Language Ability and Memory for a Story among Kapampangan-Speaking Multilingual Children

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Language and thought interact with each other. This study hypothesized that language ability would predict memory for a story. Participants were 146 six-to-nine-year-old native Kapampangan-speaking multilinguals. Each age-based group of not more than 10 children was told an unfamiliar Kapampangan story in big book format. Recognition of whether information was previously encountered in the story was measured twice: right after the story session (baseline memory) and six to seven days after (delayed memory). Kapampangan language ability was assessed through a measure of expressive vocabulary. Executive functioning skills (inhibitory control and working memory) were measured and controlled. Results showed age differences in all the variables. Participants' baseline memory was better than their delayed memory. Consistent with the hypothesis, hierarchical regressions revealed that language ability significantly predicted baseline and delayed memory for a story – even after controlling for the contributions of age and executive functioning. Analyses of covariance indicated that even after controlling for age, children with good language ability had significantly better baseline and delayed memory for a story than those with below average language ability. The findings suggest that language ability is linked to memory, implying that improvements in language ability will enhance memory skills.

Keywords: *Language ability, memory, story*

"The thing about a story is that you dream it as you tell it, hoping that others might dream along with you, and in this way memory and imagination and language combine to make spirits in the head."

-Tim O' Brien

Introduction

Language, memory, and stories are essential in life. How people think and view the world, as well as how they communicate these thoughts, is influenced by language (Anderson & Lightfoot, 2002). However, without a memory of the past, people cannot act on the present or ponder about the future (McLeod, 2013). Lastly, memory happens in the form of stories (Bruner, 1991). Thus, language, memory, and stories are connected to each other. It is these connections that the present study explored, particularly among multilingual schoolchildren in a Philippine province.

Language and cognition interact with each other. Language does not only reflect thought (Piaget, 1959), but can also shape it (Vygotsky, 1962). Language is the most important psychological tool that mediates thought, performing a regulatory role in cognitive development. This is central to the awareness and control of one's thought processes (Vygotsky, 1962). Research has shown that bilinguals, across age, outperform their monolingual peers when inhibiting distracting information during a task, switching between tasks, and/or holding information in mind while performing a task. This suggests that speaking two languages involves control processes that could become so enhanced that they could influence other aspects of cognitive processing (Bialystok et al., 2009). One such aspect of cognitive processing is memory. Language plays an important role in memory. People remember different things about the same events, depending on the usual descriptions of these events in their language communities as well as on the patterns in their own linguistic environments (Fausey et al., 2010). Language skills and memory skills are related to each other. Research among children suggests that though nonword spelling, listening comprehension, and following directions assess specific language skills, they are also influenced by verbal memory. Moreover, verbal memory skills are necessary to perform within normal limits on language assessment tasks when the stimuli are presented aurally (Anderson, 2011). The language-memory link has been shown in studies involving mono-linguals, bilinguals, and multilinguals. Adult bilinguals outperform comparable monolinguals, across time, in letter fluency and episodic memory recall (Ljungberg et al., 2013). Compared to monolingual peers, multilinguals are less likely to develop memory problems during aging, which is connected to the strong association between multilingualism (especially from early life on) and protection against cognitive impairment (without dementia), which, in turn, could be related to the enhancement of cognitive reserve and brain plasticity (Perquin et al., 2013). Though there is research that shows the cognitive advantages of bi/multilingualism, the existence and extent of this advantage continues to be debated (e.g., Lehtonen et al., 2018). Furthermore, language skills grow and decline as languages interact. Multilingualism is a process, not a state. Languages as communicative instruments and cognitive systems continuously change over time as a function of internal reorganization and interaction with the environment (de Bot & Jaensch, 2015). Thus, native language processing and skills may change in significant ways as a result of the acquisition of additional languages (Higby et al., 2013).

Language skills can develop through experience with stories (Arias Rodríguez, 2017; Atta-Alla, 2012). This can be understood in the light of the link between language and memory (Anderson, 2011), as well as the narrative structure of human experience and memory (Bruner, 1991). As Nobel Prize-winning writer Alice Munro once said, "Memory is the way we keep telling ourselves our stories." Narrative is much more than stories and communication; it is a constituent part of memory (Schank & Abelson, 1977). Telling and understanding stories are the basis for human memory. Similarly, stories are an intrinsic component of knowledge (Schank & Abelson, 1995). "Knowledge is based on stories constructed around past experiences" and "new experiences are interpreted in terms of old stories" (Schank & Abelson, 1995, p.1).

