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The Effect of Sentence Structure Training on the Progress of Chinese Children with Autism in English Grammar Acquisition

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Abstract: This study aims to investigate the impact of sentence structure training on the development of English grammar acquisition in Chinese autistic children and to specify the precise regions of English grammar that provide difficulties for these children. For autistic children, learning a new language may be tough, and learning English grammar is even more challenging because it differs structurally from Chinese. The study includes a sample of Chinese children with autism spectrum disorder (ASD) and uses a pre-test/post-test design. The participants will go through a focused training session on sentence structure that tackles English grammar only. The instruction will concentrate on various topics, such as verb tenses, syntax, and word order. Standardized language tests and a quantitative analysis of language samples gathered before and after the intervention will be used to gauge how effective the training was. It is predicted that teaching sentence structure will help Chinese children with autism learn English grammar more effectively. The results of this study will advance the knowledge of efficient language interventions for autistic Chinese children in the context of English grammar learning. The findings could impact how specifically designed intervention programs are created to improve these children's linguistic abilities. The ultimate objective of this study is to enhance the communication skills and quality of life of Chinese autistic children learning English as a second language.

Keywords: sentence structure training, English grammar, Chinese autism children

1. Introduction

The acquisition of language skills is a crucial developmental milestone for children, enabling them to communicate effectively and engage in social interactions. However, autism is a spectrum disorder [1], children with autism spectrum disorder (ASD) often face significant challenges in language acquisition due to the unique characteristics of their condition [2]. In particular, acquiring English grammar poses additional difficulties for Chinese children with autism, as English and Chinese exhibit distinct structural differences [3].

This study intends to examine the impact of sentence structure training on the development of English grammar acquisition in Chinese autistic children and to pinpoint the precise grammar rules that these children have trouble understanding. This study aims to advance the knowledge of efficient methods for promoting language development in this particular demographic by studying the effects

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of tailored intervention on English grammar abilities. The literature on language acquisition in autistic children highlights the complex nature of their linguistic challenges. Difficulties in social communication, pragmatic language skills, and receptive language abilities are commonly observed [4]. Moreover, the structural differences between English and Chinese, such as word order, verb tenses, and syntax, can pose additional obstacles for Chinese children with autism attempting to acquire English grammar [5].

To address these challenges, sentence structure training will be implemented as an intervention program to target English grammar in autistic Chinese children. The training course will concentrate on important facets of English grammar, including sentence structure, word choice, and verb tenses. Pre-test and post-test evaluations, including standardized language assessments and quantitative analysis of language samples, will be used to determine the success of the intervention.

The results of this study may offer insightful information about how well sentence structure training aids in Chinese autistic children's acquisition of English grammar. This research can aid in creating evidence-based intervention programs suited to the particular requirements of this population by pinpointing specific areas of difficulty and assessing the effectiveness of targeted intervention.

Ultimately, the outcomes of this paper can inform educators, clinicians, and parents about effective strategies for supporting language development in Chinese children with autism who are learning English as a second language. By improving their language skills, the research can enhance their ability to communicate, engage in social interactions, and participate more fully in academic and societal settings.

Although understanding others' words is a significant problem for autistic children, using grammar properly is also a potential difficulty for them. There are only a few research studies on grammar use in autistic children. This research helps to address language challenges in children with autism since children with autism spectrum disorder often struggle with language acquisition, including difficulties in understanding and using grammatical structures [6]. By focusing on sentence structure training, this research topic aims to address these specific language challenges faced by Chinese children with autism when learning English grammar. This research can enhance communication and social interactions in children with autism. Proficiency in English grammar is essential for effective communication and social interactions in English-speaking environments. By improving the English grammar skills of Chinese children with autism, this research seeks to enhance their ability to express themselves, understand others, and engage in meaningful social interactions. This can have a significant impact on their overall communication abilities and quality of life.

2. Methodology and research design

Question 1: How does sentence structure training impact the English grammar acquisition of Chinese children with autism?

To investigate the effect of sentence structure training on the progress of Chinese children with autism in English grammar acquisition, the research will design an experiment and use an independent measure design, in which different participants are used for each independent variable level, reducing demand characteristics. The experiment will be settled in a lab, constructing an artificial classroom. There are independent variables and dependent variables. Independent Variable is sentence structure training (experimental group), it will be operationalized by providing explicit instruction, modeling, and practice activities targeting various sentence structures in English grammar. The training sessions will be structured to include specific lessons or modules focused on sentence structure, such as identifying subject-verb agreement, using correct word order, or constructing complex sentences. In contrast, in no sentence structure training (control group), participants will not receive any specific sentence structure training. They will continue with their regular English language instruction, including general language learning activities, vocabulary building, or basic grammar exercises.

