

Addressing Joint Attention Deficits with Children with Autism Spectrum Disorder: A  
Music Therapy Intervention Research Study

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A Thesis  
In  
The Department  
of  
Creative Arts Therapies

Presented in Partial Fulfillment of the Requirements  
For the Degree of Master of Arts  
Concordia University  
Montreal, Quebec, Canada

April 2017

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**CONCORDIA UNIVERSITY**

**School of Graduate Studies**

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Entitled: Addressing Joint Attention Deficits with Children with Autism Spectrum  
Disorder: A Music Therapy Intervention Research Study

and submitted in partial fulfillment of the requirements for the degree of

**Master of Arts (Creative Arts Therapies, Music Therapy Option)**

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## **Abstract**

### Addressing Joint Attention Deficits with Children with Autism Spectrum Disorder: A Music Therapy Intervention Research Study

Charles-Antoine Thibeault

This study involved the development of a 12-month music therapy program addressing joint attention deficits for children 1 to 6 years old diagnosed with or suspected of having Autism Spectrum Disorder. As joint attention plays a key role in the development of social communicative skills such as language and theory of mind, its deficit can have a great impact on the life of children diagnosed with autism. Although many interventions have been developed to address this deficit in fields such as psycho-education and education, little is available in the field of music therapy. Moreover, of those interventions developed in music therapy, few involved external settings, such as homes and schools. This study used an intervention research methodology to provide appropriate guidelines for intervention with children with autism to address joint attention deficits. These guidelines include such elements as goals and objectives, including addressing joint attention responses and initiations, treatment duration, setting, intervention agent, specificities of sensory interventions with children with autism, and pertinent musical components. Results indicate that the inclusion of siblings and the use of improvisational music therapy could favor positive results. Potential implications for music therapy practice as well as areas for future research are discussed.

## Acknowledgements

I would like to thank my supervisor, Dr. Sandi Curtis, for her time and support throughout the completion of my thesis. I would also like to thank Dr. Guylaine Vaillancourt and Dr. Laurel Young for their dedication and patience throughout my education in music therapy. You have given me more than a profession; you have given me purpose. I could not be more grateful for the experience and opportunities this program has given me and I will always remember my time through the program as an important stepping-stone in my life. The love and support I have received throughout this journey has given me the strength to take the first steps to a more difficult and personal transition and I will forever be grateful for it.

I would also like to thank my peers for their support throughout the program. As we all take steps towards the rest of our lives, I will miss our weekly classes dearly.

I am also grateful for my parents and employers at *La Société de l'autisme* who have given me so much support for my dream of becoming a music therapist. I could not have followed this path blindly if it had not been for your help and acceptance, and I thank you greatly.

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## Chapter 1. Introduction

The prevalence of autism has been growing consistently in Quebec over the past 15 years (Autisme Québec, 2015). In 2016, the prevalence of autism is currently estimated to be 1% of the Canadian population (Fédération Québécoise de l'Autisme, 2016). Persons with autism show “impairment in the use of nonverbal communication, lack of peer relationship development skills, non-spontaneous interactions with others, lack of reciprocity, lack of imaginative play, and a lack of communicative exchange” (American Psychiatric Association, 2013, p. 299). They also present with such particular characteristics as repetitive behaviors, repetitive movements, ritualistic behaviors or sensory disorganization, and/or obsessive interests (De Vries, Beck, Stacey, Winslow & Meines, 2015). Warreyn, Van Der Paelt, and Roeyers (2014) indicate that children with autism exhibit deficits in three main areas of learning: imitation, joint attention, and play; they stress the importance of addressing these issues through early interventions as these are crucial to the development of social and communication skills.

Considered to be of particular importance, joint attention can be defined as “the capacity to coordinate attention and engagement on objects in the distal visual field with another person” (Elison et al., 2012, pp. 186-187). Deficits in this area are described by researchers as representing some of the earliest signs of autism (Gillespie-Lynch et al., 2015; Meindl & Cannella-Malone, 2011).

Many interventions designed to address joint attention deficits can be found in the educational research literature (Ezell et al., 2012; Kaale, Smith & Sponheim, 2012; Rao & Ashok, 2014; Warreyn & Roeyers, 2013; Wong, 2013), but only a few interventions are seen in the music therapy research literature (Geretsegger et al., 2015; Kim, Wigram & Gold, 2008; Vaiouli, Grimmet & Ruich, 2015). In addition, some interventions designed to address joint attention deficits with children with autism make use of music as a medium but have not been developed or implemented by music therapists (De Vries et al., 2015; Stephens, 2008). Among those researching and writing in this area of music therapy, Kalas (2012) observes that “music-based interventions can be a motivating medium for addressing social communication behaviors such as joint attention” (p. 434). Kalas also notes that music therapy as a treatment medium uses sensory particularities, such as hypersensitivity or hyposensitivity, as strengths and individualizes the treatment to the needs of the child. For example, by adapting the musical stimulation provided to meet the sensory needs of the child, such as using complex music with children with mild autism, the music therapist can use the sensory particularities of the child to maximize the child's attention span. In addition,

improvisational music therapy is considered to be an effective treatment for children with autism as it engages their interests and helps them to “develop spontaneous self-expression, emotional communication and social interaction” (Kim et al., 2008, p. 1758).

Although most of these interventions have proven to be effective within the treatment contexts, they fail to generalize the acquired joint attention skills to other contexts. Only one study has been found with successful generalization of skills to external settings; this study includes parents as part of a singing treatment (Vaiouli et al., 2015). These results suggest that, while difficult, generalization of context-acquired joint attention skills to external settings might be possible through an improvisational family-based music therapy approach.

### **Relevance to the Field**

In light of these studies, developing an intervention program allowing for generalization of acquired joint attention skills outside of a therapeutic context could be a logical next step for music therapy clinicians working in the field. Such a program could allow music therapists to expand the application of therapeutic results to the child’s immediate environment, increasing the practical relevance of the treatment. Additionally, developing an intervention program based on findings contained in scholarly literature could provide music therapists with the initial framework for the development of a reliable, evidenced-based music therapy program that would help to increase joint attention for children diagnosed with autism.

### **Personal Relationship with the Topic**

As I was finishing high school, I started working for *La Société de l’autisme*. This organization provides leisure opportunities as well as respite services for children, adolescents, and adults diagnosed with autism. As part of my job, I was expected to assist persons with autism with leisure activities and provide basic care during their stay in the residence of this organization. I developed many relationships with them, some of whom were severely affected by their condition whereas others were mildly affected.

I started to realize how the absence of joint attention, and the subsequent impact on their language and social skills, affected them. It was not merely an issue of respecting social conventions and fitting into the world. Without the development of language, the persons I was caring for were highly vulnerable. In the absence of language, it can be difficult to understand the world one lives in. For those I have worked with in the past, this seemed to cause anxiety and be linked with self-harm. As I started to understand this cycle and how common this was for many of these individuals, I began to see how important it was to

develop treatment interventions to address joint attention deficits early on, thus helping them to develop language and social skills.

### **Statement of Purpose**

Given the impact of joint attention deficits on social and communication skills for children with diagnoses of autism as well as the potential of music therapy as an intervention to address this, the purpose of this study was to design a music therapy intervention that increases joint attention with children diagnosed with autism, with specific attention to generalization of acquired skills to settings outside of treatment, such as home and school.

### **Assumptions**

In conceptualizing this study, I identified some of my assumptions. I assumed that music therapy would be a valid approach to address joint attention deficits. Given the sensory disorganization aspects inherent to an autistic diagnosis, I also assumed that a musical medium would be a particularly appropriate medium to address joint attention deficits with children with autism.

### **Key Terms**

Autism is defined as a neurodevelopmental disorder characterized by “impairment in the use of nonverbal communication, lack of peer relationship development skills, non-spontaneous interactions with others, reciprocity, lack of imaginative play, and a lack of communicative exchange” (American Psychiatric Association, 2013, p. 299).

Joint attention is defined as “the capacity to coordinate attention and engagement on objects in the distal visual field with another person” (Elison et al., 2012, pp. 186-187).

Within the context of this study, improvisational music therapy is defined as “a procedure of intervention that makes use of the potential for social engagement and expression of emotions occurring through improvisational music making” (Geretsegger et al., 2015, p. 260).

