

# ***The Effect of Autism Degree on Children's Verbal Communication Ability: The Mediating Role of Cognitive Function***

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**Abstract:** Autism is a developmental disorder of the nervous system, the main symptom of which is a lag in verbal communication skills. Cognitive function, as an important ability, may affect the verbal communication ability of autistic patients. The aim of this study is to explore the reason why those children with autism have a difficulty in communication, and to confirm the role of cognitive function. This study adopted the experimental method and recruited 200 non-autistic children and children with different degrees of autism as subjects. Natural observation and questionnaire survey were used to verify the influence of autism degree on verbal communication ability of patients, and explore the mediating role of cognitive function. The hypotheses of this study is that the cognitive function will influence the communication skill of children with autism, and play a mediating role, and the result is there are differences in communication skill between non-autistic children and children with autism, and the degree of autism and the cognitive function causes those differences between the communicative competence in autism and typical children.

**Keywords:** Autism, Cognitive function, Verbal communication skills.

## **1. Research background**

Autism is a heterogeneous neurodevelopmental disorder characterized by early social difficulties and abnormally limited repetitive behavior and interests. The worldwide prevalence is about 1%. People with autism have atypical cognitive characteristics such as impairment of social cognition and social perception, impairment of executive function, and atypical perception and information processing. These characteristics are supported at the systematic level of atypical neural development [1]. Language disorders are a common problem in people with autism. In relation to this issue, a comprehensive study has been published that speech disorders in autistic children are caused by several potential neurological disorders [2]. Another study hypothesized that language problems in autistic children are due to a lack of visual spatial skills [3]. These studies believe that speech disorders in autism are caused by several biological causes. Cognitive factors also play an important role in speech disorders in autistic children. For example, there is a study focusing on the relationship between voice tone and cognition in children with autism [4]. In addition, the communication skills of autistic children are also attracting attention. Studies have shown that children with autism are closely related to their mental and developmental state [5]. The above literature proves that there are

many different theories about the mechanism of language ability development of autistic children, and a complete theoretical mechanism has been formed.

Language communication is an important skill in a child's development process. Several studies have shown that many children with speech impairment have a delay in their ability to social emotions and problems with social emotions and behavior [6]. Difficult language communication can make it difficult for an autistic person to establish normal social relationships with others, and can also affect the autistic person's ability to understand the living language and also his ability to care for himself. Have sex. Another study of autism in multilingual families shows that receptive and expressive vocabulary is the most valued language skill. Existing research does not support the hypothesis that bilingual negatively affects the language and communication skills of autistic children. The language and communication skills of children with multilingual autism are similar to those of children with multilingual autism in power and development [7]. Language interventions (including the introduction of multiple languages, dialogue, and increased conversation) by parents and interventionists in autistic children have been proven to enhance the multifaceted abilities of autistic children.

Cognition pertains to the procedure of obtaining knowledge or implementing knowledge, or the process of information handling, which constitutes the most fundamental psychological process of human beings. It encompasses sensation, perception, memory, thinking, imagination, and language. Studies on the cognitive function of autism indicate that the majority of autistic patients suffer from cognitive dysfunction, primarily manifested in aspects such as perception, memory, attention, and others [8]. The causes and results of cognitive impairment in autistic patients are often discussed in the academic community. This study focuses on the impact of cognitive impairment on other aspects of autistic patients' functions, and focuses on the impact on autistic patients' language ability. Several studies have explored language impairments in people with autism and looked for causes of the condition, but until now, no models have been created that look at how cognitive functions in people with autism affect verbal communication skills [9]. Therefore, this study draws a simple mediation model, taking the cognitive function of autistic patients as the mediating variable, to explore the causes of verbal communication skill disorders in autistic patients.

The research on verbal communication ability of autistic patients is mainly divided into the following categories: the causes of verbal communication disorder of autistic patients, the differences between verbal communication ability of autistic patients and non-autistic people, and the impact of verbal communication disorder of autistic patients. Among them, few studies have combined the differences of verbal communication ability between autistic people and non-autistic people, and the influencing factors of verbal communication ability. At the same time, most of the studies on verbal communication skills of autism have adopted interview methods or case studies, and few have used experimental methods to explore the influencing factors of verbal communication skills of autism, and rarely introduced effective mediating variables. Therefore, this study adopted the experimental method to further explore the influence of autism degree on verbal communication ability of patients through natural observation and questionnaire survey, and introduced cognitive ability as a mediating variable.

