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## Study on the Effect of Piano and Chorus Teaching in Music Education for Autistic Children

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### ABSTRACT

*The purpose of this study is to explore the effect of piano and chorus teaching on music education for autistic children. Through qualitative methods, the effects of music teaching on musical skills, social interaction and emotional expression of children with autism were studied. In this study, 4 Chinese autistic children were selected as subjects, and their experiences and opinions were collected through in-depth interviews and questionnaires. The results suggest that piano and choral instruction has a significant effect on musical skills and social interaction of children with autism, but the effect on emotional expression needs further study. This study provides some suggestions for music education practice and policy making.*

**Keywords:** *Piano and chorus teaching, autistic children, music education practice, Chinese kids*

### 1.0 INTRODUCTION

Autism spectrum disorder is a kind of extensive neurological disorder. Children have defects in behavior and social communication, which leads to their inability to communicate with others normally. Since the 1960s, the prevalence of autism has been on the rise. According to the data of the US Centers for Disease Control and Prevention, the prevalence of autism has reached 1: 69 in 2018. According to the research in the 2015 Report on the Development of China's Autism Education and Rehabilitation Industry, there are over 2 million autistic children aged 0-14, and there are over 10 million autistic families in China. Once diagnosed, autism is often difficult to cure, which brings serious economic and mental burden to families. After years of practical teaching, the author found that the melody, rhythm, speed, pitch and intensity of music can improve autistic children's ability to understand language and accept instructions.

Piano performance and chorus can help children expand the scope of speech, improve their ability to recognize pitch, and improve the clarity and quality of speech. Therefore, the author designs a music teaching activity program according to the psychological and physiological characteristics of four autistic children aged 5-7 in an autistic institution in Chengdu, China, and conducts experimental teaching research. By comparing and analyzing the emotion, communication and social abilities of autistic children before and after experimental teaching, the author explores whether music teachers can find an educational

model suitable for autistic children —— let autistic children learn music, cultivate their music skills, and cultivate their music appreciation ability, so as to improve their emotional adjustment ability, social ability and language communication ability. It provides a basis for the research of preschool autistic children's music education, hoping that this research can enrich the theory and methods of music education for autistic children, promote the progress of music education for autistic children in China, and finally help autistic children get out of trouble and grow up healthily as soon as possible. It also provides reference and enlightenment for the future construction of music education for autistic children.

The chorus teaching method is useful in teaching children in China having the disorder autistic. The chorus teaching of music can be performed on Piano for children with autism. As per the view of Lu &Zuo (2022), chorus teaching plays a significant role in developing the skills among the children and also helps in learning the music. The learning of music also helps in improving the communication skills effectively for autistic children. Each child can communicate with their friends and families through hand movements as in playing piano the children gain skills based on the practice in their hands. The lives of the children gradually change following the effect of the music system in their lives.

In summary, piano teaching and choral teaching have been widely used as music therapy interventions in the treatment of children with autism. These methods can help autistic children improve their language skills and social interaction skills, thereby improving their quality of life.

## **2.0 LITERATURE REVIEW**

### **2.1 Definition, etiology and pathogenesis of autism**

It is the most common subtype of severe neuropsychiatric disorder (PDD) that occurs in childhood with autism. It begins in infancy. At present, research shows that children's autism is an abnormality caused by extensive developmental disorders caused by biological factors, which is mainly manifested as Canner's triad-social disorder, language disorder and behavior problems. At present, China conservatively estimates that there are 300,000-500,000 autistic children. This disease is a lifelong mental disability disorder, the cause of which is unknown, and there is no definite and effective treatment. Children's treatment usually requires the cooperation of family, society and related professionals. There are three sets of measurement tools widely used in the definition and diagnosis of autism at home and abroad, namely, China Classification Scheme and Diagnostic Criteria of Mental Disorders (CCMD-3), International Classification of Diseases (ICD-10) and American Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). At present, research shows that childhood autism is an abnormality caused by extensive developmental disorder caused by biological factors, but the specific cause is still unclear.

