

The Positive Impact of Music Education on the Attention of Children with ADHD

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Abstract: Attention Deficit Hyperactivity Disorder (ADHD) is a prevalent developmental disorder that typically manifests in childhood, which is characterized by difficulties in attention, hyperactivity, and impulsivity. Therefore, children with ADHD have no difficulties in understanding knowledge, but due to their hyperactivity, they face significant obstacles in acquiring it. The specific manifestations of ADHD in children include hyperactivity, lack of attention, and overly active thoughts, which prevent them from focusing and learning for extended periods. This study explores the improvement of ADHD children's condition through music education, which has significant practical implications for promoting their learning abilities and cognitive methods. By collecting and analyzing previous researches, this paper summarizes the positive impact of music education on children with ADHD. This paper shows that music can improve mental and emotional states, alter children's moods, regulate thinking patterns, and enrich the brain's cognitive modes. Personalized music education proves to be effective and practical in reducing stress during learning and in crisis intervention.

Keywords: ADHD, music education, children.

1. Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a neurotic developmental disorder, primarily caused by the slow development of the cortex during childhood. Although this slow process is not permanent, the decrease in academic performance due to distraction during the school-age period can have a negative impact on the psychological and cognitive aspects of affected children. Therefore, the prevention and positive guidance of ADHD in children have received widespread attention. ADHD in children is not only a significant focus in medical psychology but also requires cooperation from education. Data from previous life science researches indicate that the behavior of children with ADHD is closely related to the development level of their nervous system. Thus, promoting the normal development of the nervous system, enhancing cognitive functions, and fostering brain development are beneficial for the treatment of children with ADHD. According to existing information on the discipline of music therapy, the earlier music education is introduced in a child's life, the more positive the impact on their physical and mental development.

In early childhood, when a child's brain processes musical information, it positively affects memory development as well as visual and auditory spatial abilities. Listening to music also helps better regulate emotional state and mental quality, acting on neurotransmitters to improve individual

mental states[1]. In special education, music education is an interdisciplinary field, requiring integrating child educational psychology and nursing psychology to give special attention to affected children, and allowing them to feel the care and love from society. Special education uses various music teaching methods, tailored to each child's situation, following the principles of individualized instruction and gradual transition. This enhances language training and development, improves cognition and emotion, enhances physical coordination, and builds harmonious social relationships[2]. In summary, music education aids children's development and growth not only physiologically but also psychologically, playing a crucial role in their cognitive development. This paper uses the method of literature review to integrate and reflect on conclusions from different fields, aiming to explore new methods in teaching ADHD through music education. This will provide a theoretical foundation for future research in music education within special education, as well as new goals and directions for the author's future research.

2. Literature review

2.1. Review of ADHD

ADHD is a term for a series of psychological and behavioral issues in children, including inattention, hyperactivity, excitability, and difficulty with delayed gratification. Children with ADHD often show significant differences from normal children in various psychological tests and assessments. However, due to cognitive difficulties, these differences cannot be generalized as intellectual gaps. With increased societal attention to children, the special education of children with ADHD has frequently appeared in the public eye. Doctors and teachers, in particular, have given more attention, tolerance, and respect to these children. Through treatment or guidance, they help children gradually integrate into regular school learning and life. Special education teachers not only change themselves but also assist families in changing outdated or unfavorable educational concepts and methods, providing comprehensive and positive guidance and care for the children.

There may be multiple factors contributing to ADHD in children. According to the Journal of Traditional Chinese Medicine, newborns delivered by cesarean section are more prone to ADHD. Without the compression of the birth canal, the sensory function systems do not receive strong stimulation, which may later lead to a "compensation mechanism[3]." Li Yumei's "Analysis of Endurance Diagrams of 160 Cases of Children with ADHD" explains that the regulatory function of the cerebral cortex is inadequate, causing brain function disorders. This results in a failure to enhance positive regulation and inhibit negative regulation, leading to ADHD [4]. Psychologically, ADHD can be categorized into three factors: psychological factors, family factors, and environmental factors. Children with ADHD due to psychological factors differ from those affected by the first two causes, which are due to incomplete brain function development [5].

2.2. Review of music education

Due to incomplete neural development, children with ADHD often ignore the structured teaching content and ideas transmitted by parents and educators, and may even exhibit resistance. Music, as another language of humanity, can provide an unexpected benefit when traditional methods of conveying content and ideas fail. The assistance and guidance provided by music education to these children work in two stages: first, the direct impact of music on the children, and second, integrating education into the music to guide the children. This helps the children achieve a level of attention comparable to that of their peers.

Listening to music can physiologically bring a person's skin resistance and muscle tension to a comfortable state, regulate blood flow speed, and synchronize heart rate. Psychologically, it can soothe the child's inner self, creating a resonance with their favorite music, calming their emotions.

