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Means of Musical Dialogues and Reciprocity : Improvisational Music Therapy for Social Interaction of a Preschool Child with Autism Spectrum Disorder

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Abstract

This study investigates improvisational music therapy (IMT) and its influence on the social interaction (SI) of a preschool child with autism spectrum disorder (ASD) in the Czech Republic. This case study tests the use of music therapy as an augmentative intervention for children with ASD. Using a qualitative design and incorporating microanalysis, the aim was to apply methodological protocols of direct and indirect observation on individual IMT sessions. Three SI domains were assessed using microanalysis in this single case study research: a) nonverbal communication, b) sharing, and c) solace. Varied musical features elicited certain intentional behaviors, allowing the interpretation of their meanings. The nonverbal communication studied shows intention to relate, self-awareness, awareness of others, and sharing. The IMT context provides a unique space for dialogues and reciprocity in a protected and settled environment. Children's improved SI can provide insight into their ability to interact with others. IMT presents promising care for children with ASD, extending comprehensive care by including dimensions of individualization and an intrinsic, non-directive approach, allowing the child to acquire and further develop their own ways of expression for the regulation of SI. Ideas around the quality of SI within IMT need to be further investigated.

Keywords: *musical intervention, improvisational music therapy, non-pharmaceutical treatment, pervasive developmental disorder, nonverbal communication, case study*

Introduction

At present, music therapy serves various functions in different populations in hospitals, rehabilitation centers, schools, and private practices worldwide. Individuals with autism formed one of the first target groups of music therapy in the past century (Alvin, 1966; Alvin & Warwick, 1992; Benenson, 1994; Nordoff & Robbins, 1977). This is unsurprising considering the symptomatology and positive affection toward musical activities reported in individuals with autism spectrum disorder (ASD) (Blauth, 2017; Kanner, 1943; Saperston, 1973; Trevarthen, 2002).

ASD is one of the most widespread, pervasive developmental disorders. It is defined as a spectrum of congenital developmental disorders based on neurobiological brain dysfunction (American Psychiatric Association [APA], 2013; DiCicco-Bloom et al., 2006; Hazlett et al., 2017; Walsh et al., 2011; World Health Organization [WHO], 2018). The prevalence of ASD has been growing in the last few decades. Recent research statistics show that 1–1.5% of people are diagnosed worldwide (Baxter et al., 2015; Christensen et al., 2018). Experts agree that ASD's prevalence in the Czech Republic is like that of other European countries, although we lack up-to-date studies (Adamus et al., 2017; Kolářová, 2015; Ošlejšková, 2008; Šmejkalová, 2010). The disorder affects two areas: (1) social interaction (SI) and communication; and (2) rigidity in imagination, behavioral patterns, and interests (APA, 2013; WHO, 2018). In this study, the focus is guided through the following SI diagnostic criteria valid at the time of methodological preparations and data collection (APA, 2000; WHO, 2004, F80-F89):

- significant deficit in nonverbal communication (e.g., eye contact, facial expression, and gestures) associated with an inability to regulate SI;
- inability to create and maintain relationships with peers due to the lack or complete absence of shared interests, skills, activities, and emotions;
- insufficient social and emotional perception of surrounding people, preferring solo play, using other people only as mechanical tools to achieve a goal, and problems experiencing empathy; and
- lack of ability and/or need to seek solace from other people to be calmed down in stressful situations and during grief, or an inability to support others in similar situations.

A deficit in reciprocal SI is always represented in individuals with ASD, fulfilling at least two of the above-mentioned criteria, except atypical autism, where the SI deficit might be milder (APA, 2000; WHO, 2004).

Previous research confirms that music therapy interventions may benefit the SI of children with ASD including the ability to take turns in dialogue situations, eye contact, shared attention, and verbal and nonverbal communicational capacities. Several studies highlight the motivational aspect of music as communication and the influence it has on self-regulation, anger management, or behavioral difficulties (Carpente, 2017; Finnigan & Starr, 2010; Gattino et al., 2011; Geretsegger et al., 2014; Gold et al., 2006; James et al., 2015; Kim et al., 2008; Kim et al., 2009; see also Vlachová, 2016, pp. 23–24). Therefore, music therapy appears to be a unique, non-biological, and non-pharmaceutical treatment for ASD supported by extensive research (Rossignol, 2009; Wheeler et al., 2008). While this is true, different etiologies and treatments are still being investigated, creating a healthy skepticism around the process of music therapy intervention for this specific target group.

The latest extensive multi-site randomized controlled trial of improvisational music therapy (IMT) for ASD published by Bieleninik et al. (2017, TIME-A Project) described a nonsignificant mean difference (0.06; $p = .88$) between results of IMT added to standard care and standard care alone. This study suggests that IMT did not reduce symptom severity in ASD as measured by the Autism Diagnostic Observation Schedule. However, Blauth (2017) evaluated the qualitative aspects of IMT in TIME-A. She found that families of involved children appreciated the positive experience and enjoyed participating in a person-centered, non-medical study (see also American Music Therapy Association, 2017; Bergmann, 2018; Turry, 2018a, 2018b). Therefore, the present research aims to emphasize that IMT works closely with the child, especially with musical and nonverbal expressions (Alvin, 1966; Benenzon, 2007; Geretsegger et al., 2015; Wigram, 2004). This aligns with the neurodiversity rights movement which advocates for developing accessible capacities or alternative communication rather than modifying neurodiverse symptoms (Bergmann, 2018).

There is a large body of research on music therapy with ASD (Geretsegger et al., 2014; Gold et al., 2006; James et al., 2015; Kern & Aldridge, 2006; Stephens, 2008)

including case studies or series (Edgerton, 1994; Knapik-Szweda, 2019; Marom et al., 2018; Miller & Toca, 1979; Pasiali, 2012; Saperston, 1973; Starr & Zenker, 1998; Thompson & McFerran, 2015; Wimpory et al., 1995). However, a similar study has not yet been conducted in the Czech Republic. Sociocultural conditions do not have a significant effect on the occurrence of ASD but may play a role in applied interventions (Masi et al., 2017).

Some generalized patterns of the development in IMT intervention for children with ASD have been described recently by Salomon-Gimmon and Elefant (2019). Nonetheless, the concrete content and behavior in an individual IMT session is still partly unpredictable and unrepeatable. The IMT assignment is unrestrictive while free improvisation allows the therapist to musically mirror the behaviors and affective states of another person. Thus, this research design is predominantly about comparing the findings of in-depth descriptions and interpretations of the case study situations.

This paper focuses on the analysis and investigation of IMT and its influence on the SI of a preschool child with ASD in the Czech Republic. The research applies direct and indirect observation (field notes and video recordings) on individual sessions. The microanalysis of SI in this study was carried out through a focus on three areas of SI: a) nonverbal communication, b) sharing, and c) solace. The study design and focus are intended to help understand the process of music therapy intervention.

Method

This article presents a case study using a qualitative design and incorporating microanalysis. This case study is descriptively-evaluative and qualitatively describes and evaluates a phenomenon (Yin, 2009) with the aim of generating hypotheses. Knowledge is formed through an ongoing interaction between the researcher and the subject, acknowledging the subjectivity of the researcher (Smeijsters & Aasgaard, 2005). In this case double subjectivity, as the researcher is also the therapist.

Sample Description and Selection

For this paper's case study, I performed an IMT intervention with a preschool child with ASD. The research was carried out in cooperation with a kindergarten for children with ASD. Children are admitted to this kindergarten based on the recommendations of the local special education center. A total of three children out of nine with no previous experience in music therapy were selected for the IMT intervention. Consent was sought from the parents/legal guardians of the children. In this paper, the findings of IMT with one of these three children have been described for the sake of being concise. Out of the three children who participated in IMT, I decided to focus on the child who was less verbal and participated in music therapy with the most continuity, in order to enable more focused and direct analysis of the IMT intervention.

