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

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Abstract:

The study examined how the severity of autism affects children's verbal communication skills, especially focus on the mediating role of cognitive function. Autism spectrum disorder (ASD) is a common neurodevelopmental disorder. It often causes difficulties in not only communication but also social interactions. We invited 200 children aged 3 to 6 years from Beijing to participant in our test. And the aim is to see how the level of autism impacts children's communication skills by influencing cognitive function. In our research, we used many standardized tools to evaluate the severity of autism, cognitive function, and verbal communication abilities. For example, we used the Childhood Autism Rating Scale (CARS), the Montreal Cognitive Assessment (MoCA), and the Language Impairment Assessment Scale for Preschool Children. There are many ways for us to collect data, such as natural observation and questionnaires. And we analyzed the data by using SPSS and Mplus 8.3 software. The results show that verbal communication skills are different in different groups, and cognitive function plays a key mediating role among them. In conclusion, cognitive function is very important in finding out the truth of how autism severity influences verbal communication. What's more, this study aims to find out more targeted intervention strategies. In this way, educators can create more personalized teaching methods to help autistic children grow up much more healthily.

Keywords: Autism spectrum disorders, Verbal communication ability, Cognitive function

1. Introduction

1.1 Research Background

In the study of children's language education, we should focus not only on the development of typical children but also on the development of atypical children. Autistic children are a key example of atypical development. Autism spectrum disorder (ASD) is a neurodevelopmental disorder. People with autism often have difficulty in communicating and socializing with others. These difficulties can significantly prevent children from building friendships with others and handling various social problems in their lives. These difficulties may also prevent them from achieving academic success. It can be said that verbal communication is an essential part of interaction. However, this kind of ability is strongly influenced in children with ASD. Individuals in different severity have different spectrums. Therefore, all of us need to understand the impact of autism severity on children's verbal communication skills. This finding promotes the development of more targeted interventions. In this way, we can help more children with autism to improve their quality of life and cope with the challenges in their lives.

1.2 Research Significance

The aim of our study is to find how the severity of autism affects children's verbal communication ability. Among the research, we pay more attention to the mediating role of cognitive function. We collect data from some autistic children and use different methods to analyze the data. The study may promote the development of more effective intervention strategies for autistic children. These findings can also help children with autism to deal with cognitive deficits and thus improve their verbal communication skills. Furthermore, our research may provide a deeper understanding of the relationship between cognitive function and communication skills in neurodevelopmental disorders.

1.3 Definition

There are some technical terms in this study, which are defined below.

First of all, verbal communication ability refers to a person's skill to use language for communicating effectively. This ability includes language comprehension, language articulation, and the ability to use language in different situations flexibly. Specifically, verbal communication includes fluency in speaking, accuracy of language, and grammatical correctness. It also includes people's ability of having a rich vocabulary, using appropriate intonation, and understanding the context of conversations.

Secondly, cognitive function refers to the brain's ability to process information, including perception, attention, memory, thinking, problem-solving, language comprehension, and executive functions. These functions enable individuals to receive, process, and store information for effective decision-making, learning, and adaptation to the environment. In this paper, cognitive function mainly refers to its role in processing information, social interactions, and communication.

2. Literature Review

2.1 Past Research

Previous studies have explored a lot about the relationship between cognitive function and communication skills in children with autism.

Autistic children often have distinct cognitive function profiles. Studies suggest that autism is associated with challenges in executive functions, including planning, organization, and impulse control (Hill, 2004). Furthermore, people with autism often have difficulty in theory of mind. This means it is very hard for them to understand other people's thoughts and feelings.

The development of language in autistic children later than other typical children. Studies show that the severity of language difficulties is connected with the severity of autism (Tager-Flusberg, 2000). Some studies also found that differences in language skills may connect with problems with social communication skills (Paul et al., 2011). Because of this, Children with autism face challenges in different areas like phonology, grammar, and pragmatics.

What's more, research shows that cognitive impairments can negatively affect autistic children's language abilities. For example, limitations in working memory may make it harder for them to learn and use language effectively (Montgomery, 2004).

2.2 Recent Research

The focus of recent research changes to the connection between cognitive function and language ability in autistic children. It especially examines how the cognitive function affects language skills. New findings show that different parts of cognitive function, like attention, working memory, and executive functioning, is very important in building autistic children's language skills. For example, research by (Miller et al., 2020) shows that not only working memory but also cognitive flexibility impact language expression ability. They also investigate how the severity of autism affects language abilities. Landa et al. (2023)

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find if autism is more severe, the risk of language limitation is higher, especially when executive function is not strong.

