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Assessing the relationship between working memory and reading proficiency among kindergarten learners

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ABSTRACT

This study examined how working memory relates to reading proficiency among kindergarten learners in the District of Cordova, Division of Cebu Province, for the 2025–2026 school year. It focused on the connection between different parts of working memory, such as verbal, visual, and sequential, and key reading skills like letter recognition, word recognition, and reading comprehension. The study also considered learners' age, gender, parents' or guardians' occupations, and how often they are exposed to reading at home. The researchers developed an intervention plan based on the findings to support early literacy among young learners. The study used a quantitative-correlational design and involved kindergarten students from a public elementary school in the Cordova District, Division of Cebu Province. Data were gathered through questionnaires adapted from the Early Childhood Care Development Checklist and reading proficiency assessment tools. Most of the respondents were six years old, with an equal number of boys and girls. Many were exposed to reading activities at home only sometimes. Learners generally had strong working memory and showed reading proficiency. Working memory and reading proficiency were strongly and positively related. The study found that working memory is strongly and positively linked to reading proficiency among kindergarten learners, as shown by a significant correlation ($r = 0.769$, $p = 0.000$). Learners with higher working memory performed better in reading tasks, especially in letter recognition, word recognition, and reading comprehension. The study recommends implementing the proposed intervention plan to further improve working memory and reading proficiency, with a focus on word recognition and reading comprehension.

Keywords: Cordova District; early childhood; early literacy, kindergarten learner; reading proficiency; quantitative correlational.

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INTRODUCTION

Reading is a fundamental skill that significantly influences children's academic development, educational achievement, and capacity for lifelong learning. During kindergarten, children begin acquiring foundational literacy competencies, including letter recognition, phonological awareness, word identification, decoding, and comprehension.

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These competencies establish the foundation for more advanced reading abilities and facilitate learning across academic disciplines. Dadzie (2008) emphasized that reading is essential to learning in subjects such as science and mathematics, as well as to performing everyday activities that require understanding written information. Although exposure to printed materials, meaningful reading experiences, and appropriate classroom instruction contribute to literacy acquisition, reading development also depends on underlying cognitive processes that enable children to recognize, retain, organize, and interpret linguistic information. Among these processes, working memory has been identified as an important cognitive mechanism influencing how children acquire and apply early literacy skills (Skehan, 1991). Understanding its contribution to reading proficiency is particularly important during kindergarten, when children are developing the cognitive and linguistic foundations necessary for subsequent academic learning.

The relationship between working memory and reading proficiency can be understood through the theoretical framework proposed by Baddeley and Hitch (1974), which conceptualizes working memory as a cognitive system composed of a central executive and subsidiary components responsible for temporarily retaining and manipulating information. Within this framework, the central executive coordinates cognitive activities, while supporting components facilitate the temporary storage and processing of information required for complex mental operations. In early literacy development, these processes enable children to retain letter representations, associate written symbols with corresponding sounds, blend phonemes into recognizable words, follow sequences of linguistic information, and construct meaning from written texts. Working memory therefore serves as a cognitive foundation that supports the progression from recognizing individual letters and sounds to decoding words and comprehending connected language. Baddeley and Hitch (1974) further provide a theoretical basis for understanding how the contribution of working memory to reading and writing may vary across developmental stages as children's cognitive capacities and literacy demands become increasingly complex.

Working memory capacity refers to the limited amount of information that an individual can temporarily maintain and manipulate while performing cognitive tasks. Garrison and Schmeichel (2018) and Lewandowsky et al. (2012) explained that this capacity is finite, thereby influencing the amount of information that can be processed simultaneously. This limitation has important implications for beginning readers because reading requires the coordination of several cognitive operations within a relatively short period. Children must recognize visual symbols, retrieve corresponding phonological representations, maintain sound sequences, and integrate linguistic information to derive meaning. When these demands exceed available working memory resources, learners may experience difficulty remembering letter and sound relationships, blending phonemes, following oral instructions, or comprehending simple sentences and stories. Conversely, stronger working memory capacity may facilitate more efficient decoding, retention of phonological information, and comprehension of short passages. These cognitive processes suggest that differences in working memory capacity may help explain variations in reading proficiency among kindergarten learners who receive similar instructional experiences.

The cognitive demands of reading become more apparent when literacy is examined as a coordinated process involving different levels of information processing. Grabe and Stoller (2013) and Liu and Read (2020) described fluent academic reading as a cyclical process requiring the execution and integration of lower level and higher level cognitive functions. Lower level processes involve translating written symbols into meaningful linguistic units, while higher level processes support the integration, interpretation, and comprehension of information. Kendeou et al. (2014) and Verhoeven et al. (2011) emphasized that the increasing automaticity of lower level reading processes reduces the cognitive resources required for basic

word recognition, allowing greater capacity for more sophisticated mental operations. For kindergarten learners, however, these foundational processes are still developing and may require considerable working memory resources. Children who have not yet achieved automatic recognition of letters, sounds, and familiar words must devote substantial cognitive effort to decoding, potentially limiting the resources available for comprehension. This relationship demonstrates how working memory capacity and the development of automatic reading processes may jointly influence early literacy outcomes.

International research provides empirical support for the association between working memory capacity and reading ability. Cartwright et al. (2020) and Diningrat et al. (2023) identified working memory capacity as one of the most extensively investigated cognitive factors associated with reading performance, with findings indicating a significant relationship between these variables. Similarly, Peng et al. (2018), through a meta analysis of correlational studies, reported a moderate relationship between working memory and reading, with a correlation coefficient of $r = .29$ and a reported p value of .05. This finding suggests that working memory contributes meaningfully to reading performance, although it does not independently account for all differences in reading ability. Linck and Shin (2020) likewise reported a significant positive relationship between working memory and reading among second language learners, indicating that the importance of working memory extends to reading situations involving additional linguistic demands. Collectively, these studies establish a consistent empirical foundation for examining working memory as a cognitive factor associated with literacy development across different populations and language learning contexts.