As explained above, it is not only stories that matter but also memory. The importance of memory cannot be undermined. If people do not remember the past, they cannot properly operate in the present nor plan for the future. Memory is the faculty involved in processing information – encoding, storing, and retrieving it. No learning is possible without memory (McLeod, 2013). "Learning also depends on memory, because the knowledge stored in ... memory provides the framework" to which new knowledge is linked through association (Dubuc, 2002). Memory can also be considered as the mental record of experience (Eichenbaum, 2008). Remembering is about retrieving memory. Recognition is a form or method of remembering (Humphreys & Bain, 1983). It is characterized by the ability to determine whether information or stimulus has been previously encountered (Medina, 2008). Recognition memory improves with age. In a study involving children aged 3½ to 6½ years who viewed pictures of common objects, Chalmers (2014) found that item recognition was higher for older than younger children. Similarly, the findings of Koenig et al. (2015) revealed that 7-year-olds and 11-year-olds demonstrated better recognition memory than 5-year-olds, while those of Rajan and Bell (2015) showed that 10-year-olds performed better than 8-year-olds. Moreover, memory is better for stimuli presented visually than aurally (Molesworth et al., 2017), and for negative over positive and neutral pictures (Meng et al., 2017). Studies also show that noise and selective attention during encoding negatively affect memory (Moen et al., 2017; Molesworth et al., 2017), while environmental cues introduced during memory retrieval get in the way of maintaining fidelity of memory (Selmeczy & Dobbins, 2017). Research has also shown that memory takes time to be consolidated or fixed in the brain. A new memory (e.g., novel information) is fragile in nature and remains vulnerable to disruption or interference for some time after initial learning, until or unless appropriate effort is made to remember and store it (indefinitely) (McGaugh, 2000; Müller & Pilzecker, 1900). Finally, forgetting occurs with the passage of time, with learned information or memory decaying or fading as time goes by (Dewar et al., 2007; Ebbinghaus, 1913).

Despite the aforementioned connections among language, memory, and narrative in Western literature, there remains a dearth of research on the specific relationship between language ability and memory for a story, be it in the West or more so, in the East, especially in the Philippines. This is reflected in the brevity of the introduction to this paper and the lack of local citations. To help fill this gap, the present study examined the **role of language ability in memory for a story, particularly among native Kapampangan-speaking multilingual children** in a Philippine province. It hypothesized that *language ability would predict memory for a story* (over and above the contributions of other factors). The average Filipino is multilingual (Gonzalez, 2004), with most Filipinos speaking a first language different and aside from the national language, Filipino (Simons & Fennig, 2018) and English (Dekker, 2017). Thus, this study is also a step towards the representation of these non-native Filipino speaking people in the Philippines who form the majority but are not (adequately) represented in the research literature.

Method

There being no previous research directly connected to the present exploratory descriptive study, a pilot study was first conducted.

Pilot Study

In preparation for the present study, a pilot study involving 30 children (eight 6-year-olds, eight 7-year-olds, seven 8-year-olds, and seven 9-year-olds; M_{age}= 7.43, SD = 1.14) was conducted. The children did all the tasks that the participants in the main study performed. Moreover, the measures in the main study were administered to them.

Preliminary analysis of the data showed that there was a developmental trend in language ability (means ranging from 31.38 to 55.14), baseline memory (means ranging from 0.08 to 1.61), and delayed memory (means ranging from 0.07 to 1.54), with performance improving as age increased. These results pointed to the need to look at the relationship of age and the main variables. This was undertaken in the actual study. However, there was no such clear developmental pattern observed in executive functioning (means ranging from 56.88 to 61), with the 7-year-olds scoring highest and the 8-year-olds outperforming the 9-year-olds.

Further analyses showed that language ability, baseline memory, and delayed memory were related to each other, $r \geq .36$. This provided an empirical basis for the actual study's investigation of the predictive power of language ability in memory. On the other hand, executive functioning was not related to language ability, baseline memory, and delayed memory. The discrepant results concerning executive functioning could have been connected to the "live" administration of the Luria's Hand Game where the examiner herself pointed to the participant her fist or forefinger, dividing her attention between this particular act and the act of scoring-recording the participant's response. Moreover, this manner of conducting the task lent itself to a variable time interval between trials. In the actual study, for efficiency and uniformity, the participant was shown an 81-second video continuously showing either a fist or a forefinger, across 30 trials, 2.7 seconds/trial).

Finally, evaluations using a 5-point Likert scale (Strongly agree = 5, Agree = 4, Somewhat agree = 3, Disagree = 2, Strongly disagree = 1) independently made by the researcher and two teacher-observers during the story sessions indicated that the stories were appropriate to the participants in terms of language (mean = 4.00), subject matter (mean = 4.33), theme (mean = 4.00), illustrations (mean = 4.00), and comprehensibility (mean = 4.00). The same raters found the before-telling (mean = 4.67), during-telling (mean = 4.33), and after-telling parts of the sessions (4.00) engaging to the children. These results provided the grounds for the use of the particular stories and the design of the story sessions in the actual study.

