JURNAL ILMIAH KEPERAWATAN
SCIENTIFIC JOURNAL OF NURSING
P-ISSN: 2477-4391
E-ISSN: 2528-3022
VOLUME 11 NOMOR 2
JUNI 2026

PENGARUH TERAPI BERMAIN KOGNITIF (COGNITIVE PLAY THERAPY/CPT) TERHADAP PENINGKATAN MEMORI JANGKA PENDEK PADA ANAK USIA SEKOLAH

The Effect of Cognitive Play Therapy (CPT) on Improving Short-Term Memory in School-Aged Children

Siti Fadmina Nur Permata, Ema Hikmah, Endang Suartini, Cucuk Kunang Sari

Program Studi Keperawatan, Poltekkes Kemenkes Banten, Tangerang, Indonesia

Riwayat artikel
Diajukan: 17 Juni 2026
Diterima: 05 Juli 2026

Penulis Korespondensi:
- Siti Fadmina Nur Permata
- Program Studi Keperawatan, Poltekkes Kemenkes Banten, Tangerang, Indonesia
- email: fadmiinapermata@gmail.com

Kata Kunci:
Cognitive Play Therapy; Cognitive stimulation; Play therapy; School-aged children; Short-term memory

ABSTRAK

Memori jangka pendek berperan penting dalam proses belajar anak usia sekolah karena memungkinkan penyimpanan dan pemrosesan informasi secara sementara. Keterbatasan kapasitas memori jangka pendek dapat memengaruhi konsentrasi, pemahaman, dan prestasi akademik. Terapi Bermain Kognitif (*Cognitive Play Therapy*/CPT) merupakan intervensi berbasis bermain terstruktur yang dirancang untuk menstimulasi fungsi kognitif. Penelitian ini bertujuan menganalisis pengaruh Terapi Bermain Kognitif terhadap peningkatan memori jangka pendek pada anak usia sekolah di SD Negeri Sepang, Kota Serang. Penelitian kuantitatif ini menggunakan desain kuasi-eksperimen dengan rancangan *one-group pretest-posttest*. Sampel terdiri atas anak usia sekolah yang dipilih menggunakan teknik *purposive sampling*. Memori jangka pendek diukur menggunakan *Digit Span Test* sebelum dan sesudah pemberian tiga sesi Terapi Bermain Kognitif. Data dianalisis menggunakan Uji Wilcoxon Signed Rank. Hasil penelitian menunjukkan bahwa Terapi Bermain Kognitif meningkatkan memori jangka pendek secara konsisten pada seluruh responden dan menunjukkan perbedaan yang bermakna antara sebelum dan sesudah intervensi. Terapi Bermain Kognitif efektif meningkatkan memori jangka pendek pada anak usia sekolah. Intervensi ini dapat direkomendasikan sebagai strategi stimulasi kognitif oleh perawat kesehatan masyarakat, perawat sekolah, dan perawat anak untuk mendukung proses pembelajaran di sekolah dasar.

ABSTRACT

Short-term memory plays a crucial role in the learning process of school-aged children by enabling the temporary storage and processing of information. Limited short-term memory capacity may adversely affect concentration, comprehension, and academic achievement. Cognitive Play Therapy (CPT) is a structured play-based intervention designed to stimulate cognitive functioning. This study aimed to examine the effect of Cognitive Play Therapy on improving short-term memory among school-aged children at SD Negeri Sepang, Serang City. This quantitative study employed a quasi-experimental design using a one-group pretest–posttest approach. Participants were selected through purposive sampling. Short-term memory was assessed using the Digit Span Test before and after three sessions of Cognitive Play Therapy. Data were analyzed using the Wilcoxon Signed-Rank Test. The findings demonstrated that Cognitive Play Therapy consistently improved short-term memory in all participants and produced a statistically significant difference between the pre-intervention and post-intervention assessments. Cognitive Play Therapy was effective in enhancing short-term memory among school-aged children. This intervention may be recommended as a cognitive stimulation strategy for community health nurses, school nurses, and pediatric nurses to support learning in elementary school settings.

https://doi.org/10.2865/jikep.v11i3.3232

INTRODUCTION

The school-age period (6–12 years) represents a critical phase in cognitive development, characterized by improvements in logical thinking (Zakiyah et al., 2024), problem-solving, attention, and memory, which serve as the foundation for academic success. One cognitive function that significantly determines students' learning achievement is short-term memory (Baddeley, 2000). This ability functions as a temporary storage system for newly received information, lasting from several seconds to one minute before further processing (Mursyidah, 2025). Short-term memory is crucial for daily learning activities, such as understanding teacher instructions, reading lengthy texts, performing calculations, and maintaining concentration (Alloway & Alloway, 2016). Limitations in short-term memory capacity can lead to difficulties in absorbing material, being easily forgetful, and experiencing decreased academic performance (Almigo & Sonda, 2025). Globally, the World Health Organization reports that 1 in 6 school-aged children experience neurodevelopmental disorders, including impairments in cognitive development and memory function (World Health Organization, 2023). In Southeast Asia, similar issues of developmental delay are also reported to impact low learning capacity. At the national level, the Indonesian Ministry of Health emphasizes the importance of strengthening early cognitive stimulation (Kemenkes RI, 2023). More specifically, in Banten Province, variations in children's cognitive development suggest a high urgency for interventions and the utilization of relevant cognitive stimulation in elementary school settings (Kaduson, 2015).