Beyond reading proficiency, working memory capacity has been associated with broader academic performance because of its central role in learning, information processing, and knowledge retention. Amzil (2022) noted that academic achievement has traditionally served as a primary indicator of educational success, encouraging researchers to investigate the cognitive and instructional factors that contribute to differences in learner performance. Alloway and Alloway (2010), Fenesi et al. (2015), and Ramos-Galarza et al. (2019) identified working memory capacity as a particularly important predictor of academic achievement because it supports the temporary retention and manipulation of information required during learning activities. Morris and Lonigan (2022) further emphasized the importance of working memory in processing information that learners must acquire and subsequently recall. Accordingly, Demir and Ercetin (2020) and Fenesi et al. (2015) associated differences in working memory capacity with variations in the rate and extent of learning and academic achievement. Related investigations have established connections between working memory and learning processes (Jackson, 2020), written language development (Vanderberg & Swanson, 2007), and mathematical performance (Allen et al., 2019; Berkowitz et al., 2022). These findings demonstrate that working memory supports multiple dimensions of academic functioning and reinforce the importance of examining its relationship with reading proficiency during the earliest stages of formal education.

The convergence of international findings suggests that working memory contributes to literacy development by supporting the cognitive processes necessary for decoding, information retention, and comprehension. Nevertheless, the strength and nature of this relationship may differ according to learners' developmental characteristics, language experiences, educational environments, and the specific reading competencies being assessed. Research involving older learners, academic reading, and second language reading provides valuable theoretical and empirical insights, but its findings cannot automatically be generalized to kindergarten children who are still acquiring basic literacy competencies. At this

developmental stage, reading involves emerging abilities in letter recognition, phonological processing, sound blending, and elementary comprehension, which may impose different demands on working memory compared with the reading activities performed by more proficient learners. Consequently, there is a need to examine the relationship between working memory and reading proficiency within specific early childhood educational settings to determine how these variables are associated during the initial stages of literacy acquisition.

In the Philippine educational context, the relationship between working memory and reading proficiency has gained importance because of persistent concerns regarding learners' foundational literacy development. Buenaobra (2026, pp. 748 to 758) reported findings concerning the positive relationship between working memory and reading proficiency among Filipino learners, suggesting that cognitive capacity is an important factor associated with literacy outcomes. Similarly, Buenaobra (2023) examined the relationship between working memory and reading proficiency among kindergarten learners, providing relevant insights into the cognitive dimensions of early reading development. These investigations are particularly significant given the literacy difficulties experienced by many Filipino children during the early grades. Bagcat (2025, pp. 1392 to 1406) likewise highlighted concerns regarding reading proficiency among Filipino learners, reinforcing the need for educational approaches that address both instructional and cognitive factors. Together, these studies indicate that understanding reading difficulties requires attention not only to learners' exposure to literacy instruction but also to the cognitive resources that enable them to process and retain reading related information.

The urgency of addressing literacy challenges in the Philippines is further demonstrated by international educational assessments. Paunan (2026) emphasized that the country continues to experience significant difficulties in improving literacy outcomes despite ongoing educational initiatives. According to the Programme for International Student Assessment 2022 results, the Philippines ranked 75th among 81 participating countries and economies in reading, obtaining a mean score of 347. Although this performance represented an improvement over the country's 2018 results, it remained considerably below the average performance of countries belonging to the Organisation for Economic Co-operation and Development (PISA 2022 Results (Volume I and II) Country Notes: Philippines, 2023). These findings underscore continuing weaknesses in reading comprehension and suggest that foundational literacy difficulties may persist throughout learners' educational progression. The Department of Education also identified declining learner proficiency as a concern, particularly because weaknesses in reading comprehension and limited English proficiency may hinder students' ability to interpret technical materials, understand instructional content, and apply mathematical concepts effectively (DepEd tackles learners' declining proficiency, 2026). Although these assessment results concern older learners rather than kindergarten children, they highlight the importance of strengthening literacy foundations during the earliest years of schooling.

Recognizing the importance of early literacy, the Philippine educational system has implemented policies and programs intended to strengthen reading readiness and foundational learning. Republic Act No. 10157, otherwise known as the Kindergarten Education Act, institutionalized kindergarten education and reinforced the importance of providing young children with developmentally appropriate learning opportunities. Within this educational framework, kindergarten instruction supports the development of essential competencies such as letter recognition, phonological awareness, oral language development, and early comprehension. The Department of Education has also emphasized foundational literacy through the Kindergarten to Grade 12 curriculum and related early reading initiatives. These efforts reflect the understanding that literacy acquisition begins before children become independent readers and that early educational experiences substantially influence subsequent

learning outcomes. However, the continuing variation in reading proficiency among kindergarten learners suggests that access to similar classroom instruction does not necessarily produce equivalent literacy development. Such differences point to the possible contribution of individual cognitive characteristics, including working memory capacity, alongside environmental and instructional influences.

The multilingual characteristics of Philippine classrooms introduce additional considerations in understanding the cognitive demands of early reading. Many Filipino kindergarten learners encounter different languages across home, community, and school environments, including learning experiences associated with mother tongue based instruction. These linguistic conditions may require children to maintain and process information across different language systems while developing foundational reading competencies. The findings of Linck and Shin (2020) concerning the positive relationship between working memory and second language reading are relevant to this context because they suggest that working memory may become particularly important when learners must manage additional linguistic information. Nevertheless, multilingualism should not be regarded as an inherent disadvantage in literacy development. Rather, differences in language exposure, familiarity with instructional language, and opportunities for meaningful literacy experiences may influence the cognitive demands encountered by individual learners. Examining working memory within multilingual early childhood classrooms can therefore contribute to a more contextualized understanding of reading proficiency among Filipino kindergarten learners.

Existing Philippine studies also suggest that interventions addressing verbal working memory may contribute to improvements in reading comprehension. Findings involving kindergarten and elementary learners indicate that children with stronger working memory capacities generally demonstrate better comprehension performance, while remediation activities intended to enhance verbal working memory may support improvements in understanding written information. However, improvements in comprehension do not necessarily correspond to significant changes in reading speed or accuracy. This distinction is important because reading proficiency encompasses several related but separate competencies, including decoding, fluency, and comprehension. The differential relationship between working memory and these reading components suggests that cognitive interventions may have varying effects depending on the specific literacy skill being developed. It also indicates that educational strategies should be informed by a clear understanding of learners' cognitive strengths and difficulties rather than assuming that strengthening one cognitive process will automatically improve every dimension of reading performance.