Present Study

Participants

One hundred forty-six multilingual children aged six to nine years old participated in this descriptive study (45.89% male; M_{age}= 7.42; *SD* = 1.11). There were 38 6-year-olds, 41 7-year-olds, 34 8-year-olds, and 33 9-year-olds. Kapampangan was their first language (L1), Filipino their second language (L2), and English their third language (L3). They were Grade 1 to Grade 4 public school students in the city of San Fernando, province of Pampanga. They were taught following the Department of Education's (DepEd) mother tongue-based multilingual education (MTB-MLE) policy, which is a key component of Republic Act No. 10533 or the Enhanced Basic Education Act of 2013 (Congress of the Philippines, 2013). This law mandates the use of the child's first language (L1) as medium of instruction (MOI) from Kindergarten to Grade 3, and Filipino and English (the country's official languages) as MOI from Grade 4 until high school. First language (L1) literacy instruction begins in Grade 1 and ends in Grade 3. Second language (L2; Filipino) and third language (L3; English) literacy instruction begins in Grade 2 and continues until high school.

Measures

Language, executive function, and memory tests were individually administered to the participants in their L1 (unless explicitly stated that this was not so).

Language Test. Language ability was assessed through the Expressive One-Word Picture Vocabulary Test - Fourth Edition (EOWPVT-4). The manual reports reliability ranging from Cronbach's alpha of .93 to .97 for the various age groups, with a median of .95 across all ages (Martin & Brownell, 2010). Vocabulary knowledge is a proxy for a range of language skills (Hirsch, 2013). Moreover, vocabulary learning may be considered a proxy for general language learning ability (Fraser et al., 2017). The EOWPVT has been used in studies, involving monolingual and bilingual participants (e.g., Ribot & Hoff, 2017), English language learners (e.g., Lugo-Neris et al., 2010) and language minority children (e.g., Engel De Abreu et al., 2013). Though originally an English measure, the EOWPVT-4 was administered in Kapampangan due to the lack of a similar measure in the language. In the present study, "language ability" refers to the performance in the Kapampangan version of the EOWPVT-4.

In this test, the participant was asked to name in a single word each of 170 objects (e.g., corn), actions (e.g., sew/ing), or concepts (e.g., time), of increasing difficulty. Sixty-five of the words were similar in Kapampangan and English (e.g., loan words like "computer," "basket," "aquarium"). Four practice items preceded the actual test. The starting point of the test varied depending on the participant's age. The starting word for age 6 years was computer, for age 7 years was cloud/s, for age 8 years was wall, and for age 9 years, tire. For better visibility, the pictures were shown using a PowerPoint presentation on a laptop, with one picture per slide. The slide was changed to the next one as soon as the child had responded. The task was discontinued upon the commission of six consecutive errors (ceiling score). The raw score was calculated by subtracting the number of errors from the ceiling score. The test lasted approximately 10 minutes, on average.

Measures of Executive Functioning. Broadly speaking, executive functioning (EF) refers to "skills necessary for purposeful and goal-directed behavior" (Bick et al., 2017, p.496). Research shows the association between EF and language. Bilinguals (Bialystok, 2015) and multilinguals (Higby et al., 2013) have cognitive advantages over monolinguals, particularly in terms of executive functioning. Children with language difficulties or impairments have pronounced challenges in EF compared to their typically developing peers (Gooch et al., 2016; Henry et al., 2012). Research also shows the association between executive functioning and memory (Sepeta et al., 2017). Executive functioning includes attention, working memory, and organization, which are necessary for memory development (Shaffer & Kipp, 2002). Executive functioning is strongly related to, even overlaps with, memory (Duff et al., 2005). In the light of all these, EF was measured and controlled in the present study. This was necessary to do in order to ascertain the distinct relationship between language and memory.

In this study, executive functioning was assessed in terms of two core (though non-exhaustive and not completely isolated) components: inhibitory control and working memory (De Cat et al., 2018). "Executive functioning" refers to the composite of the inhibitory control and working memory scores.

Inhibitory Control. Inhibitory control is the ability to control attention, thoughts, emotions, and/or behavior to override an internal predisposition or external distraction and do what is appropriate or necessary instead (Diamond, 2013). Participants performed two inhibitory control tasks that have been used in studies involving children: Day/Night Stroop (e.g., Rajan et al., 2014) and Luria's Hand Game (e.g., Earhart & Roberts, 2014). In the present study, "inhibitory control" refers to the composite of the Stroop and Luria scores.

In both the Day/Night Stroop and Luria's Hand Game, there were two practice items (one for each of the target responses) and 30 trials. Each correct trial was scored one point. In the Day/Night Stroop, each participant was shown either a picture of a blue sky with a sun and clouds (Day['Aldo']) or a black sky with a moon and stars (Night ['Bengi']) through a PowerPoint presentation on a laptop, one picture per slide. They should say the opposite of the slide shown to earn a point. The slide was changed to the next one as soon as the child had responded. In Luria's Hand Game, the participant was shown an 81-second video continuously showing either a fist or a forefinger. They should make the opposite of the hand gesture shown to earn a point.

