Systematic Review


Athina Tsirigoti and Maria Georgiadi *

Department of Psychology, University of Crete, 74100 Rethymno, Greece; athenatsirigoti@gmail.com
* Correspondence: m.georgiadi@uoc.gr

Abstract: Autism spectrum disorder (ASD) in children is characterized by difficulties in social communication and restricted repetitive behavior patterns. Music therapy appears to have beneficial effects in the area of social interaction and communication. The aim of this systematic literature review is to investigate the effectiveness of music therapy programs on the development of social communication among preschool- and school-aged children with ASD. For this purpose, a detailed study of the relevant literature that has been published in the last decade in peer-reviewed scientific journals was conducted. Web of Science, Springer Link, PsyINFO, and ERIC databases were searched, and according to the eligibility and exclusion criteria, 12 studies were finally selected from the 167 initially found. From the analysis of the results, the following categories were defined to contribute to enhancing social communication: (a) improvisational music therapy; (b) joint attention and eye contact; (c) therapeutic relationship, synchronization, and attunement; (d) imitation; (e) understanding and interaction; (f) family-centered music therapy; and (g) language and socioemotional adjustment. The results of the review were mixed, as music therapy appeared to have a positive effect on improving the social communication of children with ASD, but a general conclusion could not be drawn about the degree of its effectiveness compared to the standard treatments that children usually receive. In the future, further research in this field, especially on the improvisational music Therapy technique, is recommended. Moreover, an increased focus on the development of a common methodological practice regarding the sample selection process and measurement tools is suggested.

Keywords: autism spectrum disorder (ASD); music therapy; social communication; systemic review; music therapy efficacy; children

1. Introduction

Individuals with autism spectrum disorder (ASD) exhibit deficits in social communication and interaction, in addition to limited repetitive patterns of behavior such as stereotypes in movement or speech, rituals, and over-reactivity or under-reactivity to sensory information [1]. In recent years, many different intervention and treatment programs have been developed for children with ASD, such as art therapy; dance therapy; drama therapy; yoga; and therapy through interaction with animals, such as dolphins, horses, dogs, etc. [2–8]. Another important therapeutic tool for children with ASD is music therapy, i.e., the use of music as an intervention tool to achieve individualized goals by a certified professional music therapist. The goals of music therapy are, among others, improving emotional expression and enhancing communication, while emphasis is placed on the quality of the therapeutic relationship and the music–emotional coordination between the therapist and the client [9,10].

The importance of music therapy in ASD lies in the opportunity given to individuals to come into contact with nonverbal types of communication, which can then lead to vocal exchanges and speech [11]. Music therapy sessions are recommended for people with ASD, based on the benefits of combining the harmony and structure of music with verbal
Another common technique is improvised music therapy, in which the client plays various instruments that do not require training or experience, while the therapist creates musical patterns based on the music, the emotional state, and the child’s movements, thus providing a safe ground for the development of a positive therapeutic relationship [10,13]. Additionally, for children with ASD, music therapy appears to have a positive effect on social behavior, speech, communication skills, and the frequency of echolalia [14,15]. Moreover, improvisational music therapy, and especially relaxed structure sessions, seems to be quite helpful for children with ASD in the area of communication and emotional expression [10,16]. Music therapy is an emerging and innovative therapeutic method for people with ASD that appears to have positive, yet at the same time mixed, results [17,18]. Specifically, according to Suvini (2019) [19], the occasionally inconclusive results of studies may be due to the targeting of music therapy programs. It is possible that the heterogeneity of the individuals participating in music therapy programs does not allow for the achievement of the initial goal, namely the reduction in the severity of autism symptomatology [19]. Thus, as reported by Broder-Fingert et al. (2017) [20], the shortcomings observed so far in research on the effectiveness of music therapy in children with ASD raise the question of whether further study in more controlled and carefully selected settings is worth the effort or whether it should ultimately be abandoned.

So far, the findings of the literature on the effectiveness of music therapy programs for children with ASD are quite encouraging [12,14,16,21–24]. Music therapy appears to greatly promote prosocial and social interaction in children with ASD and can increase the levels of joint attention and nonverbal skills [21,24]. Research by Pater et al. (2021) [14] showed significant improvement in children’s concentration on a common task and in taking initiative, while in the study by Vaiouli et al. (2015) [23], participants showed an increased ability to focus on faces and respond to joint attention. Still, music therapy has been shown to help children with ASD improve their skills in primary outcome domains that are core to ASD, such as social interaction, verbal communication, behavior, and socioemotional reciprocity [25]. The research of Salomon-Gimmon and Elefant (2019) [22] showed that, during improvisational music therapy sessions, the vocal communication of children with ASD is increased. Particularly, it was shown that, in the first sessions, there was a greater focus on regulation, self-stimulation, and personal exploration of the voice, while as the sessions progressed, the children began to focus more on vocal interaction and were to some extent satisfied with the interpersonal relationship with the therapist. In the study by Kim et al. (2009) [16], music therapy sessions mainly evoked feelings of joy and emotional synchrony in children. In particular, an improvement in the correspondence between expression and expressed emotion was observed, which highlights the importance of musical coordination and interactivity during music therapy sessions. Finally, studies have shown that music therapy interventions contribute to the development of emotional understanding and speech, factors that facilitate social skills and communication [26–28].

