2021

Reading in Kapampangan, Filipino, and English: A Look at Multilingual Children in an Economically Challenging Philippine Community

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A Look at Multilingual Children in an Economically Challenging Philippine Community

by

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MA, University of the Philippines, 2002

DISSERTATION

Submitted to the Department of Psychology

In Partial Fulfillment of the Requirements for the Degree

Doctor of Philosophy in Psychology

Wilfrid Laurier University

Abstract

The present studies advance current understanding of the skills and processes involved in multilingual reading, especially in less researched alphabetic languages. These studies examined whether the dominant models in reading in English can explain the reading processes involved among low-income multilingual speakers of Kapampangan (L1), Filipino (L2), and English (L3) in the Philippines, a developing country. Kapampangan and Filipino use the same Roman alphabet that English uses. However, these two languages have transparent orthographies while English has an opaque orthography.

Study 1 examined the psycholinguistic grain size theory within the context of multilingual reading. There were three hundred twenty-six children aged 8 to 15 years old who were individually tested on phonological awareness (PA), vocabulary, and word reading fluency in their three languages (Kapampangan, Filipino, and English), as well as on non-verbal intelligence and rapid automatized naming (RAN). It was hypothesized that 1) phonological awareness would be related to word reading fluency in each language (no matter the transparency/depth of its orthography), and 2) phonological awareness (PA) in the three languages would make unique and shared contributions to word reading fluency in each language. As expected, hierarchical regression analyses showed that PA was significantly related to word reading fluency in each language. The relationship was stronger in opaque English than in the two transparent local languages. Vocabulary made a significant contribution to English word reading fluency, but not to Kapampangan and Filipino word reading fluency. English PA and vocabulary were related to L1 and L2 word reading fluency as well. RAN was a robust predictor of word reading fluency in the three languages. As predicted, commonality analyses showed that PA in the three languages made unique and shared contributions to word reading

fluency in each language. English PA yielded the highest unique contribution to word reading fluency in all languages, larger than the common variance shared by PA in the three languages.

Study 2 examined a modified simple view of reading (SVR) within the context of multilingual reading. There were two hundred twelve children aged 8 to 13 years old who were individually assessed on word reading fluency and vocabulary and group tested on reading comprehension in their three languages (Kapampangan, Filipino, and English). It was hypothesized that 1) word reading fluency (proxy for decoding) and vocabulary (proxy for linguistic comprehension) would make unique contributions to reading comprehension in each language, and 2) the product of word reading fluency and vocabulary would significantly contribute to reading comprehension over and above their own unique contributions. Contrary to expectations, hierarchical regression analyses showed that the predictors contributed unique variance in reading comprehension only in English. Word reading fluency and vocabulary, as well as the product of word reading fluency and vocabulary, significantly predicted reading comprehension even after the other variables were controlled for. Grade level, a control variable, contributed unique variance in reading comprehension in Filipino, over and above the contributions of the other predictors. The findings suggest that a modified SVR is insufficient for understanding reading among multilingual readers in socio-economically and educationally challenging contexts. Aside from cognitive-linguistic factors, ecological factors matter in reading.

Study 3 examined the longitudinal relationship between vocabulary and word reading fluency in multilingual Kapampangan-Filipino-English speakers. There were two hundred children aged 8 to 13 years old who were individually tested on vocabulary and word reading fluency in the three languages across three time points that were six months apart. To determine the nature of this relationship, a three-wave cross-lagged panel analysis was conducted for each

language (with rapid automatized naming and phonological awareness as control variables in the first time point). As predicted, the best-fitting model for the data indicated a similar pattern of relations between vocabulary and word reading fluency over time across the three alphabetic languages (though the strength of the associations varied). Results showed a relative weakness in vocabulary, as well as the absence of significant relations to word reading fluency in all three languages. Overall, the autoregressive, concurrent, and cross-lagged relations of vocabulary and word reading fluency suggest a unidirectional relationship from word reading fluency to vocabulary.

Keywords: phonological awareness, word reading fluency, vocabulary, reading comprehension, multilingual, longitudinal, Philippines

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Introduction

Not all learners have the opportunity to achieve their potential. Six out of ten children and adolescents worldwide do not achieve the minimum proficiency level in reading (United Nations Educational, Scientific, and Cultural Organization Institute for Statistics [UNESCO UIS], 2017). Low-income and lower-middle-income countries account for a significantly large share of this number (UNESCO UIS, 2017). Many learners in these developing countries are multilingual speakers (Dörnyei & Csizér, 2002), which presents additional challenges to language and reading acquisition (Cenoz, 2003; Schroeder & Marian, 2017; Schwartz et al., 2007). More than two-thirds of these young people who struggle with learning to read are in school (UNESCO UIS, 2017). This is a learning crisis because without reading skills, attainment of academic success and fulfilling employment is compromised (Organisation for Economic Co-operation and Development [OECD], 2012). It is a waste of human potential, which threatens global progress (UNESCO UIS, 2017). Despite the scope of this problem, little research has been conducted on reading among multilingual learners in developing countries (Pretorius & Currin, 2010), with most research examining reading in English among monolinguals and bilinguals in North America and Europe. Studies have found that 1) the majority of the world's population understand and speak two or more languages (Dörnyei & Csizér, 2002); 2) the acquisition of multiple languages does not necessarily proceed in a uniform fashion (McCabe et al., 2013), and native language processing may change in significant ways as a result of the acquisition of additional languages (Higby et al., 2013); 3) the distinct cognitive consequences of multilingualism are not a mere extension of the effects of bilingualism (Schroeder & Marian, 2017), since learning a third or additional language is not the same as learning a second language (Schwartz et al., 2007); and 4) more than one billion people in more than 100 developing

countries live in multidimensional poverty, or approximately 80% of the world's population (United Nations Development Programme [UNDP], 2018). Reading instruction is one way to combat the effects of poverty and inequality (Duncan & Murnane, 2014). Reading is defined as a meaning-making process involving the reader, the text, and the activity, whose interrelationships occur within a socio-cultural context (RAND Reading Study Group [RRSG], 2002). However, mechanisms of reading acquisition in various languages and orthographies are not necessarily similar (Share, 2008). Models developed to understand reading acquisition in English cannot be readily generalized to other languages (Gathercole, 2013; Su et al., 2010) and across learning contexts (Niyozov & Tarc, 2015).

In light of the above, three studies were conducted for this dissertation. Collectively, the three studies advance current understanding of the skills and processes involved in multilingual reading, especially in less researched alphabetic languages. These studies explored whether the dominant models of word reading and reading comprehension in English can explain the reading processes involved among low-income multilingual learners in a developing country, who have to learn to read in three different languages as early as the second grade. All three studies were conducted among speakers of Kapampangan (first language or L1), Filipino (second language or L2), and English (third language or L3) in the Philippines. Kapampangan and Filipino orthographies are generally transparent (i.e., consistent letter-sound correspondences) while English orthography is relatively opaque (i.e., inconsistent letter-sound correspondences) (Katz & Frost, 1992). Kapampangan is one of the ten major languages in the Philippines. There is no literature on reading in this language. Filipino is the national language of the Philippines, but it remains under-represented in reading research. Overall, there is a dearth of literature on reading acquisition and development among learners in the Philippines, in whichever language or

languages.

Study 1 examined the role of phonological awareness in word reading fluency across Kapampangan, Filipino, and English. The aim was to determine the contributions of phonological awareness to word reading fluency in alphabetic languages that vary in orthographic depth.

Study 2 examined the roles of word reading fluency and vocabulary in reading comprehension across Kapampangan, Filipino, and English. The aim was to determine the unique contributions of word reading fluency and vocabulary to reading comprehension in each language, as well as to ascertain whether the product of word reading fluency and vocabulary would contribute to reading comprehension over and above their own unique contributions.

Study 3 examined the co-development and relations between word reading fluency and vocabulary in Kapampangan, Filipino, and English in a longitudinal design across three time points. The aim was to determine whether the nature of the relationship of vocabulary and word reading was similar across languages and over time, regardless of orthographic depth.

Larger Context of the Studies: The Philippines

All three studies were conducted in Southeast Asia, specifically in the Philippines. In order to better understand the Philippine context, a brief description of the socioeconomic, linguistic, and educational situations in the country is included below.

Socioeconomic Situation

The Philippines is a developing country in Asia (UNDP, 2018) that is underrepresented in the reading literature. Based on the last population census in 2015, it is home to more than 100 million people, many of whom live in challenging conditions (Philippine Statistics Authority [PSA], 2019a). In particular, more than 30% of children grow up in poverty (PSA, 2019b). The

recent Programme for International Student Assessment (PISA) 2018 results revealed that government spending per student in the Philippines was the lowest among 79 participating countries – and 90% lower than the average expenditure per student in Organisation for Economic Co-operation and Development (OECD) countries. Moreover, the relationship between a student's socio-economic status and his or her performance on the PISA was remarkably strong (OECD, 2019).

Linguistic Situation

The Philippines is a multilingual country, with more than 180 languages spoken by its geographically dispersed people. The official languages are Filipino and English (Simons & Fennig, 2018). In addition, many people in the Philippines speak more than two languages. These languages include "mother tongues" or languages spoken at home, as well as languages spoken by their local communities (e.g., the provincial or regional language or *lingua franca*), which might be the same as or different from home languages (Dekker, 2017). The ten most widely spoken languages (other than Filipino and English) are Tagalog, Sebuano, Ilokano, Hiligaynon, Bikol, Samar-Leyte, Kapampangan, Pangasinan, Maranao, and Magindanao. These are considered major languages, each of which is spoken by more than one million people (Reid, 2005).

Multilingualism in the Philippines reveals the differentiated value and power accorded to languages. English, a former colonial language, is the most highly prized language (Mahboob & Cruz, 2013; Tupas, 2015). As mandated in the country's 1987 Constitution, English is one of the two official languages of the country, particularly for purposes of communication and instruction. English is perceived to be the "language of jobs and socioeconomic mobility" (Tupas, 2015, p. 120). However, the structures for learning English are unequal – the more

socioeconomically privileged go to schools with good English teaching and become proficient, while those who cannot afford to do so, learn English at a less desirable level (Tupas, 2015). Though learning English is seen as a way out of poverty, it highlights existing social inequalities (Lorente, 2013; Tupas, 2015). Additionally, English continues to influence Filipino and other Philippine languages (Baklanova, 2017; Reid, 2005). This could be attributed to the continuous contact of English with local languages and its prestige as a language within the Philippine multilingual context (Baklanova, 2017). The relationship of English to local languages is mediated by the government-mandated national language, Filipino. Like English, Filipino is an official language of the country (Phil. Const. art. XIV § 7). Though Filipino challenges the dominance of English, Filipino still contributes to the marginalization of the rest of the indigenous languages (Tupas, 2015).

Filipino. Filipino is the national language, as mandated in the country's 1987 Constitution. It is to be developed and enriched based on Philippine and other languages (Phil. Const. art. XIV § 6). It has around 45 million speakers, mostly as a second language (Simons & Fennig, 2018). Filipino is primarily based on Tagalog (Malabonga & Marinova-Todd, 2007) and is its most prestigious variety (Nolasco, 2007). The two languages are sometimes used interchangeably (Gonzalez, 2005). Tagalog is a natural language with more than 20 million native speakers spread over Metro Manila (National Capital Region), the Southern Tagalog provinces, and in parts of the Central Luzon region (Simons & Fennig, 2018).

Kapampangan. Kapampangan (also known as Pampango or Amánung Sísuan) is a major Philippine language (Reid, 2005). It is the language of provincial identity and the medium of wider communication in the province of Pampanga[1] in the region of Central Luzon. It is

[1] The research site is located in this province. Kapampangan is the participants' first language.

spoken by more than two million native speakers, including those in the neighboring provinces of Tarlac, Nueva Ecija, Bulacan, and Bataan (Simons & Fennig, 2018).

Filipino and Kapampangan. Filipino and Kapampangan both belong to the Western Malayo-Polynesian group of the Austronesian language family. Though they are distinct languages, they have commonalities in phonology (e.g., syllable-timed), morphology (e.g., functions of derivational and inflectional affixes), syntax (e.g., verb before noun in a sentence), and lexicon (e.g., 39 % shared vocabulary) (Gonzalez, 2005).

Before the Spanish colonizers introduced the Roman alphabet, both Kapampangan and Tagalog used their own distinct alphasyllabaries, which appear to have similarities with other Indic scripts of Southeast Asia (Pangilinan, 2012; Scott, 1984).[2] An alphasyllabary is a writing system in which each unit represents a consonant and a particular vowel, which can be muted or changed to another vowel through diacritics or other modifications of the base sign (Daniels & Bright, 1996). Kapampangan used the *kulitan* script (Pangilinan, 2012), while Tagalog used *baybayin* script (Scott, 1984).

The current Filipino and Kapampangan orthographies are similar. Both use the Roman alphabet, which has all the 26 letters of English (named and categorized similarly), with the addition of the consonants *ng* (named as in English) and *ñ* (from Spanish, called /enye/). The "borrowed" letters *c, f, j, ñ, q, v, x,* and *z* (plus *h* for Kapampangan) are primarily used to represent proper nouns, technical terms, and local or foreign words (assimilated/integrated into Tagalog and/or Kapampangan) which have sounds not native to Tagalog and/or Kapampangan (Komisyon sa Wikang Filipino [KWF], 2013; Samson et al., 2016). Despite the inclusion of

[2] The sources have observed what appear to be similarities of the pre-colonial Kapampangan and Tagalog alphasyllabaries with Indic scripts, but do not claim that Indic scripts are alphasyllabaries. The symbol unit of Indic orthographies is the *akshara* (Nag, 2014). The concept of *akshara* has multiple levels of meaning if considered not only in linguistic terms but also in historical and sociocultural terms (Ramanujan & Weekes, 2019).

these "non-native" letters, Filipino and Kapampangan are both written with shallow orthographies, following the basic principle of writing a word the way it sounds and saying it the way it is written. Both languages are generally transparent (Ocampo, 2002; Samson et al., 2016), in contrast to the opaque English orthography, which has quasi-regular letter-sound/sound-letter relations (Katz & Frost, 1992).

Tagalog-based Filipino uses five short monophthongal vowel sounds (*a, e, i, o, u*) and 16 consonant sounds in native words (*b, d, g, h, k, l, m, n, ng* [the velar nasal *ŋ*], *p, r, s, t, w, y*, and the glottal stop *ʔ*) (Natividad, 1967; Reid & Shachter, 2008). Other consonant sounds occur in loanwords (Reid & Shachter, 2008). Kapampangan has the same five vowel sounds but only 14 of the above consonant sounds (minus the glottal fricative *h* and the glottal stop *ʔ*) in native words (Gonzalez, 2005). It has "the reflex of final glottal stop, but has no distinctive glottal stop at the beginning and … in the middle" (Gonzalez, 2005, p. 97). Similar to Filipino, other consonant sounds in Kapampangan are found in loanwords (Samson et al., 2016). As in English, a syllable in Kapampangan and Filipino is marked by a vowel sound, with or without a consonant (KWF, 2013; Samson et al., 2016). The most common syllable patterns in Filipino are consonant-vowel (CV) and consonant-vowel-consonant (CVC) (Reid & Shachter, 2008), while the minimum syllable in Kapampangan is consonant-vowel (CV) and the maximum syllable is CCV (consonant-consonant-vowel) (Natividad, 1967). As syllable-timed languages, Kapampangan and Filipino give every syllable, stressed or not, the same amount of time. The length of time it takes to say a word depends on its number of syllables. In contrast, English is a stress-timed language, where the number of stressed syllables determines how long it takes to say an utterance (Forman, 1971; Gonzalez, 2005). Kapampangan and Filipino, being languages with regular orthographies, use many polysyllabic words (Forman, 1971; Malabonga &

Marinova-Todd, 2007). In contrast, English has many monosyllabic words (Marinelli et al., 2016).

Educational Situation

The Philippines recently embarked on a major educational reform through the Enhanced Basic Education Act of 2013 (Republic Act 10533), which strengthens the curriculum and increases the number of years of basic education. This law aims to give students quality education that is globally competitive. It adds kindergarten and two more years of high school (K to 12) to the old basic ten-year education cycle, as well as recognizes the important role of language during children's formative years (Congress of the Philippines, 2013). A banner program– mother tongue-based multilingual education (MTB-MLE)– mandates "mother tongue" (MT) instruction from kindergarten to grade 3 (Congress of the Philippines, 2013). Literacy instruction in the "mother tongue" starts in grade 1 and ends in grade 3 (Department of Education [DepEd], 2016b). Filipino oral instruction is introduced in the second quarter of grade 1 (DepEd, 2016c). Filipino literacy instruction starts in the third quarter of grade 1 and continues until grade 10 (DepEd, 2016c). Filipino is gradually used as a language of instruction starting in grade 4 (Congress of the Philippines, 2013). English oral instruction is introduced in the third quarter of grade 1 (DepEd, 2016a). English literacy instruction starts in the first quarter of grade 2 and continues until grade 10 (DepEd, 2016a). English is gradually used as a language of instruction starting in grade 4 (Congress of the Philippines, 2013). The MTB-MLE policy aims to develop students' cognitive, literacy, and academic skills in the three languages while enhancing pride in their cultural heritage (DepEd, 2012). However, policies do not necessarily succeed on their own merits (Hudson et al., 2019), nor do educational reforms always significantly transform outcomes (Bautista et al., 2008). The three examples below prove so.

First, Metila and colleagues (2016) investigated best practice in MTB-MLE. They asked teachers and administrators in 200 schools across the country that represented different language contexts (e.g., MT with more than or less than two million speakers, Tagalog as MT, different MTs), about the challenges and strategies in implementing the policy. In general, the respondents reported having developed strategies to address the challenges they were facing (e.g., using direct translation and code switching when teaching[3]). Issues that were noted include the lack of a standardized MT orthography, teachers' low competence in the MT, and the perception that the use of the MT lessens the time for learning Filipino and English (Metila at al., 2016). The researchers did not examine student performance and the achievement of learning outcomes.

Second, the results of the recent Southeast Asia Primary Learning Metrics 2019 (SEA-PLM 2019) suggest that Grade 5 students taught using the new basic education curriculum and language education policy have not achieved desired learning outcomes. The SEA-PLM 2019[4] results showed that 27% of the students were only able to identify relationships between words and their meanings. Only 10% of them could understand texts with familiar structures and manage competing information in texts. Writing performance was worse. A high percentage of the students (45%) only had limited ability to present ideas in writing. Only one percent of students wrote cohesive texts with detailed ideas and a good range of appropriate vocabulary. Performance in mathematics was also weak. There were 41% of the students who exhibited only basic mathematical skills, such as adding single-digit numbers, recognize simple shapes,

[3] Similar translanguaging strategies were reported by Perfecto (2020), based on data she gathered from interviewing and observing Grades 3 and 4 English teachers from low-performing schools in two Philippine regions. The teachers used the strategies "to help their multilingual students transition from using the mother tongue as medium of instruction in the different subject areas to using English in the English classroom" (p.1).