Working Memory. Working memory requires managing information that is no longer perceptually present. It involves holding that information in mind and mentally working with it (Diamond, 2013). The working memory tasks were taken from the Wechsler Intelligence Scale for Children - IV (Wechsler, 2003) Digit Span subtest, which has a reliability of .87, as reported in the manual. This measure has been used in studies involving children (e.g., Rajan et al., 2014). In the present study, "working memory" refers to the composite of the Digit Span Forward and the Digit Span Backward scores.

In the WISC- IV Digit Span Forward task, the participant was asked to repeat a sequence of numbers in the order they were said by the examiner. In the WISC- IV Digit Span Backward task, the examiner said a sequence of numbers, which the participant had to repeat in backward order. There were 16 trials for each of the two tasks, which started with two digits and got progressively longer, up to nine digits. Each sequence length had two trials, one of which the participant had to repeat correctly to proceed to the next sequence length. Otherwise, the task was discontinued. Each correctly repeated sequence was scored one point. In both tasks, instructions were given in Kapampangan, while the digits were said and repeated in English, since it was the language the children normally used in naming the numbers and in counting.

Memory Tests. Memory was measured in terms of recognition memory, as in past research involving children (e.g., Koenig et al., 2015). Recognition memory required the participants to tell whether information was previously encountered in the story ("Yes") or not ("No"). Recognition memory was assessed twice, baseline memory (after the story session) and delayed memory (6-7 days after the story session). The baseline and delayed memory tests were similar across stories in that the items/statements were distributed among the characters and across the plot.

To measure memory for each story (either baseline or delayed), a test consisting of 10 trials or items (5 correct, 5 incorrect), with two practice items (one where the answer was YES, and the other NO), was given to each child. The order of the items in each test was counterbalanced. The directions, translated into English, were: "I will read to you a statement and show you a picture. You have to tell me if this was in the story or not. If your answer is YES, put the picture in the box with the cover of the story. If your answer is NO, put the picture in the box with the X mark. If you are not sure about your answer, put the picture in the box with the ? mark." After the 10 trials/items were over, the examiner got the pictures in the ? box and showed each one of them again to the child, asking them to place it either in the box with the cover of the story or in the X box. Each picture was colored and 8.5 x 11 inches in dimension. It was either directly lifted from the story, if the idea it represented was in the story, or drawn and colored in the same style as the actual illustrations of the story, if the idea it represented was not in the story. (See Appendix A for sample items.)

1. Baseline memory test

This test was administered to each participant right after the story session (the third session). Children who were waiting for their turn to do the test worked on an art activity which was connected to the story in a general sense, but not to the specific content of the test items (e.g., completing the tentacles of a squid cut-out).

2. Delayed memory test

This test was given to each participant six to seven days after the story session (the fourth session). It was administered in the same manner as the baseline memory test, but without any waiting activity.

The forced choice (Yes-No) baseline and delayed memory tests were scored based on the signal detection theory (SDT). The SDT provides a way to measure decision-making ability under some uncertainty, like when discriminating between two stimuli, one of which bears the target information while the other distracts from it or serves as 'noise' (Stanislaw &Todorov, 1999). The hit rate (proportion of trials on which the child correctly identified a picture/statement that had been in the story) and false alarm rate (proportion of trials on which a picture/statement not in the story was incorrectly identified as part of it) were calculated to determine item recognition accuracy, or d' (Snodgrass & Corwin, 1988). This has been used in research on recognition memory among children (e.g., Qi, 2019). The d' (sensitivity index) was used because attention and organization are essential for memory (Shaffer & Kipp, 2002). Moreover, noise and selective attention negatively affect memory (Molesworth et al., 2017; Moen et al., 2017).

Materials

Three pourquoi stories in Kapampangan were used– *Bakit Aspak Ya Gulut ing Pawu* ('Why a Turtle's Back is Cracked'), *Bakit Susulparit Yang Tinta ing Pusit* ('Why a Squid Squirts Ink'), and *Bakit Makabitin Yang Patiwarik ingTalibatab* ('Why a Bat Hangs Upside Down'). They showed a cause-effect chain of events where the main character suffered the consequences of previous actions. These stories, though communicating a serious message, unfolded in a lighthearted manner (with a touch of humor) and appealed to children's interest or curiosity. These are among the qualities of good children's stories for Filipinos (Diaz De Rivera, 2000; Padilla, 2009). The stories were controlled for length and word choice to make them understandable. They were all illustrated by the same person, using the same style and media. Each story was illustrated and printed as a big book, 13 inches x 19 inches in size. (See Figures 1-3 for sample pages.) At the time of the study, the stories had not been previously published in any of the children's three languages and had not been used in their language classes.