Ethical Considerations

I first received ethical approval from the relevant university faculty members. Following that, I received informed consent from the kindergarten where I collected the sample from and finally, I also received informed consent from the child's guardian.

However, before the intervention, with written consent, I examined the child's anamnesis from medical and educational specialists' documentation. The guardian was informed about the anonymization of the participant's data and agreed.

Brief History of the Child

Lukas (pseudonym) is a Czech boy of Czech ethnicity who lives with his family, including one sibling, in a city. He was prematurely born at six months. Between two and three years of age, his parents observed non-standard development, especially in speech. Once they excluded the possibility of sensory impairment, he underwent a psychological examination. When he was three years and nine months old, it was noted

that Lukas may have ASD due to his variations in SI, communication, and repetitive, limited play. Subsequently, a psychiatric examination confirmed the diagnosis. At the age of four years and five months, he was enrolled in the specialized kindergarten. At the time, Lukas did not use verbal expression, but responded well to his name and understood basic instructions. According to his parents, he tolerated other children but preferred playing alone. He could also use gestures like imperative pointing. Lukas had attended the kindergarten for two years before the start of the IMT intervention and received individual treatment through the *Treatment and Education Autistic and related Communication Handicapped Children Program*. After two years of kindergarten, he could use several words and word fragments (up to two dozen), but mostly expressed himself through spontaneous vocalizations.

Design and Focus

The main aim of this study was to investigate the influence of an IMT intervention concerning SI in children with ASD to answer the main research question: “How does IMT intervention influence the SI of preschool children with ASD?” Three areas of SI that can be observed within the research were defined and constituted these sub-questions:

1. *How does IMT intervention influence nonverbal communication of preschool children with ASD?*

For the purpose of this study, nonverbal communication was operationalized based on diagnostic criteria with established theories. For example, according to [Watzlawick et al. \(2011\)](#), nonverbal expression is conceptualized as present in every behavior except speech/verbal, with the basic functions of providing emotional stability, self-realization and self-expression. Similarly, the observed behavioral symptoms of nonverbal communication are in the following categories (e.g., [Argyle, 1975](#); [Vybiral, 2009](#)): (a) gestures, including head and body movements—which among other functions support fluency of turn-taking and dialogues or emit emotion’s intensity ([Bull & Doody, 2013](#); [Ekman, 1999](#)); (b) facial expression; (c) eye contact and gaze; (d) proxemics, distance and position in space; (e) body postures; and (f) physical contact.

2. *How does IMT intervention influence sharing among preschool children with ASD?*

The observable parameters of sharing as a nonverbal mode of communication are demonstrated as four interrelated categories listed in diagnostic criteria: sharing interests, sharing activities, sharing emotions, and sharing attention ([APA, 2000](#); [WHO, 2004](#)).

- **Sharing interests** – mostly concerning the manipulation of objects and might be introduced or accompanied by eye contact or sharing attention. Theory describes the ability to inspire interest and associated emotional reactions among innate means of human contact ([Trevarthen, 2011](#)). Within the IMT framework, the child is supported in such sharing through a non-directive approach where a therapist lets the children choose according to their interests, i.e., following the child’s lead ([Geretsegger et al., 2015](#)).
- **Sharing activities** – an interrelated area, sharing activities extends to the use of multiple objects, for example in mutual musical improvisations and musical dialogues where children play their own instrument or make their own sounds, but respond to sounds coming from others ([Wigram, 2004](#)).
- **Sharing emotions** – a first phase of inter-subjectivity development ([Trevarthen & Aitken, 2001](#)) that establishes a vital basis for intimate relations with others. Emotions are expressed by a broad variety of nonverbal behaviors, but especially through mimicking. Expressed emotions include: happiness, sadness, surprise, fear, anger, and disgust ([Ekman, 1992](#); [Keltner & Ekman, 2000](#)). However, individuals with ASD have atypical facial expressions making it harder to recognize and share these emotions ([Brewer et al., 2016](#)).

- **Sharing attention** – two individuals focus on one object initiated by a gesture, vocal expression, or other kinds of communication (Moore et al., 2014). Sharing attention is an important goal in comprehensive treatment for ASD (Kasari et al., 2012).
3. *How does IMT intervention influence the search for solace or offering solace to other people in preschool children with ASD?*
- In observation, solace has been divided into two categories: (a) seeking comfort or solace; and (b) providing comfort or solace. There is limited attention given to solace in ASD treatment research, even in music therapy research. This might be because the overall approach of IMT and mutual music-making is based on providing solace or remedy to a participant. Solace therefore stands as an intrinsic part of the music therapy process rather than as a studied outcome. Seeking solace might be communicated easier through music than in verbal communication (Berger, 2002). Furthermore, Jimenez (2014) suggests that music making and learning provides important source of solace to people with ASD, closely related to empowerment or positive motivation. In previous research, Marom et al. (2018) described that children with ASD sometimes use echolalia to self-provide solace during music therapy sessions. The authors also concluded that echoing, if precisely interpreted, offers clues to emotionally support the child.

Conditions of Data Collection

The IMT environment influences the course of the intervention, and therefore is part of the interpretative context of the case study. IMT applies a musical experience of improvisation to promote change within the therapeutic relationship (Bruscia, 1987; Wigram et al., 2002). The co-existence of predictable patterns and flexibility in improvised music gives bases for application in ASD helping with orientation or acceptance of change (Geretsegger et al., 2015; Wigram, 2004). Sessions with the therapist-researcher were held individually as the guardian was not present. Therefore, SI was evaluated in relation to the therapist, not peers or family. The overall approach was non-directive so that improvisations as self-expressions are acknowledged. The child was invited to play using body, voice, and musical instruments while the therapist played in reaction to them. For this purpose, previously defined IMT techniques (Bruscia, 1987; Wigram, 2004) were applied from these groups: techniques of empathy and intimacy, structuring, elicitation, and redirection techniques. The most frequently used techniques and their rationale include: a) imitation or repeating expressions after the child, which provides a sense of acceptance, promotes self-awareness, and establishes a relationship; b) making spaces to allow the child to choose and lead the activity, which generally stimulates and activates them; c) incorporating, which is the further elaboration of the child's improvisation, can stand between imitation and bonding, used to express appreciation and encourage creativity and musicality; d) interjecting, that is filling in the pause in child's improvisation, to promote creativity and the further development of expression to regulate SI; and e) bonding, which is creating a song or musical motif based on the child's improvisation or expression, thus encouraging and strengthening the relationship (Bruscia, 1987; see also Wigram et al., 2002). Other applied techniques were rhythmic grounding, tonal centering, synchronizing, sharing instruments, calming, and exaggerating. The set of musical instruments consisted of a group of 14 easy-to-handle percussion instruments, including drums, a shaker, a guiro, and a bell; and two harmonic instruments, an electrical keyboard and a lute.

Approach to Data Collection and Analysis

Direct Observation and Video Recording

The observation took place in the specialized kindergarten throughout one school year, with an intervention of 30 minutes every week (excluding holidays and health-related absences of the child), totaling 20 sessions. The observation comprised two stages:

1. Direct participatory observation was conducted during the sessions (as a music therapist-researcher) and field notes were written as a complementary source of data to preserve clinical validity and sensitivity afterward.
2. A portable camera with a microphone recorded all sessions for indirect observation. The child could see that the session was being recorded.

In qualitative research, results are influenced by the subjectivity, perceptions, biases, and approaches of a particular researcher (Abrams, 2010). Nonetheless, this method represents a basis in qualitative and music therapy research providing access to immediate real-life information (Wheeler & Kenny, 2005). Moreover, I have personal experience as a music therapist for children with ASD, having worked for educational institutions and non-profit organizations in the Czech Republic for eight years. Reflecting upon my positioning as a therapist-researcher, I am Czech and have no other ethnic background that would influence my perception of SI and nonverbal communication standards. Thus, aspects of my cultural background match that of the child. My theoretical perspective on IMT includes inter-subjectivity theory and communication theory (Trevarthen, 2011; Trevarthen & Aitken, 2001; Watzlawick et al., 2011; Watzlawick et al., 2017). The theoretical perspective on the research is based in social interactionism that underlines reflexivity of the researcher and interdependence between observer and observed matter (Fay, 1996; Harrington, 2005).