The appropriate rhythm and melody can help a restless child gradually achieve a state of tranquility [6].

Secondly, educational guidance is provided on the foundation of music. Due to the higher-than-average occurrence of abnormal behaviors in children with ADHD, teachers face a significant challenge in maintaining patience. First, since each child is an individual with significant differences from others, it is essential to develop personalized educational methods and content for each child. Second, based on the goal of gradually integrating these children into regular teaching environments, it is necessary to set timely objectives. While teaching music, teachers should clarify learning rules and assist the children in adhering to classroom discipline to facilitate their subsequent integration into a standard educational environment. Third, using diverse teaching methods and rich content, such as music appreciation, improvisational music creation, and body rhythm exercises, can enhance their attention to a single task and improve their concentration.

3. Analysis of Art Education for ADHD Treatment

This study used a multiple baseline across subjects experimental design, employing art therapy to intervene with two children with ADHD and accompanying intellectual disabilities over the course of a semester. The results showed a significant increase in the duration of their attention span and a notable improvement in their proactive language expression abilities. By comparing the methods and reports from this study with music education therapy, the author identified similarities and summarized the feasibility of using music education for the treatment and guidance of ADHD.

3.1. Research subjects

The two research subjects are both fourth-grade students at a special education school, diagnosed with ADHD and accompanying intellectual disabilities.

Leilei is a boy in a special education school. His ADHD index on the questionnaire is 2.1, and his Wechsler Intelligence Scale score is 48. He can understand simple language and instructions, and his language expression is mostly limited to words and phrases. He frequently leaves his seat, has a rapid attention shift, and exhibits aggressive behavior towards classmates.

Qiqi is a girl in the same school. Her score on the cancellation test is -2 with an accuracy rate of 74%, and her Raven's Progressive Matrices score is 55. She can understand simple language and instructions and can respond to questions with simple sentences, but she shows a lack of concentration during class.

3.2. Research plan

Leilei's treatment period involves sessions held every Tuesday afternoon in the art therapy room, each lasting 35 minutes, with one session per week. The painting themes are chosen by Lei Lei himself. The therapist helps Lei Lei express his ideas more clearly using simple sentences during the theme selection process, without intervening during the painting process. After completing the painting, Lei Lei is asked to describe his work. If Lei Lei encounters difficulties, the therapist provides guidance.

Qiqi's treatment period begins once Lei Lei's attention span stabilizes at 15 minutes or more. Qi Qi receives the same treatment method as Lei Lei, with identical treatment principles.

Table 1: Case treatment statistics [7]

Stages		Leilei			Qiqi		
Within	Stages	Baseline	Treatment	Follow-up	Baseline	Treatment	Follow-up
	Time period	3	13	4	8	8	4
	Horizontal range	5-6	6-26	15-19	7-11	13-30	19-24
	Horizontal variation	0	+20	+2	+2	+15	-4
	Average	5.33	19.23	16.5	9	22.5	21
	Stability	100%	33.3%	100%	87.5%	25%	100%
	C Value	/	0.895	/	0.76	0.74	/
	Z Value	/	3.69**	/	2.48**	2.4**	/
Between	Comparison stage	Baseline/Treatment	Treatment/Follow-up	Baseline/Follow-up	Baseline/Treatment	Treatment/Follow-up	Baseline/Follow-up
	Stability variation	Yes to No	No to Yes	Yes to Yes	Yes to No	No to Yes	Yes to Yes
	C Value	0.94	0.84	0.52	0.92	0.7	0.7
	Z Value	4.02**	3.698**	1.6*	3.92**	2.65**	2.67**

Note: ** means $P < 0.01$, * means $P < 0.05$

3.3. Results and analysis

Analysis of the statistical table shows that during the baseline/treatment period, Lei Lei's Z-value was 4.02**, and Qi Qi's Z-value was 3.92**, indicating significant changes compared to the baseline period. During the treatment/follow-up period, Lei Lei's Z-value was 3.698**, and Qi Qi's Z-value was 2.65**, showing significant changes compared to the treatment period.

This study used a drawing education approach to design and showcase a treatment plan for children with ADHD. The results indicate that art education has a significant positive effect on children with ADHD. This leads us to consider how similar therapeutic methods can be applied to music education. Music education shares many similarities with art therapy, particularly in terms of expression and emotional release.

In terms of principles and methods, the analysis of art therapy paradigms reveals that this approach adheres to principles of personalization, staged development, and stability, providing students with a more effective and targeted learning experience. These principles are equally applicable in music education. This method not only helps students better grasp musical knowledge but also enhances their interest and enthusiasm for learning. During implementation, regular observation and progress recording are also important measures to ensure teaching effectiveness.