[4] The SEA-PLM tests were administered in the official language of instruction. In the case of the Philippines, as per the existing policy, English is the medium of instruction (MOI) starting in Grade 4. Thus, the SEA-PLM tests that the Grade 5 Filipino students took were in English.

comparing angles, and understanding place value. Only 17% of them were able to perform mathematical operations and interpret tables and graphs (United Nations Children's Fund [UNICEF] & Southeast Asian Ministers of Education Organization [SEAMEO], 2020).

Third, despite the MTB-MLE policy, many teachers and students continue to degrade their own mother tongues in comparison with English and Filipino, the national language (Tupas, 2015). Parba (2018) asserts that an analysis of the socio-historical context of language policies in the Philippines reveals that English and Filipino are privileged languages. He states,

> In other words, the two languages—English and Filipino—have enjoyed the hegemonic privilege of being used, circulated, and taught in many facets of Philippine society for many years now. While the Constitution promotes the use of Filipino and English all over the country, efforts to preserve and promote the use of the local non-dominant and regional languages remained scant before MTB-MLE was put in place. (p. 28)

Further, he claims that such privileging has influenced the construction and circulation of ideologies that cause people perceive Filipino and English as more valuable languages because they are spoken by intellectuals. On the other hand, the regional or local languages are less important, and their speakers are deemed as being inferior (Parba, 2018).

Specific Context of the Studies: Resettlement Site for Survivors of a Natural Calamity

Background on the Research Locale

The three studies in this dissertation were conducted in a resettlement site in San Fernando, Pampanga, which was specifically designated for survivors of the 1991 Mt. Pinatubo eruption. The approximately 80-hectare site of flat land was opened for occupancy in 1995 and had a capacity for around 4,000 families (Gaillard, 2008). The families of the research

participants originally lived in the municipality of Bacolor, which was most adversely affected by the natural calamity. Between 1991 and 1997, the town was increasingly buried in around ten meters of lahar (destructive stream of pyroclastic material, debris, and water). The national government relocated 95% of the townspeople in designated resettlement areas. Rich families affected by the calamity had sufficient resources and could afford to relocate where they saw fit, outside of the government-designated resettlement sites. Each family in this particular resettlement site received a 94-square meter lot where a low-cost 27-square meter concrete house with basic sanitary facilities stood. Before the volcanic eruption, the town registered a 17% unemployment rate. In 2004, the jobless individuals were one third of the townspeople in the resettlement site (Gaillard, 2008).

At the time of the studies, anecdotal reports from some principals and teachers in the public elementary schools in the resettlement site suggested the following realities: 1) many of their students have parents who either reached or graduated from high school; 2) most of the children come from low, single-income households with the fathers being the breadwinners; and 3) the usual jobs of the fathers are pedicab or tricycle drivers, construction workers, and public market vendors. These principals and teachers also reported that most students and parents were native speakers of Kapampangan (like most of the people in the site), but teaching and learning materials in Kapampangan were very limited. Moreover, they observed that despite the MTB-MLE policy, students' difficulties in reading remained (Padilla, 2018).

There are seven public elementary schools in the resettlement site, all of which opened in 1995. The class size in these schools ranges from 37 to 40. This is lower than the country's average class size of 44 in public elementary schools (Poe, 2019),[5] but higher than the target

[5]Some classes in urban centers have 60 to 80 students (Castro et al., 2019).

standard size of 35 that is being proposed in Senate Bill No. 1190 (Poe, 2019) and House Bill No. 227 (Castro et al., 2019). To date, all these seven schools do not have a library. There is no library in the entire resettlement site either, despite the existence (for more than two decades now) of Republic Act (RA) 7743 or "An Act Providing for the Establishment of Congressional, City, and Municipal Libraries and Barangay[6] Reading Centers Throughout the Philippines" (Congress of the Philippines, 1994). This is the situation in 98% of the more than 42,000 barangays in the country (National Library of the Philippines [NLP], 2018).

Reasons for the Choice of the Research Locale

This resettlement site was selected as the research locale for four reasons. First, the people in the site are multilingual and live in socio-economically challenging conditions. There is a gap in reading research among such individuals. Second, the researcher speaks the lingua franca of the community, Kapampangan. This was a crucial consideration vis-à-vis the recruitment of participants, construction of measures, and collection of data. Third, her immediate and extended families are survivors of the aforementioned natural calamity, and some family members live in this resettlement area. These three reasons provided personal and logistical dimensions to the choice. Finally, the researcher studied in one of the public elementary schools in the site, back when it was located in Bacolor, years before the Mt. Pinatubo eruption. The researcher thought that this reason, along with the preceding ones, could be used as social capital that would facilitate the conduct of the three studies. In light of the said reasons, the site was considered a logical choice for research locale.

The Present Studies

The multiple challenges presented by the above situations are likely to have an impact on

[6] In the Philippines, *barangay* (also known as "barrio") is the local term for a village, community, or neighborhood. It is the smallest administrative level of government.

reading acquisition and development. Therefore, the present studies provided a unique opportunity to examine reading performance in this sample of multilingual learners. Overall, these studies aimed to address the gap in the literature on reading among multilingual learners in economically challenging contexts in general, and the research gap in reading in Philippine languages in particular. The results of these studies could lead to a better understanding of the skills and processes involved when children read in three (or more) languages, which is a necessary step in optimizing reading acquisition and development among these learners.

Challenges in Conducting the Present Studies

The present studies examined multilingual children's reading performance in three languages of varying orthographic consistency. There were several challenges in conducting these studies, which had a bearing on the different aspects of the research (e.g., review of literature, formulation of hypotheses, construction of measures, analysis of data). First, the children were in grades 4, 5, and 6, the last three years of elementary schooling. Most studies have investigated the early phases of learning to read, while relatively less is known about the intermediate stages of reading acquisition, especially in terms of performance in different orthographies (Marinelli et al., 2016), particularly non-European languages. Second, the children were nested in groups (i.e., classrooms) within their school, making statistical dependency possible (O'Dwyer & Parker, 2014). Moreover, teaching methods used by different teachers teaching different languages could influence cross-linguistic differences in reading performance (Marinelli et al., 2016). Third, comparing reading performance across languages was a concern because of the different characteristics of the languages. Though the three languages all use the Roman alphabet, there are still psycholinguistic differences between them like orthographic depth, phonemes, stress, syllable structure, and word length (Forman, 1971; Gonzalez, 2005;

Malabonga & Marinova-Todd, 2007; Marinelli et al., 2016; Natividad, 1967; Reid & Shachter, 2008). Selecting stimuli with similar psycholinguistic characteristics is difficult because of existing differences across languages (Marinelli et al., 2016). Additionally, it was a concern selecting stimuli that were not too simple or too challenging for the children. This difficulty has been reported in other studies (Marinelli et al., 2016). The English measures used in the present studies are standardized, but they were not normed on the studies' samples or on children comparable to them. All the local measures used have not been standardized and normed because no such measures exist in Filipino or Kapampangan.

Study 1: Word Reading Fluency in Multilingual Kapampangan-Filipino-English Speakers

Learning to read does not always come easily. A syllable cannot be readily sounded out. Reading is intentional and learned.

Models of Word Reading

Word reading is considered a basic process upon which other reading processes are founded (Bjaalid et al., 1997). Two major models of skilled word reading often cited in the literature are the dual-route model (direct/lexical and indirect/phonological; Coltheart, 1980) and the connectionist model (links between/among orthography [spelling], phonology [derived from pronunciation and sound], and semantics [meaning]; Seidenberg & McClelland, 1989).[7] However, researchers argue that these two models focus on English speakers reading in their native language, which is written in a quasi-regular alphabetic orthography, and is characterized as an "outlier" orthography (Share, 2008). Therefore, the models do not capture reading processes and reading acquisition in regular alphabets or writing systems (Hutzler et al., 2004).

In recent years, researchers have started asking if different languages share the same mechanisms of reading, or if reading processes differ based on a language's writing system or orthography (Nag & Snowling, 2012; Share, 2008). According to Cummins' (1979) *linguistic interdependence hypothesis*, skills transfer across languages due to a common underlying proficiency. For example, reading skills acquired in the first language (L1) can facilitate the development of similar skills in the second language (L2). This is particularly evident when L1 acquisition is supported, but when L1 proficiency is low and underdeveloped, it can be a limiting

[7] The dual route and connectionist models explain how words are recognized, without explicitly describing how the ability to read words develops. Ehri (1999) claims that there are four phases of development in learning to read words: pre-alphabetic (use of visual cues or visual features of words), partial alphabetic (emerging use of letter-sound connections or phonetic cues), full alphabetic (use of phonological recoding and orthographic mapping), and consolidated alphabetic phase (use of chunks like syllables and morphemes).

factor in the development of L2 (San Francisco et al., 2006). These findings underscore the importance of nurturing the L1 and providing high quality L1 instruction. Because of the interdependence of languages, transfer can be reciprocal, not just from the L1 to the L2 (Cook, 2003). For example, when the L1 is fostered through a bilingual education program, the concepts and skills that students learn in the L2 can transfer to the L1 (Cummins, 2005). Learning environments that allow children to access and use the two languages encourage the development of both languages (Bialystok et al., 2003; Cummins, 2001). Related to the *linguistic interdependence hypothesis* is Koda's (2008) *transfer facilitation model*, which views transfer as "an automatic activation of well-established first-language competencies, triggered by second-language input" (p.78). This model posits that L1 metalinguistic skills (e.g., phonemic awareness, morphological awareness) help in the development of reading skills in the L2, whether the two languages are typologically similar (e.g., English-French) or not (e.g., English-Chinese) (Gottardo et al., 2001; Lam et al., 2020). However, for transfer to occur, the skills to be transferred should be well developed (almost automatic) in the L1. Sustained exposure to the L2 facilitates the ongoing development of the transferred competencies (Koda, 2008).

The *central processing hypothesis* claims that common cognitive and linguistic processes such as working memory, phonological awareness, and rapid automatized naming underlie L1 and L2 reading processes regardless of orthography, such that those who struggle to read one language will also experience reading difficulties in another language (Durgunoglu, 2002; Stevenson et al., 1982). Relationships between reading skills in two languages are considered evidence of cross-lingual, common underlying processes (Chung et al., 2019). In contrast, the *script-dependent hypothesis* sees reading as a function of the orthographic transparency of a language (Geva & Siegel, 2000). The script-dependent hypothesis is related to the concept of

orthographic depth. According to the orthographic depth hypothesis (Katz & Frost, 1992), differences in the transparency of grapheme-to-phoneme correspondences (orthographic depth) lead to processing differences in naming and lexical decision. For example, in a shallow or transparent orthography (e.g., Spanish, Filipino), words are read relatively quickly because of the consistent letter-sound correspondence. In a deep or opaque orthography (e.g., English), words are read and acquired more slowly because the inconsistent letter-sound correspondence makes it more difficult to decode words (Seymour et al., 2003).

The various theoretical frameworks of word reading described above suggest that models of reading in English cannot be readily generalized to other languages, whether reading is being learned in a monolingual, bilingual, or multilingual context. Additionally, Hutzler and colleagues (2004) argue that to understand reading acquisition and development among children who read different languages, reading models should not only look at a language's orthographic depth but also its phonological features, together with relevant elements like the teaching-learning environment. The psycholinguistic grain size theory takes into account some of these factors.

The Psycholinguistic Grain Size Theory

The psycholinguistic grain size theory (PGST) asserts that reading acquisition is primarily a process of learning the correspondences between visual symbols and units of sound (Ziegler & Goswami, 2005). The pace of development of this phonological recoding varies across languages, as do the kinds of internal representations (*psycholinguistic units*) that develop in children exposed to different languages. The size of the psycholinguistic units (phonological and orthographic), or *grain size*, that should be learned in order to facilitate reading, has an impact on reading development. Factors like phonological structure, orthographic similarities among words, and transparency (consistency/regularity) of spelling-sound/sound-spelling

mappings can lead to differences in the processing strategies that characterize skilled reading in different languages. Learning to read in any language involves "solving" three basic problems: *availability* of phonological units, *consistency* of grapheme-phoneme/phoneme-grapheme mappings, and *granularity* of spelling-sound correspondences. Skilled word reading is anchored on the efficient and effective resolution of these problems (Ziegler & Goswami, 2005).

The *availability* problem highlights that not all phonological units (e.g., syllables, onset-rime, and phonemes) are equally and explicitly accessible (Anthony & Lonigan, 2004). Additionally, linguistic typology can influence the salience of units, with onset-rime division being salient for English students (Ziegler & Goswami, 2005) while body-coda units are relevant to Korean children (Yoon et al., 2002).

The *consistency* problem considers the consistency of grapheme-phoneme/phoneme-grapheme mappings. For example, in Filipino, mappings are highly consistent (Ocampo, 2002), while in English, letter-sound correspondences are less consistent (Katz & Frost, 1992). Thus, those who read a consistent orthography can depend on serial phonological recoding due to the consistent symbol-sound mappings, while readers of less consistent writing systems might use larger sublexical units to deal with the inconsistent grapheme-phoneme correspondences (Gottardo et al., 1999; Ziegler & Goswami, 2005).

The *granularity* problem points to the need to learn a larger number of orthographic units when phonology is accessed using larger orthographic units (e.g., there are more characters in Chinese than letters in English). Children learning to read transparent orthographies generally rely on small-grain-size recoding strategies due to the consistency in grapheme-phoneme/ phoneme-grapheme correspondences (Jimenez-Gonzalez, 1997).

Approaches to teaching reading should take into consideration the phonological and orthographic qualities of the language/s being read, as well as the problems of *availability, consistency*, and *granularity* that children face when learning to read these languages.[8] The methods of reading instruction and the focus on small-grain size or large-grain sizes have an impact on the acquisition and learning of reading skills and strategies (Ziegler & Goswami, 2005).

Empirical Support for PGST

Research on word reading in different languages is consistent with the psycholinguistic grain size theory. Seymour and colleagues' (2003) cross-language study on reading acquisition was conducted on 13 European alphabetic languages. Results revealed that English, a deep orthography, was the most difficult orthography to acquire among the languages investigated. The rate of reading development in English was more than twice as slow as the rate in the shallow orthographies like Greek. Ziegler and colleagues (2010) studied five European languages with orthographies of varying levels of transparency, Finnish, Hungarian, Dutch, Portuguese, and French. They found that the strength of the relationship between word reading and phonological awareness was stronger in less transparent orthographies. Even in non-alphabetic languages such as Chinese, phonological awareness was related to word reading among young readers (Shu et al., 2008). However, other factors were more strongly related to word reading in Chinese than phonemic awareness (e.g., tone awareness, syllable awareness & vocabulary knowledge) (Liu & Liu, 2018; McBride-Chang et al., 2008). Consistent with the claims of the PGST, the cited studies reflect the significance of the phonological and orthographic features of availability, consistency, and granularity across orthographies.

[8] Durgunoğlu (2006) and Frost (2006) have pointed out that the PGST does not adequately account for the morphological properties of a language and how they are connected to grain size when reading words.

However, the salient psycholinguistic units in word reading vary across languages as a function of the characteristics of these languages.

Less research exists on word reading in non-European alphabetic languages (e.g., Filipino). Among bilingual Filipino-English elementary-aged children, phonological skills were significantly related across languages as well as being related to within-language word reading (Ocampo, 2002). Additionally, phoneme awareness was related to cross-linguistic reading in Filipino and English (Ocampo, 2002). In a recent study involving grade 3 bilingual Filipino-English children, the within-language association between phoneme awareness and word reading was stronger in opaque English than in transparent Filipino (Estrera & Uno, 2017). Moreover, receptive vocabulary was significantly related to word reading in English, but not in Filipino (Estrera & Uno, 2017). However, many children in the Philippines are multilingual and learning other languages is expected to have an impact on reading acquisition.

A meta-analysis of 38 studies involving bilingual samples from preschool to early grades (4 –10 years) and 10 languages compared English to Urdu, Greek, Spanish, French, Arabic, Hebrew, Korean, Cantonese, and Mandarin. The results suggest that the cross-language correlation of phonological awareness was related to both the language/writing system and the linguistic grain size of the tasks (Branum-Martin et al., 2012). A recent longitudinal study involving three groups of English second language (L2) learners with Spanish, Portuguese, and Chinese as first languages (L1s) showed that larger units of phonological sensitivity were the most highly related to word reading performance in English in kindergarten, while smaller units were related to word reading in the older grades, supporting the theory's concept of availability (Gottardo et al., 2016). In terms of consistency and granularity, word reading in Spanish and Portuguese, which have generally consistent small unit correspondences, was more highly

related to phoneme awareness, while word reading in Chinese, which does not have the same consistency in sound-symbol mappings, was uniquely linked to tone awareness (Gottardo et al., 2016). These studies suggest that the PGST applies not only to monolingual children reading words in their respective languages, but also to bilingual reading across languages. However, the PGST has not been examined in multilingual learners.

Limitations to PGST

The PGST does not explain the links between phonology, morphology, and grain size, which are important components of language (Durgunoğlu, 2006; Frost, 2006). De Jong (2006) noted that skilled reading at the word level is more about fluency, not simply accuracy. However, PGST does not include this important aspect of reading. Wimmer (2006) pointed out that the theory sees reading acquisition as recoding accuracy and neglects the role of reading fluency, which might be more important, especially in highly consistent orthographies. A recent study by Estrera and Uno (2017) revealed that in addition to phonological awareness, rapid automatized naming (RAN) also predicted reading in Filipino and English.

The size of the unit being used does not always match with the consistency of the orthography. For example, in Dutch, which has an orthography of intermediate consistency, there is little evidence (except for digraphs) for the systematic use of larger sublexical units, even though beginning readers are taught a serial recoding strategy (De Jong, 2006). In contrast, the advantage for readers of transparent orthographies such as Italian is not solely based on their reliance on phonological strategies, because they also use large grain-sized strategies (Paulesu, 2006). The advantage then, could be explained by the consistency of phonological units represented by orthographic units of various sizes, not on the exclusive use of small-sized phonological strategies (Paulesu, 2006).

The above findings suggest that the psycholinguistic grain size theory's focus on the phonology-orthography interface and the attendant problems of availability, consistency, and granularity fails to capture the complexity of reading acquisition and development. Non-phonological factors such as fluency, morphology, meaning, and naming speed are neglected in the theory, though some studies have shown that these variables also have an impact on reading (De Jong, 2006; Durgunoğlu, 2006; Estrera & Uno; 2017; Frost, 2006; Wimmer, 2006).