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Dependent Variable is Progress in English grammar acquisition, measured by the number of correct responses on a standardized English grammar assessment. There will be a selection of Chinese children diagnosed with autism, aged between 6 and 10 years, a total of 40 children, with 20 boys and 20 girls (see Table 1), recruited from a special education school in Guangzhou, Guangdong Province, China. The children who are chosen from the school should complete the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), which is a widely used diagnostic manual published by the American Psychiatric Association (APA). It provides a standardized classification and diagnostic criteria for mental disorders, including autism spectrum disorder (ASD) and many other psychiatric conditions. To reduce participant variability, children will be chosen from level 2. Level 2 refers to the severity level of the Autism Spectrum Disorder (ASD) diagnosis. Level 2 indicates a substantial support level required for individuals with ASD [7].

Table 1: The number of participants in separate conditions.

Experimental group (sentence structure training)	10 boys+10 girls
Control group (regular language instruction)	10 boys+10 girls

All participants will undergo a pre-test assessment to measure their baseline English grammar skills. The assessment will consist of multiple-choice questions or sentence completion tasks targeting various aspects of English grammar, including word order, syntax, and verb tenses. Questions will be chosen from the Test for Reception on Grammar (TROG). There will be 20 questions selected from it that can fit autistic children's ability to understand and answer.

After that, the study will organize an Intervention period. The experimental group will receive sentence structure training, which includes a multi-sensory approach, visual modeling, and practice activities. Visual aids will be utilized, such as pictures and charts, to support understanding and reinforce sentence structure concepts. The study will incorporate multi-sensory activities to engage children with autism. Use hands-on materials, gestures, and movement to reinforce sentence structure concepts. For example, manipulatives or interactive games will help children understand sentence construction. Also, the research will demonstrate proper sentence structure through visual modeling. Show children how to construct sentences using sentence strips, sentence building blocks, or sentence frames. This visual representation can help them understand the components and order of a sentence. Moreover, the study will provide structured practice activities that allow children to apply sentence structure rules. Use worksheets and interactive whiteboards to engage children in sentence construction exercises. Offer support and guidance as needed. In addition, individualized instruction that tailors the training will be provided in order to meet the specific needs and abilities of each child. Consider their developmental level, language skills, and learning preferences. Provide additional support or modifications as necessary to ensure their success.

The control group will not receive any specific sentence structure training but will continue with their regular English language instruction. The sentence structure training intervention will be conducted for a period of 8 weeks, with two 60-minute sessions per week. After the intervention, all participants will undergo a post-test using the same English grammar assessment as the pre-test. The assessment will measure their progress in English grammar acquisition. To collect data, the number of correct responses on the English grammar assessment will be recorded for each participant in both the pre-test and post-test. A statistical analysis of covariance (ANCOVA) will be conducted to compare the post-test scores between the experimental and control groups, controlling for the pre-test scores as a covariate. Effect sizes will be calculated to determine the practical significance of the results. To conduct covariance, the study will first calculate the means: Calculate the mean (average) of a score of the experimental group and control group in both the pre-test and post-test. This involves

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summing up all the values of each variable and dividing by the total number of tests. The deviations after calculating the mean will be calculated. For each test, subtract the mean of the respective variable. This will give the deviation of each data point from the mean. The study will also multiply the deviations of the two variables together for each test and add up all the products obtained in the previous step. Finally, the sum of the products will be divided by the total number of tests. This gives us the covariance.

Covariance is a measure of how closely two variables vary [8]. The direction of the link between the variables is indicated by the sign of the covariance (+ or -). Indicating a positive association, positive covariance (covariance > 0) indicates that as one variable increases, the other also increases. Conversely, as one variable decreases, the other tends to decrease. Negative covariance (covariance < 0) suggests an inverse relationship, where as one variable increases, the other tends to decrease, and vice versa. The magnitude of the covariance value indicates the strength of the relationship between the variables [9]. A larger positive covariance indicates a stronger positive relationship, meaning the variables tend to vary together more closely. Larger negative covariance indicates a stronger negative relationship, where one variable tends to increase while the other decreases more prominently. If the covariance is close to zero, it will be considered that the variables have little to no linear relationship [10]. To determine whether there is progress through the result of pre and post-tests, the research can concentrate on the extension of the covariance.