### **Primary Research Question**

The primary research question addressed in this study was: How can a music therapy intervention program be designed to address joint attention deficits in children diagnosed with autism in a way that generalizes outside of the music therapy context?

### **Chapter Summary**

Having provided the context for this research in Chapter One, including assumptions, statement of purpose, research question, and key terms, Chapter Two reviews articles found in the fields of music therapy and education from 2006 through 2016 that address joint attention deficits with children diagnosed with autism. This literature review



provides context for understanding the need for the creation of an intervention program addressing joint attention deficits. Chapter Three provides details on the methodology used for this thesis, intervention research. In Chapter Four, the results are presented, including the proposed music therapy intervention program. Chapter Five presents a discussion of the findings, including limitations related to the chosen methodology and this research. Recommendations for further research and practice are also identified.

## Chapter 2. Literature Review

### Understanding Joint Attention as a Construct

**Defining joint attention.** Typically, joint attention (JA) has been divided into two basic constructs. The first type of JA is imperative JA and serves an instrumental function. The second type of JA is declarative JA. It typically “has the social function of sharing an interest in something with someone” (Warreyn & Roeyers, 2013, p. 659). In other words, imperative JA is motivated by a need or request, whereas declarative JA is socially motivated. Additionally, a child can either Respond to a Joint Attention (RJA) or Initiate Joint Attention (IJA). These constructs have typically been studied separately (Elison et al., 2013; Meindl & Cannella-Malone, 2011; Paparella, Goods, Freeman & Kasari, 2011; Vaiouli et al., 2015; Warreyn & Roeyers, 2014).

**Assessing joint attention.** In a study reviewing the body of literature on JA in the past decade, Korhonen, Kärnä and Rätty (2014) warned about the assessment context’s impact on performance in JA tasks. In their review of 26 different articles studying JA skills with children diagnosed with autism, they found 4 articles reporting typical JA skills in the autistic participants (Dereu et al., 2012; Leekam & Ramsden, 2006; Paparella et al., 2011; Sigman & McGovern, 2005). In their discussion, Korhonen et al. (2014) argued that this phenomenon might be due to the use of the children’s preferences, such as using a favorite doll or toy as the attention object, in the assessment protocol resulting in higher scores in JA.

In order to assess children’s JA skills, most studies reviewed used the Early Social Communication Scales (Gangi, Ibañez & Messinger, 2014; Gillespie-Lynch et al., 2015; Kalas, 2012; Kaale et al., 2012; Kim et al., 2008; Paparella, et al., 2011; Wong, 2013). This scale has been found to be appropriate for children between 8 and 30 months of age, be they typically developing children or children with developmental delays (Kalas, 2012).

### Predictors, Processes, and Implications of Joint Attention Deficits

**Predictors.** In a study examining the processes involved in JA behaviors, Schietecatte, Roeyers and Warreyn (2012) found that children presenting social abilities, such as orienting towards other people, learn about social-communicative skills which leads to the development of JA skills. In other words, social behaviors at an early age would predict JA outcomes later in life. The authors also found that lack of social motivation in children with autism would lead to fewer opportunities to develop social skills, thus affecting JA development.

In a neuro-imaging study, Elison et al. (2013) found that the 9- to 10-month period represented a time of maximal differences in RJA patterns. Also, the authors suggested that

fractional anisotropy, a method emphasizing and evaluating white matter fiber tracts in MRIs, of the right uncinate fasciculus at 6 months would strongly predict RJA at 9 months. These findings suggest that JA deficits might be correlated to neurologic differences already identifiable at 6 months of age leading to abnormal social behaviors related to autism.

In summary, JA deficits might be predicted by a child's social motivation as well as by neuro-imaging strategies suggesting neurological particularities as early as around 6 months of age.

**Processes.** In their study, Schietecatte, Roeyers and Warreyn (2012), found that understanding intention was involved in RJA, suggesting that this was a skill needed for gaze following skills. Additionally, attention disengagement seemed to be related to IJA skills. This finding suggests that lack of social motivation is not the only domain explaining deficits in IJA. Attention processes might also be involved. In simpler words, it is not only necessary for the child to want to share attention with another person; they also need to be capable of shifting their attention from the object of interest to the other person.

In terms of the implications of motivation in both RJA and IJA skills, Kryzak and Jones (2014) investigated the use of autistic children's circumscribed interests as material for treatment intervention for developing JA skills. They found that even though using circumscribed interests increased the children's IJA skills, it also sometimes overshadowed teaching procedures, rendering the treatment ineffective (Kryzak & Jones, 2014). Thus, it might be hard for autistic children to shift their attention from a stimulus if their interest for the stimulus is too pronounced. As a result, not all circumscribed interests may be appropriate for teaching JA (Kryzak & Jones, 2014).

Delving further into understanding the processes involved in JA development, Ristic et al. (2005) investigated the relationship between eye gaze direction and JA skills. They explored two hypotheses: the hypothesis of social reading, supporting the idea that social information (status, personal interest and attentional engagement) is contained in eye direction; and the hypothesis of feature correspondence, supporting the idea that sensitivity to the change in eye direction of people surrounding us would explain the need to follow their gaze towards an interesting location or event. In exploring differences between the autistic population and the typically-developing population in these areas, this study found that social relevance was driving attentional responses in typically developing persons, but feature correspondence oriented attentional responses for an autistic population. These findings support the theory that one of the components explaining JA deficits in children with autism could be related to social abilities.

A final element coming into play in JA processes relating to the use of music in treatment might be the complexity of the music used. In a study exploring the use of complex versus simple music to enhance JA with an autistic population, Kalas (2012) writes that attention regulation, imitation and the ability to monitor one self and others would play a role in the development of JA skills. This study also supports the theory that deficits in disengaging attention might be correlated to JA deficits, impairing the child's ability to share attention towards an object of interest with another person. It was also found that complex music was more effective in channeling mild/moderate autistic children's attention whereas simple music was more effective for children with severe autism.

In summary, JA processes involve social motivation, attention processes, such as attention disengagement and attention regulation, ability in following one's gaze, and ability to monitor oneself and others. Also, circumscribed interests might act as a "buffer" for lack of social motivation and constitute a stimulus motivating enough for the child to show typical JA. However, when circumscribed interests are too pronounced, they might overshadow teaching procedures and reduce JA performances, thus indicating a curvilinear relationship (i.e., circumscribed interests may improve JA but may also reduce JA at a certain "tipping" point where the child becomes overly focused on these interests).

**Implications.** JA has been found to play a part in the development of many skills, such as language, theory of mind, and social competence (Elison et al., 2012; Gangi et al., 2014; Korhonen et al., 2014; Paparella et al., 2011). Additionally, JA deficits have been found to affect children's quality of life as they influence language development and social interactions (Kaale et al., 2012). JA deficit is described by many authors as one of the earliest sign of autism (Gillespie-Lynch & al., 2015; Meindl & Cannella-Malone, 2011).

Performances on JA tasks were studied with children considered at risk of developing autism (Gangi et al., 2014). Children were considered at high-risk when they had siblings diagnosed with autism. In this study, particular attention was focused on the relationship between JA and affective responses, such as smiling. The findings suggest that children with siblings diagnosed with autism that do not show affective responses associated with JA have a higher chance of being diagnosed with autism later on. Also, within the high-risk group (i.e. having siblings with autism) IJA without smiling was associated with the severity of the diagnosis later received. This suggests that "an infant's use of IJA that is not affectively motivated may index an early behavioral ability that can be beneficially employed for a range of non-affective social functions" (Gangi et al., 2014, p. 1422).

## **Joint Attention Development**

In a study charting the emergence of JA behaviors with autistic children, Paparella et al. (2011) found that joint looks, one of the earliest non-verbal JA skill, emerge at 6 months of age. This skill then becomes intentional at 12 months of age. JA skills continue to develop gradually from this point on, expanding the development of showing, following gaze, following points, and pointing to result in the development of JA at less than 20 months of age. Paparella et al. suggest a model for the typical development of JA versus the autistic development of JA in which they illustrate that, not only is JA development delayed with children diagnosed with autism, its order is also atypical. It is important to note that the authors used an age measurement adapted to both typically-developing and autistic children, Expressive Language Age, with the purpose of accounting for the many developmental differences between neuro-typical and autistic children.