Vocabulary knowledge is strongly related to reading development in less transparent orthographies (Gottardo et al., 2017). For example, a study conducted among bilingual Spanish-English speakers showed a relationship between vocabulary and word reading in English, but not in Spanish (Gottardo, 2002). Language skills, specifically vocabulary, have been found to facilitate reading acquisition and development (Chall, 1983; Lesaux et al., 2010). Vocabulary is considered a proxy for a range of language skills (Hirsch, 2013) or for general language learning ability (Fraser et al., 2017). One mechanism which links word reading and vocabulary is posited by the *lexical quality hypothesis* (Perfetti, 2007; Perfetti & Hart, 2002). The *lexical quality hypothesis* suggests that word forms with highly specified phonological, orthographic, and semantic representations in the "lexicon" are more easily accessed. These word forms can be retrieved easily and automatically, which facilitates automatic word level linguistic processing. Therefore, phonological processing and vocabulary knowledge are related and are linked to word reading fluency. Multilingual learners who must learn multiple vocabulary items and phonological forms across several languages might have different levels of quality of their lexical representations across languages or might show individual differences across learners (Perfetti, 2007; Perfetti & Hart, 2002).

Word Reading Fluency

The psycholinguistic grain size theory (Ziegler & Goswami, 2005), like the other models of word reading cited above, views reading acquisition mainly as a matter of phonological recoding accuracy (De Jong, 2006; Wimmer, 2006). Though the theory acknowledges that the pace of development of this recoding process varies across orthographies (Ziegler & Goswami, 2005), it does not explicitly consider the role of naming speed in reading acquisition and development (De Jong, 2006; Wimmer, 2006). An important characteristic of skilled reading is the speed with which words are correctly read (Adams, 1990). Word reading fluency is characterized by fast and accurate recognition of individual words (Jenkins et al., 2003), which results from the efficient integration of phonological, orthographic, and semantic information (Breznitz, 2003). Word reading fluency is automatic word identification (National Reading Panel [NRP], 2000) that is accomplished with minimal attention or effort, consequently freeing cognitive resources for higher level processing, like meaning construction (LaBerge & Samuels, 1974; Perfetti, 1985). Accuracy develops before speed (LaBerge & Samuels, 1974). Reading fluency is a developmental-componential process. It involves orthographic, phonological, lexical, morphological, and syntactic components, which develop gradually as children become more efficient in reading. Word decoding needs to be accurate and automatic before text reading efficiency and comprehension can be achieved (Wolf & Katzir-Cohen, 2001).[9]

Research has shown that word reading fluency is related to phonological awareness. Phonological awareness (PA) was a significant predictor of word reading fluency in Spanish

[9] In the three studies in this dissertation, *word reading fluency* refers to fast and accurate context-free word reading. In earlier studies, researchers viewed reading fluency in different ways: 1. speed of accurate context-free word reading (e.g., Torgesen et al., 1997); 2. time-based accurate word reading, both in and out of context (e.g., Jenkins et al., 2003); 3. speed, accuracy, and prosody in reading (e.g., Allington, 1983); 4. accuracy, speed, expression, and comprehension when reading (e.g., Rasinski, 2003); and 5. simultaneous decoding and comprehension of text (e.g., Samuels, 2006).

among first grade children (González-Valenzuela et al., 2016). Among Greek-speaking children, PA in kindergarten predicted word reading fluency in grades 1 and 2 (Papadimitriou & Vlachos, 2014). Among grade 4 children in three languages that differ in orthographic transparency (i.e., Hungarian, Dutch, and Portuguese), PA significantly correlated with word reading fluency across languages (Vaessen et al., 2010). Georgiou and colleagues (2008) found a stronger or more salient role of PA in word reading fluency in a less transparent orthography (i.e., English) than in a more transparent one (i.e., Greek). Ruan and colleagues (2017) observed that PA was a stronger correlate of word reading fluency in English, an alphabetic language than in Chinese, a morphosyllabic language. Like PA, rapid automatized naming (RAN) has also been linked to word reading fluency in different languages. In a longitudinal study of word reading fluency in German (a transparent alphabetic language), children were tested in Grades 1, 4, and 8. The strongest predictor of word reading fluency was naming speed. Additionally, the long-term development of word reading fluency was more strongly influenced by early naming speed than by PA (Landerl & Wimmer, 2008). A meta-analysis on the relationship of RAN to different aspects of reading revealed that RAN was more strongly related to word reading fluency than word reading accuracy. Additionally, RAN was a significant correlate of both word reading accuracy and word reading fluency across languages of varying orthographic transparency, with correlations weaker for transparent than opaque orthographies. RAN was a stronger correlate of word reading fluency in non-alphabetic (e.g., Chinese, Japanese) than alphabetic languages (Araújo et al., 2015). Another meta-analysis revealed that in Chinese, PA and RAN were more strongly related to word reading fluency than word reading accuracy (Song et al., 2016).

Some research has shown that word reading fluency has correlates other than PA and RAN. Shechter and colleagues (2018) examined the roles of naming speed, phonological

awareness (PA), morphological awareness (MA), syntax awareness, and vocabulary in word reading fluency in Hebrew. They found that among both first grade and third grade children, naming speed accounted for most of the variance. In the first grade, vocabulary was an additional predictor, while in the third grade, PA and MA were the additional predictors. Meanwhile, in their study of grade 2 English-as-a-second-language (ESL) and English-as-a-first-language (EL1) children, Geva and Zadeh (2006) found that the two groups did not differ in word reading accuracy. However, the ESL group performed better than the EL1 group in word reading fluency. Expressive vocabulary, phonological awareness, rapid automatized naming, and word reading accuracy were significant predictors of word reading fluency in the ESL group, while only rapid naming and word reading accuracy were significant in the EL1 group. Therefore, word reading fluency is such a robust and comprehensive measure of reading that it considered a "gold standard" for measuring word level reading skills in transparent orthographies, such as Filipino and Kapampangan.

Research Aim

The above literature review shows that phonological awareness is linked to word reading accuracy, as the PGST posits. Additionally, research has shown that PA is also related to word reading fluency, though this claim is not explicitly part of the PGST. The current study examined the role of phonological awareness in word reading fluency across three languages: Kapampangan (L1), Filipino (L2), and English (L3). It was hypothesized that phonological awareness would be related to word reading fluency in the three languages, no matter the transparency or depth of the orthography. Moreover, the study predicted that phonological awareness in the three languages would make unique and shared contributions to word reading fluency in each language. The PGST expects correlations not only within but also across

languages, with some language-specific differences as a function of availability, consistency, and granularity (Ziegler & Goswami, 2005). It was expected that English vocabulary would be related to word reading fluency in English, an opaque orthography, where spellings of words do not always match pronunciations, making decoding more challenging.

Method

Participants

The research participants were recruited through a three-step process. First, permission to conduct the studies had to be sought from the Schools Division Superintendent of the DepEd Division Office in Pampanga. This was done through email. Second, the school principals' written informed consent was secured. Preliminary communication was established through direct messages and audio calls via Facebook Messenger. Then, an orientation on the study was given face-to-face by the researcher and written informed consent was eventually provided to her. The third step involved seeking parents' written informed consent. This was done in collaboration with the school principal and teachers. The school sent a letter to the parents of the target participants informing them about the research and the scheduled orientation on it. This letter was sent through the students. During the orientation, using Kapampangan, the researcher explained to the parents the content of the informed consent form per section (e.g., research objectives, testing sessions, risks and benefits, confidentiality). In addition, the researcher was invited by teachers to talk to parents about the research during the first parent-teacher meeting for the school year. The teachers also gave her an opportunity to talk to their classes about the research, so that the students could then tell their parents about it. During both types of talk, she explained the basics of the informed consent form in Kapampangan. Moreover, the researcher was allowed by the school principal to stay daily in the school premises 30 minutes before the

start of classes until 30 minutes after the end of classes. This gave her a chance to personally talk about the research and the consent form to parents who expressed interest in it. Aside from securing written informed consent from the principal and the parent, the child participant's verbal assent was also sought during each testing session.

The study involved public school students in grades four to six. There were originally 330 participants but four completed fewer than 20% of the measures and were consequently excluded from the final sample of 326. The children were aged 8-15 years old (M_{age} = 9.81; *SD* = 1.17; female = 51%) across the three grades. There were 108 in Grade 4 (M_{age} = 8.67; *SD* = 0.66; female = 55%), 104 in Grade 5 (M_{age} = 9.79; *SD* = 0.65; female = 52%), and 114 in Grade 6 (M_{age} = 10.92; *SD* = 0.80; female = 47%).

Measures

Language, reading, cognitive, and demographic measures were administered to the participants, either individually or in groups.

Language and Reading Measures. The participants were assessed on word and pseudoword reading, phonological awareness, and vocabulary knowledge in Kapampangan, Filipino, and English. All the English language and reading measures used in the present studies are standardized, but they were not normed on the sample or on children comparable to them. All the local language and reading measures created have not been standardized and normed, but they were validated by experts and pilot tested. The construction of the local measures was guided by the description of the English measures and the characteristics of the local languages. An effort was made to create parallel measures across languages. However, these measures were not matched item by item in terms of the languages' various psycholinguistic aspects. (See

Appendix A for details on the development of these measures.) The Cronbach's alpha value for the sample is reported for each of the English and local language and reading measures used.

In the present study, word reading fluency refers to fast and accurate context-free word reading. Word reading fluency (not simply word reading or decoding accuracy) was assessed because beyond grade 3, the speed or automaticity with which words are recognized becomes an important factor in skilled reading (Joshi & Aaron, 2011). Additionally, word reading fluency is considered a more robust measure of reading skill in transparent orthographies (Landerl & Wimmer, 2008). The Test of Word Reading Efficiency (TOWRE) as a measure of English word reading fluency has been used in studies involving bilingual speakers (e.g., O'Brien & Wallot, 2016; Özdemir et al., 2012).

Word Reading Efficiency. Word reading efficiency in English was measured through the Sight Word Efficiency subtest of TOWRE (Wagner et al., 1999b). This individually administered task required the student to read as accurately and as quickly as possible, within 45 seconds, from a list of 104 real words of increasing difficulty. The first word was *is* and the last, *transient*. Cronbach's α for the sample was .98.

Researcher-constructed measures, which were patterned after the TOWRE Sight Word Efficiency subtest (taking into consideration the characteristics of the languages), were used to individually assess word reading in Kapampangan and Filipino. Similarly, the task required the student to read in each language as accurately and as quickly as possible, within 45 seconds, from a list of 104 words of increasing difficulty. The words were randomly selected from the DepEd's corresponding lists of common/basic words in Kapampangan and Filipino (DepEd, n.d.) In Kapampangan, the first word was *at* ("and") and the last, *gatpanapun* ("afternoon"). In Filipino, the first word was *si* (particle for nouns in the personal singular case) and the last,

dalangin ("prayer"). These measures were evaluated (e.g., psycholinguistic representation, difficulty, curriculum match) by classroom teachers and concerned DepEd experts and consequently improved based on their recommendations, before they were pilot tested. Cronbach's α for the sample for each of the Kapampangan and Filipino measures was .98.

***Pseudoword Reading Efficiency*.** Pseudoword reading efficiency in English was measured through the Phonemic Decoding Efficiency subtest of TOWRE (Wagner et al., 1999b). This individually administered task required the student to read as accurately and as quickly as possible, within 45 seconds, from a list of 63 pseudowords of increasing difficulty. The first was *ip* and the last, *emulbatate*. Cronbach's α for the sample was .97.

Similar procedures to the Sight Word Efficiency subtest were used to create measures of Phonemic Decoding Efficiency to assess pseudoword reading efficiency in Kapampangan and Filipino. The pseudowords were formed based on allowable letter-sound and syllable combinations found in the respective languages. In Kapampangan, the first was *lu* and the last, *risanganan*. In Filipino, the first was *mi* and the last, *agimpulatan*. These measures were evaluated (e.g., psycholinguistic representation, difficulty, curriculum match) by classroom teachers and concerned DepEd experts and consequently improved based on their recommendations. Cronbach's α for the sample for the Kapampangan measure was .97 and for Filipino, .98.

***Overall Word Reading Fluency*.** Overall word reading fluency was the sum of the word reading and pseudoword reading efficiency scores in each language. Within-language correlational analyses using the three scores revealed *r*'s ranging from .93 to .99 for Kapampangan, .87 to .97 for Filipino, and .88 to .98 for English. These large *r*-values indicated strong relationships (Cohen, 1988) between the word reading and pseudoword reading efficiency

scores, and between the total score and the word reading or the pseudoword reading score. Thus, only the total score was used in all subsequent analyses. Overall word reading fluency as the composite of word reading and pseudoword reading efficiency scores is henceforth referred to simply as word reading fluency.

Phonological Awareness. Phonological awareness was measured at the level of the phoneme. Phoneme awareness is necessary for decoding alphabetic languages. It can predict reading outcomes by the end of the third grade and beyond (Moats & Tolman, 2005). Phonological awareness in English was measured using the Dynamic Indicators of Basic Early Literacy Skills Phoneme Segmentation Fluency (DIBELS PSF; Good et al., 2007). Phoneme segmentation fluency has been found to predict reading achievement (Kaminski & Good, 1996). This task is administered individually. Within a span of 60 seconds, students produce the phonemes in each of the 24 orally presented two- to five-phoneme monosyllabic words of increasing difficulty. The first word was *duck* and the last, *cheese*. The task was discontinued if the child had not given any accurate sound segments for the first five words. Cronbach's α for the sample was .91.

Researcher-constructed measures patterned after DIBELS PSF were used to individually assess phonological awareness in Kapampangan and Filipino. The monosyllabic and disyllabic words from two to five phonemes were used based on the characteristics of the languages. They were chosen based on the different letter-sound and syllable combinations found in the respective languages. In Kapampangan, the first word was *wa* ("yes") and the last, *lawen* ("look"). In Filipino, the first was *at* ("and") and the last, *mangga* ("mango"). These measures were evaluated (e.g., psycholinguistic representation, difficulty, curriculum match) by classroom teachers and concerned DepEd experts and consequently improved based on their

recommendations, before they were pilot tested. Cronbach's α for the sample for each of the Kapampangan and Filipino measures was .91.

Vocabulary. In this study, vocabulary was examined in terms of vocabulary knowledge. In English it was measured using the Expressive One-Word Picture Vocabulary Test (EOWPVT; Brownell, 2000). For this individually administered test, the student was asked to use a single word to name each of 170 objects (e.g., *phone*), actions (e.g., *eat/ing*), or concepts (e.g., *time*), of increasing difficulty. The starting point varied depending on the participant's age. The starting word for age 8 years was *wall*, for ages 9-10 years, *tire*, and for ages 11 years and older, *fruit/s*. More difficult items included *monocular*, *sextant*, and *louver*. The task was discontinued after six consecutive errors. Cronbach's α for the sample was .94. EOWPVT has been used in studies involving bilingual and multilingual speakers (e.g., Lugo-Neris et al., 2010; Mirza et al., 2017).

Translations of the EOWPVT with the same items as the original version, in Kapampangan and Filipino were used to measure vocabulary knowledge in these two languages. Fifty-eight of the 170 words were similar in Kapampangan, Filipino, and English (e.g., *computer, aquarium*) while seven words were similar in Kapampangan and Filipino (e.g., *ulang* [lobster], *largabista* [binoculars]). Kapampangan and Filipino allow the use of words from other languages for which there are no readily available indigenous equivalents (KWF, 2013; Samson et al., 2016).[10] The Kapampangan and Filipino versions of EOWPVT were administered in the same manner that the original English EOWPVT was administered. Cronbach's α for the sample for Kapampangan was .96 and for Filipino, .95.

[10] These measures were evaluated by two classroom teachers and two DepEd experts in terms of the accuracy and appropriateness of the translations, especially vis-à-vis the language register and variety that the students were exposed to or familiar with. The translations were improved based on their recommendations before the pilot tests were conducted. Cronbach's α for the pilot sample for Kapampangan was .88 and for Filipino, .90.

Cognitive Measures. Measures of nonverbal intelligence and rapid automatized naming (RAN) were administered prior to the language and reading assessment. These measures served as control variables. Research has shown that each of them is related to word reading (e.g., Hammill, 2004; Wimmer, 2006).

Nonverbal Intelligence. Nonverbal intelligence correlates with reading (Naglieri & Ronning, 2000). It was measured using the Matrix Analogies Test-Expanded Form (MAT-EF; Naglieri, 1985), an untimed test consisting of four subtests of 16 items each: pattern completion, reasoning by analogy, serial reasoning, and spatial visualization (a total of 64 items). This individually administered task required the student to complete a matrix by choosing the missing item from five or six different options. Each subtest was discontinued when the examinee failed 4 consecutive items within an item group. The manual reports an average Cronbach's α of .92 (age 5 to 17 years). MAT-EF has been used in studies in connection to bilingual reading (e.g., Gottardo et al., 2014; Lam et al., 2020).

Rapid Automatized Naming. Rapid automatized naming, or RAN (whether it is considered as a phonological processing measure or a distinct cognitive measure), contributes uniquely to word reading (Wagner & Torgesen, 1987; Wolf & Bowers, 1999). RAN was measured using the Rapid Digit Naming subtest of the Comprehensive Test of Phonological Processing (CTOPP; Wagner et al., 1999a). This task required the student to name six numbers arranged randomly in an array as accurately and quickly as possible. This measure was administered only in English because it was the language of instruction for mathematics. Only the naming speed was considered for this measure since only 1% of the participants made any mistakes in naming the numbers. The manual reports an average Cronbach's α of .87 (age 5 to 24 years).

Demographic Measure. A family language questionnaire was sent to the participants' parents to gather demographic information and relevant data on the children's and their parents' ability in and use of Kapampangan, Filipino, and English. However, fewer than 10% responded, and among those who did, only around 30% answered all the questions.[11] Thus, the questionnaire was orally administered in Kapampangan to each child participant. Fewer than 10% of the participants were able to answer questions connected to their parents (e.g., educational attainment, occupation, language skills), but all of them answered the questions concerning their perceptions of their language ability and use (See Appendices B and C). The questionnaire consists of yes-no items (e.g., *For each of the following Kapampangan/Filipino/English language skills, please say if you feel that your Parent 1/2 can currently perform the skill or not. 1. Understand: ___Yes ___No, 2. Speak: ___Yes ___No, 3. Read: ___Yes ___No, 4. Write: ___Yes ___No*), short response items (e.g., *What is your best language?; What is your Parent 1/2's occupation?*), and multiple choice items (e.g., *How often do you speak to friends in Kapampangan/Filipino/English? a. Friends at school: ___Always ___Frequently ___Sometimes ___Rarely ___Never, b. Friends in the community: ___Always ___Frequently ___Sometimes ___Rarely ___Never; What is the highest level of education that your Parent 1/2 attained?___ Elementary school ___Some high school studies ___ Completed high school ___ Some college or university studies ___Completed college diploma ___ Completed undergraduate degree ___ Some postgraduate studies ___ Completed graduate or professional degree*). Frequency count was used to examine the answers to the questionnaire.