Procedure

The children participated in four different sessions during school hours. Three of these sessions were solely for testing while one was a story session that was followed by a test. These sessions were all held in the same room designated by the school principal for the activities connected to the study. Table 1 presents the description and purpose of each session in the data collection process.

Testing Sessions. The language, executive function, baseline memory, and delayed memory tests were individually administered to the participants in four different sessions (see Table 1).

Story Sessions. Three story sessions in Kapampangan were held, one for each story. The stories were randomized among the participants, per age group. Each child participated in one story session only. Each story session had a maximum of 10 participants of the same age. The session was divided into three parts: before telling, during telling, and after telling (see Table 1). These parts of the session and the questions therein facilitate children's engagement with the story (Cambourne, 2002). These three parts were similar in the number and nature of questions across stories. The story session was brief and straightforward since it was intended to be a "stimulus" session, not a full-blown reading nor language lesson. Instead of using oral storytelling, a picture storybook in big book format was read aloud because Molesworth et al. (2017) found that among children, memory was better for stimulus presented visually than aurally. During the session, the story was presented both visually and aurally – the storyteller read the story aloud while showing each page of the book. (See Appendix B for a sample story session guide.)

Results

Preliminary analyses were conducted to determine variability and trends in the data. Moreover, correlations were computed to check if there was sufficient basis for conducting regressions. Table 2 presents the participants' mean scores in executive functioning, language ability, and baseline and delayed memory. The data showed sufficient variability, with no floor or ceiling effect. There was a developmental trend in all the variables, with performance improving as age increased. Post-hoc Bonferroni comparisons of one-way analyses of variance (ANOVAs) revealed that the 8-year-olds and the 9-year-olds consistently and significantly outperformed the

6-year-olds in the four variables, $F's(3, 142) \geq 5.30$, $p's < 0.01$. Additional ANOVAs showed no significant differences in baseline and delayed memory no matter what story was told to the participants, $F(2, 143) = 1.144$, $p = .321$ and $F(2, 143) = 0.945$, $p = .391$).

An examination of the sample means revealed a decrease from baseline to delayed memory (0.22 or 19.82%). Paired-sample t-test indicated that this difference was significant, $t(145) = 2.58$, $p < 0.05$). Independent-samples t-test results showed no statistically significant difference in delayed memory between participants who had a delay of six (6) days and those who had a delay of seven (7) days, $t(144) = 0.457$, $p = .649$. Finally, the correlations in Table 3 show that executive functioning, language ability, and baseline and delayed memory were significantly related to each other ($r's \geq .24$), providing sufficient basis for conducting regressions.

To test the hypothesis that *language ability would predict memory for a story* (over and above the contributions of other factors), hierarchical regressions were conducted. In both baseline and delayed memory hierarchical regressions, age and executive functioning were used as control variables, as the first step. This was done because preliminary analyses revealed significant age differences in all the variables, as well as significant relationships between executive functioning and language ability and memory.

Consistent with the hypothesis, language ability significantly contributed to baseline and delayed memory for a story, even after entering the control variables, which contributed a significant amount of variance, $\Delta R^2 = .277$ and .191, respectively. The contribution of language ability was higher in delayed memory (7% unique variance, $\beta = .325$, $t(142_) = 3.66$, $p < .001$) than in baseline memory (2.9% unique variance, $\beta = .208$, $t(142) = 2.42$, $p < .05$). In addition to language ability, age was also uniquely related to baseline memory, $\beta = .379$, $t(142) = 4.38$, $p < .001$, and to delayed memory, $\beta = .185$, $t(142) = 2.07$, $p < .05$). Executive functioning did not contribute uniquely to memory. (See Table 4.)

Due to the significant unique contributions of language ability and age to memory, one-way analyses of covariance (ANCOVAs) were conducted, with language ability as the independent variable and age as the covariate. The participants were divided into 4 language ability groups: poor (1 standard deviation [SD] or more below the mean), below average (less than 1 SD below the mean), above average (less than 1 SD above the mean), and good (1 SD or more above the mean). There was a significant difference in mean baseline memory, $F(3, 141) = 4.394$, $p < .01$) and mean delayed memory, $F(3, 141) = 5.104$, $p < .01$) among the groups. Post-hoc Bonferroni comparisons revealed that in baseline memory, the performance of participants with good language ability (1.70) was better than that of participants with above average (1.09), below average (0.99), and poor language ability (0.77). In delayed memory, the participants with good language ability (1.50) outperformed only the participants with below average (0.55) language ability. Even after controlling for age, children with good language ability had significantly better baseline and delayed memory for a story than those with below average language ability.