### **Joint Attention Behaviors and Autism**

At 17 months of age, children with autism tend to show fewer coordinated looks than typically-developing children. They also show impaired abilities to follow gaze and follow a visual point at 30 months of age. Children with autism also exhibit difficulties in initiating gestures and responding to gestures early in their development resulting in fewer opportunities for JA development. In addition, children with autism have been found to focus on people's mouths more than on their eyes in comparison with typically-developing children, thus resulting, again, in fewer opportunities for JA learning and possibly explaining why children with autism might miss attentional cues (Paparella et al., 2011).

Typically, children with autism show deficits in three important areas of learning: imitation, JA, and play (Warreyn et al., 2014). These areas have been identified as targets for early intervention and, as indicated in the previously described articles, are pivotal skills for the development of social communicative skills such as language, social competence and theory of mind. These skills are developed at a very early age and the absence of such skills is considered a reliable predictor of autism. Given the importance of the development of these skills, multiple interventions exist to address JA in psycho-education and education. The next section examines some existing interventions for the development of JA at an early age with children diagnosed with autism.

### **Interventions**

**Play centered interventions.** In order to facilitate the development of JA in a school setting, Wong (2013) developed an intervention based on play. Using classroom observations, the Early Social Communication Scales and structured play assessment, as well as the Childhood Autism Rating Scale, a brief scale to measure autism, and the Mullen Scale

of Early Learning, to assess language, motor and perceptual abilities, the author measured the effectiveness of a play intervention with 34 preschool-aged children diagnosed with autism. Wong implemented an eight-session play and JA intervention utilizing behavioral strategies and milieu teaching putting emphasis on symbolic play. Teachers were given freedom for individualization of the play activities to match the needs of the children. Wong found that play intervention helped children sustain their attention for longer periods of time after only four sessions. After eight sessions, children had significant growth in JA and symbolic play skills. However, these abilities were not generalizable to other sets of toys or other settings.

To expand knowledge of the effectiveness of pre-school interventions and their generalization to relationships outside of school settings, for instance with mothers, Kaale et al. (2012) conducted a randomized controlled trial comparing the outcomes of JA with autistic children receiving an intervention versus autistic children in a control group. To assess JA, the authors used the Mullen Scale of Early Learning, the Early Social Communication Scales and pre-school teacher-child play. The intervention was provided over 8 weeks, twice daily for a total of 80 sessions. The sessions were 20 minutes long and contained 5 minutes of table-top priming and 15 minutes of floor play. Results indicated that children receiving the intervention showed significantly greater improvement in expressive language than those in the control group. These results suggest that “preschool-based JA-intervention can be effective in altering some aspects of core social deficits in autism” (p. 103). Also, whereas these findings might be generalizable to a person not involved in the sessions, only specialist-mediated interventions seemed to result in sufficient increase in JA to be captured by standardized testing.

In exploring the use of imitation as an early intervention for promoting JA with preschool children diagnosed with autism, Warreyn and Roeyers (2013) found that 24 sessions of 30 minutes including imitation and JA exercises with increasing difficulty allowed autistic children to successfully develop JA skills. Specifically, children with autism receiving imitation interventions showed more gaze following and requesting skills than the children in the control condition. However, whereas responses to JA increased, IJA was found to be much more difficult to teach. The authors believed that this might be due to the social needs of IJA versus the instrumental nature of responses to JA. In discussing their own study, Warreyn and Roeyers (2014) stressed the importance of engaging parents in the interventions, promoting parent-child interactions as well as the development of language and social-communicative skills with children with autism.

The effectiveness of imitation interventions with children with autism was also explored by Ezell et al. (2012) in a study with 20 autistic children participating in three imitation sessions. The authors coded the first and the last session to examine JA behaviors' differences. The results indicated that with the imitation intervention, children showed increased referential-looking and gaze following skills. The authors maintained that imitation might have "captured the children's attention reflected by their greater referential looking during the intervention play phase [...] leading to the children's increased referential looking and gaze following in the subsequent spontaneous play phase" (p. 683). The generalizability of these findings was however, limited by the small number of sessions observed as well as the small sample size. Additionally, retention of JA skills in time was not studied.

In a similar study, Rao and Ashok (2014) examined the impact of using JA routines as part of treatments for the development of JA skills with children diagnosed with autism. They involved two children in social engagement games and analyzed video recording to code for JA behaviors. Their results indicated that social engagement games improved the children's eye contact, interaction, and gaze alternation as well as their verbal behaviours and imitation skills. However, the small sample size did not allow for generalization of these findings. Furthermore, the children's ability to generalize these abilities in other settings was not studied.

**Music-centered interventions.** In order to study the effect of using spontaneous imitation through music, Stephens (2008) tested the effects of using musical routines to increase children's JA. It was suggested that autistic children shared JA within the musical routines and, moreover, the children chose to participate in mutual imitation within routines using music. Yet, whereas music was found to increase JA behaviors, the use of music to increase social motivation was not explored in this research. This suggests the need for more research regarding musical interventions and their impact on social-communicative behaviors.

In a review of the literature, De Vries et al. (2015) identified empirical evidence supporting the use of music as an intervention with autistic children. The authors found that music as an intervention influenced social skills, communication, and behavioural regulation. Also, music seemed to promote interpersonal communication, reciprocity, and language skills. This literature review looked exclusively at recreational therapy articles and did not include music therapy articles, thus limiting their findings. This limitation suggests the need for more research on music therapy intervention and not only music as an intervention.

**Music therapy interventions.** In a study examining the effectiveness of improvisational music therapy treatments, Kim et al. (2008) noted that:

Improvisational music therapy has long been noted for its efficacy in engaging autistic children at their level and interest, and helping them to develop spontaneous self-expression, emotional communication and social interaction. Music offers a means of self-expression, communication and interaction than can be more easily assimilated by the children than some other medium. (p.1758)

The authors contended that the effectiveness of improvisational music therapy interventions might be due to musical attunement. Musical attunement refers to a “moment-by-moment, responsive use of improvised music and non-musical expression” (p.1759). It implies notions of imitation and predictable patterns created from musical material emanating from the child. In improvisation music therapy, musical attunement is believed to promote interaction and communication between the therapist and the child, thus positively affecting the child’s JA abilities. To examine this idea, the authors conducted twelve improvisational music therapy sessions with 15 autistic children. They found that the music therapy interventions significantly improved JA in comparison to the play interventions. Results also showed that RJA skills considerably improved after music therapy interventions, resulting in large developmental gains in language. It is therefore possible that improvisational music therapy could promote fundamental social interaction skills, especially non-verbal interactions. The authors contended that the findings obtained not only resulted from musical attunement processes, but also from the dual possibilities of stability and flexibility in musical play. It should also be noted that the results were not generalized to settings other than the experimental setting.

Similarly, a study conducted by Vaiouli et al. (2015) examined the effectiveness of weekly, individualized music therapy sessions of 30-minutes each with children diagnosed with autism. The sessions were comprised of music activities using age-appropriate songs, instrumental music, and improvisation to promote communication between the child and the researcher-therapist. All sessions started with a greeting song, a child-led part, an adult-led part, and a goodbye song. The results indicated that the intervention increased the children’s focus on faces, responses to JA bids, and IJA. The authors maintained that music was effective in arousing the child’s curiosity and attention by utilizing their interests and matching their ability levels. Also, the authors contended that the playful atmosphere of the music therapy interventions allowed children to profit from rich, sophisticated interactions



with their parents and teachers. The results of the study were transferred from the school setting to the children's home successfully by including parents in the treatment procedure.

**Guidelines for Improvisational Music Therapy with Autism.** Given its documented effectiveness and the interest of therapists in improvisational music therapy as an intervention with autistic children, Geretsegger et al. (2015) attempted to identify guidelines for the creation and implementation of music therapy treatments and programmes for children with autism. After conducting surveys and holding focus groups with music therapists working with children with autism, the authors concluded that improvisational music therapy interventions were comprised of unique and essential principles, essential but not unique principles, and compatible principles. The authors noted that unique and essential principles when creating treatment interventions with children with autism included: facilitating musical and emotional attunement; scaffolding the flow of interaction musically (meeting the child's behaviors and play); and tapping into shared history of musical interaction (using the musical material created in session by the child). Essential but not unique principles included: a) building and maintaining a positive therapeutic relationship, b) providing a secure environment, following the child's lead and setting treatment goals and evaluating progress, and c) facilitating enjoyment. Finally, compatible principles included: adjusting the setting according to children's or families' needs, clinical judgement, and practical possibilities.