## **2. Research significance**

The research on autism is very necessary for autistic people, their families and the whole society.

### **2.1. Theory significance**

In terms of theory, although there have been many studies on the language ability of autistic people, few studies have compared it with the language development level of normal people, and even fewer

studies have focused on the communication skills of autistic people. Therefore, the theory described in this paper and its related research can make up for the lack of this field. At the same time, the writing of this paper is based on a large number of previous studies, which has a considerable theoretical basis, and draws on a large number of relevant theories of predecessors to form a theoretical system with basic characteristics, and make contributions to the follow-up research in this field.

## **2.2. Reality significance**

In reality, as a vulnerable group in society, the education and intervention of autistic children have been widely valued by the society. In order to better conduct long-term intervention for autistic children, it is necessary to understand the disorder of autistic children. Therefore, it is necessary to understand the difficulties in language communication of children with autism before we can better design a plan for further long-term intervention of children with autism.

## **3. Methodology**

### **3.1. Research objectives and hypotheses**

#### **3.1.1. Research objectives**

The speech communication disorder of autistic patients is a widely concerned issue in society. Understanding the causes of speech communication disorders in autistic patients can help them better receive intervention and improve social skills. This study aims to explore the influence of the degree of autism on the speech communication ability of autistic patients and through what channels the degree of autism affects the speech communication ability of autistic patients, providing a reference for future autism intervention.

#### **3.1.2. Research hypothesis**

The degree of autism affects the speech communication ability of patients by influencing their cognitive ability.

### **3.2. Participants**

Using the cluster sampling method, about 200 subjects were selected from kindergartens and autism intervention institutions in Beijing. The subjects were aged between 3 and 6 years old, and the ratio of male to female subjects was ensured to be approximately 1:1. Among them, there were about 80 non-autistic children, 60 low-functioning autistic children, 30 high-functioning autistic children, and 30 children with Asperger's syndrome.

### **3.3. Research tools**

#### **3.3.1. General population survey**

The survey includes general demographic characteristics such as age, gender, whether the child is an only child, parents' educational level, family residence, and family economic level.

#### **3.3.2. Autism spectrum evaluation scale**

The pediatric autism assessment scale (CAS) is a diagnostic standardized scale. It was proposed by e. Schopler, r. Recler, and b.r. rner in 1980. The scoring criteria are that a person with a total score of

less than 30 is considered to have no autism. 30-60 points: autism 30-37 minutes: mild to moderate autism at least five scores above 3 severe autism (total 60 points)

### **3.3.3. Montreal cognitive rating scale**

The Montreal cognitive assessment scale (MoCA) was developed by Nasreddine et al. in Canada based on the mini-mental State Examination (MMSE) cognitive items and scores from clinical experience. There are 11 test items in 8 cognitive areas, including attention and concentration, execution functions, memory, language, visual space skills, abstract thinking, computation and directivity. The total score is 30 and the  $\geq 26$  is normal.

### **3.3.4. Pre-school children language impairment scale**

This scale table was created by hayashi takaru et al., in 1996. The object is 3 ~ 5 years old children, individual test. It is also used to evaluate fluency, intonation, speech, pitch, and type of speech impairment. There are two scales. Test 1 consists of 30 questions, which will help you understand your language and grammar skills. Question 2 has a total of 32 questions, and you can understand the child's voice, pronunciation, pitch, spoken language, fluency, intonation, etc.

## **3.4. Research methods**

### **3.4.1. Natural observation method**

The natural observation method refers to a research approach in which investigators systematically observe and document the behaviors, reactions, emotions, and characteristics of subjects without posing any questions. This study employs the natural observation method to examine children's verbal communication skills within specific topics.

### **3.4.2. Questionnaire survey method**

The questionnaire method refers to a research approach in which researchers employ controlled measurements to assess the issue under investigation, thereby collecting reliable data. In this study, both the subjects and their parents were administered scales designed to evaluate the levels of autism, cognitive function, and language development among the participants.