Based on a preliminary study at SD Negeri Sepang, Serang City, field observations revealed that several students experienced difficulty remembering instructions, easily forgot lesson explanations, and required repetition of instructions to complete tasks effectively (Winarsih et al., 2021). Unfortunately, current strategies for developing memory function in schools remain limited to conventional methods relying on rote memorization and traditional material repetition (Conroy & Perryman, 2022). This monotonous, structured approach positions students as passive recipients, thereby risking decreased motivation and active engagement (Elmanora et al., 2017). Therefore, interactive and educational alternatives are needed that align with the concrete operational stage of school-aged children, where they can learn more optimally through direct, concrete, and enjoyable experiences (Hasanah & Purnama, 2024). One relevant non-pharmacological intervention is Cognitive Play Therapy (CPT). CPT is a structured play therapy that integrates the enjoyment of play activities with directed cognitive exercises to train attention, concentration, repetition, and information retrieval. Previous research by Shams et al. (2024), Ryu and Kim (2022a), and Putri and Handayani (2023) has demonstrated that cognitive-based play interventions are effective in strengthening executive function, attention, and short-term memory in children compared to conventional methods.

Despite the growing body of evidence supporting the effectiveness of CPT internationally, significant research gaps remain that justify the urgency of this study. First, most experimental studies on CPT have been conducted in developed countries (Shams et al., 2024; Ryu & Kim, 2022a) with distinct cultural, educational, and socioeconomic contexts, making their findings potentially inapplicable to the Indonesian setting where learning culture, classroom dynamics, and cognitive developmental patterns may differ substantially. Second, empirical studies specifically examining the effect of CPT on improving short-term memory in public elementary school children in Indonesia remain very limited, as the majority of previous research has focused more on play therapy in the emotional, anxiety, or social-behavioral domains (Damayanti & Marpaung, 2025) while cognitive-specific play interventions have received considerably less attention. Third, direct testing using objective cognitive instruments such as the Digit Span Test to measure short-term memory capacity is still rarely applied at the public elementary school level, including in the Serang City area (Lestari et al., 2026), with most existing studies relying on subjective observations rather than standardized quantitative measurements. Fourth, there is a notable absence of evidence-based,

structured cognitive stimulation protocols that can be easily implemented by teachers, nurses, and parents in Indonesian elementary school settings without requiring expensive resources or specialized training. This study is crucial to conduct now because early intervention during the concrete operational stage (ages 6–12) can produce maximum long-term cognitive benefits (Piaget, 1950), and without evidence-based interventions adapted to local contexts, children at risk of cognitive developmental delays may experience persistent academic difficulties that could have been prevented.

This research makes a distinctive and significant contribution to the development of nursing science and clinical nursing practice. From the perspective of nursing science development, this study expands the evidence base regarding non-pharmacological cognitive interventions within pediatric nursing, community health nursing, and school nursing, enriching nursing theory in child cognitive health promotion by providing empirical evidence that structured play can function as a direct cognitive intervention rather than merely a psychosocial therapeutic tool. For clinical nursing practice, CPT offers a practical, accessible, and cost-effective intervention that can be seamlessly integrated into various nursing settings: school nurses can incorporate CPT into school health programs (UKS) to support students experiencing learning difficulties; community health nurses can utilize CPT as part of health promotion programs at primary health care facilities (Puskesmas) and provide training to parents and teachers; pediatric nurses can integrate CPT into the care of children with neurodevelopmental disorders or a history of stunting; mental health nurses can incorporate CPT as a complementary therapeutic modality; and home care nurses can guide parents in implementing CPT as daily home-based stimulation. Regarding nursing intervention development, this study establishes that CPT can be operationalized as a standardized nursing intervention with clear protocols, measurable outcomes (using the Digit Span Test), and evidence of effectiveness, positioning CPT for inclusion in the Nursing Intervention Classification (NIC) system. For nursing education and health promotion, the findings can serve as educational content for nursing students and practicing nurses, and the CPT model can be disseminated through training modules, workshops, and practical guidelines accessible to teachers, parents, and child care providers. From a health policy perspective, the results can support the development of evidence-based policies for integrating early cognitive stimulation programs into the school health service system in Indonesia, aligning with the Indonesian Ministry of Health's priority to strengthen early cognitive stimulation (Kemenkes RI, 2023).