The ability of autistic children develops by taking help from music and dance. Music and dance allow someone to make movements according to the rhythm. In addition, the music of the piano makes some sharp changes in the rhythm that allows a person to make changes in

movement. Thereafter, making sharp changes allows for developing the connectivity between the nerve cells. In addition, the activity of the synapses is also developed for making sharp changes in the rhythm of piano music. As per the view of Helm & Ramayana (2021), taking help from music supports the development of the mental condition of children. Music supports the development of the nervous system, thus music flows as an energy spectrum. This kind of energy flow supports the development of the flow of energy in a body. Making different neuro-imaging studies shows that our brain cells show more activity while listening to music. Music therapy supports bringing change in the emotional and behavioral aspects of the infected children. According to Hosseini & Hosseini (2018), music allows for changing the behavior of a person. Reducing the stress level supports the development of the health condition of the affected person. This also supports bringing changes in the treatment practices by changing the rhythm. Piano generates relaxing music which supports our muscle cells. Daliyeva (2022) stated that the stress and anxiety of a person reduce by listening to continuous relaxing music. Additionally, the music allows autistic children to develop their capability of paying attention. In addition, developing piano music education by taking help from chorus teaching has supports developing the interaction between different people. Hence, piano music supported improving the condition of autistic children.

## **2.2 Psychological and behavioral characteristics of autistic children**

The children who are affected with ASD face some challenges while making social interactions. Due to poor activity of the brain cells the infected persons take a long time to analyze the external situation. In awesome cases, ASD-affected children try to avoid making eye contact with others. The self-help skills of the affected person are also affected due to the poor activity of the brain cells. Guerrera et al. (2019), state that, the social barriers of an infected person can be overcome by making more interactions with others in the community. In addition, improving the environmental condition of the patients allows for developing the mental stage of the patients. Making more communication supports improving the intellectual disabilities of autistic children. Thereafter, the development of chorus teaching by taking help from piano music supports the development of the mental condition of the patients. In the case of a child, the nerve cells show low activity while transporting the electrical impulses. It has been found that the core problems of ASD can be reduced by developing the activity of the brain cells (Verhoeff et al., 2018). Making chorus study supports the development of the interaction which supports making more interaction with others. Developing neuroplasticity supports recovering the damaged brain cells. At the same time, developing the connection between the nerve cells supports making more social activity. The skills of the guardians and the music teachers also have to be developed for providing better treatment to ASD-affected patients.

ASD-affected children show low brain cell activity which affects their communication skills. In addition, lack of communication developed some conflicts while analyzing the emotional gaps of the affected children. Mainly the ASD-affected children show a slow

development of their speaking ability. Sometimes, the affected children fail to express their feelings to others. Therefore, guardians have to act more careful while dealing with the affected child. According to Amant et al. (2018), ASD-affected children first have to learn easy languages that help for developing the skills of the speaking ability. Taking help from piano music supports the development of the correlation between the eye and the muscular muscles. This kind of activity supports the development of the responses of the brain cells. Lim et al. (2021), stated that in the initial stages of the treatment ASD affected persons have to stay in a particular location. Staying in a particular location supports the ASD-affected patients in making interaction with a particular set of people. This kind of activity supports making slow progress of the treatment. Stahmer et al. (2019), stated that the sound waves of a particular music system have a huge impact on the mindset of the people. In addition, it has been found that sound waves affect the activity of brain cells. That taking help from the piano music helps for developing the harmony of action of the brain cells. Making proper interaction with the affected children and making more activity in the school supports dissolving the language barriers. In addition, piano music changes its rhythm in a continuous manner which requires more activity of the brain cells.

The behavior of ASD children shows different kinds of differences. Developing the environmental condition and maintaining a particular routine supports the development of the behavior of ASD patients. According to Lockwood et al. (2021), masking different clinical trials supports the development of the characteristics of the affected persons. In addition, increasing the communication between different groups allows the affected persons to develop their communication. Additionally, the behavior of the children can be developed by providing them with some choices including choices of colors, choices of foods and many more. Avoidance of noisy environments supports the development of the responses of ASD-affected children. On the other hand, developing the skills of the piano music teachers and the parents also supports the development of the behavior of the ASD-affected students. Lack of activity of the brain cells also allows affected sensory stimulation. Thereafter, taking help from the chorus teaching method while implementing piano music supports the development of the behavior of autistic children.