The guidelines identified here are general ones for the practice of improvisational music therapy for children with autism; as helpful as they are, they are not aimed at developing JA. They bring approaches of improvisational music therapy together in a comprehensive and complex overview of international music therapy practices with children with autism. These guidelines could, however, inform the development of future treatments and programmes focused on enhancing JA skills with autistic children.

### **Chapter 3. Methodology**

In reviewing the literature and describing different potential interventions to address JA deficits in children with autism, it became evident that although there were many interventions designed to this end outside of the music therapy field, there were very few music therapy interventions designed to specifically address JA. Furthermore, the interventions outside of the field had limitations (as described in Chapter Two) and improvisational music therapy showed promise as an approach to improving JA. This highlighted the need for research using a methodology that would allow for the creation of a strong, detailed, and reliable tool to address such an important deficit while also taking into account the research and advancements that were already in the literature. An intervention research methodology as described by Fraser and Galinsky (2010) seemed to best fit this need best.

#### **Design**

The intervention program presented in this research is guided by intervention research methodology as outlined by Fraser and Galinsky (2010). This methodology originally consists of five steps. The first step is to “develop problem and program theories” (p.463) and includes considerations of risks, protective and promotive factors related to the intervention designed. The researcher also needs to account for malleable mediators, factors indirectly influencing treatment outcomes, and intervention agent, setting and duration. The second step is the development of the program’s structure. Upon completion of this step, the research should be a complete first draft of the intervention program and be ready to be submitted to experts for review. It should also include thoughts on training and implementation. The next three steps involve testing, refining and publishing the program. In the present research, it is delimited to completing the first two steps only. This was done to accommodate the scope and timeline of a master’s thesis. It is however, important to note that the last three steps are still crucial to the development of this intervention program and these should be completed through further research.

#### **Participants**

As this study was delimited to steps one and two of the intervention research methodology (outlined below), the designed intervention was not tested and therefore this study did not include participants.

#### **Materials**

To identify the characteristics inherent to effective treatments when addressing JA deficits with children diagnosed with autism, the literature from the past 10 years in the fields of music therapy and education regarding JA interventions and ASD was reviewed. Databases such as ERIC, ProQuest, PsycInfo and RILM were used to find relevant articles, theses, and dissertations on the topic.

### **Delimitations**

Although children with autism have multiple issues of concern, this study was delimited to addressing JA deficits. As they are precursors to other deficits, they are a priority for intervention. No participants were included in this study. This study was delimited to steps 1 and 2 of the intervention research methodology as described by Fraser and Galinsky (2010; see these steps in the methodology section). The intervention program's target population was delimited to children aged 2 to 10 years old diagnosed with autism, as this constitutes the age around which children with autism could potentially develop JA (Paparella et al., 2011). Finally, the literature reviewed in this research was delimited to the past 10 years, thus ranging from 2006 to 2016 inclusive to insure the use of the most recent developments in research to design the intervention.

### **Data Collection and Analysis Procedures**

The first two steps of Fraser and Galinsky's (2010) intervention research design were conceptualized as follows:

- **Step 1:** The literature from the music therapy and education fields was initially reviewed using keywords such as “music”, “music therapy”, “autism”, “joint attention” and “intervention”. Different variations of those words were also used such as “Autism Spectrum Disorder” or “Autistic Population”. The word “Joint Engagement” was also used as it had been used interchangeably with “Joint Attention”. To be included in the research, the articles, theses, or dissertations needed to address JA deficits with autistic children. The interventions reviewed were limited to educational interventions, music interventions, or music therapy interventions.
- **Step 2:** Within this literature, risks, promotive, and protective factors inherent to JA deficits were identified. A music therapy intervention program was then constructed, taking into account the information gathered in the literature.

## Chapter 4. Results

Having reviewed the need for the creation of an intervention program and choosing the most appropriate methodology for this purpose, this chapter looks at the related literature to identify factors and variables relevant to the construction of such a program. In the process, risk factors, protective and promotive factors, malleable mediators, the intervention agent, setting, and duration of intervention are identified. The chapter also looks at characteristics of children diagnosed with autism in terms of response to musical elements.

### **Risk Factors, Protective Factors and Promotive Factors**

A review of the literature from 2006 to 2016 found that JA deficits in children with autism not only had an important impact on social communicative behaviors, but also that there was a complex variety of influential factors in its development. Many risk factors are identified as potentially leading to deficits in JA skills. These include: lack of social motivation, as discussed in previous chapters (De Vries, Beck, Stacey, Winslow & Meines, 2015; Gangi et al., 2014; Geretsegger, Holck, Carpente, Elefant, Kim & Gold, 2015; Kalas, 2012; Stephens, 2008; Vismara & Lyons, 2007), parental stress, and the severity of diagnosis and behavioral impairments (Strauss, Vicari, Valeri, D'elia, Arime & Fava, 2012). However, research has found that early intervention can be an effective protective factor in the development of JA behaviors (Warreyn et al., 2014). In addition, music has been found to be a potentially effective medium to promote JA (Finnigan & Starr, 2010; Geretsegger, Holck & Gold, 2012; Thompson, McFerran & Gold, 2013). An indepth examination of risk factors, protective factors and promotive factors follows.

**Parental stress.** In comparing the effectiveness of an intervention involving parental inclusion in treatment to an intervention without parental inclusion, Strauss et al. (2012) found that parental stress had a great influence on treatment outcomes. More specifically, the authors noted that “outcomes that imply a reciprocal interaction between parent and child, such as expressive language, adaptive behaviors and autism core symptoms are influenced by pre-treatment parental stress” (p.700). As the development of JA skills requires active participation from parents and depends on interactions between parent and child, it seems likely that highly stressed parents might not be the best candidates to deliver the intervention. In addition, being responsible for their children’s JA improvement might put the parents in a vulnerable position. Rocha, Schreibman and Stahmer (2016) notably found that parents were more likely to reduce their attempts at engaging children in JA tasks after multiple failures at doing so. This phenomenon reduced the effectiveness of their intervention, as the parents did

not maintain the IJA tasks, as observed during follow-up sessions 3 months post implementation. It therefore seems that parental stress and repeated failed attempts at engaging children in JA tasks could reduce the parents' capacity of engaging children in JA, thus decreasing the amount of JA development opportunities for the child with autism.

**Severity of diagnosis and behavioral impairments.** In addition to parent-mediated risks to the development of JA, the initial severity of the autistic child's symptoms might play a role in the development of JA skills. Strauss et al. (2012) found that "children with higher communication skills exhibit higher initial performance in correct responding on such behavior target [JA behaviors]" (p.700). On the other hand, the authors also observed that children exhibiting challenging behaviors would typically get lower results in JA performance tasks. In certain cases, therefore, it could be necessary to address those challenging behaviors before targeting JA since they would typically impede the intervention's effectiveness. The section that follows examines in greater depth how interventions can address challenging behaviors.

**Early intervention.** Lack of social motivation, leading to deficits in JA performances, is inherent to children with autism. It is therefore a risk that cannot be directly alleviated. However, its impact on children's development of social-communicative behaviors can be addressed when targeted at an early age. Early intervention can act as a protective factor against perseverative impacts of social deficits with children with autism. As such, Wetherby and Woods (2006) outlined the National Research Council's (NRC) recommendations for early intervention with children with autism: entering into an intervention program as soon as autism is suspected, engaging in intensive intervention for 5 hours per day, 5 days a week, receiving sufficient adult attention on a daily basis, including a family component, ongoing assessments, and more. This indicates that early intervention can be an important protective factor for JA skills (Warreyn et al., 2014).