The novelty of this study lies in the application of Cognitive Play Therapy as a directed cognitive stimulation method specifically targeting short-term memory in Indonesian public elementary school children, relying on an objective quantitative parameter, namely the Digit Span Test, to measure changes in memory capacity. Unlike previous studies that primarily examined play therapy for emotional or behavioral issues, this study specifically focuses on cognitive outcomes using a standardized, validated instrument. The structured CPT protocol developed for this research is designed to be easily replicable by teachers, school nurses, and parents without requiring expensive materials or specialized training, addressing the practical gap in accessible cognitive interventions in Indonesian schools. Furthermore, this study contributes to the limited body of knowledge on cognitive stimulation strategies appropriate for the concrete operational stage of development in the Indonesian cultural context. The use of a quasi-experimental design with objective pre- and post-intervention measurements provides robust empirical evidence that can inform evidence-based practice in nursing and education. By focusing on a public elementary school in Serang City, Banten Province, this research addresses a specific geographic and demographic context that has been underrepresented in previous cognitive intervention studies.

Based on the background, identified gaps, and the potential contributions described above, this study aims to analyze the effect of Cognitive Play Therapy (CPT) on improving short-term memory in school-aged children at SD Negeri Sepang, Serang City. Specifically, this study seeks to: (1) measure the short-term memory scores of school-aged children before

the administration of Cognitive Play Therapy (pretest) using the Digit Span Test; (2) measure the short-term memory scores of school-aged children after the administration of Cognitive Play Therapy (posttest) using the Digit Span Test; (3) analyze and compare the differences in short-term memory scores before and after the administration of Cognitive Play Therapy to determine the statistical significance of any changes; (4) provide empirical evidence regarding the effectiveness of CPT as a cognitive stimulation intervention for school-aged children in the Indonesian elementary school context; and (5) develop recommendations for the integration of CPT into nursing practice, particularly in school nursing, community health nursing, and pediatric nursing settings, thereby contributing to improved cognitive outcomes and academic success for school-aged children in Indonesia.

METHOD

Research Design

This study employed a quantitative approach with a quasi-experimental one-group pretest-posttest design to determine the effect of Cognitive Play Therapy on improving short-term memory in school-aged children through measurements before (pretest) and after (posttest) the intervention, where all respondents received the same treatment without a control group, allowing changes to be observed by comparing pretest and posttest scores. This design was selected based on the research objective to evaluate intervention effectiveness in a school setting with limitations in randomization and control group formation (Ryu & Kim, 2022b), and can be illustrated as $O_1 \rightarrow X \rightarrow O_2$, where O_1 is short-term memory measurement before intervention (pretest), X is administration of Cognitive Play Therapy, and O_2 is short-term memory measurement after intervention (posttest). The one-group pretest-posttest design was chosen because it allows researchers to measure changes in short-term memory ability before and after administering CPT, enabling objective analysis of the intervention's effect while accommodating the practical constraints of conducting research in a natural school setting where randomization and control group formation are challenging to implement.

Setting and Time

This research was conducted at SD Negeri Sepang, Serang City, Banten Province, Indonesia, a public elementary school located in an urban area with relatively homogeneous socioeconomic and educational backgrounds, during the 2026 academic year. The data collection was carried out over a period of four weeks, with the pretest administered in the first week, followed by three sessions of Cognitive Play Therapy intervention conducted over two weeks (two sessions in the first week and one session in the second week), and the posttest conducted in the fourth week. All measurement and intervention activities were carried out in a quiet classroom specifically prepared for the research to minimize external distractions and ensure optimal concentration for the participants, and the research activities were scheduled during school hours with coordination and permission from the school principal and classroom teachers to avoid disruption of regular learning activities.

Participants and Sampling Technique

The study population was all fourth-grade students at SD Negeri Sepang who met the research criteria, with fourth grade selected based on the cognitive development characteristics of school-aged children who are in the concrete operational stage (ages 7–11 years), enabling them to optimally follow game instructions and memory measurement processes (Rohmah, 2025). The sample consisted of 30 students selected using purposive sampling technique, where researchers set specific criteria that respondents had to meet to align with the research objectives. The sample size was calculated using the Slovin formula: $n = N / (1 + N \times e^2) = 38 / (1 + 38 \times 0.10^2) = 27.54 \approx 28$ students, and to anticipate potential dropout, researchers added 10%, resulting in a final sample of 30 students. The inclusion criteria were: (1) fourth-grade students at SD Negeri Sepang, (2) aged 9–11 years, (3) present during the research implementation, (4) able to follow game and measurement instructions, and (5) obtained permission from parents or guardians. The exclusion criteria were: (1) students who did not

participate in the entire research series (absent for more than one session), (2) students with diagnosed neurodevelopmental disorders or cognitive impairments that could affect their ability to follow the intervention, (3) students experiencing acute illness or conditions hindering intervention implementation, and (4) students whose parents or guardians withdrew consent during the research process. Respondent characteristics showed that the majority were aged 10 years (16 children, 53.3%), followed by 9 years (9 children, 30%) and 11 years (5 children, 16.7%), while based on gender, the majority were female (21 children, 70%) and male (9 children, 30%). All respondents came from public elementary schools with relatively homogeneous social backgrounds and educational environments. Before the research commenced, the researcher obtained permission from the school and conveyed information regarding the purpose, benefits, research procedures, and respondent rights to parents or guardians, with respondent participation being voluntary and conducted after obtaining informed consent from parents or guardians.

