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Intervention Study on Enhancing Pretend Play Skills in Children with Autism through Video Modeling Strategies

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Abstract: This research utilizes a multiple-probe design across behaviors within a single-subject framework to examine the effectiveness of video modeling strategies in enhancing pretend play skills in an eight-year-old child with autism. The intervention focused on three specific pretend play skills: object substitution, attributing properties, and imagining absent objects. The study's results indicate that the average proficiency in the targeted behaviors increased from 0% during the baseline phase to 97.5% during the maintenance phase. These findings suggest that video modeling strategies are highly effective in both the immediate and sustained improvement of pretend play skills in children with autism. Furthermore, the approach demonstrates significant social validity.

Keywords: Children with Autism; Video Modeling Strategies; Pretend play

1. Introduction

According to the latest 2023 report by the U.S. Centers for Disease Control and Prevention, the prevalence of Autism Spectrum Disorder (ASD) in children is estimated at 2.8 percent. This means that about 1 in 36 children aged 8 years old will be diagnosed with autism. This is an increase of about 0.5% compared to previous data, reflecting the increasing trend in autism prevalence over the years. This underscores the urgent need for educational interventions for children with autism. When children engage in pretend play, it is often concretely demonstrated by substituting common, ordinary materials for real objects or by taking on the role of a virtual character in a game. This kind of play promotes the development of abstract thinking in a subtle way. However, children with autism have significant difficulties in imagining things that do not exist, substituting objects that are not in front of them, or engaging in activities related to objects that do not exist. This is a clear reflection of their underdevelopment of pretend play skills. There has been no uniform definition of pretend play. Researchers usually categorize pretend play into four types: functional pretend play, object in place of object, fictitious object, and attribution. Piaget posited that this form of play is characteristic of children in the preoperational stage, allowing them to construct an imaginary world that symbolizes their desires and experiences based on real-life interactions[1]. The video modeling strategy created by Bandura is an intervention based on his social learning theory. Video modeling strategies have been validated as effective tools for ASD intervention in various authoritative reports, including the *Evidence-based Practices for Children, Adolescents, and Adults with Autism Spectrum Disorder* and the *National Standards Report—Phase 2*[2]. This study aims to leverage the visual learning strengths of children with autism by employing video modeling strategies to enhance their pretend play skills.

Autism, also known as "autistic disorder"[3], is a developmental disorder affecting early childhood. According to the DSM-V definition, individuals with autism exhibit persistent challenges in social communication and interaction, alongside restricted, repetitive patterns of behavior, interests, or activities[4]. The definition of pretend play has been a subject of debate. Pretend play can be

classified from two perspectives: the modes of play behavior and the types of symbolic representation. According to scholars such as Feng Hua (2015), play behavior can be categorized into three main types: child-centered activities including object substitution, creating something out of nothing, and attributing abstract properties; and the third type related to characters and environments. In terms of symbolic representation, pretend play can be divided into functional pretend play, object substitution, attributing properties, and imagining absent objects[5]. This study will adopt Feng Hua's classification and explore pretend play based on symbolic representation types, specifically focusing on object substitution, attributing properties, and imagining absent objects.

Cai Jingye (2011) posited that primary object substitution involves substitutive items that are similar in shape and function to the objects they replace, whereas advanced object substitution behaviors can be transformed into abstract thinking[6]. This study conducts a pretend play scenario with the theme of "buying fruit" to explore object substitution. In pretend play, attributing properties refers to the act of assigning imaginative characteristics or qualities to real objects or roles. Such behavior is crucial for child development as it demonstrates their cognitive understanding and the evolution of their imagination.

This study utilizes the theme of "tasting fruit" in pretend play to explore the attribution of properties. The operational definition of attributing properties is: the subject uses language to invent a non-existent characteristic or quality for a fruit model. For example, a child picks up a toy banana and says, "This banana smells sweet."