Within the District of Cordova, Division of Cebu Province, kindergarten teachers encounter learners with diverse cognitive abilities, language backgrounds, home literacy experiences, and levels of school readiness. These differences are reflected in variations in children's ability to recognize letters, remember corresponding sounds, blend phonemes, follow instructions, and comprehend simple reading materials. Some learners demonstrate relatively rapid progress in acquiring foundational literacy skills, while others require repeated instruction and additional support to achieve comparable competencies. Difficulties in retaining verbal instructions, recalling letter and sound associations, and maintaining sound sequences during decoding may be associated with limitations in working memory capacity. However, these difficulties may also arise from differences in prior literacy exposure, instructional opportunities, language familiarity, and developmental readiness. Understanding how working memory relates to reading proficiency within this particular educational setting is therefore necessary to distinguish its potential contribution from the broader conditions influencing children's early literacy experiences.

Classroom and home learning environments further shape the relationship between cognitive functioning and reading development. Large class sizes may limit opportunities for individualized instruction, while differences in home literacy environments can influence children's familiarity with printed materials, oral language experiences, and opportunities to practice emerging reading skills. Teachers commonly employ repetition, visual aids, storytelling, phonics activities, and guided reading experiences to support learners in processing and retaining information during literacy instruction. These practices may help reduce cognitive demands by presenting information in manageable sequences, reinforcing previously introduced concepts, and providing multiple opportunities for retrieval and application. When instructional activities are responsive to learners' working memory capacities, children may be better supported in maintaining phonological information, following reading sequences, and constructing meaning from simple texts. Accordingly, understanding the relationship between working memory and reading proficiency may provide a useful basis for refining instructional approaches and identifying appropriate learning support for kindergarten children.

The theoretical and empirical literature collectively establishes that reading proficiency emerges through the interaction of cognitive processes, linguistic development, instructional experiences, and environmental conditions. Baddeley and Hitch (1974) provide the theoretical foundation for explaining how temporary information storage and manipulation support reading related tasks, while Garrison and Schmeichel (2018) and Lewandowsky et al. (2012) clarify the limitations of working memory capacity that may influence learners' performance. The reading process perspectives advanced by Grabe and Stoller (2013), Liu and Read (2020), Kendeou et al. (2014), and Verhoeven et al. (2011) further explain how cognitive resources are distributed across decoding and comprehension processes. Empirical investigations by Cartwright et al. (2020), Diningrat et al. (2023), Peng et al. (2018), and Linck and Shin (2020) reinforce these theoretical explanations by demonstrating significant associations between working memory and reading outcomes. Meanwhile, research on academic achievement and other learning domains confirms the broader educational relevance of working memory capacity. These converging perspectives support the assumption that kindergarten learners' reading proficiency may be meaningfully associated with their ability to temporarily retain, organize, and manipulate information during literacy activities.

Despite this convergence, important contextual and developmental gaps remain. Much of the available literature establishes relationships between working memory and reading among broader learner populations, including older students and second language readers, while relatively limited contextual evidence is presented concerning kindergarten learners in specific Philippine school districts. Furthermore, existing findings concerning the effects of verbal working memory interventions suggest that different reading competencies may respond differently to cognitive support. These observations indicate the importance of investigating working memory and reading proficiency as related but distinct constructs, particularly among children whose literacy skills are still emerging. Although international and Philippine studies provide substantial justification for expecting a positive relationship, the extent to which this association is evident among kindergarten learners in the District of Cordova requires empirical examination. Establishing this relationship within the local context can contribute evidence that is more directly relevant to the developmental characteristics, instructional conditions, and literacy needs of the learners concerned.

The conceptual foundation of the present study is therefore anchored in the proposition that working memory capacity is associated with reading proficiency among kindergarten learners. Working memory represents the cognitive capacity to temporarily store and manipulate information necessary for completing learning tasks, while reading proficiency reflects the development and application of foundational literacy competencies, including letter

recognition, phonological awareness, word identification, decoding, and comprehension. The proposed relationship is supported by the understanding that successful reading requires learners to maintain and integrate visual, phonological, and linguistic information while constructing meaning from written symbols. Learners with greater working memory capacity may demonstrate stronger reading performance because they can more effectively retain sound sequences, retrieve previously learned associations, and coordinate the cognitive operations involved in decoding and comprehension. Nevertheless, the relationship must be examined empirically because reading development is also influenced by instructional quality, language experiences, school readiness, and home literacy opportunities. The study consequently approaches working memory as an important cognitive correlate of reading proficiency rather than assuming that it independently determines literacy outcomes.

Against this background, the present study seeks to determine the relationship between working memory and reading proficiency among kindergarten learners in the District of Cordova, Division of Cebu Province. It responds to the need for localized empirical evidence that can clarify how individual differences in cognitive capacity are associated with foundational reading development within the Philippine early childhood education context. By examining these variables, the investigation aims to contribute to a more comprehensive understanding of why kindergarten learners demonstrate varying levels of reading proficiency despite participating in comparable classroom learning experiences. The findings may also provide a basis for identifying learners who require additional cognitive and literacy support and for developing instructional strategies that respond to their developmental needs.

The significance of the study extends to kindergarten teachers, school administrators, curriculum planners, and other stakeholders responsible for improving early childhood education. For teachers, understanding the association between working memory and reading proficiency may inform the selection of instructional practices that support information retention, phonological processing, decoding, and comprehension. For school administrators, the findings may guide the identification of learning support priorities and the development of appropriate intervention programs for children experiencing early reading difficulties. Curriculum planners may likewise use the results to strengthen the integration of cognitively responsive instructional approaches into foundational literacy activities. More broadly, the study may contribute to ongoing efforts to improve early literacy outcomes in the Philippines by providing evidence concerning the cognitive dimensions of reading development. Through a clearer understanding of the relationship between working memory and reading proficiency, educators may be better positioned to design supportive, inclusive, and developmentally appropriate learning experiences that strengthen kindergarten learners' foundational literacy competencies and prepare them for continued academic success and lifelong learning.