Some scales and tools that are routinely used in research on the impact of music therapy on ASD are the Autism Diagnostic Observation Schedule (ADOS) to assess the level of communication, social reciprocity and interaction, play, stereotypes, and limited interest, and the Social Responsiveness Scale (SRS), which involves parents, teachers, or adults observing the child on a regular basis [29]. Some other assessment tools are the Autism Treatment Evaluation Checklist (ATEC), the Childhood Autism Rating Scale (CARS), the Music Therapy Diagnostic Assessment (MTDA), and the Pervasive Developmental Disorder Behavior Inventory (PDDBI) [30–32].

In the context of a systematic review of studies on the effects of music therapy on people with ASD, various conclusions have been drawn regarding the effectiveness of music therapy programs. Firstly, the application of Orff’s music therapy approach to people with ASD has shown a reduction in repetitive behaviors and improvements in social interaction and verbal communication of the treated individuals. In addition, studies involving individuals for whom improvisational music therapy was applied have shown
positive results and have highlighted the key role that the behavioral characteristics of client–therapist interaction play in the effectiveness of therapy [33]. Nevertheless, according to Mayer-Benarous et al. (2021) [34], other studies of the effects of music therapy show a positive but small effect in people with ASD. In particular, several studies evaluating the effect of music therapy on the language and communication skills of children with ASD reported two main results: First, a significant effect on learning was shown through mimetic skills, and second, music therapy sessions were associated with improvements in oral language utterance (phonology, semantics, prosody, and pragmatics).

The aim of the present systematic literature review is to investigate the effectiveness of music therapy programs in relation to the development of social communication in preschool- and school-aged children with ASD. Therefore, the research question that arises is “To what extent do music therapy programs contribute to the development and improvement of social communication of school-aged and preschool-aged children with ASD?” Although there have been extensive studies related to this question so far, there is no systematic review in the literature that focuses on children with a diagnosis of ASD of school and preschool age (3 to 12 years old) and only addresses the area of social communication. At the same time, this review only includes studies conducted within the last decade.

2. Materials and Methods

This study has been registered in the PROSPERO database 2024 CRD42024502822 available at https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024502822 Accessed on 15 January 2024.

For the purpose of this systematic review, four databases were searched: Web of Science, Springer Link, Psy INFO, and ERIC. The selection criteria were (a) participants with autism spectrum disorder diagnosis; (b) participants in the preschool-to-school age group (3 to 12 years old); (c) studies that investigate the effectiveness of music therapy programs regarding the social communication of children with ASD; (d) studies published in peer-reviewed journals; (e) no experimental studies, case studies, or reviews; and (f) studies published in the last decade (2013–2023). Studies in both Greek and English were searched, and the final included studies were chosen to be in English.

The following keywords were used during the database search: (music therapy OR music intervention OR musical therapy) AND (autism OR ASD OR autism spectrum disorder OR Asperger’s) AND (child*) AND (social communication OR communication OR social skills OR communication skills OR social behavior) AND (effect OR effectiveness OR efficacy) NOT (case study OR review) NOT (adolescen*).

Furthermore, the PRISMA flowchart (Figure 1) and CASP (Critical Appraisal Skills Programme) checklists were used to evaluate the final selected surveys. The aforementioned checklists were for surveys following the randomized trial (RCT) method. The evaluation was divided into eleven questions covering four areas: basic design, method, results, and generalizability of results. Studies that did not follow the randomized trial were only evaluated based on their results and the clarity of their research question. Therefore, with regard to the latter surveys in the checklists, the questions relevant to the randomized trial (RCT) method were not answered.

In total, after searching the databases and the keywords used, 154 studies were found. Of these, 22 were screened based on the relevant abstract and title. Of the 22 studies screened for eligibility criteria, 9 were excluded, as 4 were case studies, 1 was a review, 2 were related to another topic, 1 was related to a mixed intervention program (dance and mixed music therapy program), and the last study was not available in English. In the end, 13 studies were selected that met all the eligibility criteria. Of the 13 studies, 4 focused on improvisational music therapy, 2 on group music therapy, 1 on Orff music therapy, 1 on mime music therapy, 2 on family-centered music therapy, 1 on piano music therapy, and 2 on the therapeutic relationship during music therapy intervention.
mixed music therapy program), and the last study was not available in English. In the end, 13 studies were selected that met all the eligibility criteria. Of the 13 studies, 4 focused on improvisational music therapy, 2 on group music therapy, 1 on Orff music therapy, 1 on mime music therapy, 2 on family-centered music therapy, 1 on piano music therapy, and 2 on the therapeutic relationship during music therapy intervention. You can see all the studies included in the systematic review in Table 1.