An individual engages in imaginative object play by simulating the presence of a non-existent object, accompanied by corresponding verbal expressions and physical actions. In this study, the scenario centers around "making juice". The operational definition of this play behavior is as follows: The individual pretends to take out a juicer, saying, "Take out the juicer", while mimicking the action of placing the juicer on the table. They simulate peeling an orange while saying, "Peel the orange", as they mime removing its skin. They act as though they are opening the juicer's lid, stating, "Open the lid". Next, they pretend to place the orange into the juicer and close the lid, saying, "Put in the orange". They then press an imaginary start button while saying, "Start", and pause momentarily as if waiting for the juicer to finish. Finally, they mime pouring the juice, saying, "Pour the juice", taste it, and exclaim, "The orange juice is delicious".

Video demonstration strategies initially involved teaching via videotapes. Researchers tailor educational content and target behaviors based on the abilities and characteristics of the subjects, presenting these behaviors through video. While watching the videos, subjects are encouraged to imitate and memorize these target behaviors[7]. Kang Yunhong (2012) categorized video demonstrations into four types based on the demonstrator: basic demonstration (including adult and peer demonstrations), self-recorded demonstration, viewpoint demonstration, and hybrid demonstration[8].

In this study, the adult demonstration in the basic demonstration was used, and the instructional design and specific implementation steps were as follows: (1) Establish the target behavior of the intervention. (2) The researcher designs a teaching plan based on the target behavior, writes a video script according to the task analysis, and then has the demonstrator video script correctly show the target behavior and record the process. (3) The researcher edits the recorded video to show the demonstration video of the complete target skill, while reducing the interference of external factors in the acquisition of the target behavior. In addition to this, subtitles and voice-overs, or other cueing effects are to be added to the target behavior in the video. (4) The edited demonstration video and prepare teaching props to teach the research subjects as planned, and the video can be adjusted according to the acquisition situation.

2. Literature Review

2.1 Intervention Studies on Pretend Play in Children with Autism

Brook (2006) found that the naturalistic teaching method significantly improved both spontaneous and guided pretend play skills in children with autism[9]. Murdoc (2013) used

iPad-based game stories to intervene in the pretend play skills of four children with autism, achieving positive results in three of the participants[10]. Ya-Chih Chang et al. (2017) conducted a controlled experiment with 58 children with autism using the naturalistic teaching method. Their findings demonstrated a correlation between the increase in pretend play and the enhancement of expressive language skills[11]. Lee et al. (2019) focused on substitutive pretend play skills in four children with autism. The results showed that all participants developed previously unobserved substitutive pretend play abilities after intervention, with these skills being sustained and generalized[12]. Wang Yuchen (2011) conducted an intervention study on symbolic play skills in 20 children with autism by combining demonstration methods with a control experiment[13]. Li Simiao (2022) targeted two children with autism, finding that the frequency of correct substitutive play behaviors significantly increased and extended to natural settings[14].

2.2 Intervention Studies on Pretend Play in Children with Autism Using Video Demonstration Strategies

Reagon et al. (2006) employed video demonstration strategies to teach children with autism to engage in pretend play with their siblings, adopting roles such as firefighters and doctors. Their findings revealed that participants successfully engaged in these roles and generalized the skills to real-life scenarios[15]. MacDonald et al. (2009) used a single-subject research design to intervene in the pretend play skills of two children with autism via video demonstration, showing improvements in scripted language and play behaviors with good maintenance effects[16]. Boudreau et al. (2010) similarly found that video demonstration strategies had a sustaining impact on the pretend play skills of two children with autism[17]. Liu Yanhong et al. (2021) combined peer and adult video demonstrations to intervene in target behaviors involving imagining absent objects, discovering that video demonstration effectively enhanced the pretend play skills of children with autism and positively influenced their language abilities[18].

In summary, it can be seen that foreign studies on pretend play for children with autism have been conducted earlier than domestic studies, and the number of studies is relatively large, among which video demonstration accounts for a larger proportion, and both other visual cueing strategies and single-use video demonstration strategies have yielded relatively good results. In recent years in China, there have been studies on the application of video demonstration strategies to the pretend play skills of children with autism, but there are still fewer of them. In addition, the analysis of research design reveals that most of the studies have adopted a single-subject multi-subject cross-subject research design, while fewer studies have adopted a multi-subject cross behavioral research design. In terms of content, there were a number of studies that intervened in pretend play skills with objects. In terms of content, a larger proportion of studies have intervened in object-substitution pretend play skills, while no studies have intervened in the pretend play skills of object-substitution, attribution, and fictitious object; and more demonstrations have been conducted by adults, who are better able to understand the goals of the teaching and demonstrate appropriate target behaviors. With reference to the existing literature, this study aims to improve the pretend play skills of children with autism by selecting a basic and favorite play theme based on the interests of children with autism and using an adult as the demonstrator in the video demonstration.

this study aims to select game themes based on the interests of children with autism and their existing skill levels, employing adults as demonstrators in video demonstrations, with the expectation of improving the pretend play skills of children with autism.