**Use of music therapy interventions.** Music interventions used outside of music therapy research contexts have been found to be effective in some regards. For one, Finnigan and Starr (2010) compared a music therapy intervention, using musical instruments to attract the child's attention, to an education intervention, using non musical toys instead of instruments. The authors found that using songs increased the frequency of eye contact and increased occurrences of imitation and turn-taking skills in comparison to the non-music intervention. The authors note that music therapy "served as incentive to motivate [the child] to engage in social responsive behaviors with the music therapist" (p.339). In addition, the child's level of happiness, i.e. frequencies of smiles and laughs, as well as other enjoyment

cues, increased when music was used during the intervention. It is therefore possible that music could be an useful motivator to promote JA behaviors with autistic children.

In addition, Thompson et al. (2013) described a Family-Centered Music Therapy (FCMT) intervention aimed at promoting social engagement in young children with autism. While specific details describing the intervention are limited, the authors mentioned five main aspects of social communication that were of interest: “shared attention; focus on faces; turn taking; response to joint attention; and initiation of joint attention” (p.843). The authors described the overall intervention as a series of diverse, structured and unstructured interventions, flexible and adaptable to the child’s in-session behaviors. The authors also wrote that, given the intervention’s efficiency, “FCMT may provide a motivating social environment for the children, fostering interactions between child and parent that potentially continue beyond the session” (p.850).

These interventions underscore the potential of music to develop JA skills. However, throughout the literature, the interventions used to address JA vary in terms of approach and intervention, as well as in terms of intervention agent, intervention duration, and intervention settings. As a result, it is difficult to distinguish which intervention would provide the best results depending on the conditions within which the child is developing.

### **Malleable Mediators**

Strauss et al. (2012) identified an important malleable mediator in terms of addressing JA deficits with children with autism. In a model of interrelations between parent and child during treatment, Strauss et al. reported an indirect correlation between parental inclusion in treatment (the number of sessions done at home), problematic behaviors of children with autism, and parental stress. Not only did a high number of in-home sessions reduce the problematic behaviors, this reduction indirectly reduced parental stress, which in turn could reduce the amount of problematic behaviors, and, incidentally, increased the child’s performance in correct responding on newly introduced targets. This research indicated the great importance of addressing parental stress as a parallel to addressing JA deficits, since it had correlations with the child’s in-treatment performance. This could be addressed through: increasing the amount of supervision given to parents (Rocha, Schreibman & Stahmer, 2007); letting siblings implement the intervention, with the supervision of the interventionist, instead of parents (Ferraioli & Harris, 2011); or reducing target difficulties (Strauss et al., 2012).

As described previously, a symptom of autism is the lack of social motivation (De Vries et al., 2015; Gangi et al., 2014; Geretsegger et al., 2015; Kalas, 2012; Stephens, 2008; Vismara & Lyons, 2007). As a result, many researchers and interventionists maintained that

this lack of motivation should be the core target of interventions addressing JA deficits. Isaken and Holth (2005) went so far as to suggest “that a main treatment goal must be to teach the child with autism to respond to the same types of social reinforcers as typically developing children do, including nods, smiles, gaze shifts and a range of stimuli arising from others’ vocal verbal behavior” (p.220). The authors described behavioral interventions that could be used to teach the child to react to social stimuli as typically developing children do, thus increasing their JA performances. While this intervention yielded positive results, it is in stark contrast to a study conducted by Finnigan and Starr (2010) that used music as a reinforcer to motivate the child to engage in JA tasks, instead of conditioning the child to react to social reinforcers. The authors found that not only was the music condition, where interactions were done through melodies and toys were musical in nature, better suited to increasing the child’s motivation, the child also showed higher levels of happiness during the music intervention as opposed to the non music intervention. Here, while Isaken and Holth increased the child’s social performances through increasing social motivation, Finnigan and Starr’s findings suggest that the same results could be achieved through an intervention that is sensory based which would be equally motivating but more pleasurable for children with sensory confusion, such as children with autism.

Vismara and Lyons (2007) found that interventions aimed at JA should address the functionality of JA and not only the act of sharing attention. The authors targeted lack of social motivation as the main reason why JA would not develop naturally in children with autism. Since they do not find it necessary to share attention and engage in social play, children with autism do not usually develop this skill. In view of these results, the question arises: How can we naturally engage autistic children in JA behaviors, as it seems to be a very important stepping-stone to social and language development?

In order to answer this question, one need to look no further than to another symptom of autism: sensory confusion. Bagby, Dickie and Baranek (2012) reported that the daily life of families with children with autism is highly impacted by the child’s sensory confusion. The authors noted that “experiences, meaning, and feelings during occupations were shared less often by families with children with autism than by families of typically developing children” (p.81). The authors wrote further about a concept called the *meeting-of-minds*. This concept refers to the capacity of the caregiver and the child to understand each other to a point where the child’s behaviors make sense to the caregiver. The lack of understanding of the child’s sensory confusion is often the source of worry and fear in parents, thus feeding into the parental stress discussed previously. In this regard, the authors wrote that they “found

that the parents of children with autism seemed to be constantly *searching for the key* to create a shared experience” (p.83). This finding is especially interesting given that musical attunement, which involves “matching the child’s pulse, rhythmic patterns of movement or musical play, and dynamic forms of expression and melodic contour to the point where there is a common musical foundation between the child and the therapist” (Kim et al., 2008, p.1759), is an essential part of music therapy clinical training and practice. This way of interacting with children with autism is congruent with Caldwell’s (2006) principle of using imitation as a gateway to creating a relationship with children with autism or intellectual deficiency. Caldwell wrote that through imitation, the brain recognizes its own signal and shifts its attention from the child’s inner world to the outside stimuli, thus allowing interaction to take place.

In view of these findings, it appears that music therapists practice an approach that inherently aims at creating meaningful, shared experiences with children with autism through imitation, or in this case, musical attunement. It also appears that this approach would be a natural gateway through which music therapists could promote JA behaviors, as it aligns with the autistic child’s need for meaningful interactions, the parents’ and siblings’ need to understand the autistic child’s sensory confusion, and the inherent sensory-based qualities of music therapy interventions.

### **Action Strategies**

**Target Age.** Most interventions reviewed here target children aged between 1 and 6 years old (Ferraioli & Harris, 2011; Finnigan & Starr, 2010; Ingersoll & Schreibman, 2006; Isaken & Holth, 2009; Kasari, et al., 2012; Kasari, Gulstrud, Wong, Kwon & Locke, 2010; Landa, Holman, O’Neill & Stuart, 2011; Rocha, Schreibman & Stahmer, 2007; Solomon, Necheles, Ferch & Bruckman, 2007; Schertz & Odom, 2007; Strauss & al., 2012; Thompson, McFerran & Gold, 2013; Vismara & Lyons, 2007; Wetherby & Woods, 2006; Whalen, Schreibman & Ingersoll, 2006). More specifically, Wetherby and Woods (2006) advised that initiating intervention within the second year of life was important. As mentioned earlier, the NRC also recommended providing children with autism with an intensive intervention program as soon as autism is suspected. These factors would suggest that the targeted age for initial intervention should be around 2 to 3 years old.

**Duration.** Within the reviewed literature, the treatment was between 5 to 48 weeks, with varying intensity and varying approaches (Ferraioli & Harris, 2011; Finnigan & Starr, 2010; Ingersoll & Schreibman, 2006; Kasari, Gulstrud, Gold, Kwon & Locke, 2010; Landa, Holman, O’Neill & Stuart, 2011; Solomon, Necheles, Ferch & Bruckman, 2007; Strauss et



al., 2011; Thompson et al., 2013; Vismara & Lyons, 2007; Wetherby & Woods, 2006; Whalen et al., 2006). Interventions aimed at training parents to conduct JA training with their children varied the duration of parental training from no training at all, solely relying on in-treatment supervision (Kasari et al., 2010; Thompson et al., 2013) to 38 hours of training before the beginning of the treatment in addition to 1.5 hours of supervision every month for 6 months during treatment (Landa et al., 2011). One study combined an individual 1-day workshop with parents with 3 to 4-hour home visits monthly during the treatment period (Solomon et al., 2007) whereas another study simply gave 20 minutes of training to parents at the beginning of every session during the treatment period (Rocha et al., 2007). The literature indicates that there is no actual consensus on the time needed to train parents to implement the interventions effectively at home. It is interesting to note, that despite treatment duration, all interventions resulted in significant increases of target behaviors.