Figure 1. PRISMA flow diagram used for the selection of the final studies included in this review.

3. Results

3.1. Improvisational Music Therapy

Studies on the effectiveness of improvisational music therapy seem to have mixed results. Bieleninik et al. (2017) [35] included in their study 364 children aged 4 to 6 years with ASD, according to ICD-10. This was a randomized trial study with independent evaluators and was aimed at comparing improvisational music therapy sessions that were added to the children’s previous standard care with the standard care the children received as a stand-alone treatment to improve their social skills. Children were randomly assigned to either the low-intensity (once a week) or high-intensity (three times a week) music therapy intervention or standard care for five months. The Autism Diagnostic Observation Schedule (ADOS) and the Social Response Scale (SRS) were used to assess ASD symptoms before and after the intervention. Children’s cognitive ability was measured with a standardized IQ test or through clinical judgment. In addition, follow-up assessments were conducted at 2, 5, and 12 months. According to the results, no statistically significant difference was found in the area of social communication between the group of children with ASD who received the simple therapy and the two groups who received the improvisational music therapy intervention. Of course, the changes in the quality of life of the children who participated in the high-intensity music therapy group were more positive than those of the children in the standard care group. However, although improvisational music therapy appeared to have positive effects on the social communication of children with ASD and SRS, which were maintained up to 12 months later, these results were not statistically significantly different from the baseline/standard treatment.
In their study, Carpente et al. (2021) [13] examined the effectiveness of three improvisational music therapy techniques: exact imitation, imitation with processing, and contingent response. In exact imitation, the therapist imitates all the obvious features of the child’s behavior; in imitation with processing, the therapist adds something of his own at the end of the imitation, while in contingent response, the therapist imitates only the minor elements of the child’s response. The participants were seven children with ASD aged 3 to 5 years, mostly nonverbal. The diagnosis of ASD was confirmed by the Second Edition of the Autism Diagnostic Observation Schedule (ADOS-2). The children attended nine individual sessions, one for each improvisational music therapy technique. Three music therapists participated in the study, and the sessions lasted 30 min. The instruments used were the Mullen Scales for Early Learning (MSEL) to assess cognitive functioning skills and the ADOS-2 to assess autistic symptoms during the interaction with the therapist. Furthermore, children’s engagement levels and the three therapists’ techniques were coded so that they could then be evaluated. The results showed that improvisational music therapy incorporating the imitation technique (accurate and processed) resulted in better levels of joint attention in children with ASD. The increase in joint attention is positive as it represents the highest level of engagement for the child. Also encouraging are the findings of the study by Venuti et al. (2017) [36], where there appeared to be a positive correlation between improvisational music therapy and synchronization in children with ASD.

Crawford et al. (2017) [37] conducted an international survey that included 364 children with ASD between 4 and 7 years of age and their parents. Participants were randomly selected (randomized trial), and the researchers were not involved in the design of the treatment and the allocation of participants. Also, children were randomly divided into two treatment groups, one undergoing low-intensity therapy (once a week) and one undergoing high-intensity therapy (three times a week), and the total duration of treatment was 5 months. The last assessment (follow-up assessment) was performed 12 months after the randomization of the participants. The assessment instruments used were the ADOS to assess the severity of ASD symptoms and the Social Response Scale (SRS). In addition, parental anxiety was measured with a short questionnaire and the Warwick–Edinburgh Mental Well-Being Scale (WEMWBS). According to the findings, no statistically significant results were found regarding the improvement in the social feeling (ADOS criterion) and social responsiveness (Social Responsiveness Scale) of preschool- and school-aged children with ASD after five months of improvisational music therapy sessions. Even though after the intervention, there were improvements in scores regarding social feeling, there were no statistically significant differences compared to the standard intervention received by the control group. At the same time, there was no difference in the scores for social feeling between the low- and high-frequency group, neither after 5 nor after 12 months. Finally, no statistically significant differences were observed in the Social Responsiveness Scale (SRS) scores either.

3.2. Joint Attention and Eye Contact

Joint attention with peers was found to be statistically significant in the study by LaGasse (2014) [30]. Their study included 17 children from 6 to 9 years old with a diagnosis of ASD. Participants were randomly divided into either the music therapy group or the social skill group without music. The sessions lasted 50 min and were held twice a week for a total of five weeks. The instruments that were used were the Social Response Scale (SRS) and the Autism Treatment Evaluation Checklist (ATEC) combined with behavioral observation and coding methods. The second version of the Childhood Autism Rating Scale (CARS2) was used to determine children’s level of functioning. Video-recorded sessions were also analyzed to assess eye contact, joint attention, and initiation and/or response to communication.