3. Research Design

3.1 Research Subjects

Xuan Xuan (pseudonym), an 8-year-old boy, was diagnosed with autism at the age of 7 by a top-tier hospital. His language expressiveness and comprehension are relatively advanced; he can imitate speech, make requests, and articulate his thoughts, exhibiting lively verbal behavior. However, he tends to engage in self-talk and sometimes uses inappropriate words. During the pretend play screening, the researcher will ask questions and make

requests to the research participants, who cannot substitute similar blocks for toy fruits; cannot use creative language to give toy fruits fictional characteristics, such as “ smells sweet ” ; and cannot pretend that there is a telephone in front of them. They were not able to make dialing and calling gestures. Assessment results indicate that Xuan Xuan is capable of engaging in functional play but lacks skills in substitutive play, attributive play, and imaginative object play, making him a suitable candidate for this study.

3.2 Research Variables

3.2.1 Independent variable

The independent variable is the video demonstration strategy, which encompasses the creation of demonstration videos and the implementation of the video demonstration strategy. The researchers identified three target behaviors for intervention: "going shopping" under the theme of substitutive play, "tasting fruits" under the theme of attributive play, and "juicing fruits" under the theme of imaginative object play. Two well-liked and familiar teachers, including the researcher, were selected as video demonstrators. Using the video demonstration method, the researchers conducted a task analysis of the target behaviors and produced instructional videos. The teaching process is as shown in Figure 1:

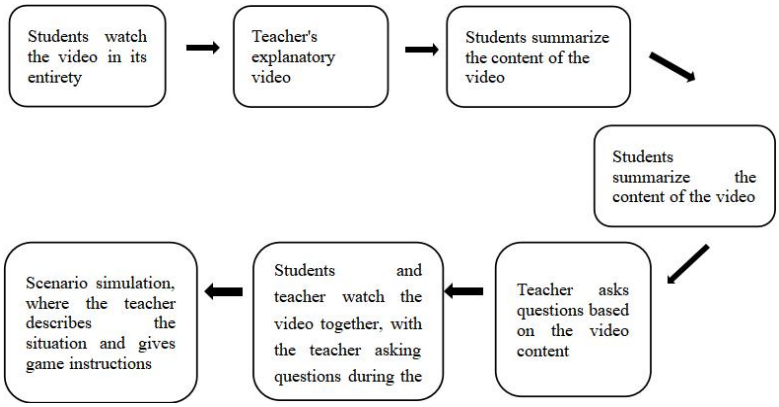

Figure 1. Teaching Process Flowchart

3.2.2 Dependent variable

The dependent variables were assessed using custom-developed observational and rating scales: the Substitutive Play Behavior Detection Record, the Attributive Play Behavior Detection Record, and the Imaginative Object Play Behavior Detection Record. Each step was rated, and the percentage of pretend responses was calculated.

3.2.3 Controlled variables

The controlled variables include the instructor, teaching duration, teaching location, and assessment method.

3.3 Research Procedure

This study employs a multiple-probe design across behaviors, typically used in single-subject research. The subject will undergo an intervention period lasting 2-3 months, with each intervention session lasting approximately 25 minutes. The study encompasses three primary phases: baseline, intervention, and maintenance. During the baseline phase, extensive data collection on the target behaviors across different role-playing game themes was conducted. Subsequently, the subject entered the teaching phase for each role-playing game theme in a sequential manner.

3.4 Data Collection

3.4.1 Data collection methods

3.4.1.1 Interview method

Before conducting the experiment, the researcher will conduct a single-person communication interview to discuss with classroom teachers and parents in order to understand the play behavior, cognitive ability and other basic conditions of the research subjects. In addition, after the experiment, the researcher will conduct interviews with teachers and parents according to the process and results of the experiment in order to establish the social validity of the experiment and obtain more feedback information.