Instruments

Data collection used the Digit Span Test instrument to measure short-term memory ability in school-aged children, a commonly used instrument for measuring short-term memory and working memory capacity that measures an individual's ability to receive, store, and recall sequences of digits presented in a specific order (Wechsler, 2014). During test administration, the researcher read a series of digits to respondents with gradually increasing difficulty levels (starting from 2-digit sequences up to 9-digit sequences), and respondents were asked to repeat the digits heard according to the instructions given (Digit Span Forward), with scores determined based on the number of digit sequences successfully recalled and correctly repeated, where each correctly recalled sequence received a score of 1 with a maximum total score of 20, and the higher the score obtained, the better the short-term memory ability. In addition to the Digit Span Test, the researcher used observation sheets to ensure that all Cognitive Play Therapy procedures were consistently implemented in each intervention session, recording respondent engagement during activities and ensuring the therapy's implementation aligned with established procedures. The validity of the Digit Span Test instrument refers to the use of a standard instrument widely used in research and assessment of children's cognitive function, part of the intellectual ability measurement developed by Wechsler (2014) that has demonstrated good construct validity in measuring short-term memory capacity ($r = 0.60–0.80$), and content validity was established through expert review by two child psychologists and one pediatric nursing expert who confirmed that the instrument appropriately measures the construct of short-term memory in the target population, with the instrument having been widely used in Indonesian research settings with appropriate cultural adaptability. Instrument reliability was supported by using uniform administration procedures for all respondents, including standardized instruction delivery, consistent question sequence, fixed implementation time (approximately 10–15 minutes per test), and a standardized scoring system, implemented to minimize measurement bias and increase the consistency of obtained results (Sugiyono, 2019), with test-retest reliability reported with correlation coefficients ranging from $r = 0.70$ to 0.85 (Wechsler, 2014), and inter-rater reliability ensured by having the same researcher administer all pre- and post-tests, eliminating variability between different test administrators.

Cognitive Play Therapy Intervention Protocol

The Cognitive Play Therapy intervention consisted of three sessions (45 minutes each) conducted over two weeks, delivered through structured play activities designed to stimulate children's cognitive functions, particularly attention, concentration, memory ability, and information processing. Session 1 focused on Auditory Memory Training through the "Number Chain" activity, where children listened to number sequences (3–7 digits) and repeated them in sequence, encouraged to use repetition strategies (subvocal rehearsal). Session 2 focused on Visual Memory and Pattern Recognition through "Memory Card" activities (recalling objects

from picture cards shown for 5 seconds) and "Pattern Copy" (replicating colored block sequences from memory). Session 3 focused on Combined Auditory-Visual Memory through the "Story Chain" activity (recalling and retelling stories in sequence, adding elements each round) and the "Number Sequence Game" (integration of auditory and visual tasks with increasing complexity). Each session included: opening and warm-up (5 minutes), core game activities (30 minutes), and closing and reinforcement (10 minutes), with the researcher conducting observations to document participation levels and ensure all respondents followed activities according to the planned stages.

Data Collection Procedure

Data collection was conducted at SD Negeri Sepang, Serang City, after the researcher obtained permission from the school and consent from parents or guardians, following five stages. Stage 1 (Preparation, Week 1) included obtaining research permission from the school principal, providing information letters and informed consent forms to parents or guardians, conducting a briefing with teachers regarding the research schedule and activities, and preparing the research room and all equipment. Stage 2 (Pretest, Week 1) involved all respondents undergoing initial measurement using the Digit Span Test to determine short-term memory ability, conducted individually in a quiet room with the researcher reading standardized instructions ("I will read some numbers. Listen carefully and repeat them back to me in the same order"), digit sequences read at a rate of one digit per second, testing continuing until the child failed two consecutive sequences at the same digit length, with total testing time approximately 10–15 minutes per child. Stage 3 (Intervention, Weeks 2–3) involved respondents receiving the CPT intervention over three sessions, conducted in groups of 5–6 children to maintain engagement while ensuring individual attention, with the researcher implementing the CPT protocol with the assistance of two trained research assistants and documenting children's participation and engagement using the observation sheet. Stage 4 (Posttest, Week 4) involved respondents undergoing another measurement using the Digit Span Test with the same procedures as the pretest, conducted individually with the same conditions, ensuring all respondents were in good physical and emotional condition before the test. Stage 5 (Data Tabulation) involved all data being entered into a spreadsheet by two independent data entry personnel to verify accuracy, checked for completeness, outliers, and inconsistencies, with any missing or unclear data followed up by reviewing observation records.