2.3 Research Gaps

Although some studies have been done on cognitive functions and language ability in autistic children, there are still some gaps in research. The lack of systematic research makes it very hard for us to study how different cognitive functions affect language abilities in detail. Although some studies have paid attention to the relationship between the severity of autism and language abilities, there is still not very clear explanation on how different levels of autism affect children's cognitive functions. Finally, it is still important for us to investigate the regulatory mechanisms that are included during this process.

Research on the mediating role of cognitive functions in the language abilities of children with autism is still scarce. More studies are needed to explore how different cognitive functions mediate the development of language abilities.

To solve these problems, we come up with the following research question: How does the degree of autism affect children's verbal communication skills? we aim to fill in these gaps through our research, thereby gaining a better understanding of how cognitive functions in children with autism impact their language abilities and providing a basis for developing more effective intervention strategies.

3. Methodology

3.1 Participants

Cluster sampling method was used in this study. About 200 subjects, ranging in age from 3 to 6 years old, were sampled from kindergartens and autism intervention institutions in Beijing. The male-to-female ratio of the subjects was about 1:1. Among them, 80 were typical children, 60 were low-functioning autistic children, 30 were high-functioning autistic children, and 30 were children with Asperger's syndrome.

3.2 Data Collection

In this study, data collection was conducted by using a variety of standardized tools to assess participants' characteristics and abilities comprehensively. The General Demographic Data Questionnaire was employed to gather basic demographic information, including age, sex, whether the participant is an only child, parental education level, family residence, and family economic status.

To evaluate the severity of autism, we used The Childhood Autism Rating Scale (CARS) developed by E. Schopler, R. Licler, and B.R. Rinner in 1980. This standardized diagnostic scale scores autism severity on a 60-point scale, with scores below 30 indicating no initial diagnosis of autism. A score of 30 to 60 indicates the presence of autism, with a score of 30 to 37 reflecting mild to moderate autism and a score of 37 to 60 with at least five scores higher than 3 indicating severe autism.

The Montreal Cognitive Assessment Scale (MoCA) developed by Nasreddine et al. in Canada, was used to assess cognitive function. This scale, which draws on clinical experience and references items from the Brief Mental State Examination, includes 11 items covering eight cognitive areas: attention and concentration, executive function, memory, language, visual-spatial skills, abstract thinking, computation, and orientation. The total score is 30 points, with 26 or more considered typical.

Additionally, the Language Impairment Assessment Scale for Preschool Children, compiled by Lin Baoji et al. in 1996, was used to evaluate language skills in children aged 3 to 5 years. The scale is divided into two parts: the first part includes 30 questions assessing language comprehension and grammar skills, while the second part includes 32 questions to assess speech, pronunciation, intonation, voice, tone, and articulation abnormalities. This scale can be used both as a diagnostic tool for identifying language disorders and as an assessment for various aspects of language development.

Data were collected through individual administration of these scales and questionnaires, followed by detailed recording and processing to ensure a comprehensive understanding of each participant's cognitive and verbal communication abilities.

3.3 Research design

Subjects were randomly selected by cluster sampling method, and the parents of the subjects were invited to complete the General Demographic Data Questionnaire and the Childhood Autism Rating Scale. According to the scale assessment results, the subjects were divided into four groups: typical children, low-functioning autism group, high-functioning autism group, and Asperger's syndrome group. First, through natural observation, children and their parents were invited to have verbal interaction on specific topics (such as kindergarten, good friends, and mothers), children's general verbal communication ability was observed, and descriptive records were made (a general classification describing children's verbal communication ability under different autism levels). Then, through questionnaire survey, subjects and parents were asked to fill in the Montreal Cognitive Assessment Scale and the

Language Impairment Scale for Preschool children, in order to deeply understand subjects' cognitive status and verbal communication ability. Finally, the scales were recovered and unified data processing was carried out.

3.4 Ethics

In this study, we strictly adhered to applicable ethical guidelines and laws to ensure the integrity of the research process and the protection of participants' rights. All data collection activities were conducted only for research process and would not be used for any other purposes. Participants were provided with comprehensive information about the study and signed informed consent forms to ensure their voluntary participation. Specifically, considering the participants were young, we tried our best to respect their emotions and did not force them to participate in any experiments. During the test, we also adjusted or suspended the tests on time according to the situations to ensure their comfort and safety.