It would thus seem that duration of parental training was not linked to treatment effectiveness. That is, until particular attention is given to Strauss et al.'s (2012) results. When discussing the impact of parental stress, the authors found that after 6 months of intervention, the strategies of the staff to manage parental stress had changed. Given parents' difficulty to achieve the behavioral targets set at the beginning of treatment, the targets' difficulties were reduced, allowing for more successes on the parents' part, offering an interesting buffer for parents' perceptions of failures. Indeed, the authors wrote that "while at treatment intake high child challenging behaviors negatively impacted the probability of parent-provided treatment at home, higher amount of parent-mediated treatment provision predicts decrease of child problem behaviors after 6 months" (p.701). In other words, child-challenging behaviors might take up to 6 months of parent-mediated intervention to decrease, allowing for better results after this 6 month-period. Highlighting the need for an adjustment period, it might be justified for interventions involving interactions between parent and child to take 6 months and longer to provide effective results.

**Intervention agents.** Given the necessity of providing children with intensive treatment ranging from 15 to 25 hours per week for a prolonged period of time (Wetherby & Woods, 2006), it seems rather enticing to include family members in the treatment. This has been found to allow for better generalization of skills learned in sessions into the child's home (Kasari et al., 2010; Schertz & Odom, 2007; Rocha et al., 2007; Solomon et al., 2007; Thompson et al., 2013). However, while most interventions included the parent as the intervention agent, there is also evidence that their initial stress level as well as previous

failed attempts at engaging their child in JA tasks might impact the intervention's outcome (Rocha et al, 2007; Strauss et al., 2012).

In view of the risks associated with parent-mediated interventions, it might be necessary to turn to another member of the family for the implementation of the intervention. As mentioned previously, Gangi et al. (2014) found that children with siblings with autism were at high-risk of developing autistic symptomatology. In a different study, Ferraioli and Harris (2011) suggested that since "siblings are the most familiar peers to a child with autism, they have the potential to evoke increases in social behavior" (p.3). The authors mentioned that training older siblings to conduct intervention with their younger autistic sibling might benefit both children, as siblings are also often deprived of prosocial behaviors compared to siblings of typically-developing children. In this study, the authors successfully trained siblings to implement JA interventions at home, allowing for increased interaction with their autistic siblings and increased JA performances from their siblings. In this way, sibling-mediated interventions might allow for generalization of learning to a home setting, would not increase parental stress or responsibility in the treatment, would successfully increase JA skills, and would also benefit the siblings' development.

**Intervention setting.** The vast majority of the interventions reviewed either offered in-home interventions or included a family member in the sessions to allow for generalization of skills outside of the sessions. The National Research Council guidelines for interventions with autistic children (2001) also indicated that interventions should include a family component and address generalization and maintenance of skills in natural contexts. In their Early Social Interaction intervention, Wetherby and Woods (2006) included routine-based intervention in natural environments to develop JA skills at home. Only two studies did not include a generalization of skills component. The first, conducted by Taylor and Hoch (2008), did not include components of a natural setting or parental training. The sessions were conducted with the behavioral therapist in different rooms of the school, such as the office, the kitchen, the gym, or the playground. The study offered promising results as it found increased responses to JA bids. However, the authors did not report generalization of skills in a natural setting. The second study was conducted by Whalen et al. (2006) and focused on the collateral effects of JA training. The authors conducted their intervention in a lab without parental participation. The authors also achieved promising results regarding the impacts of JA training, but again did not report on generalization of skills.

It seems that including a family member or conducting the intervention in a natural setting might allow for generalization of skills, thus expanding the effectiveness of the

intervention, while also respecting the NRC's guidelines to intervention with autistic children.

**Assessment period.** Whereas the concept of assessment is not new to music therapy practice, it must be noted that this step is crucial prior to interventions with children with autism. In the prospect of including siblings as intervention agents, it would also be crucial to include them in the assessment. Since autistic children tend to respond to sensory reinforcers more than social reinforcers (Isaken & Holth, 2009), it is of the utmost importance for the therapist to engage with the child in child-led interventions in order to discover the child's specificities in this regard. As the intervention begins, the use of said reinforcers will be incremental to the success of the intervention. It is thus of crucial importance to take as much time as needed to gain more information on the child's sensory preferences. In addition, as found by Kalas (2012), the complexity of the music used during treatment depends on the severity of the child's autistic symptoms. The section that follows outlines details the relationship between music complexity and symptomatology, and how this knowledge applies to practice.

**The importance of guidance for family members.** Rocha et al. (2007) found that when parents were trained to implement the intervention at home, the children's JA behaviors increased. However, one child's performance rate was similar to pre-intervention during follow-up sessions. The authors found that this child's parents did not implement the intervention at home even though they were able to correctly do implement the intervention with the presence of the therapist. Given this finding, it might be necessary to consider the use of guidance opportunities during and after the training period to ensure that parents or siblings are indeed implementing the intervention without depending on the presence of a trained clinician. It is also important to note that, whereas parents and siblings will be encouraged to implement interventions at home, they will continually be included in sessions conducted by the music therapist, thus providing many opportunities for them to observe, learn and practice under the guidance of a trained clinician.

Additionally, Strauss et al. (2012) provided parents with 1 hour of weekly supervision in order to individualize advice. The researchers also recorded three sessions in order to verify child's progress and to ensure the appropriate application of the intervention. This allowed the researchers to adjust the treatment if needed. A video assessment was also included in a study conducted by Solomon et al. (2007) in order to offer direct feedback to parents interacting with their child. The inclusion of these guidance techniques was found to

be effective in all three studies that involved accompanying parents in the implementation of interventions at home.

### **Suggested Intervention Program**

**Referral and intake.** Children referred to this improvisational music therapy program should: be suspected to have autism, i.e. showing autistic symptoms with or without a formal ASD diagnosis; be between 1 and 6 years old; and have a typically-developing older sibling. The child showing autistic symptoms should also exhibit deficits in JA at the time of the referral. Children who do not match these criteria would not be denied services; they simply would not receive this specific intervention.

Upon referral and ensuring that the child meets the inclusion criteria, the music therapist meets with the child's parents and siblings. If the autistic child has more than one sibling, the music therapist should also include the other siblings in the program. In this meeting, the music therapist explains the treatment in detail and secures the parents' consent for the child's participation in the treatment.

#### **Phase 1. Child and family assessment (1 month)**

**Goal 1: To understand child's family dynamics and joint attention needs. (Week 1-2)**

**Objective 1. Assess parental stress levels.**

**Objective 2. Assess child's problematic behaviors (if relevant).**

**Objective 3. Assess child's response to and initiation of joint attention performances.**

**Objective 4. Assess sibling dynamics.**

**Action strategies.** During the first 2 weeks of treatment, the music therapist meets with the parents and sibling to ask questions in regards to the family's dynamics as well as evaluate the autistic child's JA performances. Questions can include address both past and present family dynamics. As parental stress and past attempts at engaging children in JA performances have been found to affect treatment outcome (Rocha et al., 2007; Strauss et al., 2012), it is important to consider those variables as they will influence the music therapist's choice of target difficulties.

Questions surrounding the child's difficult behaviors are to be addressed in the first meeting as it may also impact the implementation of the treatment. It is important to keep in mind that many sources of information can be considered here. The parents can provide much information on the child's problematic behaviors at home (such as difficulties self-regulating, self-harm or aggressive behaviors towards others) and teachers or other caregivers may also be consulted, if possible, to gain a complete understanding of the child's behaviors in different settings.

During the first 2 weeks, the music therapist also ensures that the autistic child has several opportunities to engage in JA. To this end, the music therapist could give visual access to enticing instruments slightly out of reach of the child (Wetherby & Woods, 2006). This technique gives an opportunity for the child to point and direct the music therapist's attention to an object the child desires. If the child does not initiate JA with the music therapist, the music therapist can then initiate the child's attention towards the object and assess the child's response, or lack of response, to opportunities for JA. It is also important to seek information as to if and/or how the child exhibits JA at home. Questions regarding parents' attempts to engage the child in JA behaviors, both in the past and present, are to be asked.

Finally, the music therapist can assess the dynamics between the autistic child and his or her sibling by how they interact in the meeting and questions could also be asked about their dynamics at home. It might be helpful to know if the siblings engage at home, if they frequent the same school or daycare, and how the older sibling feels about this relationship. The clinician can also take time to explain the music therapy intervention to the older sibling, explaining the benefits for both.