The results showed that children with ASD who received the music therapy intervention were more in control of each other’s gaze as the sessions progressed and were paying joint attention to an object or process. At the same time, it appeared that while the level of
joint attention with peers increased, the level of joint attention with adults decreased. Furthermore, LaGasse (2014) [30] found statistically significant differences in the eye contact factor between the group that received the music therapy intervention and the group that did not receive music therapy intervention. As the intervention progressed, the children seemed to maintain more eye direction toward other people in the room. No statistically significant results were found regarding the other behavioral dimensions (other than joint attention with peers). Finally, the study by Forti et al. (2020) [38] found positive results regarding prolonged social attention. After the music therapy intervention, school-aged children with ASD showed attention in 97% of the tasks assigned to them. This figure suggests a 29% increase in attention after the intervention compared to before therapy.

3.3. Therapeutic Relationship, Synchronization, and Attunement

Mössler et al. (2019) [39] studied 48 children who were between 4 and 7 years of age and diagnosed with ASD according to ICD-10. The tool that was used was the Assessment of the Quality of Relationship (AQR) in order to assess the therapeutic relationship. According to the AQR, the therapist and the child are musically and emotionally attuned when they follow the same modus within the relationship. Furthermore, video analysis was used, following a random selection of sequences of music therapy sessions. The Autism Diagnostic Observation Schedule (ADOS), with a focus on the “social effects” domain, and the Social Responsiveness Scale (SRS) were selected to assess ASD symptomatology. These instruments were administered at baseline, at the end of the intervention (5 months), and 12 months later. The study by Mössler et al. (2019) [39] showed that the treatment relationship is a significant predictor of changes in ASD symptom severity. Another important factor is the level of musical and emotional attunement of the therapist, as this is what will help the child respond better to the intervention. At the same time, lower scores in the therapeutic relationship were associated with more severe ASD symptoms. Finally, the therapeutic relationship appeared to predict a reduction in the severity of autistic symptoms, particularly in the area of social skills.

Regarding the synchronization of children with ASD and music therapy, there seems to be a positive relationship. In particular, the study by Venuti et al. (2017) [36] involved 25 children aged between 4 and 6 years with ASD, according to the DSM-IV-TR. To measure child and therapist synchronization, five behavioral categories were coded separately for the child and therapist (facial expression, vocal expression, head direction, posture, and specific movements). Then, the behavioral and emotional dimensions of both the child and the therapist were calculated together. Their results indicated improvement in the child’s emotional and behavioral connection with the therapist after twenty sessions of improvisational music therapy. At the same time, the child’s ability to synchronize seemed to increase over time until the end of the therapy. The same findings indicate that the ability to synchronize with the therapist increases even more in children with high-functioning ASD.

Mössler et al. (2020) [40] evaluated the musical and emotional coordination between therapists and children. They included 101 children between 4 and 7 years of age, diagnosed with ASD according to ICD-10. The assessment tools that were used were the Assessment of the Quality of Relationship (AQR) to assess the child’s availability for contact and ability to engage in interactive communication at a nonverbal level. The Autism Diagnostic Observation Schedule (ADOS) and the Social Responsiveness Scale (SRS) were used to assess ASD symptoms. Their results showed that musical and emotional coordination between the music therapist and the child did not appear to predict any significant change in the communication and social interaction skills of children with ASD. However, the factor of symptom severity was found to be noteworthy. Specifically, children with milder ASD symptoms were found to have better outcomes and a better level of coordination with the therapist. Similarly, children with more severe ASD symptoms had greater difficulty in achieving emotional and musical coordination with the therapist. Finally, therapists appeared to achieve coordination with children more often, indicating a correlation between
the severity of children’s symptomology and the therapists’ ability to coordinate with the children.

3.4. Imitation

Forti et al. (2020) [38] implemented a new music therapy intervention with imitation as the central focus of the study (Soundbeam Imitation Intervention). The participants were 14 children aged 5 to 9 years with a diagnosis of ASD according to the DSM-5 and the ADOS. Modern video modeling was used to assess motor imitation and social attention. The children, observing a model representation of a musician through video, had to copy and play the drum in front of them. The participants were first asked to observe the video and the movements of the musician and then to copy the movements they saw. This process was videotaped, and through the analysis of the video, conducted by two independent researchers, the children’s sustained social attention was measured. For the music therapy intervention, 12 individual sessions of 30 min were held twice a week over a 6-week period. According to the results, there was an increase in the mimetic accuracy of the children with ASD (with a very large effect size) when trying to copy the pattern seen on the screen. There was also an increase in the children’s sustained attention in the post-intervention assessment. Therefore, the imitation technique used in music therapy interventions seems to have positive results in the area of engagement of children with ASD [13].

