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EFFECTIVENESS OF VISUAL SCHEDULE MEDIA IN ENHANCING SPOON-FEEDING INDEPENDENCE FOR CHILDREN WITH AUTISM SPECTRUM DISORDER

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ABSTRACT

Independence in daily living skills, particularly the ability to use a spoon during meals, is a fundamental adaptive milestone for children with Autism Spectrum Disorder (ASD). However, core characteristics of autism, such as difficulties in processing verbal instructions and fine motor coordination, often hinder the acquisition of these skills. This study aims to evaluate the effectiveness of visual schedule media in improving spoon-feeding independence in a child with autism. A Single Subject Research (SSR) design with an A-B-A reversal pattern was employed. The participant was a 7-year-old boy with ASD enrolled in an inclusive education institution. The intervention, conducted over four weeks, utilized a structured visual schedule depicting the step-by-step process of eating. Data were collected through structured observation and analyzed using visual inspection techniques to determine level changes and stability across phases. The findings revealed a significant improvement in the subject's independence level. The mean percentage of independence rose from 35% during the initial baseline phase (A1) to 78% during the intervention phase (B). Furthermore, the skill was successfully maintained at 74% during the second baseline phase (A2) even after the visual aids were withdrawn. The results suggest that visual schedules effectively clarify activity sequences and reduce anxiety by providing environmental predictability. The transition from physical prompting to visual reliance facilitated the internalization of the motor sequence. This research underscores the critical importance of integrating visual-based strategies into self-care curricula for children with autism in both school and home settings.

Keywords: autism; self-care; visual intervention; mealtime independence; spoon-feeding; visual schedule

1. INTRODUCTION

Education for children with autism requires highly specific and structured approaches to accommodate their unique learning styles (Mesibov & Shea, 2010). Independence in self-care activities, particularly eating skills, is a fundamental foundation for children with autism to interact socially and improve their quality of life (Khowaja &

Westerveld, 2020). However, many children with autism face significant barriers in mastering the fine motor skills and coordination required to use eating utensils like spoons effectively (Jasmin et al., 2009). These difficulties are often exacerbated by sensory processing disorders that make the eating experience confusing or even stressful for them (Ismael et al., 2018). The lack of these abilities not only impacts the child's physical health but also increases long-term dependence on caregivers (Tanner et al., 2015). Therefore, intervention strategies capable of bridging these cognitive and motor deficits through appropriate stimulation are required.

Phenomena often found in the field indicate that verbal instructions alone are insufficient to provide a clear understanding of complex activity sequences for children with autism (Rao & Gagie, 2006). The primary characteristic of autism, involving difficulties in processing auditory information, often causes oral directions to be perceived as "noise" without clear meaning (Hume et al., 2014). This results in children frequently failing to complete self-care tasks despite being given repetitive guidance. The inability to understand environmental expectations often leads to the emergence of tantrums or resistance to learning (Wheeler, 2010). Consequently, educators and parents require tools that can transform abstract instructions into more concrete and predictable forms.

Visual schedule media emerge as a potential solution because they utilize visual processing strengths, which are typically an area of strength for children on the autism spectrum (Knight et al., 2015). Theoretically, visual schedules help individuals with autism understand the sequence of events and reduce the cognitive load of remembering subsequent steps (Waters et al., 2006). By providing a visual representation of each step in using a spoon, the child is given a clear "roadmap" of what needs to be done from start to finish. The use of images or symbols helps reduce dependence on verbal prompting, which often makes the child dependent (Bryan & Gast, 2000). This strategy aligns with structured learning principles that emphasize predictability and consistency in the learning environment.

Although the use of visual supports has been widely discussed in special education literature, a significant research gap remains regarding the specificity of visual interventions for in-depth eating skills such as using a spoon. Much previous research has focused more on general daily schedules or social skills, while providing less detail on effectiveness in repetitive fine motor tasks. Furthermore, the transition from physical assistance dependence to full independence in using eating utensils is still rarely documented systematically within the context of inclusive education in Indonesia. The need for empirical evidence regarding intervention duration and the stability of results after the intervention is discontinued is crucial. Without specific research, practitioners may only implement visual schedules superficially without understanding the underlying mechanisms of behavior change.

The primary objective of this study is to analyze in depth the effectiveness of using visual schedule media in improving spoon-using abilities in children with autism. This research focuses on measuring aspects of step accuracy, independence levels, and the duration required for the child to complete eating activities. Through this approach, the researcher seeks to provide an objective picture of how visual supports can transform the

child's interaction patterns with functional tasks. Additionally, this study aims to evaluate whether the improvements achieved during the intervention phase can be maintained (maintenance) after the visual supports are faded. The results of this study are expected to provide a theoretical contribution to the development of self-care curricula in inclusive schools.