[11] All the completely answered questionnaires were filled out by the children's mothers. Most of them reported being high school graduates and full-time housewives. A few indicated being college graduates working as a government employee, a teacher, a secretary, a cashier, or an overseas Filipino worker. All wrote that Kapampangan was their first language. They reported having the ability to understand, speak, read, and write in Kapampangan, Filipino, and English.

Procedure

The participants were individually assessed in five sessions of approximately 15-20 minutes each. First, they were tested on the cognitive measures: nonverbal intelligence and rapid automatized naming. On the second to the fourth sessions, they were tested on the language and reading measures: phonological awareness, word reading fluency, and vocabulary. On any given day, to avoid confusion, the participants were tested in only one language. The order of administration across the languages was counterbalanced. The order of administration of the different measures within language was also counterbalanced among the participants. On the last session, the demographic measure (family language questionnaire) was administered. Testing sessions were held in a room in school especially designated for such purpose by the principal. These sessions were conducted before and after class, during morning and afternoon breaks, and on some occasions, during class time when allowed by the principal and/or teacher. The tests were administered by the researcher and trained research assistants (RAs). Each RA had a bachelor's degree in education and a Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Course on Research Ethics (TCPS 2: CORE) certificate.

Data Analyses

Preliminary analyses were conducted to determine variability and trends in the data. Repeated measures multivariate analysis of variance (MANOVA) with grade level as a between-subjects factor were performed to examine any differences within the participants, as well as any potential developmental differences among them. Correlations were computed to check if there was sufficient basis for conducting regressions. Then, multivariate outliers were identified before hierarchical regression analyses were performed within each language. These analyses

were followed by cross-language hierarchical regression analyses. For both within-language and cross-language hierarchical regression analyses, grade level, nonverbal intelligence, and rapid automatized naming were used as control variables, as the first step.[12] These three variables are commonly used control variables, which have been linked to word reading performance. Finally, commonality analyses were conducted to ascertain the unique and shared contributions of phonological awareness to word reading fluency in the participants' three languages.

Results

The present study examined the role of phonological awareness and vocabulary in word reading fluency among grades 4 to 6 Kapampangan-Filipino-English multilingual children. It was hypothesized that phonological awareness would be related to word reading fluency in the children's three languages. Moreover, it was predicted that phonological awareness in the three languages would make unique and shared contributions to word reading fluency in each language. The research questions and hypotheses were examined using a series of hierarchical regression analyses and commonality analyses.

Preliminary analyses revealed nine multivariate outliers. Hierarchical regression and commonality analyses were performed on the reduced sample without these outliers (n = 319), as well as on the full sample (N = 326). The pattern and significance of the results were the same for both samples. Therefore, the findings for the full sample are reported.

[12] As stated earlier, one concern in developmental studies is that general levels of performance can vary considerably with age (Marinelli et al., 2016). Grade was highly correlated with age (r = .80). Age was more variable (from 8 to 15 years), but less evenly distributed (from .3% to 30%). Grade had only three levels, but it was more evenly distributed (Grade 4 = 33%, Grade 5 = 32%, Gr 6 = 35%). It is in school where the participants have the best chance to acquire knowledge and skills in and through their languages. Beyond its relationship with age, grade level progression reflects growth in knowledge and skills, which is linked to the teaching-learning process. Whether reading develops as described (in theory) substantially depends on the instruction in school (Chall, 1983). Thus, grade level (not age) was used as a control variable. (See Appendix D for a summary of age-related results in Study 1.)

Language Use of the Sample

Almost two thirds (63%) of the children reported their best language to be Kapampangan, and the remaining percentage reported Filipino as their best language. A similar pattern was reflected in the participants' reports of the primary language used for interacting with family/household members and friends in school/community. Fewer than half of the children (43%) reported using Filipino as a secondary language at home, with approximately the same percentage saying that they frequently interacted with their friends in this language. English was rarely used in interpersonal communication (1%). For participants who read at home for at least an hour every day, they were as likely to do so in Kapampangan (35%) as in Filipino (34%). Comparably, about the same percentage of children reported watching TV, videos, and/or the Internet daily for at least an hour in Kapampangan (34%) and Filipino (35%).

Clearly, the participants' most commonly used language in everyday life is Kapampangan, with Filipino being their secondary language, and English being the least used language. Moreover, the majority of the children do not read or watch TV/videos/Internet daily (see Table 1).

Performance of the Sample

The participants' scores in the language and reading measures ranged from 19% to 60% correct (see Table 2). Neither floor nor ceiling effects were evident in the data. To determine whether the participants' performance in phonological awareness, vocabulary, and word reading fluency significantly differed across languages, an exploratory repeated-measures MANOVA was conducted. To examine potential developmental differences, grade level served as a between-subjects factor.

There was a significant effect for language, $V = .66$, $F(6, 318) = 101.10$, $p < .001$, partial $\eta^2 = .66$. In a follow-up univariate analysis, significant cross-language differences were found across the three variables: $F(2, 646) = 121.63$, $p < .001$, partial $\eta^2 = .27$ for phonological awareness; $F(1.662, 536.95) = 34.34$, $p < .001$, partial $\eta^2 = .10$ for vocabulary (with Greenhouse-Geisser adjustment); and $F(1.943, 627.628) = 133.60$, $p < .001$, partial $\eta^2 = .29$ for word reading fluency (with Greenhouse-Geisser adjustment). For phonological awareness, the participants performed better in their L1 (Kapampangan) than in their L2 (Filipino) and L3 (English), *p*'s < .001. For vocabulary and word reading fluency, they scored higher in their L2 than in their L1 (*p*'s < .05) and L3 (*p*'s < .001). Across the three variables, the sample's scores were lowest in their L3 (*p*'s < .001).[13]

A significant effect for grade level was obtained, $V = .22$, $F(6, 644) = 13.19$, $p < .001$, partial $\eta^2 = .11$. There were grade level differences in all three variables: $F(2, 323) = 5.20$, $p < .01$, partial $\eta^2 = .03$ for phonological awareness; $F(2, 323) = 38.25$, $p < .001$, partial $\eta^2 = .19$ for vocabulary, and $F(2, 323) =$, $p < .001$, partial $\eta^2 = .06$ for word reading fluency. Post hoc comparisons indicated that the grade 5 students scored significantly higher than the grade 4students in all the three variables (*p*'s < .01), while the grade 6 students outperformed the grade 4 students in vocabulary and word reading fluency (*p*'s < .001) and the grade 5 students only in vocabulary ($p < .05$).

[13] It should be noted that cross-language comparison of performance is a concern identified earlier in this paper. The measures were not matched for psycholinguistic characteristics on an item-to-item basis. The measures were not standardized and normed on the same or comparable sample. However, the characteristics of the local languages and the child participants were taken into consideration in the drafting, evaluation, and revision of the measures, prior to their administration to the sample. Additionally, Cronbach's alpha values for the sample were very high (>.90) across measures and languages. Finally, correlations within constructs but across languages were high for vocabulary (.65-.82) and very high for word reading fluency (.91-93), suggesting that these measures might reflect one construct (especially the latter). Correlations for phonological awareness across languages were moderate (.42-.54).

There was a significant interaction between language and grade level, $V = .07$, $F(12, 638) = 1.86$, $p < .05$, partial $\eta^2 = .03$. An interaction between language and grade level was found for phonological awareness, $F(4, 646) = 3.23$, $p < .05$, partial $\eta^2 = .02$, but not for vocabulary, $F(3.325, 536.95) = .466$, $p = .73$, partial $\eta^2 = .00$ (with Greenhouse-Geisser adjustment) and word reading, $F(3.886, 627.628) = 1.80$, $p < .13$, partial $\eta^2 = .01$ (with Greenhouse-Geisser adjustment).

Relations Among the Developmental, Cognitive, Language, and Reading Variables

Most of the measures were significantly related to each other, with the exception of grade level and Kapampangan and English phonological awareness. Correlations ranged from -.167 (weak: grade level and rapid automatized naming) to .929 (strong: Kapampangan and English word reading fluency). Vocabulary knowledge was also highly related across languages (*r's* = .653 to .823). Finally, phonological awareness was moderately correlated across languages (*r's* = .419 to .538) (Cohen, 1988). Table 3 presents the correlations among the variables within and across languages.

Contribution of Phonological Awareness to Word Reading Fluency in Each Language

Hierarchical regression analyses were conducted examining within-language variables uniquely related to word reading fluency. Grade level, nonverbal intelligence, and RAN were entered as control variables in the first step, given that they have been linked to word reading performance. Vocabulary and phonological awareness were entered as separate steps, as the second and third steps. The order of the final two steps was then reversed to determine unique predictors of word reading fluency.

Consistent with the hypothesis, phonological awareness significantly contributed to word reading fluency in Kapampangan, Filipino, and English, even after entering the control variables,

which contributed a large amount of variance, ΔR^2 = .413 to .439 (see Table 4). The highest contribution of phonological awareness was in English, which contributed 6.3% unique variance to English word reading fluency, β = .278, $t(320) = 6.52$, $p < .001$, while the lowest was in Filipino, which contributed 0.9% unique variance to Filipino word reading fluency, β = .107, $t(320) = 2.31$, $p < .05$.

In addition to phonological awareness, vocabulary was also related to English word reading fluency, contributing 2.5% unique variance, β = .198, $t(320) = 4.13$, $p < .001$. Vocabulary did not contribute unique variance to Kapampangan or Filipino word reading fluency.

Cross-language Contributions of Phonological Awareness to Word Reading Fluency

Cross-language hierarchical regression analyses were performed to examine the unique contributions to word reading fluency of the control variables: grade level, nonverbal intelligence, and rapid automatized naming (Step 1) and within-language phonological awareness and vocabulary (last step), over and above the contributions of the same skills in the other languages (Steps 2–3, i.e., L1 on L2; L1, L2, and L3 on L3; L1, L2, and L3 on L1; and L1, L2, and L3 on L2). Vocabulary was included because it was related to English word reading fluency in this sample. Though it did not predict Kapampangan and Filipino word reading fluency, vocabulary could still play a role in word reading fluency in these two languages as a proxy for linguistic ability. This set of hierarchical regression analyses examined the universality of phonological awareness as key to word reading fluency in any language, as well as the contribution of vocabulary above phonological awareness. Moreover, these analyses were necessary to conduct because of the cross-linguistic and cross-modal transfer of language and reading skills (Koda, 2008).

The Influence of L1 on L2. Kapampangan (L1) phonological awareness uniquely contributed to Filipino (L2) word reading fluency even after controlling for the other predictors (β = .108). Neither Filipino phonological awareness nor Filipino vocabulary had a significant impact on Filipino word reading fluency, over and above the contributions made by the other variables. Nonverbal intelligence, β = .148, $t(318) = 2.92$, $p < .01$, and rapid automatized naming, β = -.482, $t(318) = -10.58$, $p < .001$) were related to word reading fluency, even after controlling for the contributions of the other predictors (see Table 5).

The Influence of L1, L2, and L3 on L3. Neither Kapampangan (L1) nor Filipino (L2) phonological awareness and vocabulary were related to English (L3) word reading fluency. However, English phonological awareness, β = .267, $t(316) = 5.68$, $p < .001$, and English vocabulary, β = .256, $t(316) = 3.61$, $p < .001$, remained robust predictors, even after accounting for the contributions of the other variables, such as nonverbal intelligence, β = .111, $t(316) = 2.34$, $p < .05$, and rapid automatized naming, β = -.431, $t(316) = -10.26$, $p < .001$ (see Table 5).

The Influence of L1, L2, and L3 on L1. English (L3) phonological awareness, β = .281, $t(316) = 5.95$, $p < .001$, and English vocabulary, β = .169, $t(316) = 2.37$, $p < .05$, were uniquely related to Kapampangan (L1) word reading fluency, even after controlling for the other predictors. Neither Filipino (L2) nor Kapampangan (L1) phonological awareness nor vocabulary were significantly related to Kapampangan word reading fluency, over and above the contributions made by the other variables. Grade level, β = .122, $t(316) = 2.78$, $p < .01$, nonverbal intelligence, β = .106, $t(316) = 2.23$, $p < .05$), and rapid automatized naming, β = -.481, $t(316) = -11.41$, $p < .001$, were also related to Kapampangan word reading fluency, even after controlling for the contributions of the within- and cross-language predictors (see Table 5).

The Influence of L1, L2, and L3 on L2. Neither Kapampangan (L1) nor Filipino (L2) phonological awareness and vocabulary were related to Filipino (L2) word reading fluency, after the influence of the other predictors were controlled. However, English phonological awareness, $\beta = .279$, $t(316) = 5.83$, $p < .001$) and English vocabulary, $\beta = .186$, $t(316) = 2.58$, $p < .05$, remained robust predictors of Filipino word reading fluency, even after accounting for the contributions of the other variables. Grade level, $\beta = .117$, $t(316) = 2.64$, $p < .01$, and rapid automatized naming, $\beta = -.463$, $t(316) = -10.84$, $p < .001$) were also uniquely to Filipino word reading fluency (see Table 5).

Summary of Results. English phonological awareness and English vocabulary each significantly contributed to word reading fluency in Kapampangan (L1), Filipino (L2), and English (L3) – over and above any influence exerted by similar skills in the other two languages as well as the control variables. Although phonological awareness in Kapampangan contributed to word reading fluency in Filipino, it was not related to word reading fluency in English. RAN was a robust predictor of word reading fluency in all the three languages.

Unique and Overlapping Relations of Phonological Awareness Across Languages to Word Reading Fluency in Different Languages

Correlational and regression analyses showed that L1, L2, and L3 phonological awareness were related to each other. Therefore, commonality analyses were conducted to determine the unique and shared contributions of phonological awareness in the three languages in relation to word reading fluency in each language.

Phonological Awareness in Three Languages and Kapampangan Word Reading Fluency. The commonality coefficients of all possible combinations of phonological awareness in Kapampangan, Filipino, and English, and the respective percentages of their total variance

related to Kapampangan word reading fluency are presented in Table 6. The model that included all three predictors accounted for 23.41% of the total variance in Kapampangan word reading fluency. Kapampangan, Filipino, and English phonological awareness each contributed 2.34%, 4.83%, and 39.87%, respectively, of the unique variance in Kapampangan word reading fluency. English phonological awareness, which yielded the highest contribution, shared 11.83% variance with Kapampangan and 8.81% variance with Filipino phonological awareness. These three measures shared 27.28% of the total variance accounted for by phonological awareness.

Phonological Awareness in Three Languages and Filipino Word Reading Fluency. The commonality coefficients of all possible combinations of phonological awareness in Kapampangan, Filipino, and English, and the respective percentages of their total variance in Filipino word reading fluency are displayed in Table 7. The model that included all three predictors accounted for 23.85% of the total variance in Filipino word reading fluency. Kapampangan, Filipino, and English phonological awareness each contributed 1.65%, 6.70%, and 38.45% (the highest contribution), of the unique variance in Filipino word reading fluency, respectively. English phonological awareness shared 10.38% variance with Kapampangan and 9.84% variance with Filipino phonological awareness. Together, these three variables shared 27.69% of the total variance accounted for by phonological awareness.

Phonological Awareness in Three Languages and English Word Reading Fluency. The commonality coefficients of all possible combinations of phonological awareness in Kapampangan, Filipino, and English, and the respective percentages of their total variance in English word reading fluency are shown in Table 8. The model that included all three predictors accounted for 25.89% of the total variance in English word reading fluency. Kapampangan, Filipino, and English phonological awareness each contributed 4.55%, 3.52%, and 36.80% (the

highest contribution), respectively, of the unique variance in English word reading fluency. English phonological awareness shared 14.09% variance with Kapampangan and 7.41% variance with Filipino phonological awareness. The common effects accounted for by all three predictors explained 27.71% of the total variance shared by phonological awareness.

Summary of Results. As hypothesized phonological awareness in the three languages made unique and shared contributions to word reading fluency in each language. English phonological awareness yielded the highest unique contribution to word reading fluency in Kapampangan (L1), Filipino (L2), and English (L3). This contribution was larger than the contributions made by Kapampangan and Filipino phonological awareness to within-language word reading fluency. It was larger than the common variance shared by phonological awareness in the three languages. The patterns of relationships among the variables were similar regardless of which language was being predicted.

Discussion

The results of the present study support the primary assertion of the psycholinguistic grain size theory regarding the important role of phonological awareness (PA) in word reading across languages (Ziegler & Goswami, 2005). Though the theory does not explicitly consider both accuracy and rate in word reading, the significant relations between phonological awareness and word reading fluency in the three languages confirm its major claim. Phonological awareness significantly predicted word reading fluency not only in transparent Kapampangan and Filipino, but also in opaque English. These results are congruent with findings in previous studies on word reading accuracy among bilingual children learning English as a second language, whose first languages were more transparent (e.g., Estrera & Uno, 2017; Gottardo et al., 2016; Ocampo, 2002). They are also consistent with the findings on the significant role of PA

in word reading fluency in alphabetic languages that differ in orthographic consistency (e.g., Georgiou et al., 2008; Vaessen et al., 2010).

The higher contribution of phonological awareness to word reading fluency in English than in Kapampangan and Filipino is similar to what Georgiou et al. (2008) found with phonological awareness being more highly related to word reading fluency in English than in Greek. These results suggest that word reading fluency in a transparent orthography does not require as much phonological sensitivity as it does in a deep orthography.

In addition to phonological awareness, vocabulary predicted English word reading fluency, but not Kapampangan and Filipino word reading fluency. The PGST posits that in less transparent orthographies, such as English, readers use recoding strategies at both small and large grain sizes due to inconsistencies in grapheme-phoneme/phoneme-grapheme correspondences. A wide vocabulary helps determine the pronunciation of difficult to decode unfamiliar words, so vocabulary knowledge is significantly linked to reading development in less transparent orthographies. This relationship is not expected in more transparent orthographies where readers generally rely on small-grain-size recoding strategies. The present findings are consistent with those found in previous studies among bilinguals and multilinguals learning English as an L2 (e.g., Estrera & Uno, 2017; Gottardo, 2002; Mirza et al., 2017). This role that vocabulary plays in English word reading fluency suggests the use of partial phonological recoding (Share, 1995), which helps readers approximate the pronunciation of irregular words based on their familiarity with real words present in their oral vocabulary (e.g., yacht, ocean), which in turn helps them become more efficient readers.