Data Analysis

Data analysis was performed using IBM SPSS Statistics version 26, with the initial analysis stages including editing, coding, data entry, and data cleaning to ensure all obtained data were complete and suitable for analysis. Univariate analysis was conducted to describe respondent characteristics based on age and gender (Sugiyono, 2019), with categorical data presented as frequencies and percentages, while numerical data were presented as mean values, standard deviations, minimum values, and maximum values, with short-term memory scores from the Digit Span Test summarized using descriptive statistics (mean, median, standard deviation, minimum, maximum, and range) for both pretest and posttest measurements. Before hypothesis testing, pretest and posttest short-term memory score data were tested for normality using the Shapiro-Wilk test because the sample size was less than 50 respondents, with hypotheses H_0: data are normally distributed ($p > 0.05$) and H_1: data are not normally distributed ($p < 0.05$). Normality test results showed that the data were not normally distributed ($p < 0.05$), so analysis continued using nonparametric tests. The effect of Cognitive Play Therapy on improving short-term memory was analyzed using the Wilcoxon Signed Rank Test because the data consisted of two paired measurement groups from the same respondents, a nonparametric alternative to the paired t-test appropriate for ordinal data or continuous data that violate normality assumptions, working by ranking the magnitude of differences between paired measurements. The hypothesis tested was H_0 (Null Hypothesis): There is no significant difference between short-term memory scores before and after Cognitive Play Therapy (CPT has no effect), and H_1 (Alternative Hypothesis): There is a significant difference between short-

term memory scores before and after Cognitive Play Therapy (CPT has an effect). Statistical testing was conducted at a 95% confidence level with a significance level (α) of 0.05, with the research hypothesis accepted if the p-value was < 0.05. In addition to statistical significance, this study also considered the magnitude of the intervention effect by comparing mean pretest and posttest scores to provide an overview of the effectiveness of Cognitive Play Therapy in improving short-term memory in school-aged children (Yogman et al., 2018)

RESULT

This study aimed to analyze the effect of Cognitive Play Therapy (CPT) on improving short-term memory in school-aged children at SD Negeri Sepang, Serang City. Short-term memory was measured using the Digit Span Test before and after the CPT intervention. All measurement sequences were consistently administered to 30 respondents who met the study's inclusion criteria. The measurement process was conducted in a conducive environment free from external distractions so that the results obtained reflected the actual ability of each respondent.

Table 1. Distribution of Mean Digit Span Test Scores (Short-term Memory)

Variable	Group	Mean	SD	Min–Max
Short-term Memory	Before Intervention	4.57	0.728	3–6
Short-term Memory	After Intervention	19.53	0.571	18–20

Based on Table 1, the mean short-term memory score before receiving Cognitive Play Therapy was 4.57 (SD = 0.728), indicating that respondents' short-term memory capacity was in the low to lower-middle category. Following the intervention, the mean score increased substantially to 19.53 (SD = 0.571), representing a very large effect of CPT. The smaller standard deviation at posttest compared to pretest indicates that after the intervention, respondents' short-term memory abilities became more uniform, with all respondents achieving scores in the maximum range and no one scoring below 18.

To determine the significance of changes in short-term memory scores before and after the intervention, analysis was performed using the Wilcoxon Signed Rank Test. This test was selected based on normality test results showing that the data were not normally distributed ($p < 0.05$); therefore, this nonparametric test is most appropriate for comparing two paired groups of data from the same subjects.

Table 2. Results of the Wilcoxon Signed Rank Test

Category	N	Mean Rank	Sum of Ranks
Negative Ranks	0	0.00	0.00
Positive Ranks	30	15.50	465.00
Ties	0	–	–
Total	30	–	–

As shown in Table 2, all 30 respondents (100%) showed an improvement in short-term memory scores after receiving Cognitive Play Therapy, reflected by positive ranks = 30, while negative ranks = 0 and ties = 0, meaning that no child experienced a decrease or unchanged score after the intervention. The mean rank value of 15.50, which is exactly the midpoint of the 30 respondents, indicates that the distribution of score improvements was relatively even among all children. The sum of ranks of 465.00 represents the maximum possible value, further confirming the absence of negative or zero differences.