Discussion

The present study examined the role of language ability in memory for a story. It hypothesized that *language ability would predict memory for a story*, over and above the contributions of other factors.

There was a developmental trend in both baseline and delayed memory, with performance improving as age increased. This is similar to the findings of Koenig et al. (2015) and Rajan and Bell (2015). On the other hand, there was a decrease in performance from baseline memory to delayed memory. This could be due to the insufficiency of the post-telling activities (brief discussion on the story and related art activity) in consolidating or fixing children's memory for the story (McGaugh, 2000; Müller & Pilzecker, 1900). An alternative, if not additional, explanation is that memory for the story might have faded or decayed as time passed (Dewar et at., 2007; Ebbinghaus, 1913). It is possible that different post-telling activities and/or a shorter interval between the baseline and delayed memory tests would yield different results. This requires further investigation.

As hypothesized, language ability significantly predicted baseline and delayed memory for a story, over and above the significant contribution of age (and the non-significant influence of executive functioning). This robust relationship between language and memory supports Piaget's (1959) and Vygotsky's (1962) assertion that language and cognition interact with each other. The results are also consistent with the claim of Fausey et al. (2010) that language plays an important role in memory. Moreover, they support Anderson's findings (2011) that language skills and memory skills are related to each other. The present study adds to the body of research that documents the language-memory connection (e.g., Ljungberg et al., 2013; Perquin et al., 2013).

The findings of the study suggest that language is linked to memory for a story, implying that improvements in language ability will enhance memory skills connected to (a) narrative. This link could be explained by the fact that the information (story) that the children had to remember was language-based. The language-story connection has been established in studies that show that language skills develop through experience with stories (e.g., Arias Rodríguez, 2017; Atta-Alla, 2012). Meanwhile, the relationship between the narrative structure and memory has been previously claimed by Bruner (1991), Schank and Abelson (1977), and Schank and Abelson (1995). If improvements in language ability could indeed enhance memory for a story, then effective language instruction would have benefits beyond the students' language development, since they could influence memory processes as well. However, a study with an experimental design is necessary to establish a clear causal relationship between language ability and memory. Research with specific focus on the nature of the relationship between memory skills and language comprehension skills will be especially instructive. "If a child misses a question related to information he or she has heard, how do we know if the problem stems from lack of comprehension (language) or lack of remembering (memory)?" (Anderson, 2011, p. 117). Many classroom activities, as well as language and academic assessment tasks, require both language and memory skills. Understanding how the two are different and how they are related is an important step in identifying why a learner may be performing at a particular level and, consequently, what kind of instruction or intervention will benefit them the most.

On the other hand, because learning depends on memory (Dubuc, 2002; McLeod, 2013), and memory for a story is significantly predicted by language ability, it implies that developing language skills will influence not only memory but learning in general. This is important to note in the light of the MTB-MLE policy, which mandates language learning not only in the mother tongue but in Filipino and English as well, the country's official languages. Developing skills in three languages bodes well for learning because it provides learners with multiple media and tools to facilitate cognition. It implies that good language teaching does matter. Effective language instruction promotes the development of language skills, which influence memory, on which learning depends. Further research on the relationships among language ability, memory skills, and academic performance may lead to a better understanding of the different roles that each of these variables play in learning.

Limitations and Future Directions

Admittedly, the logistical constraints of the study (e.g., large sample size, individual testing, non-standardized measures) are connected to its methodological limitations. Due to these limitations, the results should be interpreted with caution. First, language ability was assessed only in the participants' first language and focused on expressive vocabulary as a proxy. The original English vocabulary test was normed and standardized on individuals not similar to the present sample. The psychometric properties of the Kapampangan version used in the study have not been established. Second, the measures used to test memory are neither standardized nor normed on the present sample or on a comparable one. It is the same case for the measures of executive functioning. Third, the study focused on memory for narrative information in general, and did not look at the specific aspects of a story that are more salient than others. Nevertheless, the results of the study can still be taken seriously for three reasons. First, the choice of measures and the design of the stimulus session are supported by previous research. Second, the findings in the pilot study informed the design and conduct of key aspects of data collection and stimulus sessions (e.g., testing, story session) as well as the data analysis in the main study. Finally, the large sample size lends statistical power to the present study.