Statement of the problem

This study aimed to assess the relationship between working memory and reading proficiency among kindergarten learners in the District of Cordova, Division of Cebu Province, during the School Year 2025–2026 as a basis for developing an intervention plan to enhance reading proficiency.

Specifically, this study sought to answer the following questions:

1. What is the demographic profile of the kindergarten learners in terms of age, gender, parent or guardian occupation, and exposure to reading at home?

2. What is the level of working memory among kindergarten learners, as perceived by the teacher respondents, in terms of verbal working memory, visual working memory, and sequential memory?
3. What is the level of reading proficiency among kindergarten learners in terms of letter recognition, word recognition, and reading comprehension?
4. Is there a significant relationship between working memory and reading proficiency among kindergarten learners?
5. Based on the findings of the study, what developmentally appropriate intervention plan can be developed to enhance reading proficiency among kindergarten learners, considering their working memory capacity?

METHODOLOGY

The study employed a quantitative, correlational research design to examine the relationships between working memory indicators and reading proficiency among kindergarten learners. This section details the research design and then describes the research setting, participants, instruments, and procedures, including the statistical methods used for data analysis, so that each methodological component is presented systematically and the transitions between them are clear. Quantitative research is designed to gather quantifiable data, which is often analyzed and interpreted using statistical, mathematical, or computational techniques and presented in numerical form (Jacobsen, 2020). The participants comprised kindergarten learners selected from public elementary schools in the District of Cordova, Division of Cebu Province. This focus is justified because kindergarten is a critical developmental stage in early literacy acquisition, and learners in this context are beginning to develop both working memory and foundational reading skills. Selecting participants from public schools in the district ensures that the findings reflect the educational environment where early interventions may have significant impact. Class advisers used either random or purposive sampling to include learners with diverse backgrounds and abilities. The design aimed to systematically analyze how working memory varies and relates to differences in early reading skills. Specifically, it examined whether working memory significantly predicts reading proficiency, including letter and word recognition and basic reading comprehension. To strengthen the analysis, regression techniques were used to test the predictive influence of working memory on reading outcomes and to determine its contribution to reading performance. This approach allowed the development of a predictive model explaining how cognitive processes, particularly working memory, support early literacy development. Quantitative research was used to describe the respondents' profiles, determine working memory behavior among kindergarten learners using indicators, and assess reading proficiency levels. Overall, the research design enabled the study to describe working memory and reading proficiency levels among kindergarten learners and to establish a statistically supported relationship between the two variables, providing a basis for early identification and intervention in reading difficulties.

Data were collected through a Google Forms survey to ensure efficiency. The respondents were Kindergarten learners, randomly selected by the adviser. The decision to use self-report measures was justified by the need to obtain insights into learners' observable behaviors and cognitive abilities in a naturalistic classroom setting, where structured adult-facilitated assessments are developmentally appropriate for this age group. The instruments were adapted from the Early Childhood Care and Development Checklist to ensure strong content validity and alignment with established measures assessing the correlation between working memory and reading proficiency. The researchers subjected all gathered data to appropriate statistical treatment, including descriptive and inferential analyses, to examine the correlation between working memory and reading proficiency within kindergarten learners.

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Descriptive statistics were used to determine learners' levels and overall performance in working memory and early reading skills.

The study used the Input–Process–Output (IPO) approach to examine the corelation between working memory and reading proficiency within kindergarten learners, as illustrated in Figure 2, the flow of the study. The process began with the Input phase, which involved assessing learners' working memory and reading proficiency. Working memory was measured using an indicator checklist of components, particularly verbal working memory, visual working memory, and sequential memory, while reading proficiency was evaluated using indicators such as letter/word recognition and basic reading comprehension. The Process phase involved a systematic, ethical sequence of research activities designed to ensure accurate data collection, analysis, and interpretation. This phase began with the submission of survey questionnaires adapted from the Early Childhood Care and Development Checklist; once approved, the questionnaires were printed and distributed, and the collected data were then subjected to statistical analysis. Finally, the Output phase produced an evidence-based intervention plan based on the analyzed data and the identified needs of kindergarten learners in working memory and reading proficiency. Based on the correlation and regression results, the study developed targeted strategies and activities to strengthen working memory skills, such as memory-enhancing exercises, structured reading tasks, and guided phonemic activities.

The study was conducted in the District of Cordova Public Elementary Schools, located in the Municipality of Cordova, Cebu, as shown in the location map of the research environment presented in Figure 3. The district comprises 12 public elementary schools that provide basic education to diverse learners, including kindergarten students at the foundational stage of literacy development. These schools implement the Department of Education's K to 12 curriculum, which highlights early reading skills and cognitive development as essential components of kindergarten education. The selected schools provide an appropriate setting for the study because they offer access to kindergarten learners with varying levels of working memory and reading proficiency. The classroom environments support early learning through play-based and guided instruction, making them suitable for administering age-appropriate cognitive and reading assessments. The district also ensures standardized teaching practices and learning resources, allowing consistent data collection and analysis. This research environment is therefore ideal for assessing the relationship between working memory and reading proficiency, as it reflects a typical public school setting where early literacy development is a primary educational goal.

The respondents of this study were kindergarten learners enrolled in selected public elementary schools within the District of Cordova, Division of Cebu Province, including Ibabao, Cogon, Catarman, Gabi, and Buagsong Elementary School. These learners are commonly aged five to six years old and are in the early stage of formal schooling, where foundational cognitive and literacy skills are actively developing. In total, 78 Kindergarten learners were selected in this study, comprising 10 respondents from Ibabao Elementary School, 15 from Cogon Elementary School, 15 from Catarman Elementary School, 15 from Buagsong Elementary School, and 23 from Gabi Elementary School, using an appropriate sampling technique to ensure representation of learners with varying levels of working memory and reading proficiency. As presented in Table 1, which shows the distribution of respondents, Ibabao ES contributed 10 respondents (12.82%), Cogon ES contributed 15 respondents (19.23%), Catarman ES contributed 15 respondents (19.23%), Buagsong ES contributed 15 respondents (19.23%), and Gabi ES contributed 23 respondents (29.49%), for a total of 78 respondents (100%). Including kindergarten learners is essential, as this stage is critical for examining how working memory predicts early reading skills, particularly letter and word

recognition and basic reading comprehension. The participants completed the assessments in a classroom setting using age-appropriate, child-friendly instruments designed to measure working memory and reading proficiency. Overall, the selected respondents provided relevant, reliable data to determine the corelation between working memory and reading proficiency, contributing to a better understanding of early literacy development among kindergarten learners.