3.5. Understanding and Interaction

Bharathi et al. (2019) [41] included in their study 60 children aged 6–12 years, categorized by high-, moderate-, and low-functioning ASD according to the DSM-5. A pre-test, a post-test, and a follow-up study three months after the music therapy intervention were designed. Furthermore, the TRIAD Special Skills Assessment (TSSA) was used as a measurement tool, which also takes into account the direct interaction of the parent and teacher with the child. The explored questions were related to understanding or taking perspective, initiating interactions, responding to new experiences, and maintaining interactions. Children received music therapy sessions for 3 months and were divided into two groups, one active and one passive. The active group engaged in singing, dancing, and playing with musical instruments while listening to the music (Orff method), while the passive group listened to the music alone without any interaction. The group that participated in the music therapy intervention with the Orff method (active group) showed improvement in social skills, which continued 3 months later. Also, the active group showed significant improvement in both the initiation and maintenance of interaction compared to the passive group, and they seemed to have a better response in communicating with other people compared to the passive group. Children who received the Orff music therapy intervention also showed statistically significant increases in comprehension and perspective taking (i.e., perceiving a situation from an alternative perspective).

3.6. Family-Centered Music Therapy

Thompson et al. (2014) [31] studied the effect of family-centered music therapy (FCMT) on the social interaction of children with ASD through parent and therapist ratings. The participants were 23 children 36-60 months old with severe ASD symptoms. The instruments were the Vineland Social–Emotional Scales of Early Childhood (VSEEC), the Social Response Scale for Preschoolers at 3 years of age (SRS-PS), the MacArthur–Bates Communication Development Inventory, Words and Gestures (MBCDI-W&G), the Parent–child Relationship Inventory (PCRI), and the Music Therapy Diagnostic Assessment (MTDA) to assess child engagement in sessions. Furthermore, semi-structured interviews with parents were performed. The results of the study showed a statistically significant effect (with a very large effect size) of FCMT on the child’s social–emotional functioning (VSEEC scale). For both parents and therapists, a significant improvement in the children’s social interaction with others in different contexts was observed.
Vaiouli and Andreou (2022) [42] studied the effectiveness of an FCMT program in promoting verbal and nonverbal communication among children with ASD and the perceptions of the parents of these children regarding the use of music as a communication tool. The music therapy program lasted 16 weeks and included weekly 45 min sessions. Participants were eight parents and their children who were diagnosed with ASD and ranged in age from 3 to 6 years. The sessions were divided into two parts. In the first part, the family presented a musical activity while all members were encouraged to improvise, and in the second part, the therapist presented a targeted musical activity and encouraged the child and parents to participate in it. Quantitative and qualitative methods were used for the purpose of the study. The instruments for the quantitative research were the Communication and Symbolic Behavior Scales Developmental Profile (CSBSDP) and the Pragmatics Profile of Everyday Communication Skills (PPECS) in preschool-aged children. For the qualitative research, the researchers conducted semi-structured interviews with parents and kept a recording diary after each session. Parents also recorded a diary each week, and after each session, the researchers engaged in short informal discussions with parents. The results of the quantitative research appeared to be statistically significant, as changes in nonverbal communication cues such as eye contact, use of gestures, and sounds were observed. Finally, according to the results of the qualitative research, the opportunity for parents to interact with their children through the music therapy session provided the opportunity for more communication and meaningful participation in joint activities in their daily lives.

3.7. Language and Socioemotional Adjustment

Schmid et al. (2020) [32] examined various aspects of social communication/behavior (language expression, problems in social processing, empathy, associative learning, and pragmatic communication). Their study involved 64 children aged 5 to 11 years with ASD and music therapists trained in the VOICSS method. Each session lasted 45 min, held once a week, and the treatment was completed in 16 weeks. The assessment instruments that were used were the DUACS behavioral outcome measurement tool and the Pervasive Developmental Disorder Behavior Inventory (PDDBI), which was completed by the teachers for each child before and after the intervention. Teachers rated their students’ oral language level. The aspects of empathy and pragmatic communication, i.e., the appropriate use of language in social situations, were found to be statistically significant. Moreover, the level of language was found to be statistically significant. Children who had a relatively high level of language from the outset also had high scores on the Behavioral Outcome Measurement Tool (DUACS). Consequently, children with a better level of language had a faster response to the intervention and more benefits. In conclusion, the results seem to suggest that children who had some basic social communication skills from the outset were more likely to benefit from participation in the music therapy intervention, and differences were seen in aspects of empathy and appropriate language use.