Future research can address the gaps in the present study. Subsequent investigations can examine the relationship between memory for stories and facts, and other language skills (aside from expressive vocabulary), to understand more holistically the language-memory connection. Second, since test norming and standardization takes a lot of time and financial resources, the measures in the present study should be improved by using them in other studies, analyzing their psychometric properties, and revising them accordingly. Third, a qualitative analysis of the remembered and forgotten information can inform the conduct of read aloud or story sessions in language arts classes, in a manner that will facilitate the retention of key information. Fourth, the present study can be replicated using other Philippine languages to determine whether the relationship between language and memory is specific to Kapampangan or not. Fifth, a study on the development of language and memory skills across time can be undertaken, to determine if the same relationship would hold longitudinally. This is important because the participants are multilingual. Language skills grow and decline as languages interact (De Bot & Jaensch, 2015). Furthermore, memory decays with the passage of time (Dewar et al., 2007; Ebbinghaus, 1913). Finally (and corollary to the recommendation above), it will be good to examine not only L1 but also L2 and L3 skills, vis-à-vis their contributions to memory for both narrative and non-narrative information, in all the learners' languages. This will benefit students who are learning content in (a) language/s not their own. It is also particularly important among Filipino primary grades students who are learning in and through different languages.

Conclusion

Despite the limitations of the present investigation and the further research needed for a better understanding of the interconnections of the variables examined, it is worth noting that this exploratory study has shown the **robust relationship between first language ability and memory for a story**. The findings suggest that **language is strongly linked to memory, implying that improvements in language ability will enhance memory skills**. This is a **significant step in understanding language, memory, and learning, particularly among populations that are underrepresented in the literature and in languages that are under-researched.** As the United Nations Educational, Scientific, and Cultural Organization (UNESCO) asserted several decades ago, "every language is sufficient enough to give high cognitive skills to its users" (1953, p. 11).

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Table 1
Sessions in the Data Collection Process

Session	Description	Purpose
1	Individual administration of the Expressive One-Word Picture Vocabulary Test – Fourth Edition (EOWPVT – 4) Kapampangan version	Gather data on the participants' first language ability (predictor variable)
2	Individual administration of the inhibitory control measures • Luria's Hand Game • Day/Night Stroop Individual administration of the working memory measures • Wechsler Intelligence Scale for Children (WISC) – IV Forward Digit Span • Wechsler Intelligence Scale for Children (WISC) – IV Backward Digit Span	Gather data on the participants' executive functioning (control variable)
3	Age-based group story session (maximum of 10 students per group) • before telling: activating prior knowledge in connection to the story and providing motivation and purpose for listening to it • during telling: sustaining motivation for and encouraging response to the story • after telling: reinforcing and extending ideas from the story	Conduct the "stimulus" session (which served as the basis for the memory tests)
	Individual administration of the baseline memory test: right after the story session	Gather data on the participants' baseline memory for the story they listened to (dependent variable)
4	Individual administration of the delayed memory test: six to seven days after the story session	Gather data on the participants' delayed memory for the story they listened to (dependent variable)

Table 2
Participants' Mean Scores in the Different Variables

Age group (years)	Executive functioning (max: 92)	Language ability (max: 170)	Baseline memory (max: 3.68)	Delayed memory (max: 3.68)
6 (n = 38)	55.74 (5.08)	31.39 (6.90)	0.34 (0.77)	0.21 (0.69)
7 (n = 41)	58.17 (5.52)	41.80 (9.20)	0.98 (1.01)	0.86 (0.92)
8 (n = 34)	59.71 (6.09)	45.29 (8.36)	1.59 (0.79)	1.26 (1.11)
9 (n = 33)	60.64 (5.63)	50.48 (13.43)	1.66 (0.72)	1.34 (1.05)
All (n = 146)	58.45 (5.82)	41.87 (11.82)	1.11 (0.99)	0.89 (1.04)

Note. Standard deviations are in parentheses.

Table 3
Correlations of the Variables

	1	2	3	4
1. Executive functioning	-			
2. Language ability	.29**	-		
3. Baseline memory	.24**	.44**	-	
4. Delayed memory	.27**	.47**	.50**	-

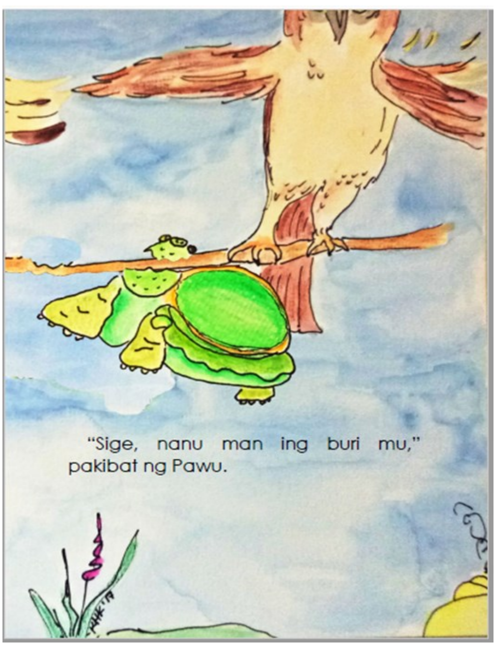
**$p < 0.01$

Table 4
Variables Related to Memory for a Story

Step	Dependent variable	ΔR^2	β	Final β	Final *t*
	Baseline memory (Total R^2 = .305, $F(3, 142) = 20.81$, p <0.001)				
1	Age	.277	.490***	.379	4.38***
	Executive functioning		.092	.066	0.89
2	Language ability	.029	.208*	.208	2.42*
	Delayed memory (Total R^2 = .261, $F(3, 142) = 16.71$, p <0.001)				
1	Age	.191	.358***	.185	2.07*
	Executive functioning		.163*	.123	1.61
2	Language ability	.070	.325***	.325	3.66***