The study used research instruments adapted from the Early Childhood and Care Development Checklist, and both variables were assessed through indicators. These instruments were appropriate for examining the relationships between working memory and reading proficiency. The first part of the instrument, the Level of Working Memory according to Indicators, assessed Kindergarten learners' working memory components, including Verbal Working Memory, Visual Working Memory, and Sequential Memory. Statements adapted from the ECCD Checklist assessed learners' Working Memory Components. A 5-point Likert Scale was used to rate each statement: 1 - Never; 2 - Rarely; 3 - Sometimes; 4 - Often; and 5 - Always. The second part, the Level of Reading Proficiency, assessed reading proficiency using indicators that reflect foundational literacy skills essential for kindergarten learners. The 5-point scale measures performance in ordinal levels, providing a systematic way to quantify skills. Each reading indicator is scored according to the learner's demonstrated ability using a 7-point frequency Likert scale: 1 - Never; 2 - Rarely; 3 - Occasionally; 4 - Sometimes; 5 - Frequently; 6 - Usually; and 7 - Very Often.

The data gathering procedures followed three stages. In the preparation stage, the researcher followed both the Graduate School data-gathering procedures and the DepEd protocols for collecting the study data. Before data collection, the research instrument was prepared and sent to the adviser for editing and approval. In the data gathering stage, the researcher first anticipated the Graduate School's go-ahead to begin data collection. Then, the researcher sought the approval of the Public Schools District Supervisor (PSDS), District of Cordova, Division of Cebu Province, through a formal request letter, to be authorized to carry out the study in the identified schools within the PSDS's area of jurisdiction. After the supervisor approved the request letter, the researcher administered the survey form to the respondents through a Google Form Sheet. With the assistance of Kindergarten Advisers, the kindergarten learners in each section of the assigned school were interviewed. In the post-data gathering stage, following the completion of the responses, the researcher collected the data in the selected schools by retrieving the data gathered in the Google Form provided. The responses were organized, tallied, and prepared for statistical treatment to analyze and interpret the study's results.

The researcher applied the following statistical treatments to present and analyze the gathered data. Percentage was used to specify the respondents' demographic profile, comprising the variables of age, gender, and first language. This enabled the researcher to present the data clearly and in an organized manner, showing the percentage of respondents in each category. The weighted mean was utilized to categorize respondents' responses regarding the level of Working Memory across components, specifically Visual Working Memory, Verbal Working Memory, and Sequential Memory. It was also utilized to assess the relationship between Reading Proficiency and the following indicators: letter recognition, word recognition, and Reading Comprehension. The weighted mean also described the overall tendency of responses across each construct, while the standard deviation was used to show the variation or consistency in the participants' responses.

For the scoring procedures, the Likert Scale technique was used to assign verbal descriptions to each item in the evaluation survey questionnaire, and a scale conversion table was applied. For the Level of Working Memory, a scale of 5 corresponded to the numeral rating 4.21 – 5.00, the descriptive rating Always, and the verbal description that the behavior or skill

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is CONSISTENTLY observed at all times. A scale of 4 corresponded to 3.41 – 4.20, Often, indicating that the behavior or skill is FREQUENTLY observed in most situations. A scale of 3 corresponded to 2.61 – 3.40, Sometimes, indicating that the behavior or skill is MODERATELY observed in some situations. A scale of 2 corresponded to 1.81 – 2.60, Rarely, indicating that the behavior or skill is SELDOM observed and occurs infrequently. A scale of 1 corresponded to 1.00 – 1.80, Never, indicating that the behavior or skill is NOT observed at all. For the Level of Reading Proficiency, a scale of 5 corresponded to the numeral rating 4.21 – 5.00, the descriptive rating Highly Proficient, and the verbal description that the learner can recognize letters, read words and simple sentences fluently, and demonstrate clear understanding INDEPENDENTLY. A scale of 4 corresponded to 3.41 – 4.20, Proficient, indicating that the learner can recognize most letters and words, read simple sentences, and understand basic texts with MINIMAL errors. A scale of 3 corresponded to 2.61 – 3.40, Developing, indicating that the learner can recognize SOME letters and words but struggles with fluency and comprehension. A scale of 2 corresponded to 1.81 – 2.60, Beginning, indicating that the learner has difficulty recognizing letters and words and requires FREQUENT teacher assistance. A scale of 1 corresponded to 1.00 – 1.80, Not Yet Demonstrated, indicating that the learner is UNABLE to recognize letters or read words and cannot yet demonstrate reading readiness skills.

RESULTS AND DISCUSSION

This chapter presents and interprets the data gathered from 78 kindergarten learners enrolled in public elementary schools in the District of Cordova, Division of Cebu Province. The study employed a quantitative, correlational research design. Class advisers selected the respondents through random or purposive sampling, and the sample was distributed as follows: 10 learners (12.82%) from Ibabao Elementary School, 15 learners (19.23%) from Cogon Elementary School, 15 learners (19.23%) from Catarman Elementary School, 15 learners (19.23%) from Buagsong Elementary School, and 23 learners (29.49%) from Gabi Elementary School. Data were collected through instruments adapted from the Early Childhood Care and Development Checklist, in which working memory was rated on a 5-point Likert scale and reading proficiency was assessed through indicators of letter recognition, word recognition, and reading comprehension. Percentages described the respondents' profile, weighted means and standard deviations described the levels of working memory and reading proficiency, and a correlation analysis tested the relationship between the two variables at the 0.05 level of significance. The discussion that follows is grounded entirely in the data gathered, and the results are interpreted in direct relation to the objectives of the study, namely to describe the respondents' profile, to determine the levels of working memory and reading proficiency, and to establish whether working memory is significantly related to reading proficiency.