Analysis Alongside Transcriptions

The video recordings were transcribed into text descriptions—including utterances—of observed SI of the child and therapist. The music played was not scored (only described). Of the 12 categories of SI explained earlier, six of nonverbal communication, four of sharing, and two of solace were observed and verbally transcribed. The transcription was revised and completed by viewing each session multiple times, revising the more complex parts in detail, or going over the video recordings later while comparing sessions. The transcriptions were enriched by field notes and further interpretations of behavioral symptoms, situations, and interactions. The focus was on qualitative characteristics and their changes, such as new appearances, repetitions, augmentations, and the occurrence or absence of aspects of SI. Analytical methods of comparison and deduction were used considering the beginning, middle, and end, or the first half versus second half of the sessions. Each session was compared with previous sessions, in parts, and as whole units. In the limited Findings section, I selected four *chosen sessions* with descriptions and interpretations of all situations that I considered most relevant to the process of SI evolution in this case; this included relevant comparisons with related situations (similarities, changes or differences) in other sessions.

Microanalysis Instrument and Quantification Supplement

Microanalysis deals with “the detailed analysis of a small but relevant amount of data drawn from a single experience” (Wosch & Wigram, 2007, p. 14). It is often used to analyze musical activity, interpersonal relationships, or communication and has benefits in the observation of people with minimal or no verbal abilities. For this research, I created an instrument of microanalysis that converts video recording of IMT sessions into a timeline, to depict and analyze SI based on the diagnostic criteria for ASD. The scheme shows the process of musical/non-musical actions and reactions of both the therapist and the child with symbols, codes, abbreviations, and technical notes concerning methods and techniques (Vlachová & Collavoli, 2014). I examined four sessions that had regular intervals (around two months) between them including the first and last sessions. Selecting exactly four sessions was the researcher’s decision based on this rationale: a) more than one to allow comparison, and b) less than 20 to allow detailed insight within the capacity of one researcher in a limited time. I further compared outputs of this microanalysis, the four schemes, and the rest of the transcribed

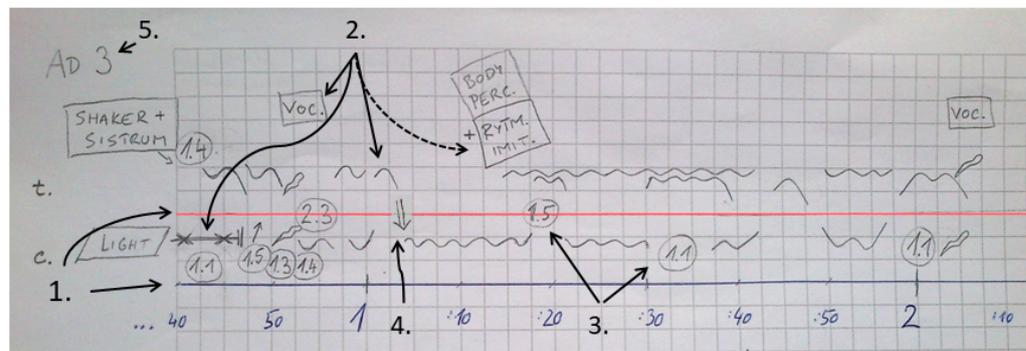


Figure 1
Example of the Scheme.

Note: Session not from this case study. Depicts: (1) time line and child-therapist division, (2) activities, (3) SI in codes, (4) interactional interpretations, and (5) technical notes.

data. I examined the intervention process by chronologically searching for changes and outstanding moments—those with accumulation of symptoms of SI, especially if they have not been observed previously (see Figure 1).

During the analysis, an additional procedure of quantification was added for three nonverbal parameters: eye contact, physical contact, and proxemic changes. These changes were appropriate to provide further insight into the intervention. The behaviors were counted in the four selected sessions, one at a time, by observing the whole session video and pausing, and checking the quantity of the behavior defined as “engaging into eye contact (initiated or accepted by child),” “engaging into physical contact (only initiated by child),” and “shifting the physical distance between the child and therapist (only initiated by child).” No independent check was applied, as explained later.

Criteria of Trustworthiness

I aimed to ensure credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985) by applying the following procedures.

- *Triangulation of methods:* Direct and indirect observation was applied for data collection, while data elaboration included microanalysis, partial quantification, and “creative synthesis” (Wheeler & Kenny, 2005) to enrich the positioning in the description-analysis-interpretation.
- *Peer debriefing:* Methods, interpretations, and research were discussed with experts from the concerned disciplines (music therapy, special and social education) to unearth possible hidden, overlooked, or inappropriate aspects or positions (Aigen, 2012). However, in this study, multiple observers and interpretations, along with cross-observer agreement checks were not applied because of limited resources.
- *Consent checking (variant of member checking):* The research report was shared with the child’s parents to ensure credibility and for ethical reasons. Member checking is a frequently employed procedure (Aigen, 2008) but not applicable with the participant in this study due to limited verbal communication. The parents were asked if the text was respectful and if any formulation was perceived as harmful or broke the terms of anonymization (Aigen, 2008; Dileo, 2005).

Findings

This section contains two parts. The first part presents the four chosen sessions of the study as explained above. The findings are divided into description and interpreta-

Table 1
The First Session

Description	Interpretation
Lukas enters the room rejecting the unfamiliar situation. He uses facial expressions, gestures, and voice to express what seems to be disagreement and anger; in a fit he screams, throwing away his shoes.	Lukas uses nonverbal expression, vivid facial gestures, and no eye contact. Emotional aspects can be perceived. He presents a lot of sound and rhythm in his movement.
The therapist leaves space for these expressions, which appear harmless.	The therapist accepts his emotional expressions. Lukas is invited to express himself freely and the therapist reacts based on his communicational and emotional states.
After his initial negativity, the therapist offers Lukas a seat through gesturing and he sits. The therapist contemporarily sings his name softly and then plays harmonic grounding on the keyboard. Lukas stays still, looking indifferent.	The therapist uses the same nonverbal channel of communication as Lukas—vocal—and then adds an IMT method—a musical instrument.
Lukas stands up, moves toward the keyboard, and starts to play clusters with strong dynamics. The therapist stands next to him and gently imitates in soft and medium dynamics.	Lukas's loud playing can be interpreted as his accepting a way to express his feelings differently. The therapist uses an imitation technique to show that she cares about him and to give him attention.
Immediately during instrumental play, first eye contact is established.	Here, eye contact is short and rare, three times in the first half of the session and seven times in the second.
Later, the first sharing of interest and activity appears. Lukas selects an object of interest (a bubble blower). The therapist elaborates this musically, working with sounds of breath and vocalization. A dialogic situation and alternation evolve.	IMT techniques of modeling, making spaces, imitating, and sharing instruments (Bruscia, 1987) are used, leading to turn-taking and vocal dialogues.
At the end, Lukas does not want to leave. He throws away his shoes, pushes the therapist, and waves his arms preventing contact. He screams and cries. He runs to the next room and calms down slightly by jumping on a trampoline and vocalizing. The therapist carries him back to class in her arms.	Lukas' difficulty in accepting change presents again with similar manifestations, but with more severity, edging toward aggression. Lukas leaves with rigid posture, neither opposing nor cooperating.

tion, so that the first exposes the material from the intervention/session relevant to the research question (subjective researcher's choice) and the latter connects it into relations (across the one described session or with other sessions), acquirable meanings, or broader understanding of the process (see Table 1, 2, 3, and 4). In the second part, synthesized findings according to key areas for the whole case are put forth.

First Session: "Anger and its Sharing"

This session took place in the second month of the school year. Additional activities in kindergarten are added after the few initial weeks so that the children settle into their basic educational programs. Lukas did not have any previous experience with IMT or with the therapist. Table 1 provides a description of what occurred in the session, with my interpretations.