### **2.3 Theoretical basis of music education for autistic children**

In the past decade, scientific research has proved many times that music education is a powerful tool to obtain children's full intellectual, social, and creative potential. Most importantly, music provides a way for children to express themselves and release their creativity. And let their own unlimited personal growth ability be inspired. Music can be used to bridge many social, physical, or emotional gaps. Therefore, some students are not satisfied with music education, and it is even possible that students perform well in performances, but their lifelong interest in music has not been cultivated in the learning results. Therefore, in this respect, music education should not only focus on achievements, but also cultivate learners' interest. Students have their own ideas and opinions on their own music education. Students'

desires and opinions should be considered in the process of participating in music education. As educators, we must ask ourselves whether our students find music education closely related to their lives (Williams, 2007). With the changes of society, so should music education. Over the years, technology has had a great impact on society, thus changing music and its teaching methods.

Over the years, technology has had a great impact on society, thus changing music and its teaching methods. In my opinion, in order to create music programs that are more relevant to students' lives, future music programs should include injecting music with technology. Many investigations have been conducted on the help of music to autistic children, and the results are very rich. Accordino, Comer, Heller (2007) made a comprehensive literature review of music therapy by narrative method, and applied it to the treatment of autistic children. This paper reviews the great improvement of various autistic children in social, behavioral, communication, sports and adaptability. According to (Darrow, 2011), he mentioned that since disabled children aged 3, 4 and 5 are promoted in the fields of communication, physical development, cognitive development, social/emotional development and adaptive development, music education can help support their goals. The application of music has many aspects, such as: in terms of emotions, the use of music promotes positive emotional changes and reduces anxiety. Socially, using music in class can improve social skills, such as "making eye contact when greeting or shaking hands with others". Some scholars have conducted case studies to support this research, including Finnigan and Starr (2010). In order to study the effectiveness of music intervention on autistic children's limited social interaction ability, Finnigan and Starr (2010) created a single-topic study with preschool children with autism as participants. They compare musical intervention (singing and musical performance) with non-musical intervention (using spoken words but not singing). In this study, the result of social reaction lays in children's eye contact, imitation and communication skills.

They found that the results of applying musical intervention were better than those of non-musical intervention. Music intervention can bring children a sense of motivation, and it also shows that music can improve the social skills of autistic children. According to the research of Darretxe and Sepulveda (2011), understanding the teaching challenges of autism can make it easier to find out the best teaching methods for them. They suggest that teachers should have a simple and clean teaching environment, communicate clearly and directly, have clear instructions for group classes, and understand and treat the needs and challenges of autistic students patiently. Hagedorn (2004) studied the importance of teachers' knowledge of autistic children's symptoms. Because most autistic children have oral language problems, music teachers will encounter different problems in communication. She also stressed that different students need to use different teaching methods. She agrees with the advantages of using routines. In addition, Hagedorn explained that visual tools are of great help in expressing expectations, progress and courses. Because she found that because of the visual tendency of autistic children, using picture books is more suitable as a visual teaching tool. Hagedorn explained that using picture books can encourage children to participate in the curriculum, and at the same time, it can improve children's communication and social benefits.

Clements-Cortez (2012) studied how to provide a more beneficial classroom environment for autistic children. This environment includes changing the expectations of students, adjusting the expectations or goals according to the students' functions, minimizing the disturbance to the classroom when possible, and providing additional support when needed. Clement-Cortez's research not only collects specific suggestions on the reconstruction and accommodation of teaching rooms through music teachers, experienced teachers with special needs and teachers trained in music therapy, but these experiences and methods can help her and students get the best physical examination in teaching. Cortez also agreed with Adamek and Darrow (2007)'s suggestion: using visual tools in the classroom, such as visual aids for classroom rules, providing schedule of activities, and using pictures in singing activities, so that students can clearly know the contents of the classroom.

Iseminger (2009) shows the importance of music teachers in the classroom. Music teachers need to consider the emotional, physical and safety needs of autistic students. As for the positioning of classroom seats, he thinks it is necessary to provide more than two seats, so that children who are difficult to sit in one place can choose and have room to move. For children who refuse to sit in chairs, Iseminger suggests that they should choose between chairs and carpet squares, so that they can sit down within the teacher's limit, and at the same time, they can control and choose where to sit. Iseminger also requires music teachers to use consistent routines for each class to provide predictability and security. He also suggested using the same visual teaching tools. If the music teacher needs to make a little change, the teacher needs to propose to change the routine predetermined things. Finally, Iseminger suggested taking into account the sensitivities of autistic children, such as texture, sound or visual input. These considerations include turning off the computer monitor, providing headphones that help reduce the noise level, lowering the brightness of lights or providing sandbags to reduce the pressure of children.