The psycholinguistic grain size theory further claims that learning to read is relatively easier and faster in more transparent than in opaque or deep orthographies (Ziegler & Goswami,

2005). This claim is confirmed by the results showing that participants' word reading fluency performance was lowest in English. The word reading fluency scores in English are lower, despite the participants having been instructed in it and Filipino for approximately similar lengths of time and having discontinued instruction in Kapampangan[14]. These results recall similar findings by Seymour et al. (2003) in their study of reading acquisition in 13 alphabetic European languages. The participants' better word reading fluency in Filipino (their L2) than in their native Kapampangan may be explained by the continued use of Filipino in the curriculum both as a subject area and as a medium of instruction. Kapampangan as a language arts subject and as a medium of instruction was discontinued after grade 3. Though Kapampangan is most salient in the children's daily lives, particularly in their social interactions, it does not hold a similarly important role in school. Ziegler and Goswami (2005) did acknowledge the importance of instruction in the development of reading skills.

Language and reading skills acquired in the L1 can facilitate the development of similar skills in another language when the L1 is supported. The children's poor word reading fluency performance not only in English but also in Kapampangan and Filipino may be explained by their generally poor phonological awareness across the three languages. However, when the L1 proficiency is low and underdeveloped, it can be a limiting factor in the development of other languages (Cummins, 1979, 2001). This low L1 performance may also be explained by their lack of reading resources in school and in the community (as reported in the description of the participants). It may also be explained by their lack of engagement in reading beyond required materials (as reflected in their answers to the language questionnaire).

[14] Despite receiving English language and literacy instruction in school, children rarely used English at home and in the community.

Among the language and reading measures, only English phonological awareness and English vocabulary each significantly contributed to word reading fluency in Kapampangan, Filipino, and English, over and above any influence exerted by similar skills in the same language. The PGST predicts relationships between phonological awareness and word reading not only within but also across languages, which was confirmed in the findings of previous studies (e.g., Gottardo et al., 2016; Ocampo, 2002; Vaessen et al., 2010). In this study, a cross-linguistic relationship was found for phonological awareness for English but not for Kapampangan and Filipino, even when phonological awareness in the two other languages had been controlled. Therefore, phonological awareness skills, which are a type of metalinguistic skill, were related to word reading fluency across languages (Koda, 2008).

Similar to English phonological awareness, English vocabulary exhibited robustness as a cross-language predictor of word reading fluency. The PGST does not expect vocabulary to play a significant role in word reading fluency in more transparent orthographies, yet in the present study, English vocabulary was significantly related not only to English word reading fluency, but to Kapampangan and Filipino word reading fluency as well, even after controlling for other variables. Although the relationship between English word reading fluency and English vocabulary is consistent with the PGST, the significant relationship between English vocabulary and word reading fluency in Kapampangan and Filipino suggests an additional explanation. It is possible that the quality of lexical representations in English, which is the learners' weakest language, is more highly related to variability in their English vocabulary and phonological awareness. Children with more robust lexical representations in English have better phonological awareness in English (Perfetti & Hart, 2002) and also better phonological awareness and language skills in their L1 and L2 (Koda, 2008). Therefore, the lexical quality hypothesis may be

used to explain the otherwise surprising finding that L3 skills are related to L1 and L2 reading. Additionally, Geva (2006) suggests that vocabulary may be a proxy for general language proficiency in an L2 or L3, showing a greater impact on word reading in more proficient learners. Both explanations require further investigation, which are beyond the scope of this study.

Methodological and sample considerations can also explain the above findings. Standardized measures were used in English but not in Kapampangan and Filipino. However, high reliability was found for the experimental measures. The strong influence of English on the two local languages (Reid, 2005) as well as its dominant status in the Philippine multilingual context could enhance the relation between English vocabulary and word reading fluency in other languages (Tupas, 2015). The idiosyncrasies of the sample could also produce these unique results. The sample has faced the challenges of poverty. First, the participants' home situation is far from ideal. They live in small houses in a government-designated resettlement site for survivors of a natural calamity. Most children's families depend on the father's minimal income from manual labor. The majority of children have parents who did not go to college. Second, the participants' reading/learning opportunities and resources are limited by the fact that there is no library in school and in the community. Aside from these socio-economic challenges, the sample has also faced the challenges of the new multilingual education policy, which requires the learning of three languages as early as grade one.

The dominance of English was evident in the results of the commonality analyses, which examined the unique and shared contributions of phonological awareness in the three languages to word reading fluency in each language. While Kapampangan and Filipino phonological awareness made unique contributions to word reading fluency in the three languages, these

contributions were smaller than the high(est) unique contribution made by English phonological awareness. Despite the linguistic interdependence hypothesis' claim that there is a common underlying proficiency (shared base) involved in learning languages (Cummins, 1979), the results showed that the unique contribution of English phonological awareness to word reading fluency in each language was clearly larger than the contribution it shared with Kapampangan and Filipino phonological awareness. This pattern was found despite the participants' phonological awareness being poorest in English and the lack of ceiling effects for the measures in each language. This finding is consistent with research on the role of phonological awareness in orthographies that are less regular and consistent (e.g., Georgiou et al., 2008; Ziegler et al., 2010). The pattern demonstrated by the commonality analyses is remarkably consistent across languages with similar levels of overlapping variance across languages, as well as English phonological awareness showing the highest unique variance regardless of which language was being read. These results suggest a common underlying construct in relation to phonological awareness across these languages that use the same Roman alphabet. The results also suggest the unique contribution of English might be related to the fact that it is the most challenging of the languages to read, due to its less transparent orthography as well as to the lower level of familiarity in the present sample. Therefore, phonological awareness skills in English might be a proxy for general underlying phonological awareness ability as was shown by the large common overlapping variance. Additionally, these findings could be related to the Philippine context with a lack of resources and materials to reinforce L1 and L2 phonological awareness.

The major contribution of rapid automatized naming to word reading fluency across languages points to a limitation of the PGST theory, and confirms that RAN uniquely contributes to word reading, over and above that made by phonological awareness (Landerl & Wimmer,

2008; Wagner & Torgesen, 1987; Wolf & Bowers, 1999). Furthermore, it is similar to the results of previous research that showed RAN playing a bigger role than PA in word reading fluency in readers of a transparent orthography (Landerl & Wimmer, 2008; Wimmer, 2006). The distinct role of RAN in word reading fluency vis-à-vis phonological awareness requires further investigation, especially in the context of multilingual reading in orthographies of different degrees of depth or transparency. Finally, the use of fluency measures of word reading might be more highly related to RAN than word reading accuracy due to the timed nature of both measures.

Limitations and Future Directions

The most significant limitation of this study involves measurement. Findings and implications should be interpreted with caution. For pragmatic reasons (e.g., large sample size, number of measures to be created in two languages, individual testing requirements, time constraints), the study was limited in two ways. First, there was only a single measure for each variable. Phonological awareness was measured only at the level of the phoneme. Assessing it at various levels might yield more useful information in understanding the relations between phonological processing and reading. For Kapampangan and Filipino, which are both syllable-timed and that had historically been written as alphasyllabaries, assessing syllable awareness could be relevant. For English, knowing the contribution of onset-rime awareness could be instructive, particularly among less skilled readers. Assessing morphological awareness in the three languages might also provide relevant information. Additionally, only word reading fluency was assessed. The initial assumption was that the participants would reach ceiling on word reading accuracy in Kapampangan and Filipino, due to the participants' age and the consistency of the scripts. However, given the low word reading fluency scores, it is not likely

that the participants would have high word reading accuracy scores. Therefore, measuring accuracy could help in better understanding the processes and skills that underlie or affect skilled word reading. Morever, despite their high reliability, all the Kapampangan (L1) and Filipino (L2) measures were not locally normed and standardized. These measures might not be comparable to each other and to the English measures due to the diverse psycholinguistic properties of the languages, which were not adequately accounted for in the construction of the measures nor in the analysis of the data. Though the use of comparably normed and standardized measures across languages is ideal, test norming and standardization takes time. Therefore, the local measures should be improved by using them in other studies, analyzing their psychometric properties, and revising them accordingly.

Despite these limitations, the study contributes to the knowledge on the roles that orthographic depth (as well as, possibly, lexical representations) and context play in word reading fluency performance, within the dynamics of three languages that interact with each other. The results can inform curriculum planning, instruction, and teacher education, especially within the context of the study. The timing of the introduction of (an) additional language/s in the curriculum should be examined carefully in light of students' low levels of word reading fluency not only in their second and third languages, but in their first language as well. The discontinuation of first language literacy instruction at the end of grade 3 should also be examined. In the delivery of instruction, priority can be given to phonological awareness because it is related to word reading fluency in similar ways across the three languages. Additionally, in English, vocabulary building activities can be given to the students, to help them read English words better and faster. The purposive teaching of phonological awareness and vocabulary, in aid of word reading fluency, can start as early as the first grade. Moreover, the findings can

inform the design of appropriate interventions for students who need help in word reading fluency in any, both, or all of the languages studied, be it due to poor phonological awareness and/or insufficient vocabulary. Finally, the results can inform pre-service and in-service teacher education by pointing to content that needs to be emphasized (e.g., relations between phonological awareness and vocabulary and word reading fluency) in the training of professionals who will teach reading to multilingual learners.

Conclusion

In conclusion, the findings of the present study suggest that the transparency or depth of the orthography does have an impact on reading performance. Word reading fluency scores in transparent orthographies, Kapampangan and Filipino, were better than word reading fluency scores in a deep orthography, English. The relationship of phonological awareness to word reading fluency was stronger in opaque English than in the two transparent languages. Vocabulary made a significant contribution to English word reading fluency, but not to Kapampangan and Filipino word reading fluency. These results lend support to the psycholinguistic grain size theory. The dominance of English phonological awareness and vocabulary, as well as naming speed, in word reading fluency across languages could also be related to the quality of the learners' lexical representations in their weakest language or to general proficiency in language learning that was more obvious in the learners' weakest language.

Overall, the findings of this study advance current understanding of the skills and processes involved in multilingual word reading fluency, especially in less researched alphabetic languages. If reading in multilingual learners is better understood, it could optimize learning

among people in most parts of the globe. For many of these learners, reading does not always come easily. It need not be more difficult.

Study 2: Reading Comprehension in Multilingual Kapampangan-Filipino-English Speakers

Understanding what one reads is not as simple as it seems. Different models have been put forward to explain what it takes to comprehend what is being read, with the simple view of reading being the dominant one.

The Simple View of Reading

The simple view of reading (SVR) is the most widely used framework for conceptualizing reading comprehension in terms of the skills readers use to understand written language (Francis et al., 2018). The SVR is a straightforward conceptual model of reading (Hoover & Tunmer, 2018). The SVR's central claim is that reading consists of only two components, decoding and linguistic comprehension (Gough & Tunmer, 1986). This view does not deny the complexities involved in reading; rather, it posits that these complexities can be divided into these two basic components. Decoding is accurate and fluent word recognition, which allows lexical access and retrieval of semantic information. Linguistic comprehension is the ability to understand spoken language. This consists of taking lexical information and deriving sentence and discourse interpretations. Reading comprehension is the ability to understand printed text. It involves similar skills and processes as linguistic comprehension but uses graphic-based information (Hoover & Gough, 1990).

A second claim of the simple view of reading is that decoding and linguistic comprehension are equally important. Both are necessary but not sufficient for reading comprehension success. Reading is not merely decoding; it requires linguistic skills like parsing and discourse building. Decoding is important as well; linguistic comprehension alone does not

allow for success in reading comprehension. Both components are necessary to succeed at reading; neither is adequate for reading comprehension (Hoover & Gough, 1990).

The SVR holds that "If reading (R), decoding (D), and linguistic comprehension (L) are each thought of as variables ranging from 0 (nullity) to 1 (perfection), then the simple view of reading can be expressed as R = D X L" (Hoover & Gough, 1990, p. 132). Decoding and linguistic comprehension are viewed as separate components. Superior linguistic comprehension but very poor decoding (e.g., dyslexia) is as possible as superior decoding but very poor linguistic comprehension (e.g., hyperlexia). The relationship between the two components is multiplicative, not additive. Reading comprehension is not possible if either decoding or linguistic comprehension is zero (i.e., R = D x L = 0 x 1 = 0; R= D x L = 1 x 0 = 0). The multiplicative relationship reflects the necessity and non-sufficiency of each of the two components. The SVR predicts that these two components will substantially contribute to the variance in reading comprehension, but that their product will further explain variation in reading comprehension over that provided by their linear (additive) combination (Hoover & Gough, 1990). The current study examined a modified version of the SVR in students in fourth and fifth grade in the Philippines.

Empirical Support for the SVR

Some studies on reading in the first language and reading in a second language lend support to the SVR.

Support for the SVR: Reading in the First Language. Research on reading comprehension in English is consistent with the simple view of reading. Garcia and Cain's (2014) meta-analysis showed that when considered together, measures of the two broad skills of word recognition and listening comprehension accounted for substantial variance in reading

comprehension across age. Catts and colleagues (2015) used the SVR to examine the early prediction of reading comprehension abilities. Word reading precursors (letter knowledge, phonological awareness, rapid automatized naming, nonword repetition) and language comprehension (receptive vocabulary, narrative language abilities [understanding and telling]) were assessed in kindergarten while reading comprehension was assessed at the end of the third grade. Word reading served as a mediator and was assessed at the end of the second grade. Findings revealed that precursors of word reading and language comprehension accurately predicted reading comprehension in both mediated and non-mediated models (Catts et al., 2015). Similarly, the Language and Reading Research Consortium and Chiu (2018) found that prekindergarten oral language (vocabulary, grammar, discourse) and code-related (letter and print knowledge, phonological processing) skills predicted Grade 3 reading comprehension. The study by Lonigan and colleagues (2018) also lends support to the SVR. It examined the joint and unique predictive influences of decoding and linguistic comprehension for reading comprehension by assessing children in Grades 3 through 5 using measures of decoding, linguistic comprehension (receptive, expressive, and depth of vocabulary, receptive and expressive syntax, listening comprehension), and reading comprehension. Overall results confirmed the prediction of the SVR: decoding and linguistic comprehension accounted for most of the variance in reading comprehension. The findings also revealed a developmental trend in the relative importance of the two components, with decoding being more strongly related to reading comprehension in younger children. However, results showed that a substantial variation in reading comprehension was shared between the two components (beyond the unique variance associated with each), suggesting that decoding and linguistic comprehension are not completely

separable. This shared variance might be related to some underlying general cognitive linguistic ability (Lonigan et al., 2018).

In recent years, researchers have started testing the simple view of reading among readers of other languages. Kendeou and colleagues (2013) used data from kindergarten Greek-speaking children. Results revealed the emergence of the SVR even before children could become conventional readers. The decoding-related (e.g., letter identification, phoneme elision) and language comprehension (e.g., receptive vocabulary, listening comprehension) factors formed distinct clusters, indicating them to be separate constructs, consistent with the SVR claim. The results of the longitudinal study involving first grade French children also validated the independence of the two SVR components (Massonnié et al., 2018). The model has also been examined on older school-age children. Tobia and Bonifacci (2015) assessed a large sample of Italian children from first to fifth grade to analyze the role of reading speed, decoding accuracy, and oral comprehension in predicting reading comprehension. Results indicated that oral comprehension and decoding accuracy formed distinct clusters within each grade group, and together explained a high proportion of variance in reading comprehension. Moreover, findings suggested that oral comprehension was a stronger predictor of reading comprehension than both reading speed and accuracy, from the first grade onward.

The examination of the SVR has not been limited to alphabetic languages. Ho and colleagues (2017) validated the SVR in Chinese. Grades 1-3 children in Hong Kong were assessed using multiple measures of decoding (character reading, word reading accuracy, and 1-minute word reading), linguistic comprehension (morphological awareness, vocabulary, morphosyntactic skills, and discourse skills), and reading comprehension (with multiple-choice and open-ended questions). Additionally, they were tested on rapid naming (Chinese digits,

English digits, and English letters) because the researchers wanted to examine if the SVR could be extended through the inclusion of this construct. Results revealed significant direct paths from decoding and linguistic comprehension to reading comprehension, but not from rapid naming (Ho et al., 2017).

Support for the SVR: Reading in a Second Language. The simple view of reading has been examined not only in the context of monolingual reading in languages other than English, but also within the context of second language/bilingual reading. Gottardo and Mueller (2009) tested Spanish-speaking English learners (ELs) when they were in 1st grade and into 2nd grade. Results showed that English oral language proficiency and word reading accuracy were the strongest predictors of English reading comprehension, lending support to the SVR. Kang and colleagues (2011) investigated the applicability of the SVR for fifth grade Korean students learning English. Results showed that both English decoding and linguistic comprehension skills significantly contributed to English reading comprehension, confirming the prediction of the SVR within the Korean English as a Foreign Language (EFL) context. When controlled for each other, decoding accounted for more of the variance in reading comprehension than listening comprehension.

Listening comprehension was the focus of the study by Gottardo and colleagues (2018). To examine the subcomponents of listening comprehension and their contributions to reading comprehension, they assessed 9 to 13-year-old second language learners of English from Spanish-speaking backgrounds on vocabulary, morphological awareness, syntactic knowledge, word reading accuracy, and reading comprehension in English (Gottardo et al., 2018). Instead of treating listening comprehension as a composite variable, the unique and shared variance of its subcomponents -- vocabulary, morphological awareness, and syntactic knowledge -- were

examined in relation to English reading comprehension. Results revealed that word reading and the three subcomponents of listening comprehension explained a sizeable amount of variance in reading comprehension, lending support to the SVR. Results showed that all three subcomponents of listening comprehension contributed to reading comprehension. In addition, morphological awareness and syntactic knowledge shared significant amounts of variance with vocabulary (Gottardo et al., 2018).

Verhoeven and van Leeuwe's (2012) study also lends support to the SVR. The word reading efficiency and listening comprehension skills of first language (L1) learners and second language (L2) learners of Dutch were related to their reading comprehension abilities throughout the primary grades. Findings showed the simple view of reading to be equally valid for L1 and L2 learners. Results also indicated that as readers gained skill in reading comprehension, the impact of word reading efficiency on reading comprehension decreased, while the impact of listening comprehension increased to the same extent in both groups of learners.