Table 2
One-third Into Treatment Intervention

Description	Interpretation
Lukas's face and body seem calm, silent as he enters.	At the beginning of this session, he no longer rejects the situation; improvement came gradually with each session. This is supported by the same setting, schedule, consistent approach, and familiarity with the therapist.
Lukas comes directly to the keyboard. For the first time, he does this without initially wandering through the room.	He becomes more direct in expressing himself through means offered in IMT.
While playing the keyboard he calls the therapist with a gesture, initiating eye contact, leading to a sharing of activity and attention. (...) He sits on the therapist's lap and plays the keyboard. After a scale-like improvisation, he pauses, turns his face toward the therapist, making eye contact, and smiles.	Here, we can interpret the sharing of emotion and the regulation of interaction through a specific sequence of musical and non-musical nonverbal expressions.
When Lukas continues improvising, the therapist joins in with vocal tones. In response, Lukas shifts his eyes and his head, repeating eye contact and raising his hand to the therapist.	Similar behavior appeared in previous sessions. Here, he is engaging repeatedly in forms of nonverbal expression that he explored during the intervention. Additionally, he evolves it further.
(...) Lukas asks for the lute with a word and a gesture. He improvises experimentally. The therapist interacts and accompanies with small vocal imitations and pauses. While playing, Lukas develops eye contact, proxemics, facial expressions, and a combination of these forms of communication.	He fluently shifts to different means of communication and different musical instruments. The therapist supports his experimentation with techniques of imitation and making spaces. Lukas uses other nonverbal communication clusters for spontaneous regulations of SI.
Lukas lies down with his face relaxed and turns toward the therapist. Later, he moves to the music's rhythm.	After expressing himself and experimenting, he seems to maintain his attention while listening to the therapist's vocal and instrumental improvisations.
After listening, he repeatedly responds with vocalizations and increased eye contact. He approaches and joins in playing the instrument with the therapist several times.	He regulates the amount of sharing by alternating engaging and listening. The frequency of eye contact increases to 12 times in the first half and 21 in the second.
At the end, Lukas's face is calm, he utters some minimal vocalizations. When the therapist announces the end of the session, he puts his shoes on, taking the therapist's hand voluntarily.	Lukas presents better concentration and more interaction with the therapist. At the end, he seems more relaxed and calmer than in previous sessions.

Session After One-third of the Intervention: "Exploring the Means and Ability to Regulate"

The IMT sessions became regular in Lukas's life as a part of his kindergarten schedule. He became familiar with the therapist and explored various possibilities within IMT (see Table 2).

Session After Two-thirds of the Intervention: "Dialogue and Reciprocity"

Here, there is more material to be referred to because more sessions have been conducted. This influences the intervention in its relational history and as well as in its interpretation (see Table 3).

Table 3
Two-thirds Into Treatment Intervention

Description	Interpretation
Upon entering, Lukas searches for the lute. He approaches the instrument, looks at the therapist, and grasps it carefully. His body movements are balanced, not agitated. He sits in front of the keyboard and starts vocalizing.	From the start, he focuses and concentrates his attention directly on the means of communication offered. He also invites the therapist to share attention.
While sitting, he expresses himself by improvising alternately on the lute and the keyboard; with every change of instrument, he establishes concentrated and serious eye contact with the therapist.	Lukas is paying attention to the therapist, maintaining awareness of the therapist's reactions, and the effects of his actions. He displayed similar behavior in previous and following sessions.
Lukas communicates with imperative pointing (glancing and gesturing). He wants to run an automatic melody on the keyboard. The therapist refuses. He accepts the information with eye contact and moves away hiding behind the corner. After a while, he looks around the corner making eye contact and returns.	Lukas now accepts restriction without protest, when at the beginning of the intervention he responded to limits or restrictions with expressions of anger.
Later, Lukas improvises on the lute and the therapist accompanies on keyboard. Eye contact increases along with varied facial expressions. Lukas' expression changes from relaxed to a smile and laughter. He produces spontaneous vocalizations with instrumental play and the therapist imitates him. In longer pauses, the therapist adds a variation, which Lukas adopts and imitates. Lukas vocalizes an interrogative melody initiating eye contact. The therapist vocalizes the answer as a variation.	Lukas initiates a dialogic situation with meaningful variations. Musical dialogues may encourage Lukas to explore new ways of nonverbal expression. For example, he uses an interrogative melody that was not proposed before by the therapist.
Lukas improvises on the keyboard and the therapist listens, leaving space for expression. In a break, the therapist plays one tone. Lukas watches the therapist's hand, leans over toward this hand, and re-establishes eye contact.	Sharing of instruments occurs as Lukas starts playing and the therapist joins in. The child accepts and shares attention using proxemic changes.
(...) The therapist brings forth the drum. Lukas responds with a sequence of nonverbal manifestations: eye contact, looking at the hand and drum, and smiling.	Lukas continues to share attention and manifest overall interest in the therapist's actions. Reciprocity increases in his way of interacting.

Last Session: “The Voice and Silence for Intimate Interaction”

This session took place at the end of the school year. At this time, Lukas might have been aware of the upcoming change. He was also verbally told about the termination of the intervention. In the session, he engaged less in instrument play or movement activities and favored mediating through voice, silence, and pauses. This made the session particularly intimate and differentiated it from previous ones (see Table 4).

Synthesized Findings

This study aimed to investigate the influence of an IMT intervention on the SI of a preschool child with ASD in a fixed number of sessions in a qualitative paradigm. A description and interpretation of selected “key (or relevant) moments” in four sessions in the case study are presented to help understand the processes occurring in the music therapy intervention, which may lead to a change in SI during the sessions.

Table 4
The Last Session

Description	Interpretation
The beginning is slow and without instruments. The only communication method used is vocal. Lukas enters the room, moves toward a chair, and sits.	Unlike at the beginning of other sessions, Lukas is not moving or choosing to play instruments.
He sits in silence, looking around the room. Then he starts to vocalize syllables: “te-i (...) tu.” The therapist sits next to him, adding imitations. These are occasionally enriched by moments of silence.	The therapist waits for the child to express and listens. Then, a musical dialogue with regular turn-taking evolves.
Silence is initiated by a lull from Lukas and adopted by the therapist during her turn. Continuing those dialogues, the therapist plays several tones on the keyboard. Lukas continues to vocalize, calmly takes the therapist’s hand, and removes it from the keys. He then continues to hold it in silence.	The vocalizations lessen in a diminuendo of voices ranging from moderately soft dynamics to very soft (“mp” to “ppp”) ending in slight breathing sounds.
Another vocalization dialogue follows with two long periods of eye contact and then two minutes without eye contact while Lukas sways rhythmically in a chair, laughing. Then in silence again, Lukas lies down and reinitiates eye contact.	He regulates the intensity of the interaction with the therapist. An unusual, relaxed expression of laughter appears and it is maintained longer than in the session previously described.
After another silent pause, Lukas starts a vocalizing dialogue with eye contact and small improvisations on the keyboard. The therapist listens, then adds and enriches these by singing his name. Lukas reacts with eye contact and vocalization with distinct intonation. Along with new improvisations on the keyboard, the vocalizations crescendo together with rising intensity of eye contact, succeeded by laughter.	Lukas holds long and attentive eye contact—a fully focused 6-second view with clearly articulated vocalization. He is attracted by the singing of his name.
He pauses playing, watching the playing hands of the therapist, before he joins in sharing the instrument again. Continuing, Lukas laughs again then creates mimic grimaces, moving slightly away from the therapist and closer again.	Lukas seems to be interested and attentive toward the therapist’s playing. This might be because he has been reassured through the attention the therapist gives him.
Later, when he plays the lute, his face is serious and focused. Once, he even frowns. Eye contact increases even more, and Lukas smiles at the therapist. Then, he makes another grimace and relaxes his face again.	He varies mimics for the regulation of SI, and combines them with proxemic changes, eye contact, and instrument play.
Before the end of the session, the therapist sings a song created in the first sessions using improvisations and Lukas’ name. She verbally repeats that this is their last session. Lukas is calm, accepting this silently with repeated eye contact.	I perceive this session as the most significant with elements of vocalization dialogues interspersed with silent pauses. The session’s conclusion was silent for 20 seconds with repeated eye contact engaged four times in 10 seconds. The session ends the same way it started, in silence.