**Goal 2: To assess child and sibling reinforcer preferences. (Week 3-4)**

**Objective 1. Assess child's musical complexity preferences.**

**Objective 2. Assess the role of music at home and at school.**

**Objective 3. Assess sibling's musical complexity preferences.**

**Action strategies.** As this intervention uses the autistic child's preferred stimuli as a reinforcer for JA responses and initiations, it is important for the music therapist to assess the autistic child's interests. As Kalas (2012) suggests, the complexity of the musical stimuli is to be adjusted to the child's severity of autistic symptoms. A child with a diagnosis of severe ASD has been found to respond better to simple music, using simple root chords and simple rhythm, whereas a child with mild/moderate ASD would respond better to complex music, using syncopated rhythms and inverted chords. It is then important to assess the children's responses to both complex and simple music in order to elicit as much attention as possible from both siblings.

It is also important to note that Finnigan and Starr (2010) suggest that the use of pre-composed songs can be effective in teaching social responsiveness with children with autism. To use songs to this end, the music therapist needs to know the child's musical background and the use of music in the different settings of the child's environment.

**Phase 2. Sibling and Parent training (1 month)**

**Goal 1: To encourage siblings to initiate joint attention opportunities. (Week 5-6)**

**Objective 1. Use of modeling and role-playing to teach basic joint attention probing.**

**Objective 2. Understanding sensory confusion associated with autism and how to help their siblings cope.**

**Objective 3. Consistent guidance at the beginning and end of each session.**

**Action strategies.** During this phase of treatment, the sibling is encouraged to engage their brother or sister in JA tasks. The music therapist could use techniques such as role-playing or modeling to help the child practice the skills learned in those sessions. The sibling here learns about the importance of imitation and the addition of new material throughout this imitation (Caldwell, 2006). They learn how to match their sibling's pulse, rhythmic patterns of movements or musical play in a different modality it was first presented in. For example, the music therapist could help them match the speed at which someone else walks with a rhythm on a drum, or imitate vocal noises and adding their own noises to it. These skills will allow siblings to musically attune with their autistic brother and sister. The concept of musical attunement has been found to be an effective component of improvised music therapy intervention by Kim et al. (2008) when addressing JA deficits with children with autism.

As mastering the skills needed to participate in JA behaviors with their autistic siblings can be difficult, it is recommended that the child be over the age of 5-year-old. The sibling should have developed language and have the attentional capacity to sustain their attention during the sessions.

In light of Bagby et al.'s (2012) research on the impact of sensory confusion in family's lives, it is important to note that the sibling's understanding of their brother or sister's sensory-based behaviors might be incremental to the way their relationship develops. The sensory particularities of children with autism, as discussed below, need to be openly discussed and taught to their siblings. Understanding why autistic siblings might be struggling with eye contact or sensory perceptions might allow siblings to adjust their expectations and prevent sensory overload for their siblings. This particular change might also allow for more *meeting of minds* to occur, allowing for meaningful interactions between siblings.

During the implementation of the intervention, it is recommended that the music therapist allocate time at the beginning and at the end of each session to check in with the sibling. In these check-ins, the music therapist assesses how the sibling is feeling and go over the interventions they will be implementing that day. Guidance and feedback is also given at

the end of each session to allow the sibling to adjust or make modification to the difficulty of targets if need be.

**Goal 2: To guide parents in overseeing the joint attention engagement opportunities.**

**(Weeks 7-8)**

**Objective 1. Encouraging parents to recognize the siblings' needs for meaningful interactions with their autistic sibling and the importance of giving them a voice in the family dynamics.**

**Objective 2. Encouraging parents on helping the sibling to interact with their younger autistic sibling despite the potential for non-responsiveness and/or undesired responses.**

**Objective 3. Learning balance between intervention and play, and how to combine both.**

**Action strategies.** As parents' involvement in the treatment is also of importance in both siblings' development (Strauss et al., 2012), it is important for the music therapist to engage them in the program. As engagement between siblings in JA can be difficult, it is advisable for the parents to offer guidance and support at home. Finnigan and Starr (2010) found that the playful interactions of the music condition allowed for children to engage in JA tasks with more motivation and overall happiness. In addition, Stephens (2008) found that children with autism engaged in social reciprocity when they were "engaged in pleasurable, child-led, shared attention routines" (p. 68). These findings suggest the importance of keeping the JA opportunities playful and light-hearted. To this end, parents need to lower their expectations for both the autistic child and their siblings, as the lack of a playful mindset might impair the effectiveness of the intervention. Additionally, the sibling's stress level also needs to be regularly checked by both parents and music therapist. If their stress level is too high for them to playfully engage with their autistic sibling, the difficulty of targets should be adjusted. Parents thus need to be encouraged to look for signs of stress in their autistic child's sibling.

In addition, similarly to siblings, the sensory particularities of children with autism, has to be openly discussed with parents. Their understanding of how their child perceives the world and copes with their sensory confusion has been found to have a significant impact on family's lives (Bagby et al., 2012). As seen in Jones, Quigley and Huws (2003), certain autistic behaviors, such as stims or gaze avoidance are a direct response to sensory confusion and serve an important role in coping with this confusion. It is important that parents and caregivers are aware of the role those behaviors hold in the child's daily life to allow for meaningful interactions and shared experiences to happen.

### **Phase 3. Intervention implementation (10 months)**

**Goal 1: To develop responses to joint attention initiations. (Weeks 9 to 41, 8-month duration)**

**Objective 1. Respond to siblings shifting their hand from one instrument to another.**

**Objective 2. Respond to siblings tapping their hand from one instrument to another.**

**Objective 3. Respond to siblings showing one instrument.**

**Objective 4. Respond to siblings' eye contact.**

**Objective 5. Respond to siblings pointing an instrument.**

**Objective 6. Follow siblings' gaze shifts.**

**Actions Strategies.** During this phase of treatment, the music therapist provides two sessions per week, 60-minutes duration each. This 60-minute includes 15 minutes of practice with the sibling at the beginning of the sessions and 15 minutes of check-in with the sibling at the end of the session. 30 minutes are allocated to music therapy interventions. One session is held in a clinical setting, while the second session is held in a home setting, allowing for generalization of skills outside of the clinical setting. This intervention intensity allows enough time for siblings to practice skills at home and provides with sufficient intervention time from the music therapist to allow for positive results. No time frame is given to achieve the objectives during the 10-month period allocated to this goal; this is meant to allow more flexibility in terms of target difficulty. If the child cannot achieve an objective, its difficulty is reduced to prevent feelings of failure on the part of both the siblings and the parents (Rocha et al., 2007; Strauss et al., 2012). This assessment regarding the difficulty of targets is to be done after 6 months of intervention in congruence with Strauss et al.'s (2012) results as presented above (See Duration section).

The objectives in this section are inspired by the goals identified by Ferraioli and Harris (2011) as effective steps in engaging autistic children in JA responses with their siblings. They are here viewed as stepping stones in evaluating the child's progress towards responding to JA. The interventions here remain flexible to adapt to the child's needs in the moment. The music therapist has to be attuned to the child's reactions and incorporate as many of those reactions in the improvisation (Thompson et al., 2013). As found by Caldwell (2006), the music therapist needs to aim at imitating as many inputs from the autistic child's behavior as possible while adding new material in their imitation. The author writes that not only is imitation important for the child to recognize the therapist's presence, but surprise would allow for this initial attention to switch to engagement. Caldwell suggests that "one of the most dramatic ways of using surprise is to shift the mode in which the imitation is



offered” (p.278). This is essential to the intervention, as it gives meaning to the interaction. It allows for families to have more meaningful, shared experiences that could be generalized to a home setting through the sibling’s presence in therapy.