*$p < 0.05$; *** $p < 0.001$

Figure 1
A page from *Bakit Aspak Ya Gulut ing Pawu*



Note: This figure demonstrates a scene close to the story's climax.

Figure 2
A page from *Bakit Susulparit Yang Tinta ing Pusit*

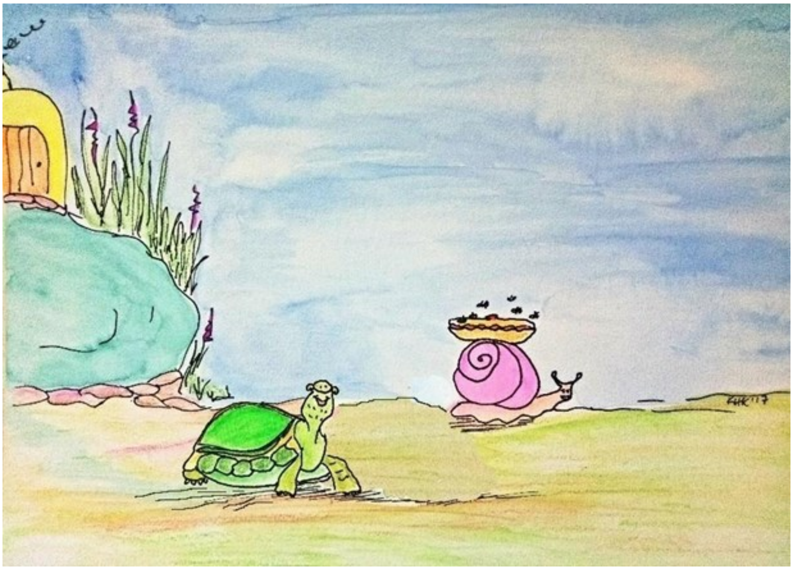
Note: This figure demonstrates a scene near the story's end.

Figure 3
A page from *Bakit Makabitin Yang Patiwarik ing Talibatab*

Note: This figure demonstrates the story's last scene.

Appendix A

Sample Items for Memory for a Story
(translated into English)



Snail brought Frog a pie.

Turtle broke his neck when he fell.

Appendix B

Sample Story Session Guide
(translated into English)

- Before telling
  - ◊ What do you see in this picture? (Storyteller shows a picture of a bat hanging upside down.)
  - ◊ What do you know about a bat?
  - ◊ Why does a bat hang upside down? Let's find out if you are right.
- During telling
  - ◊ What did Bat do when Bird asked him to help her build a nest?
  - ◊ What did Bat do when Rat asked him to help him find food?
  - ◊ What do you think Bat would tell Cat? Let's find out if you are right.
  - ◊ What do you think Bat's reply to Cat would be?
  - ◊ What do you think Bat would do now? Let's find out if you are right.
  - ◊ What did Bird, Rat, and Cat tell Bat when he came back? Let's say it together.
  - ◊ What do you think happened next?
- After telling
  - ◊ According to the story, why does a bat hang upside down? Let's go back to your earlier predictions and find out who guessed it right.
  - ◊ If you were Bat's friend, what would you tell him? Why?
  - ◊ Now it's time for you to make your own bat! Put the missing eyes in the bat cut-out. Then decorate its wings. (This is a waiting activity as the children are called one by one to take the baseline memory test about the story.)

About the Author

Portia P. Padilla is a PhD Psychology (Developmental) candidate at the Wilfrid Laurier University (Waterloo, Ontario, Canada). She earned her Bachelor of Secondary Education (Major in English, Minor in Math) and Master of Arts in Education (Major in Reading Education) degrees from the University of the Philippines Diliman, where she is currently a faculty member in the College of Education. Her current research interests include first language reading, bi/multilingual reading, teacher knowledge of reading, Philippine children's literature, and language and memory, most of which are reflected in her recent national and international conference presentations. Her published papers are related to general education, reading comprehension, metacognition, dyslexia, local children's storybooks, and distance education.

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Author Note

This study is part of a comprehensive research project which was reviewed and approved by the University Research Ethics Board at Wilfrid Laurier University (REB #5292). The corresponding author, Portia P. Padilla, declares no conflict of interest in connection to the present study.