Nonverbal Communication and Solace

Gestures

From the beginning of the intervention, Lukas uses gestures he is familiar with as per his history. Later, he improvises spontaneous gestures during vocalization dialogues. For example, he raises his hand and stops, open-palmed, before the therapist’s face in

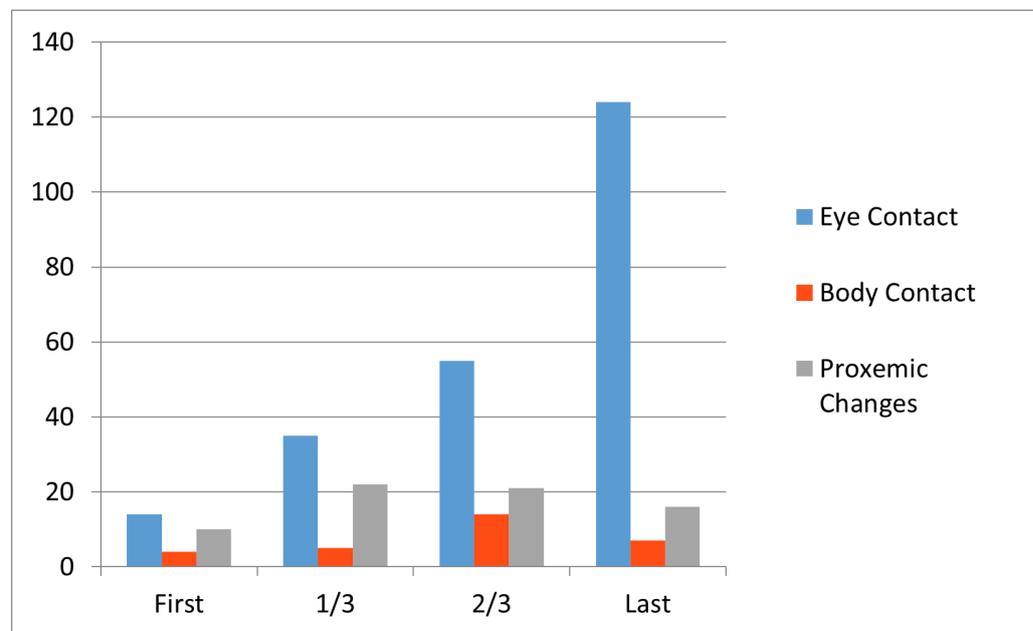


Figure 2

Quantity of Eye Contact, Body Contact, and Proxemic Changes in Four Selected Sessions.

response to her singing his name. Then he flutters one hand above his head, holding this position in a moment of long eye contact.

Facial Expressions

Lukas uses facial expressions, especially in expressing what appears initially to be disapproval and anger, and later joy, playfulness, and reciprocity. There was a qualitative change in facial expressions from the 12th session when Lukas began using new, more subtle facial gestures combining these with playful experimentation. He formed his mouth into wide vowel shapes “a, ae,” contrasting with a form similar to the pronunciation of “u,” switching repeatedly in a constant rhythm. These expressions were observed in the turn-taking game with the therapist. Later, he changes his forehead creasing and eyebrow movements in grimaces. He repeats distinctly different facial expressions when looking at the therapist and an instrument. The first is interpreted as a social smile and the second as concentration.

Eye Contact

Lukas’ eye contact stood out as the biggest observable change in behavior. It became gradually more frequent and was sustained for longer during the intervention (see Figure 2). He used eye contact in adequate ways for communication of SI. Furthermore, he synchronized this with other nonverbal expressions such as facial expressions, gestures, body postures, use of instruments, vocalization, and dialogue. Lukas used eye contact repeatedly in situations of turn-taking, playing an instrument, and joint activities. He initiated eye contact when starting, changing, or terminating his solo activity, and to monitor the therapist’s responses.

Proxemics

Proxemic changes increased during the intervention, except for the last session where Lukas moved less. It was observed that Lukas used moving away, while maintaining eye contact and a distinct facial expression, during dialogical situations. Sometimes this was accompanied by grimaces and laughter.

Body Postures

At the beginning and end of the first session, Lukas maintained a rigid posture standing sideways to the therapist. In following sessions, he acted similarly but gradually started standing or sitting facing the therapist. These reciprocal postures often coincided with instrument sharing, handling, or improvisations and were accompanied increasingly by eye contact. During improvisation on the keyboard Lukas sat on the therapist's lap and in later sessions lay down silently listening. This showed his enjoyment of pleasant moments, calmness, and his trust in the evolving relationship.

Physical Contact and Solace

Lukas did not use many expressions of physical contact, but this aspect evolved throughout the intervention with some of these expressions indicating solace. There may be a pattern within therapeutic relations that starts with an awareness of one's self and an awareness of others and continues with support (proofs of availability and boundaries) and with solace exchanges. For example, Lukas gently removed the therapist's hand from the keyboard or he used the therapist's hand to improvise on the keyboard. At the end of the 7th session, he took the therapist's hand of his own accord and in the next session, he touched her hand to greet her. Additionally, Lukas sat on the therapist's lap while playing the keyboard. In the 10th session, he embraced the therapist repeatedly after playing and listening to a loud sound. This moment could be interpreted as the seeking of solace during stress. Similar behavior, however, did not occur in every stressful moment (e.g., at the end of the initial sessions Lukas did not notably seek solace). The only situation that Lukas may have been close to offering solace was at the end of the 19th session, where he encouraged the therapist to conclude the session with a word and intonation. This, presuming that the end of the intervention is a grief-like experience for both participants (Benenzon, 2007; Kim, 2014).

Sharing Interest, Activity, Emotion, and Attention

Sharing of the activity occurred in the first session. Lukas expressed himself through new means, and he accepted the therapist's joining in the same activity. In the course of the intervention, longer periods of concentrations of attention appeared as a prerequisite for the ability to share attention. For example, in the 18th session, Lukas played seven minutes of a continuous improvisation, both independently and accompanied by the therapist.

Lukas accepted the presence of the therapist during his playing and musical improvisation. He and the therapist shared many improvisations, vocalization dialogues, and breathing sounds, which evolved into dialogues. Lukas enjoyed various movements like jumping, dancing, and rhythmical rocking as solo activities, but in the 10th session, he directly invited the therapist to share in these activities, thus sharing interests.

To delineate the difference between expressing emotion and sharing emotion at a nonverbal level, one should always include an aspect of subjective interpretation. It could be argued that every emotional expression is already shared. Additionally, IMT intervention works on a relational basis where emotion is intrinsically present. Lukas initially expressed anger, disapproval, and confusion. Later during the intervention, he shared many moments of music-making enjoyment but also listening enjoyment, happiness, and sometimes surprise.

Discussion

This study aimed to investigate the influence of an IMT intervention on the SI of a preschool child with ASD in a fixed number of sessions in a qualitative paradigm. A description and interpretation of selected relevant moments in four sessions in the case study are presented to help understand the processes occurring in the music therapy intervention, which may lead to a change in SI during the sessions. Observing as well as applying micro-analysis enabled plausible findings in three areas of SI: (1) nonver-

bal communication, (2) sharing, and (3) the search for solace or offering solace to other people.