Broadly, this study also examines how visual schedules play a role in lowering a child's anxiety levels when facing new motorically challenging tasks. With certainty regarding the sequence of steps, children tend to be calmer and more focused on coordinating their hand and mouth movements. This increased focus is expected to contribute to mealtime efficiency and reduce the behavioral barriers that frequently arise. A better understanding of the link between visual structure and emotional regulation will enrich the repertoire of intervention methods for children with autism. This research becomes relevant amidst the demand for children with special needs to function as optimally as possible in broader social environments.

The urgency of this research is also based on the practical needs of educators in inclusive education institutions to have evidence-based guidelines for teaching self-care. Educators often face constraints in determining when to provide physical assistance and when to allow the child to try independently. With a visual schedule system, the boundaries of independence become more measurable for both teachers and students. The use of structured observation instruments in this study allows for highly detailed monitoring of progress per session. This provides valuable feedback for real-time adjustments to teaching strategies.

The integration of visual processing and motor skill mastery through visual schedules is a strategic step in the education of children with autism. This study serves to test the hypothesis that consistent visual structures will positively correlate with an increase in the percentage of independent eating in children. Through a single-subject design, the dynamics of individual behavior change will be clearly visible, providing insights that cannot be obtained through large group studies. Thus, this research not only seeks answers regarding the method's effectiveness but also looks for patterns of success that can be replicated in similar contexts.

2. METHODOLOGY

Research Design

This study employs an experimental method with a Single Subject Research (SSR) design using the A-B-A reversal pattern. This design was specifically chosen to facilitate an in-depth analysis of the functional relationship between the independent variable, namely the visual schedule media intervention, and the dependent variable, which is the ability to use a spoon in a single subject. The implementation of the A-B-A design involves three crucial phases: the initial baseline phase (A1) to record the subject's natural condition before treatment; the intervention phase (B) where the visual schedule media is introduced and

applied; and the second baseline phase (A2), which serves as a maintenance stage to evaluate the stability of the behavior after the intervention is withdrawn. Through this pattern, the researcher can verify whether the observed behavioral changes are indeed a direct result of the intervention provided.

Participants

The subject of this research is a 7-year-old boy diagnosed with Autism Spectrum Disorder (ASD), currently enrolled in an inclusive education institution. The participant was selected based on urgent special education needs, as the subject exhibited significant barriers in fine motor coordination and auditory instruction processing during mealtime activities. The subject's initial condition showed a very high level of dependence on physical prompting from caregivers or assistant teachers, making the mastery of self-care skills—specifically using a spoon—a priority for his adaptive independence.

Instruments and Intervention Media

Data were collected using structured observation sheets designed to record every detail of the subject's progress during each session. This instrument was developed based on

a task analysis of spoon usage, which includes step-by-step accuracy, level of independence based on a prompting scale, and the duration required to complete the eating activity. In addition to the observation instrument, this study utilized visual schedule media as the primary intervention tool. This media consists of a series of graphic images representing concrete steps in the eating process: holding the spoon, scooping food from the plate, bringing the food to the mouth, and placing the spoon back correctly.

Figure 1. The Four-Step Visual Schedule for Spoon-Feeding Intervention

Data Collection

The following table outlines the indicators used in the observation sheet to measure the ability to use a spoon:

No	Measurement Component	Achievement Indicators	Scoring Criteria
1	Step Accuracy	The subject's ability to follow the eating sequence: holding, scooping, feeding, and placing the utensil.	1. Correct sequence2. Incorrect/skipped steps

No	Measurement Component	Achievement Indicators	Scoring Criteria
2	Independence Level	The reduction in the frequency of assistance provided by the educator during the eating process.	1. Independent (No prompts)2. Visual/Verbal Prompting3. Physical Prompting (Hand-over-hand)
3	Duration	The efficiency of time required by the subject to complete a single meal activity.	Calculation of total time (minutes/seconds) per session.
4	Visual Attention	The subject's consistency in looking at and attending to the visual schedule board before acting.	1. Focused on the schedule2. Ignored the schedule

Data Analysis

The data analysis technique used is visual inspection of graphic formats. This analysis process encompasses two primary levels: within-phase analysis and between-phase analysis. The researcher calculated the percentage of the subject's independence in each session to determine the trend, data stability, and level of behavioral change. The effectiveness of the visual schedule media was assessed based on the magnitude of the increase in the mean independence score from the baseline phase to the intervention phase, as well as the subject's consistency in maintaining those skills during the second baseline phase.

3. RESULTS

Quantitative Data Summary of Subject's Independence

The table below summarizes the quantitative data obtained from the three research phases (A1-B-A2). This data encompasses score ranges, means, and stability trends, demonstrating the numerical effectiveness of the intervention.