In terms of specific implementation, similar to art therapy, music teachers can engage students by analyzing musical excerpts and providing simple stories about these pieces, or by exploring favorite sounds from everyday life. These activities can stimulate sustained interest in children. Through various individualized teaching methods, teachers can guide children to maintain prolonged focus. In art therapy, cases express and reflect on their work through drawing and describing their creations. Similarly, in music education, students can enhance their ability to express and reflect on music by performing and discussing their understanding and feelings about musical pieces. This approach helps students gain a deeper understanding of music and express their emotions more confidently.

4. Suggestions on music education for ADHD children

Music education is a discipline aimed at developing students' musical skills, appreciation, and overall qualities through learning and practicing music. It can enhance cognitive development, improve emotional states, and contribute to personal growth and creativity. Given these supportive effects, music education holds significant potential and possibilities for advancement in the special education of ADHD.

4.1. The Orff Schulwerk

There are many types of teaching methods used in music education, with the most commonly employed being the Orff Method, the Kodály Method, and the Dalcroze Method.

Currently, the Orff Approach is widely used in China. This method focuses on nurturing students' musical perception, aesthetic ability, and musical creativity from the student's perspective[8]. It can enhance students' love for music and improve their concentration through this passion. The strategies employed by the Orff Method are diverse. Firstly, it creates a relaxed and positive musical environment that helps children with ADHD engage without resistance. Secondly, it integrates bodily movement and musical rhythm in teaching, allowing children to experience and immerse themselves in the music education process in a more concrete and vivid way. Lastly, the method incorporates music games, such as improvisation and free movement, which address the psychological needs of children with ADHD and provide them with more space for creative expression.

4.2. Suggestions

Firstly, children with ADHD are a special group. When teaching children with ADHD, it is important to consider their unique needs in social interactions, emotional and cognitive development, psychological growth, self-discipline, and especially attention. Before conducting music education for children with ADHD, their distinctive needs and challenges must be thoroughly and comprehensively considered.

4.2.1. Create a Structured and Stable Learning Environment

Establish clear classroom rules and schedules to help children with ADHD understand and adhere to them. Begin and end lessons with brief rituals (such as warm-up exercises or reviews) to provide a structured learning framework. Design music lessons in short, manageable units to avoid prolonged periods of focused learning and reduce the risk of attention distraction.

Set up a dedicated learning area for children with ADHD, providing a quiet and distraction-free environment to minimize external disruptions. Incorporate the Orff Method to create a relaxed and enjoyable music learning space and atmosphere, allowing children to feel more comfortable and immersed in their music education. Foster a learning environment centered on encouragement and cooperative education, minimizing competition and stress, and ensuring that children feel cared for and respected.

4.2.2. Choosing the Orff Schulwerk

Incorporate auditory, visual, and kinesthetic teaching methods for a multi-sensory approach, making learning more engaging and enjoyable. Use diagrams, videos, and hands-on activities to help children with ADHD better understand and remember musical concepts.

Transform music learning into a game, employing gamified learning methods to stimulate interest through interaction. Utilize music games and interactive tools to enhance the enjoyment and involvement in learning. Encourage children to create freely, enhancing their expression of emotions

and feelings. Start with simple musical elements and gradually increase the difficulty, progressing step-by-step to ensure students keep pace with the learning. Set specific goals for each learning stage and provide rewards for achieving these goals.

4.2.3. Making personalized teaching plans

Customize teaching content based on each student's interests and abilities, ensuring that music education meets their individual needs. Allow students to choose their preferred instruments or music styles to enhance their engagement and enthusiasm for learning. Flexibly adjust the teaching plan and pace to ensure that students can keep up with and enjoy the learning process. Identify and address any difficulties students encounter during the learning process promptly, providing personalized support.

5. Conclusion

The relationship between humans and music is mutually reinforcing. Even individuals who are congenitally deaf strive to leave their mark in the vast natural world. Music has a significant impact on emotions and serves as a means for individuals to express their feelings. The influence and effects of music are profound; different musical characteristics can reveal various potentials in people. For example, in music with a strong rhythm, people may instinctively engage in movement. Music can stimulate diverse emotions and cognitive processes, and alter behavior to meet aesthetic needs. Combining the characteristics and effects of music with educational theory, music-assisted therapy for children with ADHD is feasible. Music can support children with special needs in integrating into group settings when appropriate intervention measures are implemented.

This study has certain limitations. The sample size of experimental data is relatively small, and the analysis was only comparative, without direct experimentation in music education. Future research will involve selecting more direct samples for experimentation to obtain more accurate data and conclusions. The study selected the Orff Method and provided recommendations for music education for children with ADHD, which offers valuable insights for future in-depth research.

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