Profile of the respondents

Of the 78 respondents, 45 (57.69%) were six years old and 33 (42.31%) were five years old. Gender was equally distributed, with 39 females (50.00%) and 39 males (50.00%). Among the six-year-old learners, 24 were female (30.77%) and 21 were male (26.92%), while among the five-year-old learners, 15 were female (19.23%) and 18 were male (23.08%). The equal gender representation supports a fair examination of working memory as a predictor of reading proficiency, and the larger share of six-year-olds may indicate somewhat greater developmental readiness for cognitive and reading-related tasks, consistent with evidence that

working memory and foundational literacy are actively developing at this age (Alloway et al., 2004).

With respect to the occupations of parents or guardians, 23 (29.49%) were office workers or employees, 19 (24.36%) were unemployed, 14 (17.95%) were professionals, 13 (16.67%) were daily wage workers, 8 (10.26%) were skilled workers, and 1 (1.28%) was a business owner. Although most guardians were employed, the considerable proportion of unemployed guardians may influence the availability of educational support and learning resources at home. Because occupation may reflect socio-economic background, it is relevant to children's cognitive development, including working memory and reading proficiency.

Learners' exposure to reading at home was largely occasional. Thirty-four learners (43.59%) were exposed to reading at home sometimes, 25 (32.05%) rarely, 9 (11.54%) always, 8 (10.26%) often, and 2 (2.56%) never. Regular and consistent reading engagement at home therefore appears limited for many learners. This is significant because home literacy practices, including access to books, reading habits, and parental involvement, have been found to predict reading comprehension (Lesino, 2025), and limited exposure may constrain vocabulary, memory, and early reading development. Understanding these profiles allows educators to design instructional strategies suited to learners' circumstances, in line with Pečiuliauskienė's (2022) emphasis on clear instruction and intrinsic motivation.

Level of working memory

Verbal working memory was rated High, with an aggregate mean of 3.83 and an aggregate standard deviation of 0.83, and all twelve indicators were described as High. The child can recall a short sequence of numbers, letters, or words in order obtained the highest mean (4.05; SD = 0.85), followed by the ability to repeat words or short phrases after hearing them (4.04; SD = 0.83) and to remember and follow simple directions given by the teacher (3.97; SD = 0.90). The ability to remember characters or events after listening to a short story obtained a mean of 3.92 (SD = 0.79), responding correctly to questions about verbal information 3.87 (SD = 0.73), remembering rules or steps explained verbally 3.83 (SD = 0.80), and remembering spoken information while drawing, writing, or playing 3.83 (SD = 0.80). Keeping instructions in mind while completing tasks obtained 3.78 (SD = 0.85), remembering what others said during class interactions 3.76 (SD = 0.91), remembering and using new words introduced during lessons 3.67 (SD = 0.85), and recalling instructions even after starting a task 3.64 (SD = 0.85). The lowest mean, 3.58 (SD = 0.85), was obtained for repeating sentences or instructions with few mistakes, which was nonetheless still described as High. These results indicate good auditory retention and sequencing, which are important foundations for reading, while suggesting that learners may still find longer or more complex instructions somewhat harder to retain. The pattern accords with evidence that verbal working memory supports the retention and integration of verbal elements essential to comprehension (Nouwens et al., 2017) and that it predicts academic achievement when measured in real classroom settings (Friso-van den Bos & van de Weijer-Bergsma, 2020).

Visual working memory was likewise rated High, with an aggregate mean of 3.90 and an aggregate standard deviation of 0.79, and all twelve indicators were described as High. The highest mean, 4.21 (SD = 0.76), was obtained for recalling shapes or colors after seeing them, which indicates that learners retain the visual elements needed to identify letters, words, and images. Recognizing pictures shown earlier and remembering visual information needed to match pictures or objects each obtained 4.00 (SD = 0.79). The remaining indicators obtained the following means: recalling the order of pictures or objects 3.99 (SD = 0.80), remembering letters or symbols shown during the lesson 3.97 (SD = 0.85), remembering where objects are placed in the classroom 3.95 (SD = 0.79), remembering visual demonstrations shown by the

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teacher 3.85 (SD = 0.81), recalling pictures shown a few moments earlier 3.83 (SD = 0.76), remembering simple visual patterns or sequences 3.82 (SD = 0.77), reproducing the arrangement of blocks, pictures, or objects after seeing them 3.78 (SD = 0.80), and repeating an activity after watching the teacher demonstrate it 3.74 (SD = 0.81). The lowest mean, 3.71 (SD = 0.81), was obtained for recalling visual details from picture books, which was still High but suggests slightly less consistency with richer visual content. Nevo and Bar-Kochva (2015) similarly observe that the visual and verbal components of working memory influence reading fluency and comprehension in distinct ways.

Sequential memory was also rated High, with an aggregate mean of 3.81 and an aggregate standard deviation of 0.83, and all ten indicators were described as High. Remembering the steps in songs or rhymes obtained the highest mean (3.97; SD = 0.79), followed by remembering the sequence of classroom routines (3.94; SD = 0.78), repeating letter or sound sequences in the correct order (3.87; SD = 0.87), and repeating movement or clapping patterns in the correct order (3.86; SD = 0.80). Arranging pictures to show the correct sequence of events and recalling the order of actions demonstrated by the teacher each obtained 3.79 (SD = 0.83 and 0.84, respectively), following step-by-step verbal instructions in the correct order obtained 3.78 (SD = 0.86), repeating a sequence of numbers or words correctly 3.74 (SD = 0.84), and remembering the correct sequence when completing tasks 3.69 (SD = 0.90). Recalling the order of events from a story obtained the lowest mean, 3.68 (SD = 0.80). Learners thus appear to remember sequences most readily when they are embedded in songs, rhymes, and routines, which suggests that musical and repetitive activities support memory retention, whereas narrative recall demands the integration and retention of more complex information.

Taken together, the three components were all described as High. Visual working memory obtained the highest mean (3.90; SD = 0.79), followed by verbal working memory (3.83; SD = 0.83) and sequential memory (3.81; SD = 0.83), yielding a grand mean of 3.85 and a grand standard deviation of 0.82, interpreted as High on the scale in which 3.41 to 4.20 denotes High. The kindergarten learners therefore demonstrate strong working memory across all components. This is consistent with Baddeley's (2003) account in which temporary storage and attentional control support linguistic processing, and with the view that working memory is a central component of literacy progression (Hu & Hu, 2023).