Table 1: Summary of Spoon-Feeding Independence Percentage Across Phases

Research Phase	Number of Sessions	Score Range (%)	Mean Score (%)	Trend Direction	Stability
Baseline 1 (A1)	4	35% – 35%	35%	Zero Trend	Stable (100%)
Intervention (B)	9	10% – 90%	78%	Increasing (+)	Variable to Stable
Baseline 2 (A2)	5	74% – 80%	74%	Decreasing to Level	Stable (80%)

Visual Analysis of Independence Level in Spoon-Feeding

The primary focus of this study was to evaluate the effectiveness of a visual schedule intervention on the ability of a 7-year-old child with autism to use a spoon independently. Data were collected over consecutive sessions following the A-B-A Single Subject Research (SSR) design, measuring the Percentage of Independence (%) per session.

Visual inspection of the graphed data reveals a functional relationship between the introduction of the visual schedule and the immediate increase in the subject's ability to perform the target behavior without prompting. The data paths are illustrated in Figure 1.

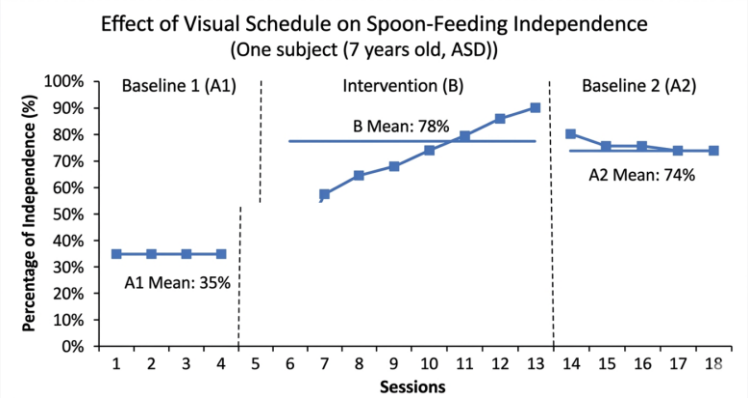

Figure 2. The Percentage of Independent Eating (Spoon-Feeding) for Subject A Across A-B-A Phases

Detailed Analysis of Data Trends and Level Changes

The detailed quantitative analysis derived from the visual data presented in Figure 1, which corresponds to the averages reported in the abstract, is summarized as follows:

Baseline 1 Phase (A1): In this initial phase, the subject was observed in his natural eating condition without any visual support. The level of independence remained low and stable, with a mean average score of 35%. During these sessions (Sessions 1–4), the subject exhibited a high level of dependence on continuous physical and verbal prompting to complete the spoon-feeding process, often failing to maintain focus.

Intervention Phase (B): Immediately following the introduction of the visual schedule, there was a sharp, rapid, and positive level change. The data path shows an immediate spike in independence, labeled 'B' in Figure 1. Throughout the intervention sessions (Sessions 5–13), the subject showed marked improvement, labeled with a mean average score of 78%. Observations noted a significant reduction in the frequency and intensity of physical prompts as the subject learned to attend to and follow the visual steps.

Baseline 2 (Maintenance) Phase (A2): After the intervention was withdrawn in Session 14, the subject's ability to use a spoon independently did not regress to baseline A1 levels. Although there was a minimal immediate level decrease, the behavior stabilized at a high level. The mean average score during phase A2 was 74%. This stable data trend

(Sessions 14–18), which remains within the higher range achieved during the intervention, demonstrates successful maintenance of the target behavior. The child internalizes the visual schedule structure and continues to function with high independence even after the physical schedule is removed.

4. DISCUSSION

The significant increase in the average percentage of independence, rising from 35% in the baseline phase to 78% during the intervention phase, demonstrates that visual schedule media is a highly effective instrument for bridging cognitive barriers in children with autism. This finding reinforces the theory that individuals with autism possess stronger information processing capabilities through visual pathways compared to transient verbal instructions (Mesibov & Shea, 2010). When the subject is provided with concrete pictorial representations of the steps involved in using a spoon, the cognitive load required to remember the sequence of activities is drastically reduced (Hume et al., 2014). This reduction allows the subject to focus more intensely on the fine motor coordination necessary to scoop food without the confusion of determining the next stage. Such success also indicates that visual structures are capable of transforming an unpredictable environment into an ordered one for the child. Thus, a visual schedule functions not only as a mnemonic aid but also as a compensatory strategy for the functional communication deficits experienced by the subject (Knight et al., 2015).

Analysis of the second baseline phase (A2) data, which remained stable at 74%, provides strong evidence of skill retention or maintenance in the subject. Even after the visual schedule board was withdrawn, the subject was able to maintain most of the spoon-using skills acquired during the intervention. This suggests that the consistent use of visual media over a four-week period facilitated the internalization of motor schemas into the subject's long-term memory (Waters et al., 2006). A slight decrease from 78% to 74% is a common phenomenon in SSR designs, yet this figure remains significantly higher than the initial capability in phase A1. This successful retention indicates that the subject has developed an independence that no longer relies entirely on external stimuli (Bryan & Gast, 2000). Such a pattern confirms that systematically structured visual interventions can produce lasting and sustainable behavioral changes (Tanner et al., 2015).