Dănciulescu and Zaharia (2022) [43] used the piano as the only musical instrument. The participants were 60 children aged 3 to 7 years diagnosed with ASD. The PEP-3 was used as an assessment instrument, which is a standardized and appropriate tool for assessing the developmental level acquired by children. This instrument also included the reports of the examiner and the child’s caregiver. The research indicated positive effects on the communication of children with ASD, in particular in terms of their ability to speak, listen, read, and write, and a reduction was observed in maladaptive social behaviors (in terms of emotional expression, social reciprocity, and stereotyped motor and verbal behaviors). Furthermore, according to the caregivers, there were also improvements in the children’s adaptive behavior in terms of their interactions during activities with peers and adults. You can see all the studies included in the systematic review in Table 1.
Table 1. Studies included in the systematic review evaluating the effectiveness of various music therapy interventions in enhancing aspects of social communication in children with ASD.

<table>
<thead>
<tr>
<th>Study Title</th>
<th>Authors</th>
<th>Year</th>
<th>Participants</th>
<th>Study Design</th>
<th>Intervention</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects of Improvisational Music Therapy vs. Enhanced Standard Care on Symptom Severity among Children with Autism Spectrum Disorder: The TIME-A Randomized Controlled Trial</td>
<td>Bielenik et al. [35]</td>
<td>2017</td>
<td>364 children aged 4 to 6 years with ASD (according to ICD-10)</td>
<td>Randomized control trial</td>
<td>Improvisational music therapy</td>
<td>No statistical difference was observed in the severity of symptoms. The level of improvement in both groups was small.</td>
</tr>
<tr>
<td>The Impact of Imitation on Engagement in Minimally Verbal Children with Autism during Improvisational Music Therapy</td>
<td>Carpent et al. [13]</td>
<td>2021</td>
<td>7 children with ASD ages 3 to 5, mostly nonverbal</td>
<td>Single-subject research design</td>
<td>Three IMT imitation techniques</td>
<td>Results suggest that the accuracy of imitation, as well as in the durations of continuous social attention were observed. The therapeutic relationship works as a predictive factor for the therapy of generalized social skills in children with ASD.</td>
</tr>
<tr>
<td>A Joint Behavioral and Emotive Analysis of Synchrony in Music Therapy of Children with Autism Spectrum Disorders</td>
<td>Venuti et al. [36]</td>
<td>2017</td>
<td>25 children with ASD (according to DSM-IV-TR) aged from 4 to 6 years</td>
<td>Single-subject research design</td>
<td>IMT sessions</td>
<td>The results confirmed the changes in the social skills of children with ASD after intervention.</td>
</tr>
<tr>
<td>International Multicentre Randomised Controlled Trial of Improvisational Music Therapy for Children with Autism Spectrum Disorder: TIME-A Study Effects of a Music Therapy Group Intervention on Enhancing Social Skills in Children with Autism</td>
<td>Crawford et al. [37]</td>
<td>2017</td>
<td>364 children with ASD between 4 and 7 years of age</td>
<td>Three-arm, parallel-group, researcher-masked, international multicenter randomized control trial</td>
<td>Improvisational music therapy</td>
<td>The results confirmed the changes in the social skills of children with ASD after intervention.</td>
</tr>
<tr>
<td>The Therapeutic Relationship as Predictor of Change in Music Therapy with Young Children with Autism Spectrum Disorder: Attunement in Music Therapy for Young Children with Autism: Revisiting Qualities of Relationship as Mechanisms of Change</td>
<td>Forti et al. [38]</td>
<td>2020</td>
<td>14 children aged 5 to 9 years old with a diagnosis of ASD (according to DSM-5)</td>
<td>Single-subject research design</td>
<td>Soundbeam Imitation Intervention (SII)</td>
<td>Significant improvements in the accuracy of imitation, as well as in the durations of continuous social attention were observed. The therapeutic relationship works as a predictive factor for the therapy of generalized social skills in children with ASD.</td>
</tr>
<tr>
<td>Music Therapy as a Therapeutic Tool in Improving the Social Skills of Autistic Children</td>
<td>Bharathi et al. [41]</td>
<td>2019</td>
<td>54 children with mild to severe autism aged 6–12 years</td>
<td>Pre-test, post-test and follow-up</td>
<td>Orff method</td>
<td>Findings showed that the severity of symptoms is related to the ability of the therapist to attune to the child. The results consistently showed that music therapy with the Orff method is an effective intervention for improvement in social skills in children with ASD.</td>
</tr>
<tr>
<td>Family-Centred Music Therapy to Promote Social Engagement in Young Children with Severe Autism Spectrum Disorder: A Randomized Controlled Study</td>
<td>Thompson et al. [31]</td>
<td>2014</td>
<td>23 children (36–60 months old) with severe ASD</td>
<td>Randomized controlled study</td>
<td>Family-centered music therapy</td>
<td>FCMT improved the social interactions at home and in the community, as well as the relationship of the parent with the child, but not the language skills or the general social response.</td>
</tr>
<tr>
<td>Promoting Communication for Young Children with Autism Spectrum Disorders: A Family-centered Music Therapy Intervention</td>
<td>Vaiouli et al. [42]</td>
<td>2022</td>
<td>8 parents and their children with ASD (aged 3 to 6 years)</td>
<td>Quantitative and qualitative methods</td>
<td>Family-centered music therapy</td>
<td>The results confirm the changes in the social skills of children with ASD after intervention.</td>
</tr>
</tbody>
</table>
Table 1. Cont.