Level of reading proficiency

Letter recognition was rated Proficient, with an aggregate mean of 3.86 and an aggregate standard deviation of 0.96, and all ten indicators were described as Proficient. The highest mean, 4.08 (SD = 0.89), was obtained for identifying letters in the child's own name, which probably reflects repeated exposure and personal relevance. Recognizing all uppercase letters obtained 3.92 (SD = 0.99), correctly naming letters shown randomly 3.90 (SD = 0.95), recognizing all lowercase letters 3.87 (SD = 1.01), identifying letters in simple words 3.87 (SD = 0.90), and matching uppercase and lowercase letters correctly 3.86 (SD = 1.04). Pointing out letters in books or classroom materials obtained 3.83 (SD = 0.92), recognizing letters during classroom activities and games 3.82 (SD = 0.98), and differentiating similar letters such as b/d and p/q 3.76 (SD = 0.97). The lowest mean, 3.73 (SD = 0.98), was obtained for identifying letters when spoken by the teacher, which suggests that some learners find it slightly harder to connect spoken letter names with their visual forms. Because alphabet knowledge is an established early predictor of later literacy outcomes (National Early Literacy Panel, 2008), this result provides an encouraging foundation.

Word recognition was rated Developing, with an aggregate mean of 3.31 and an aggregate standard deviation of 1.00. Only one indicator, the ability to read their own name, was described as Proficient, with a mean of 4.00 (SD = 0.87). The remaining nine indicators were all described as Developing: recognizing rhyming words read aloud (3.36; SD = 0.91), identifying words in classroom charts or posters (3.35; SD = 0.99), recognizing familiar words in print (3.27; SD = 1.03), recognizing frequently used classroom words (3.27; SD = 1.03), reading simple words without guessing (3.22; SD = 1.05), identifying words from short labels or signs in class (3.21; SD = 1.01), reading basic sight words correctly (3.18; SD = 1.02), recognizing words in simple storybooks (3.17; SD = 1.02), and matching spoken words to written words (3.12; SD = 1.07), the lowest. Learners therefore recognize words that are personally meaningful and frequently encountered but are still consolidating the link between spoken and written language. This is plausible because beginning readers rely heavily on working memory resources to process grapheme-phoneme correspondences, retain decoded sounds in sequence, and assemble them into words (Barnes, 2022).

Reading comprehension was also rated Developing, with an aggregate mean of 3.31 and an aggregate standard deviation of 0.93. Answering who, what, and where questions about a story was the only indicator described as Proficient (3.42; SD = 0.85). Recalling characters or events in a story and answering questions about a story read aloud each obtained 3.40 (SD = 0.89), describing what is happening in storybook pictures 3.38 (SD = 0.91), sequencing events from a story correctly 3.31 (SD = 0.89), recalling details from previously read stories 3.29 (SD = 0.88), and predicting what will happen next in a story 3.27 (SD = 1.00), all described as Developing. Identifying the main idea of a short story obtained 3.21 (SD = 1.01), while recognizing cause and effect in simple stories and retelling a story in their own words each obtained the lowest mean of 3.19 (SD = 0.98 and 0.99, respectively). Learners thus handle basic story details better than higher-order skills such as interpreting relationships between events and expressing understanding independently. As the literature cautions, comprehension is not simply a memory task, since vocabulary, grammar, background knowledge, and oral language also contribute substantially.

Across the three components, letter recognition obtained the highest mean (3.86; SD = 0.96), whereas word recognition (3.31; SD = 1.00) and reading comprehension (3.31; SD = 0.93) were both Developing. The grand mean was 3.49 and the grand standard deviation was 0.96, interpreted as Proficient. Learners therefore demonstrate proficient reading overall, with a strong base in letter recognition and a clear need for continued support in decoding, connecting spoken and written language, and understanding stories, skills that depend on information processing, retention, and recall, the functions associated with working memory.

Relationship between working memory and reading proficiency

A correlation analysis was conducted to determine whether working memory is significantly related to reading proficiency. The analysis yielded an r-value of 0.769 and a p-value of 0.000, significant at $p < 0.05$ (two-tailed). The coefficient indicates a strong positive correlation, and because the p-value is below the 0.05 level of significance, the decision was to reject the null hypothesis, and the result was remarked as significant. The null hypothesis that there is no significant relationship between working memory and reading proficiency among kindergarten learners is therefore rejected, and learners with higher working memory are more likely to demonstrate greater proficiency in letter recognition, word recognition, and reading comprehension.

This finding agrees with meta-analytic evidence of a positive association between working memory and reading performance (Peng et al., 2018), with evidence that working memory predicts reading literacy and wider academic achievement (Barmark & Sydsjö, 2021;

Gathercole et al., 2004), and with research indicating that working memory limitations can constrain the acquisition of reading skills (Gathercole et al., 2006). Working memory helps children retain individual sounds while blending them into words and hold story details across successive sentences, and interventions targeting memory processes have been associated with improved literacy outcomes (Melby-Lervåg & Hulme, 2013; Diamond & Lee, 2011). Working memory may accordingly be regarded as a significant predictor of reading proficiency among kindergarten learners. Two cautions are warranted. A correlation does not by itself establish causation, and reading development also depends on oral language, phonological awareness, vocabulary, home literacy practices, and quality of instruction, a consideration made salient by the limited home reading exposure observed in the respondents' profile.

Synthesis

Among the 78 kindergarten learners studied, working memory was High in verbal working memory (3.83), visual working memory (3.90), and sequential memory (3.81), with a grand mean of 3.85, while reading proficiency was Proficient overall (grand mean = 3.49), with letter recognition Proficient (3.86) and word recognition and reading comprehension both Developing (3.31). The correlation of $r = 0.769$ ($p = 0.000$, $p < 0.05$) shows that the two variables are strongly and significantly related. These results address each objective of the study by describing the learners' profile, establishing the levels of working memory and reading proficiency, and confirming a significant relationship between them. They contribute to the early literacy field by supporting the use of working memory indicators to identify learners who may need support, particularly in word recognition and comprehension, and they provide an evidence base for the developmentally appropriate intervention plan, comprising memory-enhancing exercises, structured reading tasks, and guided phonemic activities, that is presented in the next chapter.