## **3.5. Test procedures**

The study objects were randomly selected by cluster sampling. Parents of the subjects were invited to fill in the general demographic questionnaire and the child autism rating scale, and the subjects were divided into 4 groups according to the assessment results: non-autistic children group, low-functioning autistic children group, high-functioning autistic children group and Asperger's syndrome children group. First, through natural observation, children were invited to have verbal interaction with their parents on specific topics (such as kindergarten, good friends, mother, etc.), and three observations were made, each lasting 10 minutes. The children's general verbal communication ability was mainly observed, and descriptive records were made (describing the general classification of children's verbal communication ability under different autism levels, such as good, average, and poor). Then, by means of questionnaire survey, the parents of the subjects were sent to fill in the Montreal Cognitive Assessment Scale and the Language Impairment Scale for Preschool Children, so as to deeply understand the cognitive status and language communication ability of the subjects. Due to the young age of the subjects, all questionnaires will be completed by parents. Finally, the data are collected and unified data processing is carried out.

### **3.6. Data processing**

SPSS and Mplus8.3 software were adopted. Frequency was used for statistical description, Cronbach's  $\alpha$  coefficient was used for reliability test, and structural validity and criterion association validity were used for validity analysis.

## **4. Result**

### **4.1. The differences between the communicative competence in autism and typical children**

Autism is a developmental disorder of the nervous system. Due to developmental abnormalities, people with autism typically have developmental delays in social interaction, poor language skills, and a lack of basic communication skills. Their language barriers are mainly reflected in rigid and repetitive language, no fluctuation in pronunciation and intonation, and no interaction with others. These characteristics make the study of autistic language relatively difficult, but one accepted theory is that there is a gap between the language abilities of autistic people and those of normal children due to poor neurological development. A lot of current research is aimed at finding developmental differences between children with early autism and the general population. The research attempts to achieve the purpose of early detection and intervention for autistic children through these findings. One study compared the language development of children with autism in the first year of life to that of children without autism. Research shows that children with autism have a much lower rate of babbling in their first year of life than the average child, and boys are lower than girls [10]. In addition to language skills early in life, many studies have focused on how autistic children's narrative skills differ from those of the general population at an early age. These differences are mainly reflected in being able to describe things completely and make them understandable to others. A study has revealed that children with autism are less likely than their typically developing peers to identify the underlying causes of characters' internal states. Instead, they tend to focus on labeling emotions and explaining actions [11]. People with autism are also worse at verbal input than the average person. They have difficulty understanding the meaning of other people's speech, so it is more difficult to communicate effectively with others. A study suggests that interventions targeting social communication can be effective for people with autism. For example, in the family, language intervention for autistic children taught by parents can effectively improve the social behavior of autistic children interacting with others [12].

### **4.2. The reason of those differences between the communicative competence in autism and typical children**

Bertelsen and her close friends found that the unbalanced subtype of SC-RRB has many things in common, but also exhibits subtle differences in the functional neural circuitry and the genomic basis behind this circuitry [13]. This study and others like it suggest that neurodevelopmental disorders play an important role in language and social impairments in children with autism. Of course, there may be other psychological reasons for this that are worth exploring. For example, another study demonstrated the impact of mental development on the social development of children with autism, which showed that higher mental abilities lead to children with autism having stronger communication and pragmatic abilities that are closer to those of normal children [14]. At the same time, the results of this study indicate that cognitive function can be used as a partial mediating variable to affect the verbal communication ability of autistic patients. Among them, this study speculated that the learning ability of attention and perception in cognitive function plays a major role in the process of affecting the language learning of autistic patients. Due to attention deficit and perceptual disorders, people with autism have difficulty learning to interact with others and have



lower social skills. The findings could help future educators and scholars better understand how to teach language to people with autism. To sum up, both neurological and psychological influences can affect autism's communicative abilities, and higher mental abilities can give autism a chance to catch up with non-autistic peers.

## 5. Conclusion

There is a gap between the language development of autistic children and that of non-autistic children, and many studies not only study these gaps themselves, but also study the sources of these gaps. Due to the insufficient development of language ability, children with autism may have some differences in communication ability from ordinary children, which makes it difficult for children with autism to integrate into the school environment and reach normal communication with others. Subsequent studies can further study how to intervene in the speech function of children with autism at an early stage based on previous studies on the causes of communication deficits in children with autism. At the same time, horizontal research should also continue to investigate the differences between autistic children and normal children in more aspects of skills, so as to provide more data for further intervention and treatment, so as to draw more feasible programs.

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