

The Effectiveness of Therapeutic Intervention in Improving Visual Perception Skills in A Child with A Learning Disability: A Case Study

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Abstract

This study aimed to examine the effectiveness of therapeutic intervention in the development of visual perception skills in a child with a learning disability. The study employed a qualitative approach using a case study design. The participant was a seven-year-and-ten-month-old boy who had been professionally diagnosed with a learning disability and had consistently undergone occupational therapy and 3M therapy (reading, writing, and numeracy) since December 2023 at Pusat Terapi Mentari, Selangor. Data were obtained primarily from therapy reports and video recordings of intervention sessions, while the data were analyzed thematically with the support of data triangulation. A comparison of development across the early intervention phase in 2023, the middle phase in 2024, and the most recent phase in 2025 showed improvements in several key domains, including visual discrimination, visual-motor coordination, copying skills, attention, and problem-solving ability. Attention span increased from less than three minutes to more than 10 minutes, while puzzle-solving ability improved from four pieces to 20–30 pieces. However, eye tracking and form constancy remained significant challenges. The findings indicate that structured, consistent, and repetitive intervention incorporating verbal instructions, visual demonstrations, and manipulative activities may support the development of visual and learning-related skills. Nevertheless, the findings from this single-case study should be interpreted with caution and cannot be generalized to all children with learning disabilities..

Keywords: therapeutic effectiveness, learning disability, visual perception, visual-motor coordination, case study

1. Introduction

Therapeutic intervention (Carvalho, 2016) is an important form of support for children with learning disabilities, particularly when learning difficulties are associated with visual processing, motor coordination, attention, and task performance. These skills are related to learning processes because children need to receive, retain, and use information effectively while completing a task (Atkinson & Shiffrin, 1968; Piaget, 1952). In early learning contexts, children need not only to recognize symbols and shapes but also to sustain attention, track information sequentially, copy forms, and integrate visual information with motor movement. Visual perception is an important aspect of children's academic and

daily functional development. The ability to discriminate shapes and symbols, sustain visual attention, track information, and coordinate visual input with motor movement is required for a range of learning tasks. Difficulties in these areas may create challenges in activities such as copying, drawing, reading, arranging objects, and completing tasks that require visual processing. According to Yang and Chang (2024), activities featuring continuous hands-on interaction and progressive visual manipulation provide essential scaffolding to enhance children's visual processing skills.

In this context, therapeutic intervention implemented in a structured, consistent, and repetitive manner may support the development of visual and motor skills. Activities such as puzzles, shape matching, block play, copying shapes, drawing along lines, and manipulative tasks provide opportunities for children to strengthen skills progressively. Learning approaches that use concrete experiences and developmentally appropriate activities may also help children build skills through exploration and repetition (Piaget, 1952). In addition, systematic visual-motor training may support the coordination required for learning tasks, which in turn enhances essential academic skills such as reading and mathematics (Cho et al., 2022). The use of verbal instructions accompanied by visual demonstrations is also relevant to intervention delivery. Dual Coding Theory proposes that information can be supported through the combined use of verbal and visual representations (Paivio, 1986). In therapy, verbal instructions accompanied by visual examples, picture-based materials, and manipulative activities provide children with more than one form of stimulus. This approach is also consistent with principles of cognitive load management, whereby clear and organized information can help individuals focus attention on relevant information during learning (Mayer & Moreno, 2003).

This study specifically focused on the effectiveness of therapeutic intervention based on the development of a child with a learning disability who received therapy consistently. The study materials indicated that, during the early phase, the participant experienced difficulties in visual discrimination, eye tracking, visual-motor coordination, and form constancy. The participant also demonstrated a very short attention span and required a high level of assistance when completing tasks. Therapy records were subsequently used to examine changes in the participant's skills throughout the intervention period. Observing these changes is important because child development occurs progressively and may be influenced by learning experiences, the environment, and processes of observation and imitation (Bandura, 1977). Accordingly, this study aimed to analyze the effectiveness of therapeutic intervention on the development of the participant's visual perception skills, identify changes in the participant's skills across the early, middle, and most recent intervention phases, and identify skill domains that showed improvement as well as domains that continued to require further intervention.

Focusing on these three aspects provides a more comprehensive picture of the participant's development throughout the intervention period, particularly because changes in skills may not occur uniformly across domains. Progressive assessment also allows functional changes to be examined within the context of intervention delivered over time (Creswell, 2014). Assessment of therapeutic effectiveness in this study was not based solely on the participant's final achievement but also considered patterns of change over time. Some skills may show substantial improvement, whereas particular domains may continue to require support and ongoing intervention. Therefore, examining development progressively can help identify strengths, needs, and areas requiring attention in subsequent intervention planning. This

approach also enables findings from therapy reports and observations of intervention sessions to be examined systematically in understanding changes in the participant (Creswell, 2014).

2. Methodology

This study employed a qualitative approach using a case study design. This design was selected because the study aimed to gain an in-depth understanding of the changes and therapeutic experiences within a real-world context. The study was conducted at Pusat Terapi Mentari, Bandar Saujana Putra, Jenjarom, Selangor. The participant was a seven-year-and-ten-month-old boy who had been professionally diagnosed with a learning disability. The participant had consistently received occupational therapy and 3M therapy since December 2023. Data were obtained from therapy reports and video recordings of intervention sessions. Therapy reports were used to identify development, intervention strategies, and outcomes, while video recordings were used to examine behavior, responses, interaction with the therapist, and task performance.