3.4.1.2 Single-subject experimental method

A cross-behavioral multiple probe experiment was used. With the consent of the teachers and parents of the study subjects, the researcher

will record videos of the study subjects throughout the experiment. These video recordings will be used as raw data for data analysis and observer consistency assessment after the completion of the experiment, thus supporting the objectivity and credibility of the experimental results. The researcher will assess the performance of the participants using a self-administered probe recording form and analyze the results to determine the effectiveness of the video demonstration strategy in intervening with pretend play skills for children with autism. At the same time, the researcher will also analyze the reasons for the effectiveness, summarize the shortcomings of the experiment, and make recommendations for improvement in order to promote the development of research and practice in related fields.

3.4.2 Analysis of information

3.4.2.1 Inter-observer consistency analysis

In this study, inter-observer consistency was tested to ensure the reliability of the study. The researcher invited a student in the professional field to perform the observation records with the researcher. By comparing and discussing the observation data, only when the researcher and the observer recorded with 80% consistency did we use the data records for formal instructional analysis.

Next, the researcher took a random sampling approach and for each skill goal, conducted one random observation with the observer during the baseline phase, three random observations during the intervention phase, and two random observations during the maintenance phase. Ultimately, all observations were summarized to calculate inter-observer agreement.

3.4.2.2 Analysis of procedural consistency in the teaching process

Procedural consistency in the teaching and learning process is the degree of conformity between the actual implementation of teaching activities and the intended teaching program. In this study, this consistency was obtained through the evaluation of the content of a randomly selected instructional video by the participating observers based on the examination of the instructional procedure checklist provided by the researcher. During the baseline period of the study, the researcher conducted one randomly sampled observation; during the intervention period, this was increased to three randomized observations; and during the maintenance period, two randomized observations were conducted. The observers gave ratings based on the consistency criteria of the instructional procedures to ensure that the instructional process was carried out as planned.

3.4.2.3 Visual analysis

This study used visual analysis to analyze the data of the study in order to interpret the findings. The visual analysis consisted of within-phase and between-phase analyses to assess the effectiveness of teaching and learning and to draw conclusions from the study.

3.4.2.4 Social validity analysis

The teaching assistants and parents of the research subjects in this study were involved in the teaching experiment and were more knowledgeable about the whole teaching situation. The researcher used a self-compiled interview outline to conduct individual interviews with the teaching assistants and parents of the research subjects, transcribed the interviews into textual form, and then coded the interviews in order to collect the information for the assessment of social validity of this study.

4. Research Results and Discussion

4.1 Analysis of the Effectiveness of Target Skill Instruction

According to the line graph in Figure 2, the performance of all three target skills remained at 0% during the baseline phase, indicating a completely stable state and highlighting the subject's deficiency in these skills. During the intervention phase, the substitutive play skill showed a level change of +60% with a mean of 75.6%, the attributive play skill exhibited a level change of +100% with a mean of 56.7%, and the imaginative object play skill demonstrated a level change of +87.5% with a mean of 66.7%. The overlap rates with the baseline phase were all 0%, signifying significant improvement in the subject's target skills and immediate effectiveness of the intervention. During the maintenance phase, the achievement rates for the target skills were 100%, 100%, and 96%, respectively, all maintaining a stable state. Compared to the intervention phase, the mean levels increased, with overlap rates of 100%, 100%, and 40%,

respectively. This indicates that the video modeling strategy had a sustained effect on improving the subject's target skills.