Adamer (2001) studied some teaching guidelines for autistic children. These guidelines emphasize the importance of music teachers' cognition of autistic students, such as communicating with other music teachers who have taught autistic children and getting familiar with the information of their education plans. This information includes students' learning skills, such as specific behaviors, achieving independent goals, and strengthening cooperation ability. Because Adamer believes that understanding students' goals will help provide students with the best way to learn. Although Adamer's research is not specific to autism, she stressed that music teachers should consider similar thinking when working with autistic children, because the needs of autistic children are usually very physical and depend on their individual level of function.

Taking music lessons or starting to learn the piano can be beneficial to adopt new changes which can be beneficial for overcoming inner inertia. Children who are suffering from autism face different challenges while trying to interact with other people. As per the opinion of Kivijärvi & Poutiainen (2020), learning ability and adopting new skills can be beneficial to overcoming intellectual disabilities. On the other hand, it is also observed that if these children cannot get attention from rather close relatives or family members they start to feel anxious or



stressed. Overcoming problems is important and thus learning the piano or taking piano lessons is beneficial for sharing the attention with others. The learning lesson also needs their full concentration and this strategy will be beneficial for increasing the concentration of these children as well.

### **3.0 METHODOLOGY**

Qualitative research is a method of inquiry that focuses on understanding human behavior, beliefs, experiences, and attitudes in a natural setting. It is a type of research that aims to gain an in-depth understanding of a particular phenomenon or situation. It involves collecting and analyzing non-numerical data, such as interviews, observations, and textual analysis. The data are typically descriptive and exploratory, rather than explanatory or predictive. The research aims to uncover the underlying meanings, patterns, and themes that emerge from the data. Qualitative method help to develop in-depth knowledge. In addition, this method will help to develop attention to specific participants. At the same time, qualitative methods support the development of knowledge about the risk factors of research. Selecting specific respondents and collecting descriptive answers from them is helpful to the development of research integration.

#### **3.1 Research Design**

Qualitative research will be divided into four steps: coding, concept, category and theory. Coding is to determine the key points that need to be collected. The concept is to group similar contents of data, the category is to collect similar data generation theory, and the theory is to collect thematic details of data. Coding will be used after an interview.

#### **Research objective**

The main objective of this study was to explore the effects of piano and choral instruction on music education for children with autism, including the effects on musical skills, social interaction and emotional expression. Through the combination of qualitative and quantitative methods, the teaching effect is comprehensively evaluated, and the experience and feelings of autistic children on music education are deeply understood.

#### **Research method**

This study adopts the qualitative research method, and the qualitative research part mainly adopts in-depth interviews and questionnaires to explore the experience and opinions of autistic children on piano and chorus teaching. The questionnaire was divided into teachers' part and parents' part.

## Population and Sampling

In this experiment, 150 parents signed up voluntarily, only 50 autistic children were selected. The participants must meet these criteria:

- (1) Meet the criteria of the Diagnostic Statistical Manual of Mental Disorders(3rd edition)
- (2) Autism behavior checklist (ATEC) score more than 53 points
- (3) Children's autism rating scale(CARS) score more than 30 points.
- (4) Preschool autistic children aged from 5 to 7 years old
- (5) Asperger's syndrome, Helle's syndrome, Rett's syndrome, specific sensory language disorder, and childhood schizophrenia are excluded.

If they meet these criteria, they are typically autistic children. At the same time, through interviews with parents and teachers, as well as the observation of children's behavior, the author selected 4 preschool autistic children who were able to control their own behavior, had certain musical ability, or did not dislike music to conduct the experiment.

