

Study of the Effect of Music on the Perceptual Abilities of Children with Autism

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Abstract: The application of music therapy in children with autism is gaining attention, especially showing positive effects in improving their perceptual abilities. This study explored the potential mechanisms and application methods of music's effects on the perceptual abilities of children with autism through literature review and empirical analysis. It was shown that music therapy can significantly improve social interaction, communication skills, and self-expression of children with autism, especially in enhancing their auditory and visual perceptual abilities. In addition, music therapy, as a non-verbal communication method, provides an effective way for children with autism to express their emotions and needs, which contributes to their social integration and personal development. Future studies should further explore the application of music therapy in children with different types and degrees of autism in order to optimise their intervention strategies.

Keywords: Music Therapy; Children with Autism; Perceptual Skills; Social Interaction; Communication Skills.

1. Introduction

1.1. Background to the Study

Autism, or autism spectrum disorder, is a complex neurodevelopmental disorder that begins in early childhood. It is primarily caused by genetic factors, and environmental factors may also play a role. Autism usually manifests itself as impairments in social interaction and communication, limited interests, and repetitive patterns of behaviour. These symptoms have a significant impact on the daily functioning of the individual. Globally, the prevalence of autism appears to be on the rise, which may be related to improved diagnostic criteria and increased awareness. Although some effective treatments exist, such as behavioural and communication training, there is currently no cure for autism. Therefore, it is becoming particularly important to explore new treatments to improve the quality of life of these individuals.

The concept of a link between autism and music is as old as the earliest reported cases of autism, and music has been used as a therapeutic tool for decades. Music therapy holds promise as an intervention for individuals with autism, utilising their strengths in music processing to enhance communication and expression. [1] Music therapy, as a method of utilising the healing properties of music to improve and maintain physical and mental health, has been widely used in recent years in interventions for a variety of neurological disorders. Particularly in autism intervention, studies have shown that music therapy promotes social skills, emotional expression, and cognitive functioning in children with autism. The non-invasive, fun and easy-to-accept characteristics of music therapy make it particularly suitable for early childhood intervention.

1.2. Significance of the Study

Research on the effects of music on the perceptual abilities of children with autism has important theoretical and practical implications. Firstly, this study could extend the existing music therapy literature by providing additional evidence on how music affects the perceptual abilities of children with

autism. Secondly, by gaining a deeper understanding of the specific mechanisms of action of music therapy in autism interventions, it may provide guidance to professionals in designing and implementing more effective individualised intervention programmes. In addition, the findings may also provide insights for research in other related fields, such as studies on the effects of music on other neurodevelopmental disorders. Finally, from a practical application perspective, it was determined that the effectiveness of music therapy in enhancing the perceptual abilities of children with autism could help to improve the overall functioning and quality of life of these children and bring about positive changes for them and their families.

2. Perceptual Skills and Their Importance for Children with Autism

2.1. Perceptual Characteristics of Children with Autism

Sensory-motor is the basis of all children's behaviours, and from the moment they are born, they begin to know and feel the outside world through sensory-motor. Children with autism are no exception, and their awareness of the outside world must be realised through sensorimotor activities, which are like a link between autistic children and the outside world. However, the perceptual-motor development of autistic children is abnormal and slow, which seriously hinders the learning and life of autistic children. Perceptual-motor abilities are particularly important for the development of children with autism. The perceptual characteristics of children with autism differ significantly from those of typically developing children. They may exhibit hypersensitivity or insensitivity to sensory stimuli, as well as a fixated interest in specific stimuli. This encompasses visual perception, auditory perception, tactile perception, gustatory and olfactory perception with proprioception. It is important to note that autism spectrum disorders are a broad category and different children may exhibit different perceptual

characteristics. In addition, these characteristics may change with age. Therefore, interventions and support for children with autism should be individualised to meet their specific needs.