One of the key factors supporting the success of this intervention is the ability of the visual schedule to lower the subject's anxiety levels during mealtime. Children with autism often exhibit resistant behaviors or tantrums when they do not understand environmental expectations or feel overwhelmed by complex motor tasks (Wheeler, 2010). With clear visual guidance, the subject feels more secure because he knows exactly the beginning and end of the task to be completed. The reduction in physical prompting behaviors during the intervention sessions was directly proportional to the subject's increased emotional calmness at the table. When anxiety is reduced, the subject can direct his mental energy toward coordinating hand and mouth movements with greater precision (Jasmin et al., 2009).

Therefore, the visual schedule plays a dual role as both a pedagogical aid and an emotional regulation instrument for children with autism spectrum disorder (Khowaja & Westerveld, 2020).

The link between visual attention and fine motor execution is another crucial aspect identified in the discussion of these results. Using a spoon requires complex hand-eye coordination, where the subject must simultaneously monitor the spoon's position relative to the plate and his mouth. Visual media helps the subject maintain focus on physical objects (the spoon and food) by providing a visual anchor in the form of steps to follow (Rao & Gagie, 2006). Prior to the intervention, the subject's attention was easily diverted by environmental stimuli; however, during phase B, the subject was observed referring to the schedule board more frequently before taking action. This increase in attention duration provides the subject with the opportunity to perform motor repetitions correctly and consistently. This aligns with the principle that learning adaptive skills in children with special needs requires sensory support tailored to their learning profile (Ismael et al., 2018).

The effectiveness of this intervention is also evident in the efficiency of spoon-feeding duration achieved by the subject at the end of the study. Before the intervention, the subject spent a considerable amount of time on a single bite due to frequent pauses or unnecessary movements. Following the implementation of the visual schedule, an automation of steps occurred, making the flow of eating activities more structured and fluid. The subject's speed in finishing meals increased not because he was rushing, but because the hesitation at each transition between steps had vanished (Waters et al., 2006). This ability to conserve cognitive energy through visual structure allows the subject to complete tasks with a lower level of fatigue. This is a vital achievement in self-care training, where time efficiency also serves as an indicator of a child's functional maturity (Tanner et al., 2015).

The implementation of this intervention carries significant practical implications for educators in inclusive education institutions. Often, shadow teachers provide physical assistance (hand-over-hand) too quickly due to time constraints or a lack of supporting media in the classroom. This study proves that by providing a visual schedule, teachers can gradually reduce direct assistance and allow the child space to try independently. The use of structured observation instruments in this study also helps teachers monitor the child's progress objectively based on data rather than mere assumptions (Knight et al., 2015). A strategy for fading or gradually reducing visual support in the future can be better planned thanks to the stability data in phase A2. Consequently, inclusive schools should consider integrating visual-based media into every daily life skills curriculum (Mesibov & Shea, 2010).

The use of visual schedule media has been empirically proven to significantly improve the spoon-using abilities of children with autism. This success is not limited to achieving high independence scores but also includes stable skill internalization and improved behavioral regulation. These results contribute to special education literature regarding the importance of teaching methods that respect a child's neurobiological diversity. The researchers suggest that parents and practitioners replicate the use of these visual schedules in the home environment to strengthen skill generalization. Consistency between school and home in

applying visual structures will accelerate the achievement of full independence for children with autism (Hume et al., 2014). With the mastery of eating skills, the subject now possesses better basic modalities to participate in broader social interactions at the dining table (Khowaja & Westerveld, 2020).

5. CONCLUSION

Based on the data analysis and discussion, it can be concluded that the use of visual schedule media is significantly effective in improving the spoon-feeding abilities of a 7-year-old child with autism. This effectiveness is demonstrated by a drastic increase in the subject's average independence score, rising from 35% in the initial baseline phase (A1) to 78% during the intervention phase (B). The utilization of image-based instructions successfully compensated for the subject's difficulties in processing verbal directions and motor coordination, thereby transforming the pattern of dependence on direct physical assistance into a more measurable level of independence.

This study also proves that the skills acquired by the subject possess a strong retention rate, where the independence score remained stable at 74% even after the intervention was withdrawn (phase A2). This indicates that the consistent visual structure helped the subject internalize the sequence of eating activities into long-term memory and reduced anxiety through more predictable situations. As a practical implication, educators and parents are encouraged to integrate visual-based approaches into self-care curricula to support the sustainable functional independence of children with autism, both at school and at home.

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