As this music therapy intervention is a sensory-based intervention aimed to address deficits in a population that typically has sensory confusion, it is important to look at some of the sensory particularities that might be present in the children participating in the intervention. In a study conducted by Jones et al. (2003), first-hand accounts of adults with autism was collected through online blogs detailing the adults’ experiences with sensory confusion and different coping mechanisms. In general, the adults here mentioned discomfort when exposed to high-pitched sounds or unexpected sounds when discussing auditory stimulation. These sounds can go as far as causing physical pain as well as discomfort. These sounds thus need to be controlled for in the music therapy environment. It is also important to note that the human voice was mentioned as highly distracting by some participants of the study as it stimulates two senses at a time, the visual movements of the mouth in addition to the sounds made by the voice. One adult describes the human voice as “horribly distracting” (p.115), ruining his concentration and feeling like “Chinese water torture” (p.115). This often causes problems for autistic children in school as they can often only focus on one sense at a time. A participant in the study mentions coping with sensory overload by only listening to the teacher and thus appearing lazy or distracted because they could not take notes, would not look at the teacher, and would have a blank look on their face. It is important to keep this in mind when working with children with autism, with the music therapist individualizing the approach to meet the sensory particularities of each client; this could include avoiding phrases such as “look at me when I speak” or “look at the instrument when you play”. This coping mechanism is also to be kept in mind when assessing the child’s progress through these objectives as some autistic children may be perfectly attentive to auditory stimuli, but not shift their gaze as expected. In addition, it is also important for the music therapist to be attentive to the child’s sensory needs, providing as much stimulation as possible if the child is hyposensitive, usually exhibited by hitting cymbals as hard as the child can or putting their ear very close to speakers, and keeping the stimulation to a minimum if the child is hypersensitive, thus exhibiting coping mechanisms such as putting his hands on his ears or stepping away from the music.

**Goal 2: To develop initiations of joint attention. (Weeks 42 to 50, 2-month duration)**

**Objective 1. Coordinated gaze shifting between siblings.**

**Objective 2. Initiation of pointing from the autistic child.**

**Action strategies.** During this treatment phase, the interventions are similar to those suggested above. The music therapist however needs to allow for more opportunities for the child to initiate and engage in opportunities for JA. This can be achieved through several changes to the music therapy environment, such as putting certain objects out of reach, as suggested by Wetherby and Woods (2006) or introducing novel instruments and giving more time for the child to initiate the behavior before prompting (Taylor & Hoch, 2008). The same attention to sensory overload needs to be paid here as it was for the last goal. Giving time for the child to initiate JA can be done musically by adding more space in the music. The music therapist can, for example, imitate the musical expression of the child, expand on it and add empty spaces for the child to fill up. This technique can also be taught to the sibling to allow them to direct the interventions as much as possible. At this point in the program, as much control as possible is given to the sibling to gradually remove the need for the music therapist to be present for the successful implementation of the techniques.

**Phase 4. Follow-up (3 months and 6 months after the end of intervention)**

**Goal 1: To assess the autistic child's joint attention performances and generalization of skills outside of music therapy sessions.**

**Objective 1. Determine the long term effects of the intervention on the child's joint attention development.**

**Action strategies.** During a meeting with the child's parent, teacher and siblings, the music therapist needs to assess the child's JA behaviors at home and at school. Questions regarding social engagement and language development are to be asked, as well as questions regarding parental stress and sibling relationship. This meeting is conducted again 6 months after the intervention. The music therapist should allow for more sessions to take place if the child's JA has not generalized outside of the music therapy setting.

## Chapter 5. Discussion

This study was aimed at developing a music therapy intervention program addressing JA deficits with children diagnosed with autism. Its creation was based on the literature on JA, its development and impact, and existing interventions from various fields. It was found that JA's development is impaired in children with autism due to the lack of social motivation (Kryzak & Jones, 2014; Sciettecatte, Roeyers & Warreyn, 2012), thus preventing the development of declarative JA and reducing the amount of opportunities for responding and initiating JA. This atypical JA development was also found to have an impact on the development of social communicative skills, such as language and social abilities (Schiettecatte, Roeyers & Warreyn, 2012; Warreyn, Van Der Paelt & Roeyers, 2014). In addition, it was found that music therapy, more specifically improvisational music therapy was an effective medium to address those deficits as they are adapted for autistic children's sensory needs (Finnigan & Starr, 2010; Kim et al., 2008; Thompson et al., 2013). Given the importance of social and communicative skills in children's development, it was imperative to develop an intervention program in music therapy to address deficits in JA skills.

The intervention program developed in this research includes guidelines from various fields of intervention to determine duration, setting and intervention agents as well as improvisation music therapy components to shape the intervention. Special attention was given to flexibility of intervention to allow clinicians to shape the intervention to their needs without reducing the intervention's effectiveness. Its action strategies thus focused on guidelines instead of strict protocols and procedures.

In addition to addressing JA deficits, this study also considered the importance of generalizing the intervention's results to an external setting, such as the child's home. This study aimed to respond to this primary question: "How can a music therapy intervention program be designed to address JA deficits in children diagnosed with autism in a way that generalizes outside of the music therapy context?"

The resulting intervention program was a 12-month intervention including assessment and intervention phases focusing on responding to JA bids, initiating JA bids and generalizing those skills to a home setting. To address JA deficits, it was found, within the psycho-education and psychology literature, that sensory-based intervention provided promising results. More specifically, the use of sensory reinforcer in lieu of social reinforcers allowed children with autism to receive positive reinforcement for successful JA behaviors while staying true to themselves. Special attention was thus given to adapting the sensory

aspects of the intervention to the needs of the child. To do so, this intervention program included elements from improvisational music therapy, such as musical attunement, and psycho-education, such as imitation and play, allowing opportunities for the child to develop JA skills in an environment that is adapted to the child's needs.

To address the second component of the primary question, regarding generalization of skills outside of the music therapy settings, it was found that a family component was necessary for the child to develop JA skills at home. As it was also found that parental stress and past unsuccessful attempts at engaging the child in JA opportunities greatly impacted the results of the interventions, it was determined that the inclusion of siblings in the intervention was pertinent to generalize JA skills at home. In addition, acting as a buffer for the social vulnerability that siblings of children with autism present and the importance of family dynamics for the well being of its members, there seemed to be great potential in including siblings of children with autism in the intervention.

As summarized above, it seems that the intervention created in this study successfully answers the primary question aiming at developing a music therapy intervention addressing JA deficits while also generalizing JA gains outside of the music therapy context.

### **Limitations**

This study had some limitations, the first of which is the limited amount of current literature on music therapy and JA. Very few interventions have been created in the music therapy literature to address JA deficits in children with autism in comparison with psycho-education and psychology. This resulted in an intervention largely based on the literature from different fields of studies and limited the amount of information available surrounding the musical aspects of the intervention. This information was also limited by the very few details provided in the music therapy literature regarding the music interventions/protocols used by the authors. It was quite difficult to discern the musical components used by the authors, thus rendering details on the musical aspects used very vague. As this study solely relied on literature, precise information about the musical components that should be used in the intervention were limited.

In addition, this study was limited as it only addresses the first two steps of the intervention research developed by Fraser and Galinsky (2010). Review of the intervention program as well as standardization and testing of its effectiveness were not conducted. This delimitation allowed this research to fulfill the requirements of a master's thesis, but the applicability of the results are only hypothetical. Therefore, it would be important to

implement the last three steps of the research design to allow for this intervention to be tested, standardized, and applied.

### **Conclusion**

It is recommended, to allow for further refinement of the intervention program, that the program be submitted for review by others, such as experts and community stakeholders. It could then be modified and enhanced. It is also recommended that the remaining steps of the research design by Fraser and Galinsky (2010), such as refining and confirming efficacy, testing the effectiveness of the intervention in a practice setting and disseminating the program's findings and material, be implemented, making it possible to ascertain the program's effectiveness in practice.

It is also recommended that clinicians keep in mind the small scope of functionality this intervention is designed to address with children with autism. Interventions addressing affective development as well as tolerance for transitions or self-regulations could also be paired with this intervention. The development of JA can have tremendous impact on the life of the child with autism. It should not however be forgotten that children with autism face many challenges in navigating society as it is and require support and acceptance from both parents and siblings as well as clinicians.

The intervention program presented here took into account the strengths of children with autism as well as their weaknesses. It is hoped that this program will allow for the child to have successful opportunities throughout its implementation in both the music therapy setting and at home. In this regard, through this research, the primary research question was answered and a music therapy intervention program was created to address JA deficits in children diagnosed with autism in a way that generalizes outside of the music therapy context.

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