2.2. Impact of Perceptual Skills on Functioning in Children with Autism

The unique perceptual abilities of children with autism have a profound impact on their functioning. Because they respond differently to sensory stimuli than typically developing children, they may experience challenges in social interactions, learning, and daily living skills.

The perceptual characteristics of children with autism present them with additional challenges in social interactions. For example, they have difficulty understanding non-verbal cues, such as facial expressions, gestures or body language, which affects their communication and interaction with others. In addition, they may have impairments in social communication, such as difficulties in starting a conversation, maintaining a dialogue or understanding what others are saying.

Attention problems in children with autism may stem from the way they respond to sensory stimuli. They may be distracted by sensory stimuli, resulting in difficulty concentrating during learning. In addition, they may exhibit repetitive behaviours or habits in response to the uncertainty of sensory input.

Children with autism may experience challenges with self-care, as their sensitivity or insensitivity to touch and proprioception may lead to difficulties in performing everyday activities. For example, activities such as dressing, bathing or brushing teeth may require additional support and adaptive strategies. In addition, their adaptability to changes in the environment may be affected, as changes in sensory stimuli may lead to strong reactions or discomfort.

The emotional responses of children with autism may be influenced by the way they react to sensory stimuli. They may show abnormal emotional responses to certain situations or stimuli, which may be due to the fact that they process sensory stimuli differently than typically developing children. In addition, they may have difficulty understanding the emotions or feelings of others, which further affects their social interactions and emotional communication.

3. Theoretical Basis and Application of Music Therapy

3.1. Definition and Theoretical Model of Music Therapy

Music therapy is a therapeutic approach that utilises the healing properties of music to improve and maintain an individual's physical and mental health. Research has shown the benefits of music therapy and caregiver-provided music therapy for people with autism. [2] It works through a professional music therapist who designs, implements and evaluates music interventions to meet the specific needs of the patient. The American Music Therapy Association defines music therapy as the use of various forms and interventions of music to help people improve their physical, mental, and emotional states and learning abilities. The concept of a link between autism and music is as old as the first reported case of autism, and music has been used as a therapeutic tool for decades. [3] Music therapy is an evidence-based practice whose effectiveness has been confirmed by several studies.

Music therapy is a diverse field with theoretical models that cover a wide range of dimensions from biology to psychology. These models provide a rich theoretical foundation for the practice of music therapy, guiding therapists in choosing appropriate treatments for their patients.

3.2. Techniques and Methods of Music Therapy

Children with autism possess a basic ability to recognise and remember musical melodies as well as musical rhythms, and there are no significant differences between the performance of children with autism and normally developing children in terms of melodic pitch discrimination, rhythmic discrimination or melodic memory. [4] The practice of music therapy as a specialised field of clinical application is based on a variety of techniques and approaches. These techniques can be selected and adapted depending on the therapeutic goals and mainly include the following:

(1) active music therapy: in active music therapy, patients are encouraged to participate personally in the music-making process, including playing an instrument, singing or improvising. This approach is centred on expression and communication, helping patients to express their emotions, build self-confidence and enhance interpersonal interaction skills through music. Active participation in music activities can promote self-expression and self-exploration, which in turn can help improve emotional regulation and social skills.

(2) Passive Music Therapy: In contrast to active music therapy, passive music therapy involves allowing the patient to listen to music rather than generating music on his/her own. The therapist chooses appropriate music according to the patient's needs and preferences and instructs the patient on how to focus on the musical experience. This approach is suitable for patients who may not be able to actively participate in the production of music, or for relaxation, anxiety and pain relief.

(3) Creative Music Therapy: Creative music therapy encourages patients to express their thoughts and feelings through the creation of songs, scores or musical pieces. This approach emphasises the creative process and the unique expression of the individual and aims to promote self-awareness, emotional expression and innovative thinking in patients. Creative music therapy is often used to help patients deal with psychological trauma, enhance their sense of self-worth and improve their mental health.