<table>
<thead>
<tr>
<th>Study Title</th>
<th>Authors</th>
<th>Year</th>
<th>Participants</th>
<th>Study Design</th>
<th>Intervention</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Investigation of a Classroom-Based Specialized Music Therapy Model for Children with Autism Spectrum Disorder: Voices Together Using the VOICSS Method</td>
<td>Schmid et al. [32]</td>
<td>2020</td>
<td>64 children with ASD between the ages of 5 and 11 from nine classes</td>
<td>Single-subject research design</td>
<td>Class-room-based specialized music therapy model</td>
<td>Improvements in language, communication, and socioemotional learning were observed.</td>
</tr>
<tr>
<td>Piano with a Twist: A Pilot Study Exploring the Preliminary Effects of a Piano Therapy Program for Children with Autism Spectrum Disorder</td>
<td>Danciulescu and Zaharia [43]</td>
<td>2023</td>
<td>60 children with ASD aged 3 to 7 years</td>
<td>Pilot study controlled trial</td>
<td>Piano therapy program</td>
<td>Significant changes were observed in all three developmental sections (communication, motion, and adjustment behavior) in the experimental group in comparison to the control group.</td>
</tr>
</tbody>
</table>

4. Discussion

This systematic review investigated the effectiveness of music therapy programs in the development of social communication in school-age and preschool-aged children with a diagnosis of autism spectrum disorder. For this purpose, 13 studies that met the eligibility criteria, i.e., empirical studies examining the effectiveness of music therapy interventions on the social communication of children with ASD, were included, and the age range was 3 to 12 years. The most common music therapy technique appears to be improvisational music therapy, with mixed results. Two studies with very large samples showed no significant differences in children’s social communication after participation in the improvisational music therapy program [35,37]. However, improvisational music therapy appears to have positive effects when it incorporates the imitation technique [13] and positively correlates with the child’s synchronization with the therapist [36].

Positive results were obtained regarding the joint attention of children who participated in music therapy programs, i.e., prolonged attention to an object or process together with other children in the program and the therapist [30,38]. The results of the effect of music therapy on increasing eye contact in children with ASD are also encouraging [30]. Another important factor is the therapeutic relationship. The quality of the therapeutic relationship seems to contribute to a better response of the child to the intervention and a reduction in the severity of autistic symptoms related to social skills [39]. Additionally, the child’s emotional and behavioral connection with the therapist and their musical–emotional coordination seem to increase as the music therapy sessions progress. However, the child’s level of functioning is also important in achieving the above [36,40]. Moreover, in two of the studies, there was an increase in children’s imitative ability, comprehension, and interaction maintenance [13,41]. The effect of family-centered music therapy (FCMT) on socioemotional functioning and the development of social interaction of children with ASD in different social contexts and their interaction with parents also seems to be positive [31,42]. Another important factor is the level of language. Children who have already developed some language skills seem to be the ones who benefit most from music therapy interventions [32]. Finally, potentially encouraging results regarding the social communication of children with ASD also seem to be achieved by therapy with a single musical instrument, e.g., piano therapy [43].

These results seem to confirm the results of other experimental and case studies [16,21,23,24,44–46]. In particular, Kim et al. (2009) [16] found a positive relationship between music therapy and the child’s emotional synchronization with the therapist. Moreover, quite high levels of engagement by children were found in the case of music therapy interventions compared to other activities, and an increase was observed in joint attention and nonverbal social communication skills (such as eye contact) after an improvisational music therapy intervention [21]. The field of joint attention has been the subject of other research related to the effectiveness of music therapy programs, with positive results [23,24]. In addition, a case study noted an increase in three domains of social behavior (eye contact,
imitation, and conversation skills) after the music therapy intervention [44]. However, other systematic reviews related to the effectiveness of music therapy on ASD symptomatology have shown mixed results. In general, positive results have been found, especially regarding social communication, but at the same time, some nonstatistically significant results have been noted in some studies. In fact, the effects of improvisational music therapy on people with ASD and the quality of the therapeutic relationship have been found to be mostly positive. Finally, a difficulty that is often encountered is the precise identification of the methodology followed in each study (music therapy method, duration, suitability of therapists, etc.), resulting in difficulties in the comparison of studies with each other [33,34].