Limitations to the SVR

Kirby and Savage (2008) acknowledge the usefulness of the SVR as a broad framework through which to conceptualize reading comprehension and its relationship to global linguistic comprehension and word-reading abilities. However, they argue that the SVR is not a full theory of reading. They find SVR incomplete or in need of further empirical support, particularly in the conceptualization of decoding and the measurement of reading comprehension. In addition, they posit that the roles of reading fluency, reading comprehension strategies, and text illustrations, as well as considerations of second-language learning context, should be taken into account. Francis and colleagues (2018) also find the SVR inadequate. They proposed a Complete View of Reading (CVR_i), a model that 1) extends the SVR by including the cognitive underpinnings of

decoding and language comprehension (component skills framework), 2) illustrates differences between readers of various abilities and ages (developmental framework), and 3) highlights the impact of text features and linguistic discourse on readers' comprehension (text and discourse framework), all of which the SVR does not take into consideration. Perfetti and Hart (2002) assert that the focus should shift away from decoding and linguistic comprehension toward a more integrated conceptualization of reading skill based on the quality of lexical representations, both oral and written. Nation (2019) claims that there is an underlying language factor that feeds into decoding and linguistic comprehension, and bi-directional connections between the two components. Furthermore, she underscores the significant role of reading experience in enriching language learning. Aaron and colleagues (2008) propose a componential model of reading (CMR) consisting of three domains: cognitive (i.e., word recognition and language comprehension), psychological (e.g., student motivation and interest, teacher knowledge and expectations), and ecological (e.g., home environment, school environment). Finally, Catts (2018) asserts that though the SVR has been useful for conceptualizing reading comprehension, it has "contributed to false impressions about the complexity and malleability of comprehension." There is a "need to more fully recognize the multidimensional nature of comprehension and take a more specific approach to intervention (and assessment) … that can impact students' performances in relevant ways" (p. 321).

Challenges to the SVR: Reading in the First Language. Not all studies on reading in English validate the simple view of reading. Kershaw and Schatschneider (2012) examined the SVR in students in Grades 3, 7, and 10. Aside from being assessed on decoding, linguistic comprehension, and reading comprehension, the students were also tested on passage fluency, working memory, and performance on nonverbal IQ to determine their contributions to a model

of reading for all grades. They found that for Grade 3, nonverbal IQ was a significant predictor of reading comprehension. Moreover, Grade 3 data suggested that the SVR was better defined as the sum, not the product, of decoding and linguistic comprehension. For Grades 7 and 10, passage fluency significantly predicted reading comprehension even after controlling for decoding and linguistic comprehension. Overall, results did not strongly support the simple view of reading, suggesting that decoding and linguistic comprehension are not the only components involved in reading comprehension. Silverman and colleagues (2013) found these two components to be inadequate in explaining reading comprehension. Data from fourth-grade children showed that reading fluency (operationalized as quick and accurate reading of letters, words, sentences, passages) added unique variance beyond decoding and linguistic comprehension and played a mediating role between decoding and reading comprehension. Additionally, compared to an additive model, a multiplicative model for the relationship between decoding, linguistic comprehension, and reading comprehension did not add explanatory power**.**

Studies on reading in other alphabetic and non-alphabetic languages have yielded results that do not strongly support the SVR. Protopapas and colleagues (2013) analyzed cross-sectional and longitudinal data from Greek children in Grades 3-6. Overall, results indicated that vocabulary was a strong concurrent and longitudinal predictor of reading comprehension over and above word reading accuracy and oral language comprehension. Moreover, a large amount of the variance in reading comprehension attributed to word reading accuracy and oral language was explained by vocabulary, suggesting that the two components are interrelated, not dissociated. These findings were inconsistent with the propositions of the simple view of reading. On the other hand, the results of Asadi and colleagues' (2017) cross-sectional investigation of reading comprehension in vowelized Arabic lent only weak support for the SVR.

Data came from first to sixth-grade children's performance on measures not only of decoding, listening, and reading comprehension but also orthographic and morphological knowledge. Results indicated that reading comprehension was only moderately explained by the SVR (38%-56%). Orthographic and morphological knowledge explained an additional 10-22% of the variance beyond that explained by decoding and listening comprehension. However, even with this added contribution, approximately 40% of the variance in reading comprehension remained unexplained. The distinct characteristics of the Arabic writing system and orthography could be influencing reading processes differently than languages where the SVR has been validated (Asadi et al., 2017). An examination of reading in Chinese did not validate the SVR. Yeung and colleagues (2016) analyzed longitudinal data from Grades 1-3 Cantonese-speaking Chinese children. Interrelationships between linguistic comprehension skills (expressive vocabulary, word definition, oral narrative skills, and syntactic skills), decoding (word recognition and text reading fluency) and reading comprehension (sentence comprehension and passage comprehension) were examined. Results showed that an additive (i.e., linear) componential model with linguistic comprehension and decoding as predictors of reading comprehension was a better fit for the Chinese reading data than the SVR's multiplicative model (R = D x L). Additionally, results suggested that linguistic comprehension and decoding in Chinese were not as independent as proposed in the SVR. This particular finding could be related to the distinct feature of the Chinese writing system – the script-sound-meaning convergence of the Chinese character. The Chinese character strongly connects semantic knowledge to decoding, unlike the grapheme-phoneme correspondence in alphabetic systems (Yeung et al., 2016).

Challenges to the SVR: Reading in a Second Language. Not all findings from research on second language (L2) reading have validated the SVR. Results from the study of Paige and

Smith (2018) did not strongly support the simple view of reading. Data from fifth-grade English-language learners (ELLs) in India were collected using measures of reading fluency (word reading fluency, passage reading fluency), silent reading comprehension, listening comprehension, and reading vocabulary. As hypothesized by the SVR, the analyses resulted in a two-factor model of reading comprehension, with language and decoding as its two components. However, in the final path model, language explained 16.2% of the variance while decoding explained 17.6%, with the total model explaining only 33.8% of the variance in reading comprehension. This is contrary to the prediction of the simple view of reading that decoding and linguistic comprehension will substantially contribute toward explaining the variance in reading comprehension. Therefore, there must be factors other than language and decoding skills that could better explain English reading comprehension in ELLs in India.

In the United States (U.S.), recent studies among high school English speakers learning Spanish as a second language (L2) have revealed that L2 word decoding and L2 listening comprehension are strong predictors of L2 reading comprehension, consistent with the SVR (Sparks, 2019). Though these two components explained 60 to 67% of the variance in L2 reading comprehension for students completing the third year of L2 learning, the substantial variance left could be explained by the U.S. still being a largely monolingual English environment, even among most L2 learners' families. If the environment does not actively support L2 acquisition, students may have little interest, motivation, or reason to study the L2. The SVR does not account for these ecological and psychological factors, which studies have found to be significant for the development of reading skills (Sparks, 2019). In Canada, a study among Chinese-English bilingual learners in upper elementary grades found direct effects of the cognitive (i.e., word reading accuracy, word reading fluency, vocabulary, and listening

comprehension) and psychological (i.e., motivation, acculturation) domains on reading comprehension, while the ecological domain (i.e., number of L1 and L2 books at home, maternal education, and age at which the child first started shared book reading with parents) only had an indirect influence. Results indicate that the interactions of these three domains (not only decoding and language comprehension) should be considered in the promotion of successful reading comprehension (Li et al., 2020). On the other hand, research among L2 learners of languages other than English have found that vocabulary makes a unique contribution to reading over and above that of word reading efficiency and oral language skills (Droop & Verhoeven, 2003) or word recognition and oral language comprehension (Tunmer & Chapman, 2012).

Reading in Multiple Languages

Two thirds of the global population understand and speak two or more languages (Dörnyei & Csizér, 2002), making multilingualism quite common (McCabe et al., 2013). However, research on multilingual reading is not as common, and studies testing the simple view of reading (SVR) in/across three languages is lacking. Bérubé and Marinova-Todd (2012) investigated the relationship between first language (L1: Africans, Amharic, Croatian, Czech, Danish, Fanti, German, Greek, Hungarian, Korean, Polish, Serbian, Spanish, Tagalog, Vietnamese [alphabetic]; Cantonese, Japanese, Mandarin, Shanghainese [logographic/syllabary] typology and the development of second (L2: French) and third (L3: English) language and literacy skills in multilingual children. Findings showed that multilingual children who were literate in an alphabetic L1 showed advantages in L2 and L3 reading comprehension over those who had a logographic/syllabary L1. However, they did not differ in word reading and pseudoword reading accuracy. Meanwhile, Piper and colleagues (2016) looked into the relationship of oral passage reading fluency and reading comprehension among Kenyan children

in two or two or three languages: English, Kiswahili, and one of two mother tongues, Dholuo or Gikuyu. They found that though many children could read English words more easily than words in Kiswahili or their mother tongue, their reading comprehension was significantly lower in English than in Kiswahili. Finally, Smidfelt (2018) studied the cross-linguistic comprehension processes of multilingual Swedish L1 speakers while reading and decoding text in Italian, a language unknown to them. The participants had English as L2 and French, Spanish, and German as L3. The results revealed that all the previously acquired languages were used to infer the meaning of the words in the texts, indicating non-selective access to the mental lexicon. Though these three studies did not directly test the SVR, they suggest that reading comprehension in three languages is not as simple as Hoover and Gough (1990) viewed it.

Research Aim

The research cited above shows that there is still no consensus on the validity of the simple view of reading (SVR) as an explanation for reading comprehension. The investigations have yielded both confirmatory and contrasting results in different languages (e.g., transparent or not, alphabetic or not) and reading contexts (e.g., first or second language, monolingual, or bilingual/multilingual).

The present study examined the role of word reading fluency (proxy for decoding) and vocabulary (proxy for language comprehension) on reading comprehension across three languages: Kapampangan (L1), Filipino (L2), and English (L3). In light of a modified simple view of reading, it was hypothesized that word reading fluency and vocabulary would make unique contributions to reading comprehension in each language. Moreover, it was predicted that the product of word reading fluency and vocabulary would significantly contribute to reading comprehension over and above their own unique contributions. Though it did not

explicitly test a modified simple view of reading, the study of Lee and Chen (2019) among emerging bilinguals found that in Grade 3, word reading fluency, vocabulary, and the product of the two significantly and uniquely contributed to English and French reading comprehension.

Method

Participants[15]

The study involved students in Grades 4 and 5 who also participated in Study 1. There were originally 214 participants but two of them completed fewer than 20% of the measures and were consequently excluded from the sample of 212. The children were aged eight to 13 years old (M_{age} = 9.22; SD = 0.86; female = 53%) across the two grades. There were 41 students (19%) who were eight years old, 97 (46%) who were nine years old, 65 (31%) were 10 years old, seven (3%) who were 11 years old, and two (1%) who were 13 years old. There were 108 in Grade 4 (M_{age} = 8.67; SD = 0.66; female = 55%) and 104 in Grade 5 (M_{age} = 9.79; SD = 0.65; female = 52%).[16]

Grades 4-5 (approximately 9-10 years) students are in the early phase of the reading to learn stage, when they use reading as a tool to acquire new knowledge. They are expected to have achieved automatic word recognition and fluency at the end of Grade 3, such that starting in Grade 4, their reading development is characterized by the growing importance of word meaning, prior knowledge, and strategic knowledge, which are all key in comprehension. During this initial phase, vocabulary and prior knowledge may still be limited; listening comprehension may be more effective than reading comprehension; and reading may focus on only one

[15] See Study 1 for details on the recruitment of participants and securing written informed consent.

[16] Grade 6 students who participated in Study 1 were excluded from Study 2 because their overall performance as a group was unexpectedly poorer than that of the Grade 5 group.

viewpoint. The grade levels or ages at which this and other stages of reading development occur are approximations. Whether reading develops as described depends, to a substantial extent, on the instruction provided at home and/or in school (Chall, 1983). The above description pertains to reading development in the first language. There may be similarities and/or differences in some phases/stages and areas of reading development among children learning more than one language, possibly due to factors like amount of language exposure, usage of the different languages (Hammer et al., 2014), language distance, age of acquisition, and other linguistic, cognitive, and socio-cultural factors (Chung et al., 2019).

Measures

Language, reading, and demographic measures were used to collect data. Due to the lack of standardized tests in Kapampangan and Filipino, measures were created in these languages that were patterned after or translated from the English measures, when and where appropriate.

Language and Reading Measures. The participants were assessed on word reading fluency, vocabulary, and reading comprehension in Kapampangan, Filipino, and English. In the present study, the word reading fluency and vocabulary measures used were the same ones used in Study 1. For the current study, reading comprehension measures in the local languages were constructed, guided by the description of the English measure and the characteristics of the local languages. As in Study 1, an effort was made to make the measures similar, but they were not matched item by item in terms of the languages' various psycholinguistic aspects. The Cronbach's alpha value for the sample is reported for each of the English and local language and reading measures used.

***Word Reading Fluency*.** In the present study (as in Study 1), word reading fluency refers to fast and accurate context-free word reading. Word reading fluency (not simply decoding

accuracy) was assessed because it is a more important and robust measure beyond the third grade (Joshi & Aaron, 2011), as well as in transparent orthographies (Landerl & Wimmer, 2008). Additionally, the decoding component of the SVR refers to quick and accurate reading of isolated words (Gough & Tunmer, 1986). Word reading fluency in English was measured through the Sight Word Efficiency subtest and the Phonemic Decoding Efficiency sub-test of the Test of Word Reading Efficiency (TOWRE; Wagner et al., 1999b). In this study, word reading fluency was the sum of the scores in the two subtests. This was the case for word reading fluency in Kapampangan and Filipino as well, which were assessed using measures patterned after the TOWRE. Within-language correlational analyses using the three scores revealed *r*'s ranging from .94 to .99 for Kapampangan, .89 to .98 for Filipino, and .89 to .98 for English. Cronbach's α for the sample was .98 for English, .97 for Kapampangan, and .98 for Filipino. In this study, word reading fluency was used as a proxy for decoding. (See Study 1 for details on these word reading fluency measures.)

Vocabulary. In the present study (as in Study 1), vocabulary was examined in terms of vocabulary knowledge. In English, it was measured using the Expressive One-Word Picture Vocabulary Test (EOWPVT; Brownell, 2000). Translations of the EOWPVT in Kapampangan and Filipino were used to measure vocabulary in these two languages. Cronbach's α for the sample was .95 for English and Kapampangan and .93 for Filipino. In this study, vocabulary was used as a proxy for language comprehension. Vocabulary knowledge has been used as a proxy for a range of language skills (Hirsch, 2013). Further, vocabulary learning may be a proxy for general language learning ability among English language learners (ELLs) (August et al., 2005; Fraser et al., 2017) or general language proficiency in an L2 or L3 (Geva, 2006). The participants in the study were ELLs; they were learning Filipino as L2 and English as L3. Additionally,

Hoover and Gough (1990) cite Singer and Crouse's (1981) work as one of the early studies that lent support to the simple view of reading. In the Singer and Crouse (1981) study, linguistic comprehension was assessed as vocabulary knowledge.[17] (See Study 1 for details on the vocabulary measures used in the present study.)

Reading Comprehension. Reading comprehension in English was measured using the Passage Comprehension Subtest of the Group Reading Assessment and Diagnostic Evaluation (GRADE; Williams, 2001). The GRADE Passage Comprehension Subtest is an untimed multiple-choice measure consisting of 24-28 items. It requires the student to read short passages of various types/topics (e.g., fiction, science, practical) and answer explicit and implicit comprehension questions after (e.g., *What does Meg do on hot days?* [explicit]; *What is this story about?* [implicit]). It was group administered to the participants. Because English was the participants' L3, the grade level of the test that was chosen for administration was adjusted to three levels below the students' current grade level (i.e., Grade levels 1 and 2 for participants in Grade levels 4 and 5, respectively). Due to the difference in the number of test items for the two grade levels, percentages were used in reporting scores. Cronbach's alpha was .69 for the Grade 4 sample and .78 for the Grade 5 sample.

Researcher-constructed measures, which were patterned after the GRADE Passage Comprehension Subtest and took into consideration the characteristics of the languages, were used to assess reading comprehension in Kapampangan and Filipino. Similar to the GRADE test,

[17] The plan was to use a listening comprehension test as a measure of linguistic comprehension, as recommended by the proponents of the SVR. However, listening comprehension measures in Kapampangan and Filipino were not constructed due to time constraints. The development of reading comprehension measures took longer than expected, due to the multiple pilot tests and revisions that had to be done, to improve the psychometric properties of the tests (see the section on the reading comprehension measure for details). Aside from this, the process took up passages/texts and schools that could otherwise have been used for the development of the listening comprehension tests. Finally, it should also be noted that the word reading fluency tests required individual administration and the sample size was large.

there was a different test for each grade level. The Kapampangan and Filipino tests were evaluated (e.g., difficulty, curriculum match, test construction guidelines) by subject area teachers and concerned DepEd experts, and consequently improved based on their recommendations. In each language, the 20-item test for each grade level went through three pilot tests. After each pilot test, the necessary revisions of the measures were made, guided by the indices of discrimination and difficulty and Cronbach's reliability. After these pilot tests, the best items from the three grade levels were chosen. This new version was pilot tested once, after which the necessary refinements were made. The actual test that was group administered to the sample consisted of nine items, three each for every passage. Similar to those in the GRADE test, the items were a combination of explicit and implicit comprehension questions, while the passages were of various types/topics. These were true for both languages. Examples of questions in Kapampangan are *Nanu ing dapat linisan?* (What should be cleaned?): explicit; *Nung atin lang katuki ring linya ning tula, nanu kayang laman da?* (What would the next lines in the poem be about?): implicit. Examples of questions in Filipino are *Kailan nagsasayang ng kanin ang mga Pilipino?* (When do Filipinos waste rice?): explicit; *Ano ang magandang pamagat para sa talata?* (What is a good title for the paragraph?): implicit. (See Appendix E for details on the development of these measures.) Cronbach's alpha for the sample was .46 for Kapampangan and .56 for Filipino.

Demographic Measure. As in Study 1, a questionnaire was used to gather demographic and linguistic information. Fewer than 10% of the children's parents responded, and only around 25% of them answered it completely.[18] Thus, the questionnaire was orally administered in

[18] All the completely answered questionnaires were filled out by the children's mothers. Most of them reported being high school graduates and full-time housewives. A few indicated being college graduates working as a government employee, a teacher, or a cashier. All wrote that Kapampangan was their first language. They reported having the ability to understand, speak, read, and write in Kapampangan, Filipino, and English.

Kapampangan to each student instead. Fewer than 10% of the children answered questions about their parents, but all replied to language-related items directly connected to themselves (See Appendices B and C for details on this measure.).