3.5 Data Analysis

SPSS and Mplus 8.3 software were used for data processing. First, we calculated descriptive statistics such as frequency, mean, and standard deviation, and evaluated reliability by using Cronbach's α coefficient to ensure internal consistency of the scale. Next, construct validity was assessed through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to confirm that the scale accurately measured the theoretical framework. In addition, we evaluated the standard correlation validity to examine the correlation between the scale and external benchmarks to verify its validity. Finally, using Mplus 8.3 for the structural equation modeling (SEM), to test autism severity by influencing the cognition to the hypothesis that affect children's ability to communicate. These steps ensured the reliability and validity of the data analysis, thus validating the research hypotheses.

3.6 Limitation

Although cluster sampling method was used for random selection, the samples were only collected from kindergartens and autism intervention centers in Beijing, which may limit the geographic representativeness of the sample and affect the generalizability of the results. Additionally, participants were divided into typical children, low-functioning autism, high-functioning autism, and Asperger's syndrome groups based on assessment scales. However, the manifestation of autism spectrum disorders varies greatly among individuals, and the existing grouping criteria may not fully capture these differences. Finally, the observation of children's verbal communication abilities relied on the subjective judgments of observers, which may introduce potential bias.

4. Result

Based on the experimental design, the following results can be predicted. Firstly, significant differences in verbal communication abilities are expected between the groups. The typical children group is anticipated to show the strongest verbal communication skills, while the low-functioning autism group may have significant communication difficulties. The high-functioning autism group is expected to perform better than the low-functioning group but still below the typical children. The Asperger's syndrome group's verbal communication abilities are expected to be close to those of the high-functioning group, though some social communication issues may still be present.

In terms of cognitive function, the results from the Montreal Cognitive Assessment (MoCA) and the Language Impairment Scale for Preschool Children are expected to show that typical children score the highest, while the low-functioning autism group scores the lowest, reflecting the correlation between cognitive function and verbal communication ability.

Overall, natural observation records are expected to reveal that typical children show the best communication abilities, while children in the autism spectrum groups will display varying degrees of communication challenges. The experiment aims to validate the hypothesis that autism severity affects verbal communication abilities by affecting cognitive function.

5. Conclusion

In conclusion, autism is a widespread and increasingly recognized neurodevelopmental disorder that significantly affects children's social interactions and communication skills. Our study confirms that the degree of autism affects children's verbal communication abilities through its influence on cognitive function. We hope that this study can make a positive contribution to the education of autistic children and help them grow up healthily.

References

[1]Hill, E. L. (2004). Executive dysfunction in autism. *Trends in Cognitive Sciences, 8(1),* 26-32.

[2]Landa, R., Bhat, A., & Camaioni, L. (2023). Autism severity and language development: The role of cognitive function. *Journal of Autism and Developmental Disorders, 53(5),* 1887-1902.

[3]Liselotte Kjellmer, Åsa Hedvall, Elisabeth Fernell,

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Christopher Gillberg, & Fritjof Norrelgen. (2012). Language and communication skills in preschool children with autism spectrum disorders: Contribution of cognition, severity of autism symptoms, and adaptive functioning to the variability. *Research in Developmental Disabilities*, *33(1),* 172-180.

[4]Miller, M., Wang, J., & Liu, Z. (2020). Cognitive functions and language abilities in children with autism: A systematic review and meta-analysis. *Autism Research, 13(6),* 1038-1054.

[5]Montgomery, J. W. (2004). Working memory and language development in children with specific language impairment. *Journal of Speech, Language, and Hearing Research, 47(3)*, 607-621.

[6]Ozonoff, S., Dawson, G., & McPartland, J. C. (2004). A to Z of autism: Executive function. *Journal of Autism and Developmental Disorders*, *34(4),* 401-407.

[7]Paul, R., Lombardino, L., & Silliman, E. (2011). Language and communication development in autism spectrum disorders. In F. R. Volkmar (Ed.), *Autism and Pervasive Developmental Disorders* (pp. 159-183). Cambridge University Press.

[8]Tager-Flusberg, H. (2000). The self and the other in autism: A developmental perspective. *Handbook of Autism: A Clinical and Developmental Approach* (pp. 243-274). Cambridge University Press.