This work encountered several limitations. First of all, some of the surveys used had quite a small sample, and in only two of them, the sample was sufficiently large and representative. Also, not all of the surveys used the randomized trial method in their sample, which makes it difficult to generalize the conclusions. Moreover, the selected studies used various music therapy techniques and methods, such as improvisational music therapy, family-centered music therapy, group music therapy, and imitation music therapy. This makes it difficult to generalize the conclusions and compare the studies. In fact, while we often see the Autism Diagnostic Observation Schedule (ADOS) and the Social Response Scale (SRS) used as measurement tools, they were not selected by all studies. Another limitation is that in one of the thirteen included studies, participants did not have a formal diagnosis of ASD but received individualized programs consistent with those selected in the case of ASD. In addition, children who participated in music therapy interventions often differed in their level of functioning and language level. This fact does not allow us to draw clear conclusions about the effectiveness of the programs. In addition, due to the relatively limited literature, the age range finally included in this review was 3 to 12 years. This range involves developmental differences and different developmental stages among the various ages. Finally, the language of the literature search was English and Greek, which excluded a number of studies.

To summarize, all the results, especially those regarding improvisational music therapy, demonstrate no significant difference in effectiveness compared to the basic therapy received by children [35,37]. Meanwhile, some studies emphasize its importance in terms of joint attention and child–therapist synchronization [13,36]. More generally, music therapy has been found to have a positive relationship with increasing joint attention and eye contact in children with ASD, as well as improving mimetic accuracy [30,38]. Another important aspect is the therapeutic relationship that develops during therapy. In particular, it has been observed that the quality of the therapeutic relationship contributes to a reduction in the severity of autistic symptoms (mainly in the area of social communication), and, on the one hand, musical and emotional coordination between therapists and children seems to help in improving the child’s response to the intervention, but on the other hand, it does not predict any significant change in communication and social interaction skills [39,40]. Also, there seems to be a positive relationship between music therapy and increased understanding and interaction and a positive relationship between family-centered music therapy and increased social–emotional functioning and interaction in children with ASD [31,41]. Finally, children’s initial language and social skills appear to play an important role in their subsequent response to a given music therapy intervention [32].

Regarding the research field of music therapy as a therapeutic tool for the development of social communication in children with ASD, further research is suggested, with a special focus on improvisational music therapy, as its results seem promising to a great extent. As shown in this systematic review, more emphasis needs to be placed on the methodological practice followed in research, particularly on the measurement tools and the sample selected. A relatively common methodological strategy may help, in the future, to make the results easier and more generalizable.
5. Implications for Practice

The encouraging results of the studies included in this review demonstrate the value of music therapy as a practical tool for children with ASD. For example, some schools continued the music therapy interventions after the completion of the study [41]. Moreover, such evidence-based effective interventions, which enable children to use their communication skills, are in great need for schools with children with varying levels of abilities [32]. Regarding the therapists, it is recommended that emphasis be given to the bodily expressions of children; with this in mind, the therapists may move or play music accordingly, achieving successful attunement [40]. Furthermore, it is recommended that, during the music therapy intervention, the therapeutic relationship should be developed deliberately and not by chance or circumstantially [39]. Additionally, a 20-session cycle is suggested as the most successful for high-functioning children with ASD. Also, the FCMT (family-centered music therapy) results in a motivating social environment for children with ASD, enabling interactions between children and parents, which may continue beyond the sessions [31,42]. Finally, the DUACS tool is a fast and credible means for the evaluation of social interactions of children with ASD [32].

6. Conclusions

In conclusion, the results from the surveys selected for this review were mixed. For the most part, there appears to be a positive effect of music therapy interventions on social communication in school-aged and preschool-aged children with ASD. However, no general conclusion can be drawn about the effectiveness of music therapy compared to other common, less alternative interventions. Nevertheless, the results of this systematic review are enlightening with regard to the most recent research data in the field of different music therapy interventions and their effectiveness in the social communication of children with ASD.

Author Contributions: Conceptualization, A.T. and M.G., methodology, A.T. and M.G., Analysis A.T. and M.G., writing-original draft preparation A.T., writing-review and editing M.G. and A.T., supervision M.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new data were created or analyzed in this study. Data sharing is not applicable to this article.

Conflicts of Interest: The authors declare no conflicts of interest.

References


31. Thompson, G.; McFerran, K.S.; Gold, C. Family-centred music therapy to promote social engagement in young children with severe autism spectrum disorder: A randomised controlled study. Child Care Health Dev. 2014, 40, 840–852. [CrossRef]


34. Mayer-Benarous, H.; Benarous, X.; Vonthron, F.; Cohen, D. Music Therapy for Children with Autistic Spectrum Disorder and/or Other Neurodevelopmental Disorders: A Systematic Review. Front. Psychiatry 2021, 12, 643234. [CrossRef]


**Disclaimer/Publisher’s Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.