Procedure

In the present study, all the participants' scores in the Study 1 word reading fluency and vocabulary measures, as well as their answers in the language questionnaire in Study 1 were used. Thus, for purposes of this study, the additional measures were reading comprehension tests in Kapampangan, Filipino, and English. The tests were group administered on three separate days, lasting approximately 30-40 minutes each. The order of administration across the languages was counterbalanced among the participants. The administration of the reading comprehension measures was conducted within three weeks of the last day of the administration of the measures in Study 1. The schedule and the location of testing sessions were the same as those in Study 1. (See Study 1 for details.)

Data Analyses

All raw scores for vocabulary, word reading fluency, and reading comprehension tests were transformed to percentages, for consistency. The descriptive statistics of the three main variables were calculated to ascertain whether there was variability in the data. Multivariate outliers were identified. Repeated measures MANOVA with grade level as a between-subjects factor was performed to examine any differences within the participants, as well as any potential developmental differences among them. Bivariate correlations were computed to check if there was sufficient basis for conducting regressions. An additional variable was created in each language – the product of the two components (word reading fluency [D] X vocabulary [L]). Next, three sets of hierarchical regressions were conducted (one for each language) in this

manner: step 1 – grade level (as a control variable), step 2 – word reading fluency, step 3 – vocabulary, and step 4 – vocabulary X word reading fluency.[19] Similar regressions were conducted with word reading fluency and vocabulary interchanged in steps 2 and 3.

Results

The present study examined the role of word reading fluency and vocabulary in reading comprehension among grades 4 and 5 Kapampangan-Filipino-English multilingual children. It was hypothesized that word reading fluency and vocabulary would make unique contributions to reading comprehension in each language. Moreover, the product of word reading fluency and vocabulary would significantly contribute to reading comprehension over and above their own unique contributions. The hypotheses were examined using a series of hierarchical regression analyses.

Preliminary analysis revealed nine multivariate outliers which were significantly influencing some of the regression results.[20] Therefore, these nine outliers were excluded from all analyses. The findings for the reduced sample (N = 203) are reported in this paper.

Language Use of the Sample

A little more than half of the children (52%) reported their best language to be Kapampangan, with Filipino coming as a close second (47%) and English a far third (1%). A similar pattern of Kapampangan dominance was reflected in the participants' reports of their

[19] As noted in Study 1, one concern in developmental studies is that general levels of performance can vary considerably with age (Marinelli et al., 2016). Grade was highly correlated with age (r = .65). Age was more variable (from 8 to 13 years), but less evenly distributed (from 1% to 46%). Grade had only two levels, but it was more evenly distributed (Grade 4 = 51%, Grade 5 = 49%). It is in school where the participants have the best chance to acquire knowledge and skills in and through their languages. Beyond its relationship with age, grade level progression reflects growth in knowledge and skills, which is linked to the teaching-learning process. Whether reading develops as described (in theory) substantially depends on the instruction in school (Chall, 1983). Thus, grade level (not age) was used as a control variable. (See Appendix F for a summary of age-related results in Study 2.)

[20] Two of these were also outliers in Study 1.

primary home language (52%). On the other hand, more children reported frequently using Filipino than Kapampangan or English in interacting with their friends at school (58%) and the community (57%). The same pattern of Filipino dominance was found in the language used by participants who reported reading daily in Filipino (20%) and watching TV, videos, and/or the Internet daily (41%) in Filipino. Clearly, the participants' most commonly used languages in everyday life are their first language, Kapampangan, and the national language, Filipino (their L2). English did not figure prominently in any aspect or activity in the children's daily lives. It should be noted that although only a minority of the children reported reading or watching TV/videos/Internet daily, there were more of them who did the latter (26-41%) than the former (12-28%), in any language. Table 9 presents the information on the participants' language use.

Performance of the Sample

Neither floor nor ceiling effects were evident in the data. The participants' scores in word reading fluency, vocabulary, and reading comprehension ranged from approximately 30% to 62% correct. (See Table 10). To determine whether the participants' performance in word reading fluency, vocabulary, and reading comprehension significantly differed across languages, a repeated-measures MANOVA was conducted.[21] To examine potential developmental differences, grade level served as a between-subjects factor.

There was a significant effect for language, $V = .65$, $F(6, 196) = 60.34$, $p < .001$, partial $\eta^2 = .65$. In a follow-up univariate analysis, significant cross-language differences were found in all three variables: $F(1.920, 385.955) = 97.13$, $p < .001$, partial $\eta^2 = .33$ (with Greenhouse-Geisser adjustment) for word reading fluency; $F(1.765, 354.702) = 32.05$, $p < .001$, partial η^2

[21] It should be noted that cross-language comparison of performance is a concern identified earlier in the paper (i.e., introduction and Study 1). Though the results of the comparison are reported, these should be interpreted with caution, in light of the said concern.

= .14 (with Greenhouse-Geisser adjustment) for vocabulary; and $F(2, 402) = 108.75$, $p < .001$, partial $\eta^2 = .35$ for reading comprehension. In all the three variables, the participants scored higher in their L2 (Filipino) than in their L1 (*p's* < .05) and L3 (*p's* < .001). Across the three variables, the sample's scores were lowest in their L3 (*p's* < .001).

A significant effect for grade level was obtained, $V = .17$, $F(3, 199) = 13.38$, $p < .001$, partial $\eta^2 = .17$. Grade level differences were found in all three variables: $F(1, 201) = 8.35$, $p < .01$, partial $\eta^2 = .04$ for word reading fluency; $F(1, 201) = 40.27$, $p < .001$, partial $\eta^2 = .17$ for vocabulary, and $F(1, 201) = 9.37$, $p < .01$, partial $\eta^2 = .05$ for reading comprehension. The grade 5 students significantly scored higher than the grade 4 students.

There was a significant interaction between language and grade level, $V = .07$, $F(6, 196) = 2.59$, $p < .05$, partial $\eta^2 = .07$. An interaction was found for reading comprehension, $F(2, 402) = 6.11$, $p < .01$, partial $\eta^2 = .03$, but not for word reading fluency, $F(1.920, 354.702) = 2.37$, $p = .10$, partial $\eta^2 = .01$ (with Greenhouse-Geisser adjustment) and vocabulary, $F(1.765, 354.702) = .32$, $p = .70$, partial $\eta^2 = .00$ (with Greenhouse-Geisser adjustment).

Across languages, grade level was significantly related to word reading fluency (*r's* ranging from .174 to .218, *p's* < .05) and vocabulary (*r's* ranging from .352 to .393, *p's* < .01). Grade level was also related to Filipino reading comprehension ($r = .284$; $p < .01$). Word reading fluency was related across languages (*r's* ranging from .917 to .939; *p's* < .01). Additionally, vocabulary (*r's* ranging from .648 to .790; *p's* < .01) and reading comprehension were related across languages (*r's* ranging from .415 to .444; *p's* < .01). Finally, word reading fluency, vocabulary, and reading comprehension were related to each other in Kapampangan (*r's* ranging from .223 to .483; *p's* < .01), Filipino (*r's* ranging from .321 to .424; *p's* < .01), and English (*r's* ranging from .502 to .607; *p's* < .01). (See Table 11).

Contributions of Word Reading Fluency, Vocabulary, and Their Product to Reading Comprehension in Each Language

Hierarchical regressions were conducted to examine the unique contribution of each variable over and above those explained by the other variables. Grade level was entered as a control variable in the first step, in light of the grade level effects on performance across the three variables. Word reading fluency and vocabulary were entered as the second and third steps, respectively. The order of these two steps was then reversed. As a final step, the product of these two variables was entered. Table 12 presents a summary of these results.

In Kapampangan, vocabulary ($\Delta R^2 = .043$, $\beta = .224$, $t = 3.02$, $p < .01$) and word reading fluency ($\Delta R^2 = .190$, $\beta = .462$, $t = 7.05$, $p < .001$) each contributed unique variance to reading comprehension if they were entered as second and third steps, respectively. However, they were no longer significant if their product was entered in the model. None of the variables made a significant unique contribution to reading comprehension in the final model when all four variables were entered (see Table 12).

In Filipino, word reading fluency ($\Delta R^2 = .101$ to $.137$, β's $= .337$ to $.380$, t's $= 5.14$ to 5.92, p's $< .001$) and vocabulary ($\Delta R^2 = .024$ to $.060$, β's $= .174$ to $.298$, t's $= 2.50$ to 3.75, p's $< .05$) each contributed unique variance to reading comprehension whether as second or third step. However, similar to Kapampangan, they were no longer significant if their product was entered in the model. Only grade level made a significant unique contribution to reading comprehension after the contribution of each of the variables had been controlled ($\Delta R^2 = .081$, $\beta = .144$, $t = 2.11$, $p < .05$). (See Table 12.)

In English, word reading fluency significantly contributed to reading comprehension even after controlling for all the other variables, specifically grade level, vocabulary, and the

product of word reading fluency and vocabulary, β = -.852, t = -2.90, $p < .01$. It contributed 26.9% unique variance as the second step and 6.8% unique variance as the third step. Vocabulary also significantly contributed to reading comprehension even after controlling for all the other variables, β = -.569, t = -2.09, $p < .05$. It contributed 36.4% unique variance as the second step and 16.4% unique variance as the third step. Finally, the product of word reading fluency and vocabulary contributed 4.2% unique variance to reading comprehension, β = 1.928, t = 4.01, $p < .001$. (See Table 12.)

Summary of Results

Across languages, results showed that vocabulary (proxy for linguistic comprehension) and word reading fluency (proxy for decoding) significantly contributed to reading comprehension only when the other variables were not controlled. Word reading fluency explained unique variance when grade level and vocabulary were controlled in Kapampangan while in Filipino, vocabulary and word reading fluency explained unique variance as the third step when grade level and the other complimentary variable (vocabulary or word reading fluency) were controlled. When the contributions of other variables (i.e., grade level; product of word reading fluency [D] and vocabulary [L]) were controlled for, neither word reading fluency nor vocabulary contributed unique variance to reading comprehension in Kapampangan or Filipino. This finding could be in part because the contribution of the product of word reading fluency and vocabulary incorporates the variance explained by these two variables. The exception to this was the English model, in which word reading fluency and vocabulary each contributed unique variance to reading comprehension, over and above the contributions of the other variables. Moreover, in English reading comprehension, the product of word reading fluency and vocabulary contributed unique variance, over and above the independent

contributions of the two components. Overall, the inconsistent results across languages did not fully support the modified SVR-based hypotheses that 1) word reading fluency and vocabulary would make unique contributions to reading comprehension, and 2) the product of word reading fluency and vocabulary would significantly contribute to reading comprehension over and above their own unique contributions.

Discussion

Overall, the participants did not perform well across measures and languages. Their better performance in Filipino (their L2) than in their native Kapampangan may be explained by the continued use of Filipino in the curriculum both as a subject area and as a medium of instruction. Kapampangan, the mother tongue, was a language arts subject and a medium of instruction only until grade 3. Moreover, the participants' use of Filipino for social interaction at home, in the community, and at school is almost as frequent as their use of Kapampangan. As the national language, Filipino (along with English) is an official language, as well as the language of popular culture and the media. Though English is the most highly prized language, its relationship with the local languages is mediated by the government-mandated national language, Filipino (Tupas, 2015). Even if performance in Filipino was better than performance in Kapampangan and English, it was still low. This may be explained by their poor Kapampangan (L1) skills. Language and reading skills acquired in the L1 can facilitate the development of similar skills in another language when the L1 is supported. When the L1 proficiency is low and underdeveloped, it can be a limiting factor in the development of other languages (Cummins, 1979, 2001). Additionally, the overall poor performance across languages may be connected to their lack of reading resources in school and in the community, their overall lack of out-of-school reading, and the implementation of the new multilingual education policy among them. All these point to

the ecological domain in the componential model of reading (Aaron et al., 2008; Li et al., 2020; Sparks, 2019), which the modified (as well as the original) simple view of reading fails to capture.

Moreover, the modified SVR does not explicitly take into consideration differences between readers of various ages or grade levels,[22] which is part of the developmental framework that Francis et al. (2018) propose in their complete view of reading. This developmental aspect of reading may explain the significant contribution of grade level to the variance in Filipino (L2) reading comprehension, over and above the contributions of decoding (word reading fluency), linguistic comprehension (vocabulary), and their product. The L2 reading comprehension study of Paige and Smith (2018) revealed that the variance explained by decoding and language comprehension was not as substantial as the SVR claims, while Verhoeven and van Leeuwe (2012) found that with grade progression, the impact of word reading efficiency on reading comprehension decreased, while the impact of listening comprehension increased. Neither study suggests that age or grade level alone explains a significant variance in reading comprehension after other factors have been controlled for, which is the case for Filipino. This particular finding for Filipino reading comprehension requires further investigation. On the other hand, that grade level has a unique contribution to the variance in reading comprehension in Filipino but not in Kapampangan and English may be interpreted in light of the government and educational language policies mandating the learning and use of Filipino as the national and official language and as a medium of instruction in schools starting in grade 4. Additionally, Filipino is commonly used in the participants' daily activities, second only to Kapampangan. Though Kapampangan

[22] Though the SVR itself does not make any explicit hypothesis or specific prediction in connection to various ages (developmental aspect), some studies (e.g., Joshi et al., 2015; Tilstra et al., 2009) have examined the applicability of the SVR across grade levels.

remains dominant in the children's everyday life, mother tongue instruction ceases after the third grade. Meanwhile, English is rarely used by the children outside school. It is possible that grade progression becomes more salient in Filipino reading comprehension after the third grade when mother tongue literacy instruction has been discontinued. As the children enter the stage of reading to learn in their L1 and in their two other languages after grade 3, educational opportunities become even more important. It is a challenging time because the transition is not only from learning to read to reading to learn (Chall, 1983), but also from using the children's L1 as the language of teaching and learning to using their L2 and L3 as the media of instruction (Congress of the Philippines, 2013). It is in school where the children have the best chance to acquire knowledge and skills in and through these languages. However, in Kapampangan, the children do not have the opportunity to practice reading to learn, while their reading skills in English are the weakest among the three languages and might not be used to acquire new knowledge at this time. Seen within this context, the contribution of grade level to Filipino comprehension is connected to developmental and ecological aspects of reading, which the modified (as well as the original) SVR does not capture.

The significance of the modified SVR's two components of reading comprehension – word reading fluency (proxy for decoding) and vocabulary (proxy for linguistic comprehension) – was not reflected in most of the hierarchical regressions when their product was included. In the participants' L1 (Kapampangan), neither one of the two components nor their product substantially contributed to reading comprehension. This is contrary to the claims of the modified SVR but consistent with the findings on L1 reading comprehension by Asadi et al. (2017), Kershaw and Schatschneider (2012), and Silverman et al. (2013), which suggest that decoding and linguistic comprehension are not the only components involved in reading

comprehension (contrary to the claim of the original SVR). Similarly, in the participants' L2 (Filipino), neither one of the two components nor their product substantially contributed to reading comprehension when all three were included. This is again contrary to the claims of the modified SVR but consistent with the findings on L2 reading comprehension by Li et al. (2020), Paige and Smith (2018), and Sparks (2019), and which suggest that decoding and linguistic comprehension are not the only components involved in reading comprehension (contrary to the claim of the original SVR). These results may also be explained by the modification of the SVR in this study, which further "simplified" the model, i.e., using proxy variables for decoding (word reading fluency) and linguistic comprehension (vocabulary) instead of making a more comprehensive assessment of each component. On the other hand, in the participants' L3 (English), word reading fluency, vocabulary, as well as the product of word reading fluency and vocabulary, contributed unique variance to reading comprehension. These results lend support to the modified SVR used in the study. They are consistent with the findings of Lee and Chen (2019). The significant role of word reading fluency in English reading comprehension, at a time when vocabulary is expected to play a major part, may be related to the fact that it is the most challenging of the languages to read, due to its less transparent orthography as well as to the lower level of familiarity in the present sample. Thus, the participants were still in the process of becoming efficient at word recognition, the decoding component. In the modified SVR (as well as in the original SVR), as one component approaches a high/mastery level, the other component becomes increasingly important for reading comprehension. The participants had poor word reading fluency and vocabulary scores. Having no mastery in either component, they were likely relying on whatever word reading skills and vocabulary knowledge they had in their effort to understand what they were reading. Compared to word reading fluency, vocabulary contributed

a larger unique variance to reading comprehension either as a second or third step. This may be explained from a developmental perspective. The studies of Lonigan et al. (2018) and Verhoeven and van Leeuwe (2012) revealed a trend in the relative importance of the two components, with decoding being more strongly related to reading comprehension in young children who were still learning to become more efficient/fluent readers, and its impact decreasing as children progressed in school where they improved their word recognition skills, while the impact of the other component (linguistic comprehension) increased. Vocabulary was used as a proxy for linguistic comprehension. The significant contribution of vocabulary to reading comprehension in English is consistent with the modified SVR's claim. Moreover, it supports the findings of Droop and Verhoeven (2003), Protopapas et al. (2013), and Tunmer and Chapman (2012) that vocabulary is a robust predictor of reading comprehension, over and above the contribution of word reading/decoding. It should be noted that in the study of Tunmer and Chapman (2012), vocabulary, an aspect of linguistic comprehension, also directly contributed to decoding. Finally, the unique variance in reading comprehension contributed by the product of word reading fluency and vocabulary is consistent with the modified SVR's claim regarding the multiplicative relationship of the two components and its central role in reading comprehension.

Additional explanations for the findings lie in methodological and sample considerations. These include the use of standardized measures in English but not in Kapampangan and Filipino. The idiosyncrasies of the sample could also produce these unique results. The sample has faced the challenges of poverty. First, most participants belong to low-income households and have parents who only reached or graduated from high school. Second, the children's school and community do not have a library, which limits their reading/learning opportunities and resources. Aside from these socio-economic difficulties, the participants have also confronted the

challenges of the new education policy which requires them to learn three languages as early as grade one.

Limitations and Future Directions

The limitations of this study are acknowledged. Findings and implications should be interpreted with caution. For pragmatic reasons (e.g., relatively large sample size, number of measures to be created in two languages, individual testing requirements, time constraints), the study was limited in several ways. First, there was only a single measure each for decoding, linguistic comprehension, and reading comprehension. Using additional measures for each construct may yield results that will better reflect the inherent complexity of each construct. This is especially true for linguistic comprehension, which was assessed using vocabulary as a proxy. For example, administering a listening comprehension test parallel to the reading comprehension test (as indicated by the proponents of the original model) used may provide more relevant information. Similarly, different measures of reading comprehension focus on different subskills (Keenan et al., 2008). Therefore, multiple measures of reading comprehension should be included. Additionally, all the Kapampangan (L1) and Filipino (L2) measures were not standardized. These measures might not be comparable to each other and to the English measures due to the diverse psycholinguistic properties of the languages, which were not adequately accounted for in the construction of the measures or in the analysis of the data. However, no standardized, normed measures are available in Filipino or Kapampangan. It is particularly noted that the L1 and L2 reading comprehension measures did not have high reliability. Since test norming and standardization takes time, these local measures should be improved by using them in other studies, analyzing their psychometric properties, and revising them accordingly. Moreover, the present study examined the modified SVR only in terms of

within-language variables. Studying the cross-language relations between decoding, linguistic comprehension, and reading comprehension both concurrently and longitudinally will provide researchers a better understanding of multilingual reading. Finally, the present study focused only on word reading fluency and vocabulary as predictors of reading comprehension. A two-pronged research program that will investigate not only the dynamic nature of reading development (involving interactions among reader, text, and activity, within the challenging socio-economic and educational contexts of the sample) but also the multidimensionality of reading comprehension (beyond its cognitive-linguistic components) will better inform reading assessment and instruction.