	Case A	Case B	Case C	Case D
Gender	Male	Male	Male	Male
Age	4 years 1 month	3 years and 5 months	4 years and 5 months	3 years and 8 months
Actual age of development	2 years and 3 months	2 years 1 month	2 years and 6 months	1 year and 5 months
Family economic condition	good	good	cold	good
Parents' educational degree	undergraduate	undergraduate	undergraduate	undergraduate
Main carer	Mother	Parents	Parents	Grandparents
Whether or not an only child	Yes	Yes	Yes	Yes
Autism diagnosis	Mild	Mild	Mild	Severe
Score of CARS	34	32	35	43



Whether or not to take medication	No	No	No	No
Condition of nursery	Fused	Fused	Non-fused	Non-fused

### Participants Background

	Case A	Case B	Case C	Case D
Speech/language/communication	The grammatical structure is incomplete, and complete sentences are rarely used. Speak at a faster pace with no rhythm changes.	Less proactive in talking to people, parroting, such as asking "who am I" and repeating "who am I". Frequent self-talk, mostly unintentional language	Speak quietly, stop mainly in repeating other people's words, or ask meaningless questions, personal pronouns are not clear, and do not use "I" to refer to themselves.	Have simple language skills, cannot speak simple sentences, mainly repetitive language and meaningless language.
Socializing	Able to follow simple commands. They rarely take the initiative to interact with others, and their attention is not concentrated.	Able to follow simple commands. Does not like physical contact, cannot concentrate for a short period of time.	Indifferent to their surroundings, able to obey simple instructions from teachers and inattentive	Timid, impatient personality, and dissatisfied through crying and shouting. No interest in group activities and games. Unable to obey simple instructions.
Perception/cognition/awareness	Less gaze and pursuit, responsive to parents or familiar people calling their names, no sense of danger, poor sense of orientation.	There is eye chasing and short-term eye contact, and big movements are better accomplished, and fine movements do not match their actual age.	Lack of gaze and pursuit, poor sense of balance, fine movements do not match their age, and do not grasp objects with their hands.	Lack of sensitivity to one's own name, lack of gaze and gross and fine movements do not correspond to actual age.
Physical/Behavioral	Easy to show excitement, follow the blind running and jumping of your companions, and occasionally scream.	Littering, poor physical control. It is easy to show excitement and often shout loudly in class.	Aggressive tendencies and rigid behavior. It is easy to show excitement. The body coordination ability is general, often walking on tiptoe, and likes to tiptoe jump.	Self-masochistic, like to bite hands, unsteady walking. Poor physical coordination and dislike of standing. Cover your ears when you hear loud sounds.

Music background	No special musical training and prefer upbeat music, and parents often play nursery rhymes to children. Spend half an hour singing and enjoying music with my parents every day. Hearing favorite rhymes will be very focused, engrossed, and sing along.	No special music training, like lyrical music and children's songs, and parents have the habit of playing music to children, and sometimes sing and listen to music with their parents. Sing along to favorite songs. Love the keyboard.	No special musical training and enjoys upbeat music and children's songs. Parents often play nursery rhymes in the car, and often listen to music and play musical instruments with their children. Children are excited to hear their favorite children's songs and sing along. Wanted children to learn instrument.	No special music training, upbeat rhythm and soothing rhythm music are preferred. Often listen to nursery rhymes, folk songs, light music or Peking Opera. I often sing children's songs and listen to music with my parents. Likes to hit the keys of the electronic organ and has never studied the instrument.
Parents' attitudes towards music	Music is not important in life.	Music is not important in life.	Music is not important in life.	Music is important in life.

### Participants Background Key Performance

## Measurement

**In-depth interview:** The autistic children in the experimental group were interviewed in depth to explore their experience, opinions and feelings on piano and chorus teaching. The interview can cover the sense of achievement, challenge and self-cognition in the teaching process.

**Questionnaire survey:** A questionnaire survey was designed for parents and teachers to understand their views and observations on piano and choral teaching.

## 4. RESULTS AND DISCUSSION

### 4.1 Interview content analysis

Through the content analysis of the in-depth interviews of 4 autistic children, several main themes are summarized. First, the subjects said that making progress in music instruction made them feel proud and fulfilled. Secondly, they believe that piano and choral teaching can help them better understand and express emotions. At the same time, many subjects also mentioned that they learned to communicate and cooperate better with others during musical collaboration.

### 4.2 Participants experience and feel

Through the questionnaire survey, the opinions and observations of parents and teachers on piano and chorus teaching were collected. The majority of parents and teachers said that piano and choral instruction had positive effects on the musical skills, social interaction and

emotional expression of children with autism. They believe that piano and choral teaching not only improves children's musical skills, but also strengthens their performance in social communication and emotional expression. Parents and teachers generally agree that piano and choral instruction provides a positive learning environment for children with autism, making them more confident and happy to participate in music learning and performance.

