).
4. Open "video **A**". Get out the scoring sheet labeled "video **A**"
5. For the first 40 seconds which starts with the *singing and music* intervention check whether the child smiled at all:
- If **yes** he smiled, then mark a **4 or 5** based on how happy he looks
- If he did not smile, but looked neutral mark a **2 or 3.**
- If he is frowning or crying, looking unhappy, then mark a **0 or 1.**
6. Score the reactions for the next 40 seconds of intervention, *singing,* followed by the last 40 seconds, *listening*.
7. Do the same thing for the other two kids in "video **A**".

Rating Scale

Happy

5: laughing, jumping, making shouting/yelling happy noises

4: smiling, engaged with me

Neutral

3: showing no general facial expression, looks calm, at ease

2: showing no general facial expression, looks uneasy

Unhappy

1: frowning, looks sad

0: crying, tantrum, making angry noises

Video A	Singing and Music	Singing	Listening
Interval/duration	40 seconds	80 seconds	120s
Youssef			
Andy			
Alex			

Video B	Listening	Singing and Music	Singing
Interval/duration	40 seconds	80 seconds	120s
Youssef			

Andy			
Alex			

Video C	Singing	Listening	Singing and Music
Interval/duration	40 seconds	80 seconds	120s
Youssef			
Andy			
Alex			

Video D	Listening	Singing and Music	Singing
Interval/duration	40 seconds	80 seconds	120s
Andy			
Alex			

Video E	Singing	Listening	Singing and Music
Interval/duration	40 seconds	80 seconds	120s
Andy			
Alex			

Video F	Listening	Singing and Music	Singing
Interval/duration	40 seconds	80 seconds	120s
Andy			

Alex			

Video G	Singing and Music	Singing	Listening
Interval/duration	40 seconds	80 seconds	120s
Andy			
Alex			

Video H	Listening	Singing and Music	Singing
Interval/duration	40 seconds	80 seconds	120s
Andy			
Alex			

Video I	Singing	Listening	Singing and Music
Interval/duration	40 seconds	80 seconds	120s
Andy			
Alex			

Video J	Singing	Listening	Singing and Music
Interval/duration	40 seconds	80 seconds	120s
Andy			
Alex			

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