Table 3. Results of the Wilcoxon Signed Rank Test

Variable	Z-score	p-value
Short-term Memory Scores Before and After Cognitive Play Therapy (CPT)	-4.837	<0.001

Based on the Wilcoxon Signed Rank Test results in Table 3, a Z-value of -4.837 was obtained with a p-value < 0.001. The negative and large absolute Z-value indicates that the direction of change was consistently an improvement, and the magnitude shows that the difference between pretest and posttest was very large. The p-value of less than 0.001 indicates

a very statistically significant difference between short-term memory scores before and after receiving Cognitive Play Therapy, far below the established alpha threshold ($\alpha = 0.05$). Therefore, the null hypothesis (H_0) stating that there is no effect of Cognitive Play Therapy on short-term memory is rejected, and the alternative hypothesis (H_a) stating that there is a significant effect is accepted.

Cognitive Play Therapy has a significant effect on improving short-term memory in school-aged children at SD Negeri Sepang, Serang City. This finding is supported by three main pieces of evidence: (1) a very large mean score increase from 4.57 to 19.53; (2) improvement occurring in all 30 respondents (100% positive ranks) with no one experiencing a decrease or unchanged score; and (3) the results of the Wilcoxon Signed Rank Test with $Z = -4.837$ and p-value < 0.001

DISCUSSION

1. Effectiveness of CPT and the Theoretical Foundation of Working Memory

The significant improvement in short-term memory scores following Cognitive Play Therapy (CPT) demonstrates that structured, play-based cognitive interventions can produce substantial and meaningful changes in children's cognitive functioning. The increase in mean Digit Span Test scores from 4.57 (low category) to 19.53 (very high category), with all 30 respondents showing improvement and no ties or negative ranks, provides compelling evidence that CPT has consistent and reliable effectiveness as a cognitive stimulation method in elementary school children populations. The magnitude of the score increase (14.96 points or 327.5%) indicates that the intervention produced not only statistically significant changes but also clinically and educationally meaningful improvements, with memory capacity expanding from holding 3–6 digits to 18–20 digits an increase of 3–4 times from initial capacity.

Theoretically, these findings align with Baddeley's Working Memory Theory (Baddeley, 2000), which explains that short-term memory operates through the phonological loop for language and auditory information and the visuospatial sketchpad for visual and spatial information. The CPT intervention, involving games with oral instructions, active repetition, and information retrieval, provided very strong stimulation to both systems, thereby increasing their capacity after intensive training (Yogman et al., 2018). Furthermore, the central executive component in Baddeley's theory plays a role in directing attention and coordinating these two systems (Baddeley, 2012). CPT, which required children to focus on instructions and switch between tasks within games, indirectly trained central executive function as well. This finding is consistent with research by Diamond (2013), who confirmed that repeated practice on tasks involving the phonological loop and visuospatial sketchpad can significantly improve children's working memory capacity, especially when practice is provided in a fun, pressure-free context such as play. Cowan (2014) stated that short-term memory capacity is plastic and can be improved through appropriate interventions, and this study provides empirical evidence supporting that statement in the context of elementary school children in Indonesia.

2. Piaget's Theory, Alignment with Previous Research, and Practical Implications

Piaget's Theory of Cognitive Development states that school-aged children (6–12 years) are in the concrete operational stage, learning most optimally through direct experience, manipulation of physical objects, and enjoyable activities (Piaget, 1950). Therefore, CPT using concrete play media such as number cards and sequence games is very appropriate for facilitating encoding, storage, and retrieval processes more effectively compared to conventional methods such as rote memorization, which is abstract and passive (Ginsburg, 2007). The encoding process occurring in CPT was strengthened by spaced repetition integrated into each game session, where children were asked to recall information at increasingly longer time intervals a strategy scientifically proven to enhance long-term memory retention (Kang, 2016). The concrete nature of the play materials and the hands-on engagement required by CPT activities align perfectly with Piaget's assertion that children at

this developmental stage learn best through tangible, manipulative experiences rather than abstract verbal instruction alone.

These findings are consistent with recent international research by Shams et al. (2024), Ryu and Kim (2022a), and Putri and Handayani (2023), which demonstrated that cognitive-based play interventions effectively strengthen executive function, attention, and short-term memory in children compared to conventional methods. This study extends these findings by providing evidence from an Indonesian elementary school context, demonstrating that CPT's effectiveness transcends cultural and geographical boundaries. Furthermore, these findings reinforce the statement by Yogman et al. (2018) that structured play with specific cognitive targets provides a clear framework and immediate feedback, enhancing intrinsic motivation and cognitive engagement in children. Vygotsky's research on the zone of proximal development (ZPD) is also relevant for explaining CPT's effectiveness (Vygotsky, 1978). In each game session, the researcher acted as a facilitator providing adequate scaffolding, allowing children to complete tasks slightly above their ability level, thereby promoting cognitive development to a higher level. The progressive difficulty built into the CPT sessions starting with simpler memory tasks and advancing to more complex challenges ensured that each child was consistently working within their ZPD, maximizing learning potential.

3. Nursing Implications

The findings of this study have significant and concrete implications for nursing practice across various settings, particularly in pediatric nursing, community health nursing, school nursing, and nursing education.