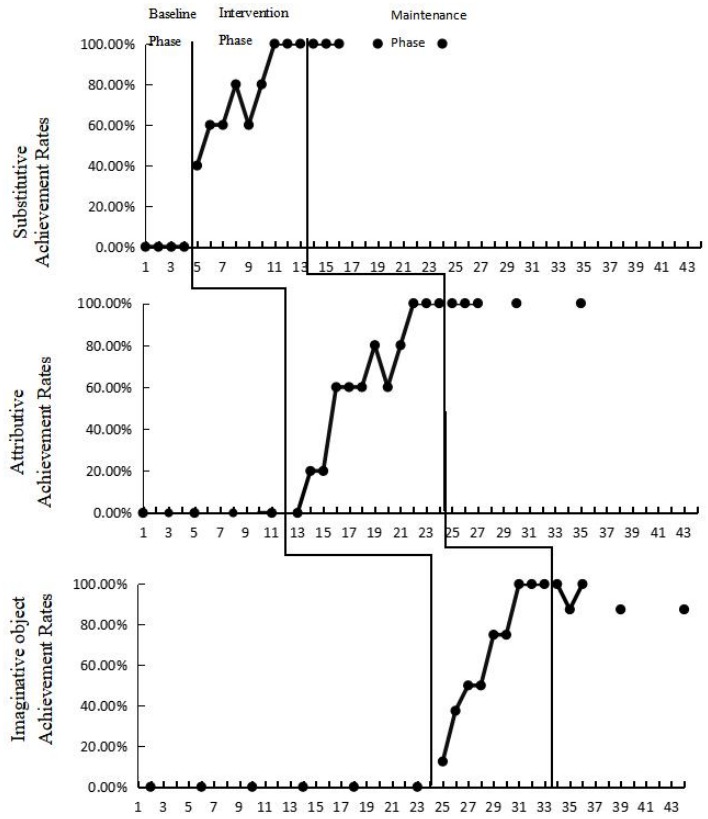

Figure 2. Effectiveness of Target Skills Across Instructional Phases

4.2 Analysis of Research Validity and Reliability

Based on the compiled interview data, the assistant teachers of the subject reported that Xuan Xuan exhibited significant progress in pretend play skills, displaying spontaneous pretend play behaviors, inviting teachers and peers to engage in pretend play, and demonstrating new play behaviors that had not been observed before. Xuan Xuan was seen pretending to taste toy fruits with peers, and there was an increase in social interactions with classmates. Xuan Xuan's mother also observed the development of pretend play skills at home that had not been present before, showing a certain level of interest in pretend play, and noted an increase in social interactions with neighborhood children. She believed that the method effectively captured Xuan Xuan's attention and interest.

4.3 Discussion of Instructional Effectiveness

Visual analysis reveals that the video modeling strategy substantially enhances the three target pretend play skills in children with autism, demonstrating immediate effectiveness. These findings are consistent with the results of related studies by MacDonald et al. (2009) and Boudreau (2010), who also observed significant immediate effectiveness using video modeling interventions for pretend play in children with autism. The results align with Liu Yanhong (2021) and colleagues' research on the use of video modeling to intervene in the skill of imagining absent objects in children with autism. Although their study incorporated both adult and peer models and focused solely on the skill of imagining absent objects, it also demonstrated notable maintenance effects.

5. Conclusion and Recommendations

5.1 Conclusion

This study employed a multiple-probe design across behaviors within a single-subject research framework, focusing on an 8-year-old child with autism to examine the effectiveness of video modeling strategies on pretend play skills. The conclusions drawn from the study are as follows: Video modeling strategies exhibit substantial immediate effects, maintenance effects, and social validity in the

intervention of pretend play skills in children with autism.

5.2 Research and Teaching Recommendations

5.2.1 Integration of reinforcement and prompting

In terms of research methodology, it is suggested that video modeling strategies be integrated with reinforcement and prompting techniques to enhance the learner's motivation and efficiency. Researchers should also compare the results of different instructional experiments to identify the most effective teaching methods.

5.2.2 Selection of relevant play content

Instructors should tailor the play content to the cognitive level and interests of children with autism. By using appropriate instructional materials, they can create a vivid and engaging play atmosphere and environment that boosts motivation, triggers intrinsic interests, and inspires the child's willingness to participate.

5.2.3 Enhancing teaching enjoyment

Applying natural language reinforcement techniques can deepen children's memory of the instruction and promote generalization in daily life. For instance, when a child pretends to taste a red magnetic disk as a tomato, one might say, "The tomato you picked looks very sweet", instead of "You did a great job, here's a sticker." Furthermore, the researchers provided the child's favorite orange juice as a reward, saying, "Try the orange juice you just made", to increase the subject's enthusiasm and interest.

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