The present research aims to emphasize that IMT works closely with the child, especially with musical and nonverbal expressions (Alvin, 1966; Benenzon, 2007; Geretsegger et al., 2015; Wigram, 2004). This aligns with a neurodiversity rights movement which advocates for developing accessible capacities or alternative communication rather than modifying neurodiverse symptoms (Bergmann, 2018). The latest extensive multi-locational randomized controlled trial of IMT for ASD published by Bieleninik et al. (2017) described a nonsignificant mean difference between results of IMT added to standard care and standard care alone. The trial suggests that IMT did not reduce symptom severity in ASD as measured by the Autism Diagnostic Observation Schedule. However, the present study corroborates claims of other authors that dealing with quality of life before symptom-reduction is a possible advantage of IMT (Blauth, 2017; Straus, 2014; Turry, 2018b).

Lukas used a variety of nonverbal communications from all the observed categories: gestures, facial expressions, eye contact, proxemics, body postures, and physical contact. He also manifested behavioral symptoms in various meaningful combinations. During the intervention, the variety of behaviors he displayed expanded. These results seem to depict the possibilities of non-directive and child-centered approach of IMT for a child with ASD. Furthermore, the musical features of many situations allow us to interpret the meanings or motivations of these behaviors. Lukas's nonverbal communication (used for regulation of SI) shows efforts to create a relationship, self-awareness and awareness of others, and of sharing in all the observed categories. Being able to use nonverbal communication as well as becoming aware of this ability and practicing it are important signs of a healthy personality. This may be enabled by the IMT context that provides unique methods for engaging dialogues and reciprocity in safe and comfortable environments. The benefits of musical dialogues established during this process hold value during the intervention and may hold value after the intervention. The improvement in SI achieved by children can prove their ability to interact with others. This also compares well with Benenzon's (1994) argument that health is the recognition of our own communicational channels and capacities (p. 65 and 67).

It should be noted that other children's reactions to such an intervention may differ or they may need a professional and sensitive adjustment of treatment. However, the spectrum of the child's musical expressions that the therapist builds upon is very broad and therefore, allows individual adjustments. This spectrum includes vocal expressions, body sounds, instrumental play, and movement. Beyond this, rhythm, an intrinsic part of movement, is often accompanied by a sound (e.g., rubbing or a thud). Music therapy professionals agree that following the child's lead is an essential principle enabling the sharing of emotion (Geretsegger et al., 2015). The length of the sessions was chosen to fit into the kindergarten schedule and capacities of the research. According to Benenzon (2007), a rough minimal time for participants to enter fully into a nonverbal session is 30 minutes. However, it can be less for a child with low verbal capacities. Different session lengths or frequency, and their optimal variety, are to be further studied in future research.

This study does not include a comparison with control conditions such as standard care or placebo conditions nor does it investigate the influence or impact of the intervention outside the sessions. There are limitations to the generalization of these findings due to the heterogeneity within ASD and the unrepeatability of the intervention. The evaluation of moments of SI regulation and especially solace must be framed in the overall approach of IMT and mutual music-making. This approach is based on providing solace or remedy to a participant. It is particularly useful in the case of a child who can be misunderstood or feel disconnected throughout life while using idiosyncratic attempts to communicate (Brewer et al., 2016; Kasari et al., 1990) and still wishes to be attended and responded to as in explanation proposed by Kim (2014).

Future research could further expand our understanding of the processes involved in IMT. Presuming that knowledge is formed through an ongoing interaction between

the researcher and the subject, acknowledging the subjectivity of the researcher is essential (Smeijsters & Aasgaard, 2005). In this case double subjectivity takes place as a researcher is also a therapist.

IMT presents promising opportunities for the care of children with ASD, bringing the aspect of individualization intrinsic in a non-directive approach into comprehensive treatment. IMT, thus, empowers children to learn, and further develop their own expressive channels for the regulation of SI. Future research could compare SI development inside and outside the intervention. Multiple observers and interpretations, along with cross-observer agreement checks, present another possibility for future study-design. We would like to encourage ongoing research into para-medical treatments in general, providing joint relevant information for care-takers, stake-holders, and interested audience with the scope of enriching the clinical practice.

Conclusion

This qualitative case study investigates the influence of individual, non-directive IMT on the SI of a preschool child with ASD and took place in a specialized kindergarten in the Czech Republic. The observations reveal that the child uses a variety and combination of nonverbal communication from every category, which expands during the intervention. These carry meanings of relation, self-awareness, awareness of the others, and sharing. The IMT context thus provides a unique method for dialogues and reciprocity in a protected and comfortable environment. In conclusion, IMT presents promising opportunities for the care of children with ASD, bringing the aspect of individualization intrinsic in a non-directive approach into comprehensive treatment. IMT, therefore, empowers children to learn, and further develop their own expressive channels for the regulation of SI. Future research could compare SI development inside and outside the intervention. Multiple observers and interpretations, along with cross-observer agreement checks, present another possibility for future study-design.

About the Author

Zuzana Vlachová studied social education and music therapy in Czech Republic and Italy and has a personal experience as a music therapist for children with ASD, working for schools and non-profit organizations in Czech Republic for eight years.

Disclosure Statement

The author has professional interest in the studied material. No other conflict of interest is reported.

References

- Abrams, B. (2010). Evidence-based music therapy practice: An integral understanding. *Journal of Music Therapy*, 47(4), 351–379. <https://doi.org/10.1093/jmt/47.4.351>
- Adamus, P., Vančová, A., & Löfflerová, M. (2017). *Poruchy autistického spektra v kontextu aktuálních interdisciplinárních poznatků* [Autism spectrum disorders in the context of current interdisciplinary knowledge]. Ostravská Univerzita, Pedagogická Fakulta.
- Aigen, K. (2008). An analysis of qualitative music therapy research reports 1987–2006: Articles and book chapters. *The Arts in Psychotherapy*, 35(4), 251–261. <https://doi.org/10.1016/j.aip.2008.05.001>
- Aigen, K. (2012). Publishing qualitative research in the Nordic Journal of Music Therapy: Guidelines for authors, reviewers, and editors for evaluating manuscripts [Supplementary web material]. *Nordic Journal of Music Therapy*, 21(2), 109–110. <https://doi.org/10.1080/08098131.2012.685274>
- Alvin, J. (1966). *Music therapy*. Hutchinson & Co. Ltd.
- Alvin, J., & Warwick, A. (1992). *Music therapy for the autistic child* (2nd ed.). Oxford University Press.