(4) Music Psychotherapy: Music Psychotherapy combines the techniques of music therapy and counselling to explore and resolve the patient's psychological problems through the use of music as a therapeutic tool. The therapist will guide the patient to explore music-induced emotional experiences, memories and thoughts in order to gain insight into the patient's inner world. This approach helps patients identify and process their emotions and behavioural patterns in a safe and supportive environment.

(5) Music relaxation techniques: Music relaxation techniques utilise the soothing properties of music to help patients relax and reduce stress and anxiety. This can be achieved in a variety of ways, such as guided imagery, progressive muscle relaxation or simple music listening. The therapist may use soft music and calming sounds in conjunction to guide the patient to a state of deep relaxation.

In summary, the techniques and methods of music therapy are diverse and can meet the specific needs of different patient groups. Therapists have the flexibility to select and apply

different music therapy techniques according to each patient's performance and feedback during the treatment process in order to achieve the best therapeutic effect. What these techniques have in common is an emphasis on the potential of music as a therapeutic tool and the importance of the therapeutic relationship established between the therapist and the patient.

4. Research Analyses of Music Therapy Interventions on the Perceptual Abilities of Children with Autism

The majority of children with autism respond positively to music, suggesting that music therapy is a great intervention for children with autism. [5] Children with autism can improve their social skills, emotional expression, and self-awareness by engaging in playing an instrument, singing, or improvisation. Studies have shown that active participation in musical activities can help children with autism better understand and imitate non-verbal social cues.

By listening to music, children with autism can learn how to relax and regulate their emotions. Certain types of music, such as classical music, have been found to be particularly effective in improving attention and concentration in children with autism.

By composing music, children with autism can express their feelings and thoughts, which helps to enhance their creativity and self-confidence. In addition, the decision-making and choices made during the music creation process can enhance the problem-solving skills and executive functioning of children with autism.

Music therapy improves the perceptual processing skills of children with autism through multi-sensory stimulation (auditory, visual, tactile, etc.). For example, the rhythm and melody of music can help them better understand the concepts of time and rhythm.

Through group music activities, children with autism have the opportunity to practice social interactions such as taking turns and making eye contact. These activities help them build social skills in a safe and supportive environment. Music therapy provides a non-threatening platform to express

emotions, and children with autism can express feelings that are difficult to put into words through music. This helps to reduce their symptoms of anxiety and depression.

5. Discussion and Directions for Future Research

Although existing findings support the effectiveness of music therapy in autism interventions, more research is needed to explore how children with different types and severities of autism respond to music therapy. Future studies should use larger sample sizes, long-term follow-up studies, and control group designs to more accurately assess the effectiveness and durability of music therapy.

In summary, music therapy, as a non-invasive therapeutic tool, has significant potential for improving perceptual abilities, social skills and emotional regulation in children with autism. With more research, we expect to gain a deeper understanding of the mechanism of action of music therapy in autism interventions and to optimise its application strategies to maximise therapeutic outcomes for children with autism.

References

- [1] Ruiz, M., Groessing, A., Guran, A., et al. (2023) Music for autism: a protocol for an international randomized crossover trial on music therapy for children with autism. *Frontiers in Psychiatry*, 14:1256771.
- [2] Kelly, L., Kenny, N., McGlynn, C., et al. (2024) Exploring the experiences of a person with dementia and their spouse who attended a telehealth music therapy programme: Two case examples from Ireland. *Nordic Journal of Music Therapy*, 33(4):281-298.
- [3] Zhang, Y. (2017) Training of perceptual-motor ability in children with autism. *Heihe Education*, (11):71-72.
- [4] Wang, X., Yang, Y., Li, Y., Wang, Y. (2022). Promotion of Perceptual Ability by Music in Children with Autism. *Heilongjiang Science*, 16:69-70+73.
- [5] Zhu, X. (2022). Music conditioning system based on EEG signals of autistic children. Thesis of Jinan University.