For School Nursing Practice: School nurses can integrate CPT into school health programs (UKS) as a standardized cognitive stimulation intervention for students experiencing learning difficulties, concentration problems, or declining academic performance. The structured CPT protocol developed in this study provides school nurses with an evidence-based, cost-effective tool that can be implemented during school health services or as part of regular health promotion activities. School nurses can conduct initial cognitive screening using the Digit Span Test to identify students with low short-term memory capacity, then provide CPT as an early intervention strategy. This proactive approach aligns with the school health service's role in supporting students' holistic development and academic success.

For Community Health Nursing: Community health nurses at primary health care facilities (Puskesmas) can utilize CPT as part of child development screening and health promotion programs. They can provide training to parents, teachers, and community health workers on implementing CPT at home and in educational settings, reaching children who may not have access to specialized cognitive interventions. The simplicity and low-cost nature of CPT (using number cards and everyday objects) make it particularly suitable for community-based implementation, especially in resource-limited settings or remote areas where access to specialized cognitive services is limited.

For Pediatric Nursing: Pediatric nurses in hospitals and clinics can integrate CPT into the nursing care of children with neurodevelopmental disorders, a history of stunting, malnutrition, or other conditions affecting cognitive function. As a non-pharmacological adjunct therapy, CPT can complement existing medical treatments and support children's cognitive rehabilitation. Pediatric nurses can adapt the CPT protocol for use in inpatient settings, providing structured cognitive stimulation during hospitalization to maintain and improve cognitive function.

For Mental Health Nursing: Mental health nurses can incorporate CPT as a complementary therapeutic modality in child mental health nursing care, addressing cognitive aspects of various mental health conditions such as anxiety, depression, or trauma-related disorders, where attention and memory are often impaired.

For Home-Based Nursing and Family Empowerment: Home care nurses and community nurses can guide parents in implementing CPT as daily home-based stimulation, empowering families to actively participate in their children's cognitive development. Parents

can be trained to conduct simple memory games using household objects, making cognitive stimulation a natural part of daily routines.

For Nursing Education: The findings of this study can serve as educational content for nursing students in pediatric nursing, community health nursing, and child development courses. Nursing educators can incorporate CPT modules into nursing curricula, equipping future nurses with practical skills in cognitive assessment and stimulation. The CPT protocol developed in this study can be used as a teaching tool for clinical skills training.

For Health Policy and Program Development: The results support the integration of cognitive stimulation programs into the school health service system (UKS) in Indonesia and community-based child development programs. This aligns with the Indonesian Ministry of Health's priority to strengthen early cognitive stimulation (Kemenkes RI, 2023) and provides the empirical foundation needed to justify resource allocation, training programs, and policy development.

4. Study Limitations

This study has several limitations that should be acknowledged. First, the one-group pretest-posttest design without a control group cannot control external factors such as maturation, testing effects, or history factors. The absence of a control group means we cannot be absolutely certain that the improvement was solely due to CPT and not other factors such as exposure to the same test (practice effect) or natural cognitive development over time (Shadish et al., 2002). Second, the sample was limited to only 30 students from one public elementary school in Serang City with relatively homogeneous socioeconomic and cultural characteristics. These findings cannot yet be generalized to broader populations such as private schools, schools in rural areas, or schools with different ethnic and cultural backgrounds. Third, measurements focused only on short-term memory using the Digit Span Test (specifically Digit Span Forward), which measures only auditory verbal memory span, without measuring other cognitive function dimensions such as complex working memory, executive function, attention span, processing speed, or visual memory (Wechsler, 2014). Fourth, the absence of follow-up measurements after the intervention means we do not know whether the achieved improvements were permanent or temporary over time (Fuchs et al., 2017). Fifth, potential social desirability bias or the Hawthorne effect may have influenced children's performance during posttest measurements, as participants may have been motivated to perform better knowing they were being evaluated. Sixth, the study did not account for potential confounding variables such as baseline cognitive ability, nutritional status, sleep patterns, or home environment factors that could influence cognitive performance.

5. Suggestions for Future Research

Based on these limitations, several recommendations are proposed for future research. First, involve a control group with a randomized controlled trial (RCT) design to prove causality more strongly and control for confounding variables. Second, expand the scope of schools from various regions with different socioeconomic, geographic, and cultural characteristics to increase the generalizability of findings. Third, measure other cognitive executive functions such as working memory, attention, inhibitory control, and cognitive flexibility to obtain a more holistic picture of CPT's impact. Fourth, conduct follow-up tests at specific time intervals (1, 3, and 6 months post-intervention) to assess the sustainability of CPT effects and determine whether booster sessions are needed. Fifth, use qualitative or mixed-methods approaches to explore children's subjective experiences during CPT, factors influencing intervention success, and their perceptions of CPT's benefits in daily life at school and at home (Creswell & Poth, 2018). Sixth, examine the optimal dosage of CPT (number of sessions, frequency, duration) to determine the minimum effective intervention. Seventh, investigate the effectiveness of CPT in specific subgroups, such as children with learning disabilities, children with a history of stunting, or children from disadvantaged socioeconomic backgrounds. Eighth, develop and validate a CPT training module for nurses, teachers, and parents to standardize implementation across different settings.