- American Music Therapy Association. (2017). *Statement to AMTA Members on the TIME-A Trial Published by Bieleninik et al. (2017)*. https://www.musictherapy.org/research_and_asd_brief_statement_on_time-a_trial/
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.).
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425596>
- Argyle, M. (1975). *Bodily communication*. International Universities Press.
- Baxter, A. J., Brugha, T. S., Erskine, H. E., Scheurer, R. W., Vos, T., & Scott, J. G. (2015). The epidemiology and global burden of autism spectrum disorders. *Psychological Medicine*, 45(3), 601–613. <https://doi.org/10.1017/S003329171400172X>
- Benenzon, R. O. (1994). *Società famiglia istituzioni autismo musicoterapia* [Society family institutions autism music therapy]. Phoenix.
- Benenzon, R. O. (2007). *La parte dimenticata della personalità. Nuove tecniche per la musicoterapia* [The forgotten part of the personality. New techniques for music therapy]. Borla.
- Berger, D. S. (2002). *Music therapy, sensory integration and the autistic child*. Jessica Kingsley Publishers.
- Bergmann, T. (2018). TIME-A: Ist Musiktherapie bei Autismus Zeit-und Geldverschwendung?. *Musiktherapeutische Umschau*, 39(1), 5–11. <https://doi.org/10.13109/muum.2018.39.1.5>
- Bieleninik, L., Geretsegger, M., Mössler, K., Assmus, J., Thompson, G., Gattino, G., Elefant, C., Gottfried, T., Iglizzi, R., Muratori, F., Suvini, F., Kim, J., Crawford, M. J., Odell-Miller, H., Oldfield, A., Casey, Ó., Finnemann, J., Carpenite, J., Park, A., Grossi, E., & Gold, C. (2017). Effects of improvisational music therapy vs enhanced standard care on symptom severity among children with autism spectrum disorder: The TIME-A randomized clinical trial. *JAMA*, 318(6), 525–535. <https://doi.org/10.1001/jama.2017.9478>
- Blauth, L. K. (2017). Improving mental health in families with autistic children: benefits of using video feedback in parent counselling sessions offered alongside music therapy. *Health Psychology Report*, 5(2), 138–150. <https://doi.org/10.5114/hpr.2017.63558>
- Brewer, R., Biotti, F., Catmur, C., Press, C., Happé, F., Cook, R., & Bird, G. (2016). Can neurotypical individuals read autistic facial expressions? Atypical production of emotional facial expressions in autism spectrum disorders. *Autism Research*, 9(2), 262–271. <https://doi.org/10.1002/aur.1508>
- Bruscia, K. (1987). *Improvisational models of music therapy*. Charles C. Thomas.
- Bull, P., & Doody, D. P. (2013). Gestures and body movement. In M. L. Knapp, & J. A. Hall (Eds.), *Nonverbal communication* (pp. 205–228). De Gruyter. <https://doi.org/10.1515/9783110238150.205>
- Carpente, J. A. (2017). Investigating the effectiveness of a developmental, individual difference, relationship-based (DIR) improvisational music therapy program on social communication for children with autism spectrum disorder. *Music Therapy Perspectives*, 35(2), 160–174. <https://doi.org/10.1093/mtp/miw013>
- Christensen, D. L., Braun, K., Baio, J., Bilder, D., Charles, J., Constantino, J. N., Daniels, J., Durkin, M. S., Fitzgerald, R. T., Kurzius-Spencer, M., Lee, L., Pettygrove, S., Robinson, C., Schulz, E., Wells, C., Wingate, M. S., Zahorodny, W., & Yeargin-Allsopp, M. (2018). Prevalence and characteristics of autism spectrum disorder among children aged 8 years – Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2012. *Morbidity and Mortality Weekly Report, Surveillance Summaries*, 65(13), 1–23. <https://doi.org/10.15585/mmwr.ss6513a1>
- DiCicco-Bloom, E., Lord, C., Zwaigenbaum, L., Courchesne, E., Dager, S. R., Schmitz, C., Schultz, R. T., Crawley, J., & Young, L. J. (2006). The developmental neurobiology of autism spectrum disorder. *Journal of Neuroscience*, 26(26), 6897–6906. <https://doi.org/10.1523/jneurosci.1712-06.2006>

- Dileo, C. (2005). Ethical precautions in music therapy research. In B. L. Wheeler (Ed.), *Music therapy research: Quantitative and qualitative perspectives* (2nd ed., pp. 226–235). Barcelona Publishers.
- Edgerton, C. L. (1994). The effect of improvisational music therapy on the communicative behaviours of autistic children. *Journal of Music Therapy*, 31(1), 31–62.
- Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion*, 6(3/4), 169–200. <https://doi.org/10.1080/02699939208411068>
- Ekman, P. (1999). Emotional and conversational nonverbal signals. In L. S., Messing & R. Campbell (Eds.), *Gesture, speech, and sign* (pp. 45–55). Oxford University Press.
- Fay, B. (1996). *Contemporary philosophy of social science: A multicultural approach* (Vol. 1). Blackwell.
- Finnigan, E., & Starr, E. (2010). Increasing social responsiveness in a child with autism: A comparison of music and non-music interventions. *Autism*, 14(4), 321–348. <https://doi.org/10.1177/1362361309357747>
- Gattino, G. S., Riesgo, D. S. R., Longo, D., Leite, J. C. L., & Faccini, L. S. (2011). Effects of relational music therapy on communication of children with autism: A randomized controlled study. *Nordic Journal of Music Therapy*, 20(2), 142–154. <https://doi.org/10.1080/08098131.2011.566933>
- Geretsegger, M., Elefant, C., Mössler, K. A., & Gold, C. (2014). Music therapy for people with autism spectrum disorder. *Cochrane Database of Systematic Reviews*, (6). <https://doi.org/10.1002/14651858.cd004381.pub3>
- Geretsegger, M., Holck, U., Carpentier, J. A., Elefant, C., Kim, J., & Gold, C. (2015). Common characteristics of improvisational approaches in music therapy for children with autism spectrum disorder: Developing treatment guidelines. *Journal of Music Therapy*, 52(2), 258–281. <https://doi.org/10.1093/jmt/thv005>
- Gold, C., Wigram, T., & Elefant, C. (2006). Music therapy for autistic spectrum disorder. *Cochrane Database of Systematic Reviews*, (2), 1465–1858. <https://doi.org/10.1002/14651858.cd004381.pub2>
- Harrington, A. (2005). *Modern social theory*. Oxford University Press.
- Hazlett, H. C., Gu, H., Munsell, B. C., Kim, S. H., Styner, M., Wolff, J. J., Elison, J. T., Swanson, M. R., Zhu, H., Botteron, K. N., Collins, D. L., Constantino, J. N., Dager, S. R., Estes, A. M., Evans, A. C., Fonov, V. S., Gerig, G., Kostopoulos, P., McKinstry, R. C., Pandey, J., Paterson, S., Pruett, J. R., Schultz, R. T., Shaw, D. W., Zwaigenbaum, L., Piven, J., & The IBIS Network. (2017). Early brain development in infants at high risk for autism spectrum disorder. *Nature*, 542(7641), 348. <https://doi.org/10.1038/nature21369>
- James, R., Sigafos, J., Green, V. A., Lancioni, G. E., O'Reilly, M. F., Lang, R., Davis, T., Carnett, A., Achmadi, D., Gevarter, C., & Marschik, P. B. (2015). Music therapy for individuals with autism spectrum disorder: A systematic review. *Review Journal of Autism and Developmental Disorders*, 2(1), 39–54. <https://doi.org/10.1007/s40489-014-0035-4>
- Jimenez, S. D. (2014). *An exploration of teaching music to individuals with autism spectrum disorder* [Doctoral dissertation, Antioch University Seattle]. Antioch University Repository and Archive. <https://aura.antioch.edu/etds/94>
- Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child*, 2, 217–250.
- Kasari, C., Sigman, M., Mundy, P., & Yirmiya, N. (1990). Affective sharing in the context of joint attention interactions of normal, autistic, and mentally retarded children. *Journal of Autism and Developmental Disorders*, 20(1), 87–100. <https://doi.org/10.1007/bf02206859>
- Kasari, C., Gulsrud, A., Freeman, S., Paparella, T., & Helleman, G. (2012). Longitudinal follow-up of children with autism receiving targeted interventions on joint attention and play. *Journal of the American Academy of Child & Adolescent Psychiatry*, 51(5), 487–495. <https://doi.org/10.1016/j.jaac.2012.02.019>
- Keltner, D., & Ekman, P. (2000). Facial expression of emotion. In M. Lewis, & J. Haviland-Jones (Eds.), *Handbook of emotions* (2nd ed., pp. 236–249). Guilford Publications.