CONCLUSION

The findings of this study lead to the conclusion that kindergarten learners in the District of Cordova, Division of Cebu Province, S.Y. 2025-2026, possess a high level of working memory, as shown by their high performance in verbal working memory, visual working memory, and sequential memory. Most of the respondents were six years old, with an equal distribution of male and female learners, and most of their parents or guardians were office workers or employees. Most learners were also exposed to reading activities at home only sometimes. These demographic characteristics are relevant because age, parental occupation, and the frequency of home-based reading activities have been shown to influence cognitive and literacy development. Six-year-old learners are typically at a developmental stage in which working memory and reading abilities progress rapidly, while the equal gender distribution allows for a more balanced analysis. The prevalence of office worker or employee parents may suggest certain patterns of educational support or access to learning resources at home, and intermittent exposure to reading activities may affect the development of foundational literacy and working memory. Among the components of working memory, visual working memory obtained the highest mean score, indicating that learners are particularly effective in processing, storing, and recalling visual information such as letters, symbols, pictures, and shapes. These results support Baddeley and Hitch's Multicomponent Model of Working Memory, which posits that working memory consists of specialized systems responsible for processing different types of information. The learners' strong performance in

verbal, visual, and sequential memory suggests that the phonological loop and the visuospatial sketchpad function effectively in supporting cognitive tasks essential for early learning.

In terms of reading proficiency, the learners showed strong letter recognition skills, while their word recognition and reading comprehension were still developing. Despite these differences, their overall reading proficiency was considered proficient. These results indicate that knowing letters is not enough for learners to read independently, since moving from letter recognition to reading words and understanding text requires more advanced cognitive and language skills, such as decoding and memory, which many learners have not yet fully developed. Consequently, learners need continued support to progress from basic to more complex reading skills. Practical interventions such as guided reading, phonics activities, repeated word practice, and storytelling can address these needs, and the use of multisensory activities and memory games in daily lessons may help learners remember and understand words better. When teachers and parents work together to establish regular reading routines at home, learners gain more opportunities to practice these skills, which helps them move from recognizing letters to reading and understanding words and stories.

Moreover, the study revealed a strong, significant positive relationship between working memory and reading proficiency ($r = 0.769$, $p = 0.000$). This finding indicates that learners with stronger working memory abilities tend to demonstrate higher levels of reading proficiency, and it confirms that working memory plays a vital role in supporting reading-related tasks, including remembering letter-sound relationships, recognizing words, following sequences of information, and comprehending texts. Working memory may therefore be considered an important predictor of reading proficiency among kindergarten learners. These results support both Baddeley and Hitch's Multicomponent Model of Working Memory and Marie Clay's Early Literacy Processing Theory, which highlight that effective information processing, storage, and retrieval are essential cognitive foundations for successful early literacy development. Nonetheless, alternative explanations should be considered. Extraneous variables such as the quality of classroom instruction, socioeconomic status, parental involvement, and prior exposure to literacy activities may also contribute to reading proficiency but were not controlled for in this study. Despite these considerations, the results highlight the necessity of an intervention plan aimed at improving word recognition and reading comprehension by strengthening verbal, visual, and sequential memory.

The limitations of the study also warrant careful consideration. Self-report instruments may introduce bias or inaccuracies, as social desirability or limited self-awareness among young children could affect responses. Additionally, focusing on a single district introduces the risk of selection bias and limits the study's external validity, as the results may not account for the diverse demographic, cultural, socioeconomic, and instructional contexts found in other educational settings. This narrowed sampling frame potentially overlooks regional variations in educational resources, pedagogical approaches, and home literacy environments that may influence both working memory and reading proficiency. The cross-sectional design further constrains the ability to determine causality, as it captures only a single point in time and does not account for developmental changes or the directionality of the observed relationships. Without repeated measures or tracking of participants, the study cannot differentiate whether stronger working memory leads to improved literacy skills, or whether the relationship is reciprocal or mediated by other factors such as language exposure or instructional quality. These limitations collectively reduce the applicability and broader transferability of the findings to other populations or contexts, and they underscore the importance of interpretive caution.

To address these limitations, future research should incorporate multisite sampling to capture variation across geographic, cultural, and socioeconomic environments, thereby increasing the representativeness and potential applicability of results. Mixed-method designs

that integrate quantitative instruments with qualitative approaches, particularly classroom-based observations and in-depth teacher interviews, would yield a more thorough understanding of the dynamic interplay among cognitive and contextual factors in literacy development. Longitudinal designs that trace the same learners over time are essential to identify developmental pathways, clarify causal relationships, and detect shifts in working memory and reading proficiency as children mature. Experimental and intervention-based research is also necessary to determine the effectiveness and sustainability of targeted memory-enhancement strategies across diverse classroom settings. In practice, educators in other districts should pilot and systematically evaluate memory-building interventions, adapting strategies to fit local needs and monitoring implementation through ongoing, formative assessments. School administrators and policymakers should prioritize context-sensitive adaptation of interventions and provide sustained professional development for teachers to ensure that reading instruction is appropriately aligned with the cognitive profiles and evolving literacy needs of learners.

In light of these conclusions, it is recommended that kindergarten teachers implement specific activities, such as guided reading sessions, repeated phonics exercises, memory-based games, and structured storytelling, to strengthen learners' working memory in developmentally appropriate contexts. Parents should establish consistent home reading routines by setting aside daily time to read aloud, share stories, and practice letter and word recognition with their children using printed or digital materials. School administrators should support these efforts by allocating funds for age-appropriate literacy resources, organizing professional development on memory-supported instructional strategies, and implementing school-based intervention programs that include collaborative workshops and regular assessments of learners' working memory and early reading skills. Furthermore, kindergarten classes should adopt and implement the proposed intervention plan based on this study's results to enhance learners' word recognition and reading comprehension while maximizing their strengths in verbal, visual, and sequential memory. The intervention plan may serve as a practical tool for teachers to address young learners' literacy needs and improve their overall reading proficiency.

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