Question 2: Which part of grammatic acquisition is the most challenging for children with autism?

To identify the specific areas of English grammar that pose challenges for these children, a naturalistic observation will be conducted. The observation will take place in a naturalistic setting, which is a classroom in the special education school. The observation will include children between the ages of 6 and 12 diagnosed with autism. They will be recruited from a special education school in Guangzhou, Guangdong province, China. Participants will be selected based on their diagnosis of autism and age criteria. They will also be chosen from Level 2 in the criteria of DSM-5.

The study will observe the participants during the interaction with their teacher involving English language usage. The observation will be conducted discreetly to minimize any potential disruptions or biases. Data on the participants' language use and specific grammar challenges will be collected. The study may use various data collection methods, such as video and audio recording, to capture the participants' language interactions. To be more specific, participants' interactions and conversations will be recorded. Collecting samples of participants' spoken or written language to analyze their grammar usage. Also, collect written assignments to identify grammar errors and challenges.

The collected qualitative data, which is a record of video and audio, will be reviewed and transcribed. It will be conducted over one month to capture a representative sample of the participants' language use since there is little communication between autistic children and teachers.

After that, the study will analyze the data to identify specific areas of English grammar that pose challenges for the participants. The analysis will involve coding the data to categorize the grammar difficulties observed, comparing which themes have more weight, and seeing which themes in the grammar challenges will be identified and summarized to recognize the particular grammatical concepts that autistic children struggle with. The study will focus on identifying grammar-related difficulties, such as incorrect verb tenses, pronoun confusion, sentence structure errors, and challenges with word order.

3. Ethical consideration

Ethical Considerations are imperative when involving children in the research. The study will obtain informed consent from parents or legal guardians of the participating children, ensure confidentiality of personal information, allow voluntary participation, minimize harm, and conduct the experiment by ethical guidelines and regulations for research involving human subjects. The research will follow

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ethical guidelines and obtain necessary approvals from ethics committees or institutional review boards to ensure the ethical and responsible conduct of the study.

4. Conclusion

In conclusion, the research predicts that sentence structure training has a positive effect on the progress of Chinese children with autism in English grammar acquisition. The intervention provided specific instruction and practice on sentence structure, targeting word order, verb tense, and sentence formation. The observation aims to assess the effects of sentence structure training on the sentence construction skills of children with autism. By observing participants' language use and collecting language samples before and after the training, this study can provide insights into the impact of sentence structure training on sentence construction abilities in naturalistic settings. The findings can inform the development of targeted interventions and strategies to improve sentence construction skills and support overall language development in autistic children.

This paper also has some shortcomings. It exists participant variability. Children with autism can have various abilities, challenges, proficiency levels, and learning styles. Accounting for these individual differences and designing effective interventions for diverse learners can be complex. Besides, researching autism can be resource-intensive and time-consuming. Limited resources, such as funding, personnel, and access to appropriate assessment tools, may impact the scope and feasibility of the study, potentially limiting the depth and breadth of the research findings. To establish the effectiveness of sentence structure training, a control group is typically used for comparison. However, it may be challenging to find an appropriate control group that matches the participants in terms of language abilities, cultural background, and other relevant factors. This can introduce potential confounding variables and limit the strength of the conclusions drawn from the study. The study's findings may also have limited generalizability to other populations or contexts. The research focuses specifically on Chinese children with autism learning English grammar, and the results may not apply to children from different cultural backgrounds or those learning other languages.

As for future research, it is possible to conduct a longitudinal study to investigate the long-term effects of sentence structure training on the English grammar acquisition of Chinese children with autism. Follow participants over an extended period to assess whether the improvements in sentence structure skills are sustained over time. Besides, it is forward-looking to explore individual differences in response to sentence structure training among Chinese children with autism. Investigate factors such as age, cognitive abilities, language proficiency, or severity of autism symptoms that may influence the effectiveness of the training. It is potential to find the generalization to the Chinese language. Examine whether sentence structure training in English has any transfer effects on the Chinese language skills of Chinese children with autism. Investigate whether improvements in English grammar acquisition also enhance sentence structure skills in their native language. What's more, comprehensive mixed-methods research should be conducted. Combine quantitative measures, such as standardized assessments, with qualitative methods, such as interviews or observations, to gain a comprehensive understanding of the impact of sentence structure training on Chinese children with autism. Explore their perspectives, experiences, and perceptions of the training program.

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