Interview date	2022.6.11
Respondents	Interviewed parents
Interview questions	
1. Through the recent period of study, are you in your daily life? Have you found that children are willing to increase their active expression?	Yes, in the past six months, it has been found that they are more and more fond of talking to people in their lives, and they always ask you something or ask some questions. More expressive than ever.
2. Has avoiding eye contact improved?	Yes, in life, we also constantly teach him to look others in the eye when talking to them.
3 Can you respond to other people's calls and take the initiative in time when interacting with others? Say hello to people?	Can answer the call of others, and neighbors, friends and others who are not familiar with them. Can also say hello.
4. Will you take the initiative to ask for help when you encounter difficulties?	Yes, but occasionally it is not clear.

**Record Form of Parent Interview with Four Autistic Children on Piano and Chorus Learning Achievements**

Target behavior	The first cycle 16 class hours	Second cycle 16 class hours	The third cycle 16 class hours	The fourth period 16 class hours
1 concentrate for half a class hour (times)	2	five	eight	11
2 Obey and respond to instructions (completion rate)	58%	62%	75%	82%
3. Proactively express ideas (times)	three	six	eight	13
4 temper tantrums, crying and other excesses (times)	five	four	one	one

5 Active humming melody (times)	three	six	eight	12
6 Under the condition that teachers don't remind you, Active score playing (second time)	four	seven	10	15

**Observation record of the influence and effect of piano and chorus teaching on 4 autistic children**

serial number	Evaluation scope	Evaluation project	Evaluation record (P, E, F or X)			
			First time	second time	third time	
one	Experience representation	Hand over the items as instructed.	P	P	P	
2		Demonstration articles	E	E	P	
three		Identify pictures	E	P	P	
four		Tell the missing part of the picture.	E	E	P	
five		Say the name of the picture	P	P	P	
nine	cause and effect relationship	simple reason	Know the direct consequences of actions.	E	E	P
10			Understand the relationship between items.	F	E	P
11			Sign for help.	E	E	P
12		classify	Image classification (functional classification)	E	E	P
13			Complete simple puzzles.	P	P	P
14			Picture Classification (Concept Classification)	E	E	P
15		match	Physical pairing	E	E	P
16			Pairing of two texture items	E	E	P

17		sort	Point out the first, second and last positions.	E	P	P
18			Arrange sticks according to length.	P	P	P
19	concept	timeconcept	Name the days in a week.	P	P	P
20		spaceconcept	Can tell the time in the picture (in the morning, Evening)	P	P	P
21			Name the four seasons	P	P	P
22			Answer simple clock face questions	F	E	P
23			Know the inherent way things are placed.	F	E	P
24			Place items (above and below) as required.	E	P	P
25			Place items (inside and outside) as required.	E	P	P
26			Pick up items (front and back) as required	E	P	P
27		Qianconcept	Paired red and green colors (same shape)	P	P	P
28			Paired yellow and blue colors (shape, sizeNo)	P	P	P
29			Basic color classification	P	P	P
30			Say the color name.	P	P	P
31			Name the colors of common objects.	P	P	P
32			Distinguish the weight of an object	E	P	P
33		Identify half and the whole thing	E	E	P	

**Cognitive Assessment Form for Autistic Children**

serial number	Evaluation scope		Evaluation project	Evaluation record (P, E, F or X)		
				First time	second time	third time
1	Language and ability before communication	non verbal communication ability	Eye contact	E	E	P
2			Hand movements	P	P	P

3			Cater to the head and body movements.	E	P	P
4		distinguishShouto u	Respond to the position, volume and tone of sound.	E	E	P
5			Distinguish human voice from other voices.	E	P	P
6	Verbal explanation	Name instruction	Respond to one's own name	E	E	P