- Kern, P., & Aldridge, D. (2006). Using embedded music therapy interventions to support outdoor play of young children with autism in an inclusive community-based child care program. *Journal of Music Therapy*, 43(4), 270–294. <https://doi.org/10.1093/jmt/43.4.270>
- Kim, J. (2014). The trauma of parting: Endings of music therapy with children with autism spectrum disorders. *Nordic Journal of Music Therapy*, 23(3), 263–281. <https://doi.org/10.1080/08098131.2013.854269>
- Kim, J., Wigram, T., & Gold, C. (2008). The effects of improvisational music therapy on joint attention behaviours in autistic children: A randomized controlled study. *Journal of Autism and Developmental Disorders*, 38(9), 1758–1766. <https://doi.org/10.1007/s10803-008-0566-6>
- Kim, J., Wigram, T., & Gold, C. (2009). Emotional, motivational and interpersonal responsiveness of children with autism in improvisational music therapy. *Autism*, 13(4), 389–409. <https://doi.org/10.1177/1362361309105660>
- Knapik-Szweda, S. (2019). The significance of the process of music therapy for children with multiple social and communication disabilities. *Voices: A World Forum for Music Therapy*, 19(1). <https://doi.org/10.15845/voices.v19i1.2732>
- Kolářová, Z. (2015, April 1). Děti s autismem přibývá. Celoplošná systémová péče však v Česku neexistuje [Number of children with autism is increasing. The nationwide system of care in the Czech Republic, however, does not exist]. *Zdravotnický deník*. <http://www.zdravotnickydenik.cz/2015/04/deti-s-autismem-pribyva-celoplosna-systemova-pece-vsak-v-cesku-neexistuje/>
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.
- Marom, M. K., Gilboa, A., & Bodner, E. (2018). Musical features and interactional functions of echolalia in children with autism within the music therapy dyad. *Nordic Journal of Music Therapy*, 27(3), 175–196. <https://doi.org/10.1080/08098131.2017.1403948>
- Masi, A., DeMayo, M. M., Glozier, N., & Guastella, A. J. (2017). An overview of autism spectrum disorder, heterogeneity and treatment options. *Neuroscience Bulletin*, 33(2), 183–193. <https://doi.org/10.1007/s12264-017-0100-y>
- Miller, S. B., & Toca, J. M. (1979). Adapted melodic intonation therapy: A case study of an experimental language program for an autistic child. *Journal of Clinical Psychiatry*, 40(4), 201–203.
- Moore, C., Dunham, P. J., & Dunham, P. (2014). *Joint attention: Its origins and role in development*. Psychology Press.
- Nordoff, P., & Robbins, C. (1977). *Creative music therapy: Individualized treatment for the handicapped child*. John Day.
- Pasiali, V. (2012). Supporting parent-child interactions: Music therapy as an intervention for promoting mutually responsive orientation. *Journal of Music Therapy*, 49(3), 303–334. <https://doi.org/10.1093/jmt/49.3.303>
- Rossignol, D. A. (2009). Novel and emerging treatments for autism spectrum disorders: A systematic review. *Annals of Clinical Psychiatry*, 21(4), 213–236.
- Ošlejšková, H. (2008). Poruchy autistického spektra: poruchy vyvíjejícího se mozku [Autism spectrum disorder: disorders of the developing brain]. *Pediatric pro Praxi*, 9(2), 80–84.
- Salomon-Gimmon, M., & Elefant, C. (2019). Development of vocal communication in children with autism spectrum disorder during improvisational music therapy. *Nordic Journal of Music Therapy*, 28(3), 174–192. <https://doi.org/10.1080/08098131.2018.1529698>
- Saperston, B. (1973). The use of music in establishing communication with an autistic mentally retarded child. *Journal of Music Therapy*, 10(4), 184–188. <https://doi.org/10.1093/jmt/10.4.184>
- Smeijsters, H., & Aasgaard, T. (2005). Qualitative case study research. In B. L. Wheeler (Ed.), *Music therapy research: Quantitative and qualitative perspectives* (2nd ed., pp. 440–458). Barcelona Publishers.
- Starr, E., & Zenker, K. (1998). Understanding autism in the context of music therapy: Bridging theory and practice. *Canadian Journal of Music Therapy*, 6(1), 1–19.

- Stephens, C. E. (2008). Spontaneous imitation by children with autism during a repetitive musical play routine. *Autism, 12*(6), 645–671. <https://doi.org/10.1177/1362361308097117>
- Straus, J. N. (2014). Music therapy and autism: A view from disability studies. *Voices: A World Forum for Music Therapy, 14*(3). <https://doi.org/10.15845/voices.v14i3.785>
- Šmejkalová, H. (2010). Analýza poradenských služeb a vzdělávání dětí a žáků s poruchami autistického spektra [Analysis of counseling services and education for children and pupils with autism spectrum disorders]. *IPPP ČR*. <http://www.ippp.cz/images/stories/doc/studie/zvr%20pas%20analza%202010%20h%20.pdf>
- Thompson, G. A., & McFerran, K. S. (2015). Music therapy with young people who have profound intellectual and developmental disability: Four case studies exploring communication and engagement within musical interactions. *Journal of Intellectual and Developmental Disability, 40*(1), 1–11. <https://doi.org/10.3109/13668250.2014.965668>
- Trevarthen, C. (2002). Autism, sympathy of motives and music therapy. *Enfance, 54*(1), 86–99.
- Trevarthen, C. (2011). What is it like to be a person who knows nothing? Defining the active intersubjective mind of a newborn human being. *Infant and Child Development, 20*(1), 119–135. <https://doi.org/10.1002/icd.689>
- Trevarthen C., & Aitken, K., J. (2001). Infant intersubjectivity: Research, theory, and clinical applications. *Journal of Child Psychology and Psychiatry, 42*(1), 3–48. <https://doi.org/10.1111/1469-7610.00701>
- Turry, A. (2018a). Response to effects of improvisational music therapy vs. enhanced standard care on symptom severity among children with autism spectrum disorder: The TIME-A randomized clinical trial. *Nordic Journal of Music Therapy, 27*(1), 87–89. <https://doi.org/10.1080/08098131.2017.1394902>
- Turry, A. (2018b). Actually, music therapy does work. *Music and Medicine, 10*(2), 113–114.
- Vlachová, Z. (2016). Muzikoterapie: situace výzkumu u jedinců s autismem [Music therapy: situation of research at individuals with autism]. *Speciální pedagogika, 26*(1), 32–45.
- Vlachová, Z., & Collavoli, G. (2014). Microanalysis research for autistic children [Special Issue]. *Music Therapy Today, 10*(1), 222–223.
- Vybíral, Z. (2009). Psychologie komunikace [Psychology of communication]. (2nd ed.). Portál.
- Walsh, P., Elsabbagh, M., Bolton, P., & Singh, I. (2011). In search of biomarkers for autism: Scientific, social and ethical challenges. *Nature Reviews Neuroscience, 12*(10), 603. <https://doi.org/10.1038/nrn3113>
- Watzlawick, P., Bavelas, J. B., & Jackson, D. D. (2011). *Pragmatics of human communication: A study of interactional patterns, pathologies and paradoxes*. W.W. Norton & Company.
- Watzlawick, P., Beavin, J., & Jackson, D. (2017). Some tentative axioms of communication. In C. D. Mortensen (Ed.), *Communication theory* (pp. 74–80). Routledge.
- Wheeler, B. L., & Kenny, C. (2005). Principles of qualitative research. In B. L., Wheeler (Ed.), *Music therapy research: Quantitative and qualitative perspectives* (2nd ed., pp. 59–71). Barcelona Publishers.
- Wheeler, D., Williams, K., Seida, J., & Ospina, M. (2008). The Cochrane Library and autism spectrum disorder: An overview of reviews. *Evidence-Based Child Health, 3*, 3–15. <https://doi.org/10.1002/ebch.218>
- Wigram, T. (2004). *Improvisation: Methods and techniques for music therapy clinicians, educators, and students*. Jessica Kingsley Publishers.
- Wigram, T., Pedersen, I. N., & Bonde, L. O. (2002). A comprehensive guide to music therapy: *Theory, clinical practice, research and training*. Jessica Kingsley Publishers.
- Wimporly, D., Chadwick, P., & Nash, S. (1995). Brief report: Musical interaction therapy for children with autism: An evaluative case study with two-year follow-up. *Journal of Autism and Developmental Disorders, 25*(5), 541–52. <https://doi.org/10.1007/bf02178299>
- World Health Organization. (2004). *International statistical classification of diseases and related health problems* (10th revision). <https://apps.who.int/iris/handle/10665/42980>

- World Health Organization. (2018). *International statistical classification of diseases and related health problems* (11th revision). <https://icd.who.int/browse11/l-m/en>
- Wosh, T., & Wigram, T. (Eds.). (2007). *Microanalysis in music therapy: Methods, techniques and applications for clinicians, researchers, educators and students*. Jessica Kingsley Publishers.
- Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Sage.