CONCLUSION

This study successfully analyzed the effect of Cognitive Play Therapy (CPT) on improving short-term memory in school-aged children at SD Negeri Sepang, Serang City. The main finding confirms that CPT administered over three structured sessions significantly improves children's short-term memory ability, as evidenced by the substantial increase in Digit Span Test scores from pretest to posttest. The primary conclusion of this study is that play activities designed in a structured manner with specific cognitive targets are proven effective as a cognitive stimulation medium to optimize children's ability to remember, focus attention, and process information, particularly for children in the concrete operational stage of development.

This study makes an important contribution to nursing science and elementary education by providing empirical evidence that structured, play-based cognitive interventions can produce clinically meaningful improvements in children's cognitive function. The CPT approach demonstrates that learning methods tailored to children's developmental characteristics can create an active, enjoyable, and meaningful learning atmosphere while simultaneously supporting students' cognitive functions. The findings also contribute to the body of knowledge in pediatric nursing and community health nursing regarding non-pharmacological cognitive interventions that are accessible, cost-effective, and easily implemented in resource-limited settings.

Recommendation

Based on these results, specific recommendations are proposed as follows:

1. For Nursing Practice: School nurses are recommended to integrate CPT into school health programs (UKS) as a standardized cognitive screening and early intervention tool for students experiencing learning difficulties or concentration problems. Community health nurses should incorporate CPT into child development programs at primary health care facilities (Puskesmas) and provide training to parents, teachers, and community health workers to ensure wider accessibility of cognitive stimulation across various settings. Pediatric and mental health nurses are encouraged to utilize CPT as a non-pharmacological adjunct therapy in the care of children with neurodevelopmental disorders, stunting, or mental health conditions affecting cognitive function, while nursing educators should integrate CPT modules into nursing curricula to equip future nurses with practical cognitive assessment and stimulation skills.
2. For Families and Communities: Parents and families are encouraged to implement simple CPT-based activities at home using everyday objects such as number cards, picture cards, or household items, making cognitive stimulation an enjoyable and routine part of daily family interactions. Teachers and school personnel should incorporate cognitive-based play activities into classroom learning to create an active, engaging, and developmentally appropriate learning environment that supports children's cognitive development while maintaining academic motivation.
3. For Future Research: Future researchers are recommended to develop randomized controlled trial (RCT) designs with control groups to establish stronger causal evidence, expand sample sizes and include schools from various regions with different socioeconomic, geographic, and cultural characteristics to increase generalizability, and conduct follow-up measurements at specific time intervals (1, 3, and 6 months post-intervention) to assess the long-term sustainability of CPT effects. Additionally, future studies should examine the effectiveness of CPT in specific subgroups such as children with learning disabilities or children from disadvantaged socioeconomic backgrounds, and explore the optimal dosage of CPT (number of sessions, frequency, duration) to determine the minimum effective intervention protocol. These steps are essential to strengthen the evidence base, minimize external bias, and increase the generalizability of findings to broader populations and settings.

Acknowledgments
The authors express their utmost appreciation and gratitude to all parties who have contributed, assisted, and supported the completion of this research:

1. Hj. Yanti Sulistiawati, M.Pd., as the Principal of SD Negeri Sepang, Serang City, who granted research permission and provided full support during the data collection process at the school.
2. All fourth-grade students of SD Negeri Sepang, Serang City, who actively and enthusiastically participated as respondents in this study.
3. Colleagues, educational staff, and all parties who cannot be mentioned one by one, who provided technical assistance and encouragement during the research implementation. May the contributions and kindness given receive multiplied rewards from God Almighty.

Author contributions
SFNP: Conceptualization, methodology, formal analysis investigation, writing – original draft.
EH: Supervision, validation, writing – review & editing.
ES: Formal analysis, validation, writing – review & editing.
CKS: Validation, writing – review & editing.
Funding
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
Conflict of Interest
The authors declare no conflict of interest.
Ethics Statement
This study obtained ethical approval from the Health Research Ethics Committee of the Politeknik Kesehatan Kementerian Kesehatan Banten with approval number DP.03.04/F.XXII.25/00145/2026. Ethical approval was granted based on the assessment that the study met the ethical principles of health research according to WHO 2011 standards and CIOMS 2016 guidelines. Informed consent was obtained from the parents or guardians of all research participants before the study commenced. The confidentiality of respondent identities was maintained, and all data obtained were used solely for research purposes.

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