Data were analyzed thematically. The process involved data transcription, coding, theme development, and triangulation. The main codes included therapy challenges, intervention strategies, and therapeutic effectiveness. Triangulation was conducted by comparing information from the available data sources to develop a more comprehensive picture of changes in the participant. Therapy records collected since December 2023 served as an important source for examining development over time. From an ethical perspective, the original study stated that written consent was obtained, privacy and confidentiality were protected, and the participant was free to discontinue participation if uncomfortable. Because the participant was the researcher's own child, the potential for researcher bias was acknowledged as an important limitation of the study.

3. Results and discussion

The analysis indicated positive development in several skills following continued intervention. The main comparison is summarized as follows:

Domain	2023 – Early Phase	2024 – Middle Phase	2025 – Most Recent Phase
Motor planning	Very weak	Began to follow modeled movements	Moderate; required verbal prompts
Eye-hand coordination	Weak	Moderate with assistance	Moderate and stable for basic tasks
Fine motor	Weak	Moderate	Good
Copying task	Unable	Able to copy basic lines	Able with verbal cues
Attention span	< 3 minutes	5–8 minutes	> 10 minutes
Problem solving	4-piece puzzle	20 pieces	20–30 pieces
Visual discrimination	Weak	Improved	Good/stable

Eye tracking	Not yet stable	Still showed difficulty	Still weak
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3.1 Effectiveness in Visual Discrimination

During the early phase, the participant showed difficulty identifying similar shapes and symbols, including confusion between certain letters and numbers. Following intervention, the ability to discriminate objects and shapes improved. In 2024, the improvement became more evident when the participant received direct guidance and additional visual materials such as flashcards and visual games. By 2025, the participant demonstrated more stable ability to recognize letters and discriminate symbols. This change suggests that consistent training may help the participant develop visual discrimination skills. However, the finding should be understood as development within an individual case rather than evidence that all children would respond to intervention in the same way.

3.1 Effectiveness in Visual-Motor Coordination

At the beginning of the intervention, the participant was unable to copy basic shapes effectively. The difficulties involved hand control and the ability to translate visual information into motor movement. In 2024, the participant began to copy lines and basic shapes when provided with guides and step-by-step instructions. By 2025, the skill had developed to copying more complex forms, including three-dimensional objects, although verbal cues were still required for certain tasks. The findings indicated progressive improvement in visual-motor coordination. Manipulative activities, shape-copying tasks, block play, and tasks combining visual information with movement were among the strategies used during intervention. This improvement is important because visual-motor coordination is related to writing, drawing, and tasks requiring hand use based on visual information.

3.2 Effectiveness in Attention and Task Tolerance

The most notable change was observed in attention span. In 2023, the participant could sustain attention for less than three minutes during visual or manipulative tasks. In 2024, this increased to approximately five to eight minutes. By 2025, the participant was able to sustain attention for more than 10 minutes, particularly during activities such as drawing, block arrangement, memory matching, and tangram. The increase in attention suggests that structured and repetitive intervention may have helped the participant develop greater task tolerance. Game-based activities also provided more meaningful stimulation, thereby helping maintain engagement in activities.

3.3 Domains Requiring Continued Intervention

Although positive development was observed, eye tracking and form constancy remained major challenges. Video recordings showed irregular eye movements, a tendency to skip or repeat lines while reading, and visual fatigue during prolonged tasks. Form constancy also remained weak when shapes or letters were presented in different sizes, orientations, or print forms. This indicates that therapeutic effectiveness was not uniform across all domains. Improvement in visual discrimination, visual-motor coordination, and

attention did not automatically result in mastery of eye tracking and form constancy. Therefore, intervention should continue to be adapted according to domains that remain weak.

3.4 Effectiveness in Self-Confidence and Communication

Changes were also observed in self-confidence and social interaction. At the initial stage, the participant was more withdrawn, made less eye contact, and communicated less spontaneously. After receiving therapy regularly, the participant showed greater willingness to participate in activities, respond to greetings, and attempt new tasks when encouraged. At the same time, the participant still required encouragement to increase confidence in certain situations. This change suggests that intervention involving therapist interaction and structured play activities may have had a positive effect on social engagement. However, social changes cannot be attributed to a single therapy component because child development is also influenced by other experiences and environmental factors.

4. Conclusions

This study indicates that therapeutic intervention implemented consistently, structurally, and progressively was associated with positive development in several skills in a child with a learning disability. Improvements were observed in visual discrimination, visual-motor coordination, copying skills, attention, problem solving, and self-confidence. Attention span increased from less than three minutes to more than 10 minutes, while puzzle-solving ability increased from four pieces to 20–30 pieces. However, eye tracking and form constancy remained major challenges. These findings indicate that therapeutic intervention should be evaluated on a domain-specific basis and tailored to the individual needs of the child. Overall, the study highlights the importance of continued therapeutic intervention and collaboration among therapists, teachers, and parents in supporting the development of children with learning disabilities.

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