7			Understand the names of common items.	P	P	P
8			Understand "you, me, him"	E	P	P
9		identify	Identify food	E	E	P
10			Identify furniture	E	P	P
11			Identify tableware	P	P	P
12			Identify family members	E	P	P
13		actioninstruction	Affirmative action instruction	E	P	P
14			Understand the negative action instruction	E	P	P
15			Understand the "first-then-"instruction	E	P	P
16		Understand thingstie	Understand the relationship between whole and part.	E	E	P
17			Understand affiliation	F	E	E
18			Understanding conditional relations	F	E	P
19			Understand causality	E	P	P
20			Understand the turning relation	F	E	E
21	Language words	Express requirements and answer the question	Express body parts	P	P	P
22			Express fruit	P	P	P

**Improvement of autistic children's social communication ability in piano and chorus learning**



### 4.3 Discussion

Effects of piano and choral teaching on musical skills: The research results show that piano and choral teaching have a significant impact on the musical skills of children with autism. This may be attributed to the systematic and comprehensive teaching of piano and chorus, which promotes the musical development of autistic children through comprehensive training for different musical skills. In addition, collective cooperation and performance in music learning also provide autistic children with more opportunities to show themselves, and enhance their interest and motivation in music learning.

Influence of piano and choral teaching on social interaction: Piano and choral teaching has a significant effect on the social interaction of autistic children. Through choral cooperation and musical exchange, children with autism are more actively engaged in social activities in the music class and enhance their communication and cooperation skills with others. Music teaching provides them with a platform for emotional communication, which helps them to better express and share their emotions.

Effects of piano and choral teaching on emotional expression: Although the research results showed that piano and choral teaching had a positive trend on the emotional expression of children with autism, the difference was not significant compared with the control group. This may be related to the complexity of emotional expression in children with autism, which varies from individual to individual. In addition, emotional expression is influenced by the external environment and an individual's ability to manage emotions, and more in-depth research is needed to explore the long-term effects of music education on emotional expression.

Assessment of teaching quality: There was no direct assessment of teaching quality in this study. However, the impact of teaching quality on the research results should not be ignored. The effective implementation of music education requires rich experience in music teaching and understanding of the characteristics of autism. In future research and practice, more attention can be paid to the training and professional development of music education teachers to ensure the quality of teaching.

Persistence of teaching effects: This study evaluated teaching effects in the medium term; however, the effects of music education on children with autism may be a long-term process. Future research could consider long-term follow-up studies to understand the long-term effects of piano and choral instruction on children with autism, as well as its ongoing impact on their musical interest and participation.

## 5.0 CONCLUSION AND IMPLICATION

Music education institutions and schools can strengthen the application of piano and choral teaching in the music education of children with autism, and promote the development of their musical skills and social interaction. When teaching piano and chorus, music teachers should pay attention to individual differences and adjust teaching content and methods flexibly according to the characteristics and needs of autistic children. Educators and parents should pay attention to the potential influence of music education on emotional expression and emotional management of children with autism, and provide them with more opportunities for emotional communication and expression.

Although this study provides a preliminary understanding of piano and chorus teaching on music education for autistic children, there are still some limitations. Future studies can further expand the sample size, strengthen the research on the impact of piano and chorus teaching on emotional expression, and the long-term impact of piano and chorus teaching on learning motivation and emotional experience of autistic children. In addition, it is also possible to explore the educational effects of different types of music education on autistic children, such as folk music, pop music or jazz music, so as to enrich the diversity of music education and meet the individual needs of different autistic children. In addition, the implementation of piano and chorus teaching can be combined with emerging technological means, such as virtual reality (VR) and augmented reality (AR), to provide more interesting and personalized music teaching experience for children with autism. Through VR and AR technology, various music learning scenes can be created, so that children with autism can be more immersive and participate in them, and improve their learning enthusiasm and engagement. In addition, in-depth research on the influence of music education on the emotional expression of autistic children can combine the research methods of psychology and neuroscience to explore how music education affects the emotional cognition and emotional expression ability of autistic children at the brain level. It is helpful to understand more deeply the mechanism of music education in the emotional development of autistic children, and provide more scientific basis for teaching design. It is worth noting that the influence of music education on children with autism is influenced by a combination of factors, including family support, social environment, and individual cognitive and learning characteristics. Therefore, future research could integrate music education for autistic children into a broader framework of sociological and pedagogical research to fully explore its interaction with other factors. Finally, music education policy makers and practitioners should actively advocate inclusive education, promote the provision of diverse music education opportunities for children with autism, and encourage educational institutions to provide relevant training and support for music educators to ensure the effective implementation of music education for children with autism.

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