Despite these limitations, the study is still able to contribute to the knowledge base on the roles that word reading fluency and vocabulary play in reading comprehension in three languages, especially among multiliterate children living in challenging conditions. The results can inform curriculum planning, instruction, and teacher education, especially within the context of the study. The timing of the introduction of (an) additional language(s) in the curriculum should be examined carefully in light of students' low levels of performance not only in their second and third languages, but in their first language as well. The discontinuation of first language literacy instruction at the end of grade 3 should also be examined. Instruction in word reading should be enhanced since it plays a bigger role than vocabulary in reading comprehension among the generally low-performing readers in the sample. Opportunities for reading practice should be provided so that the learners will become more fluent readers, starting with word level fluency. However, it should be noted that vocabulary instruction can not be put aside. Investment in vocabulary building will eventually pay off once the children have become efficient in word recognition, at which time vocabulary and other aspects of oral language will

play a more important role in reading comprehension. Finally, the results can help inform pre-service and in-service teacher education by pointing to issues that need to be addressed in the training of people who (will) teach language and reading to multilingual learners with limited resources such as how to develop a reading habit among students in the absence of a library and how to develop reading skills in a language children seldom use in their daily lives.

Conclusion

In conclusion, the findings of the present study suggest that the simple view of reading, though helpful, is insufficient for understanding reading comprehension, especially among multilingual readers in socio-economically and educationally challenging contexts who are underrepresented in the reading literature. Decoding, linguistic comprehension, and reading comprehension are complex processes and constructs which can not be adequately explained through a two-factor equation. Developmental and ecological factors matter as well, as the results of this study suggest.

Overall, this study advances our current understanding of multilingual reading, particularly in less researched alphabetic languages. There is a point in seeking to understand how people understand what they read – in whatever language(s) they encounter in print. Understanding what one reads is not as simple as it seems.

Study 3: Longitudinal Relationship Between Vocabulary and Word Reading in Multilingual Kapampangan-Filipino-English Speakers

Words are powerful. This is reflected in the process and results of reading. A key component of reading is knowing words. Word knowledge consists of knowing the sounds of words, how they are written, and what they mean (Seidenberg, 2005). The greater the knowledge of the phonological, orthographic, and semantic constituents of words, the more efficient word reading becomes (Perfetti & Hart, 2002). Though the goal of reading is comprehension, it cannot happen without the ability to read and understand words (Perfetti, 2010). Word meanings are central to word identification (Perfetti, 2010). Word reading skill is predicted by vocabulary skill and, in turn, vocabulary, is affected by word reading skill (Perfetti, 2010). How well readers know how to read words and how well they know what words mean will influence how well they comprehend the texts they read (Perfetti, 2010). In light of this, the present study focused on the relationship between word reading fluency and vocabulary.

Reading in General: The Central Processing and the Script-Dependent Hypotheses

Word reading fluency and vocabulary can be examined within the context of two major hypotheses on reading in general. In the last two decades or so, reading acquisition and development has been generally understood in terms of the same underlying cognitive mechanisms, or, alternatively, differences in writing systems (Geva & Siegel, 2000). The *central processing hypothesis* claims that common cognitive and linguistic processes such as working memory, phonological awareness, and rapid automatized naming underlie L1 and L2 reading processes regardless of orthography (Stevenson et al., 1982). These cognitive and linguistic processes are related to word reading fluency (e.g., Balhinez & Shaul, 2019; Landerl & Wimmer, 2008; Vaessen et al., 2010) and vocabulary (e.g., Gorman, 2012; López-Escribano et al., 2018;

Mcdowell et al., 2013). Relationships between reading skills in two languages are considered evidence of cross-lingual, common underlying processes. Moreover, cross-language relations in reading are facilitated by shared linguistic features (Chung et al., 2019). Related to this proposition is the *linguistic interdependence hypothesis*, which posits that skills transfer across languages due to a common underlying proficiency (Cummins, 1979).

On the other hand, the *script-dependent hypothesis* claims that reading is a function of the orthographic transparency of a language (Geva & Siegel, 2000). Related to this premise is the orthographic depth hypothesis, which asserts that differences in the transparency of grapheme-to-phoneme correspondences lead to processing differences in naming and lexical decision tasks, which are central to word reading (Katz & Frost, 1992). Readers of a transparent orthography can depend on serial phonological recoding due to the consistent symbol-sound mappings, while readers of less consistent writing systems might use larger sublexical units to deal with the inconsistent grapheme-phoneme correspondences (Ziegler & Goswami, 2005). Fluency is important in reading acquisition in highly consistent orthographies (Wimmer, 2006), while vocabulary knowledge is strongly related to reading development in less transparent orthographies (Gottardo et al., 2017).

Relations Between Vocabulary and Word Reading

Word reading and vocabulary are not completely dissociated from each other; they are interconnected aspects of word knowledge. Efficient word reading and vocabulary are reciprocally related. Efficient word reading affects vocabulary because it allows the retrieval of meanings of familiar words as well as the introduction of new words. Vocabulary affects word reading because reading words whose meanings are known reinforces form-meaning connections, which helps create a specific representation for each word. As readers read words,

they enhance their vocabulary knowledge; as they use their knowledge of the meanings of words while reading them, they make the words more (readily) identifiable (Perfetti, 2010).

A study among Dutch children throughout their elementary years (Grades 1-6) found 1). early vocabulary to be predictive of later word decoding, and 2). efficient word decoding to be a key to ongoing vocabulary growth starting in mid-elementary school (Verhoeven et al., 2011). A two-year study among Chinese primary-school children also found evidence for reciprocal relationships between word reading and vocabulary skills. Vocabulary knowledge predicted initial levels of word reading, and early levels of word reading predicted vocabulary growth (Hulme et al., 2019).

Other studies point to a unidirectional relationship, mostly with vocabulary influencing word reading. In English (a deep or opaque orthography), vocabulary knowledge helps readers to recognize words they are sounding out, especially when there are several possible pronunciations due to inconsistent or less predictable letter-to-sound mapping. Knowledge of word meanings allows readers to differentiate among these multiple possibilities through the selection of the pronunciation that sounds like a known word (Kirby et al., 2008). Specifically, receptive vocabulary was significantly related to decoding (Ouellette, 2006) and novel word reading (Mitchell & Brady, 2013), while expressive vocabulary predicted visual word recognition (Ouellette, 2006). The relationship between vocabulary and word reading in English was also observed among Grade 1 bilingual Spanish-English speakers (Gottardo, 2002) and adolescent Chinese-English bilinguals (Gottardo et al., 2017). Additionally, vocabulary knowledge and word reading fluency were significantly related in English and French among Grades 2 and 3 emerging bilinguals (Lee & Chen, 2019). Though vocabulary knowledge plays a smaller role in word reading in more transparent orthographies (Ziegler et al., 2010), there is evidence that

vocabulary is related to word reading in non-alphabetic languages. Vocabulary (aside from rapid naming and semantic radical awareness) was a unique correlate of Chinese word reading among kindergarteners (Wang et al., 2015). In the abjad (consonantal writing system) Hebrew, vocabulary as well as naming speed, distinctly contributed to word reading fluency in the first grade, when a regular orthography with a pointed script was used (Shechter et al., 2018). On the other hand, a longitudinal study among English readers found the opposite – word reading predicted vocabulary. Grade 4 word reading skill was significantly related to vocabulary growth between Grade 4 and Grade 10, after controlling for kindergarten vocabulary skill. Stronger readers showed greater gains in their vocabulary than weaker readers (Duff et al., 2015).

Although the relationship between word reading and vocabulary has been observed empirically, the findings do not always show that the two are reciprocally related. The nature of the relationship between word reading and vocabulary has not been explored extensively in multilingual learners, particularly those in socio-economically and educationally challenging situations.

Research Aim

The current study examined word reading fluency and vocabulary in multilingual speakers of Kapampangan (L1), Filipino (L2), and English (L3). In particular, it studied the co-development and relations between vocabulary and word reading fluency in a longitudinal design across three time points that were approximately six months apart. The performance of children beginning in Grade 4 and Grade 5 was examined in Kapampangan and Filipino (two local languages with generally transparent orthographies) and in English (a language with more opaque orthography). Specifically, the study addressed the following question*: Is the nature of the relationship between vocabulary and word reading fluency similar across languages and*

over time, regardless of orthographic depth? It was predicted that the relations between vocabulary and word reading fluency would be similar across languages over time, especially since all three languages use the Roman alphabet. It was also predicted that the strength of the relations would vary across languages as a function of orthographic depth, as well as the participants' linguistic and educational contexts. Finally, it was predicted that the relations would be reciprocal.

Method

Participants[23]

The study involved students who also participated in Study 1 and Study 2. They were in Grades 4 and 5 at the start of the study. At Time 1 (first quarter of the school year), there were originally 214 participants but two of them completed fewer than 20% of the measures and were consequently excluded from the sample. Among the remaining 212 participants, there were 108 in Grade 4 (M_{age} = 8.67; *SD* = 0.66; female = 55%) and 104 in Grade 5 (M_{age} = 9.79; *SD* = 0.65; female = 52%). Overall, 41 students (19%) were eight years old, 97 (46%) were nine years old, 65 (31%) were 10 years old, seven (3%) were 11 years old, and two (1%) were 13 years old. At Time 2 (6 months after Time 1; last quarter of the school year), all 212 students from Time 1 participated. At Time 3 (6 months after Time 2, including a full two-month summer break; first quarter of the following school year), only 200 students participated, with 100 in each grade level. The final sample for this study consisted of the 200 students who participated at Times 1, 2, and 3. All children in the sample completed all measures at the three time points.

[23] See Study 1 for details on the recruitment of participants and securing written informed consent.

Measures

Language, reading, cognitive, and demographic measures were used to collect data. Due to the lack of standardized tests in Kapampangan and Filipino, measures were created in these languages that were patterned after or translated from the English measures, when and where necessary.

Language and Reading Measures. The participants were individually assessed on phonological awareness, word reading fluency, and vocabulary knowledge in Kapampangan, Filipino, and English. (See Study 1 and Study 2 for concerns regarding within-construct cross-language measures.)

Phonological Awareness. In the present study (as in Study 1), phonological awareness (PA) was measured at the level of the phoneme. English PA was measured using the Dynamic Indicators of Basic Early Literacy Skills Phoneme Segmentation Fluency (DIBELS PSF; Good et al., 2007). To test PA in Kapampangan and Filipino, measures patterned after DIBELS PSF were used. (See Study 1 for details on these PA measures and their manner of administration.)

Phonological awareness (PA) is related to vocabulary (Whitehurst & Lonigan, 2001) as well as word reading (psycholinguistic grain size theory; Ziegler & Goswami, 2005), though the relationship between PA and word reading may be less relevant in transparent than in opaque orthographies (Landerl et al., 2013). In light of this, PA was one of the control variables. It was administered only at Time 1. Cronbach's α for the sample for each of the measures in Kapampangan, Filipino, and English was .91.

Word Reading Fluency. In the present study (as in Study 1 and Study 2), word reading fluency refers to fast and accurate context-free word reading. Word reading fluency (not simply

decoding accuracy) was assessed because it is a more important and robust measure beyond the third grade (Joshi & Aaron, 2011), as well as being the more robust word reading measure in transparent orthographies (Landerl & Wimmer, 2008). Word reading fluency in English was measured through the Sight Word Efficiency subtest and the Phonemic Decoding Efficiency sub-test of the Test of Word Reading Efficiency (TOWRE; Wagner et al., 1999b). In this study (as in Study 1 and Study 2), word reading fluency was the sum of the scores in the two subtests. This was the case for word reading fluency in Kapampangan and Filipino as well, which were assessed using measures patterned after the TOWRE. (See Study 1 for details on these word reading fluency measures and their manner of administration.) These measures were administered at each of the three time points. Cronbach's α for the sample for each of the Kapampangan, Filipino, and English word reading measures was .99 at Times 1, 2, and 3.

Vocabulary. In the present study (as in Study 1 and Study 2), vocabulary was examined in terms of vocabulary knowledge. In English, it was measured using the Expressive One-Word Picture Vocabulary Test (EOWPVT; Brownell, 2000). Translations of the EOWPVT in Kapampangan and Filipino were used to measure vocabulary in these two languages. (See Study 1 for details on these vocabulary measures and their manner of administration.) These measures were administered at each of the three time points. Cronbach's α for the sample for each of the Kapampangan and Filipino measures was .94 at Times 1, 2, and 3. Cronbach's α for the sample for the English measure was .95 at Times 1, 2, and 3.

Cognitive Measure: Rapid Automatized Naming. In the present study (as in Study 1), rapid automatized naming (RAN) was measured using the Rapid Digit Naming subtest of the Comprehensive Test of Phonological Processing (CTOPP; Wagner et al., 1999a). (See Study 1 for details on this measure and its manner of administration.)

Rapid automatized naming (RAN) contributes uniquely to word reading (Wagner & Torgesen, 1987). RAN might be more salient in transparent than in opaque orthographies (Kirby et al., 2010; Mann & Wimmer, 2002). In light of this, RAN was one of the control variables. It was administered only at Time 1. The manual reports an average Cronbach's α of .87 (age 5 to 24 years).

Demographic Measure. As in Study 1 and Study 2, a questionnaire was used to collect demographic and linguistic information. Fewer than 10% of the students' parents responded, and only around 25% of them answered it completely. (See Study 2 for a summary of these parents' responses.) Thus, the questionnaire was orally administered in Kapampangan to each child instead. Fewer than 10% of the children answered questions about their parents, but all responded to language-related items directly connected to themselves. (See Study 1 for details on this measure and its manner of administration.) This measure was administered only at Time 1.

Procedure

The present study used the participants' scores and responses on the following variables/measures in Study 1 as Time 1 performance: phonological awareness, word reading fluency, vocabulary, RAN, and language questionnaire. (See study 1 for details on the administration of the measures.). Thus, for purposes of this study, only word reading fluency and vocabulary measures in Kapampangan, Filipino, and English were individually administered at Time 2 and Time 3. On any given day, to avoid confusion, the participants were tested in only one language, in sessions lasting approximately 10-15 minutes each. The order of administration across the languages was counterbalanced. The order of administration of the different measures within language was also counterbalanced among the participants. The schedule and the location of testing sessions were the same as those in Study 1. (See Study 1 for details.)

Data Analyses

Descriptive statistical analysis, repeated measures MANOVA, and bivariate correlational analysis of the main variables were conducted. To determine the nature of the longitudinal relationship between vocabulary and word reading fluency, a three-wave cross-lagged panel analysis was conducted for each language. Cross-lagged panel analyses examine the stability of and relationships between variables over time, to determine any unidirectional or bidirectional influences. In the present study, the cross-lagged panel model that included the two main variables, vocabulary and word reading fluency, served as the baseline model. Figure 1 demonstrates the (cross-lagged) relations from vocabulary to word reading fluency and vice-versa, across different time points. The model accounts for the (concurrent) relations of vocabulary and word reading fluency within each of the three time points, as well as the (auto-regressive) relations within each variable that demonstrate its development or stability over time (Kearney, 2017; O' Brien at al., 2019). The model includes rapid automatized naming (RAN) and phonological awareness (PA) as control variables at Time 1. The central processing hypothesis asserts that RAN and PA are common underlying mechanisms in reading in different languages (Geva & Siegel, 2000; Stevenson, et al., 1982). Moreover, the double deficit hypothesis claims that both are essential for skilled word reading (Wolf & Bowers, 1999). Because cross-logged panel models examine possible unidirectional or bidirectional relationships between the two main variables under study, other influential variables should be measured and included in the model as well (Kearney, 2017).

Results

This longitudinal study examined the relations between vocabulary and word reading fluency in three different languages across three time points among Kapampangan-Filipino-

English multilingual children. To determine the nature of this relationship, a three-wave cross-lagged panel analysis was conducted for each language.

Language Use of the Sample

A little more than half of the children (52%) reported their best language to be Kapampangan, with Filipino coming as a close second (47%) and English a distant third (1%). A similar pattern of Kapampangan dominance was reflected in the participants' reports of their primary home language (52%). On the other hand, more children reported frequently using Filipino than Kapampangan or English in interacting with their friends at school (60%) and in the community (59%). The same pattern of Filipino dominance was found in the language used by participants who reported watching TV, videos, and/or the Internet daily (40%) in Filipino, as well as those who reported reading daily at home in Filipino (25%). Clearly, the participants' most commonly used languages in everyday life were their first language, Kapampangan, and the national language, Filipino (their L2). English (their L3) did not figure prominently in any aspect or activity in the children's daily lives. It should be noted that although only a minority of the children reported reading or watching TV/videos/Internet daily, there were more of them who did the latter (25-40%) than the former (10-25%), in any language. (A similar pattern of results was reported in Study 2. See Table 9.) Table 13 presents the information on the participants' language use.

Performance of the Sample

Table 14 reports the descriptive statistics for the control variables and the main variables, across languages and time points. Neither floor nor ceiling effects were evident in the data. Three multivariate outliers were identified.[24] Analyses were performed without these outliers as well as

[24] One of these outliers was also an outlier in Study 1 and Study 2.

on the full sample. The pattern and significance of the results were the same for both samples. Therefore, the findings for the full sample (N = 200) are reported. At Time 1, the participants' performance in the main variables (vocabulary and word reading fluency) ranged from 30% to 58% correct. At Time 2, both vocabulary and word reading fluency means increased in all three languages, with scores ranging from 33% to 64% correct. At Time 3, only performance in word reading increased in all languages, with means ranging from 59% to 66%. To determine whether performance in word reading fluency and vocabulary significantly differed across time and languages, a repeated-measures MANOVA was conducted.[25]

There was a significant effect for time, $V = .62$, $F(4, 196) = 81.35$, $p < .001$, partial $\eta^2 = .62$. In a follow-up univariate analysis, significant cross-time differences were found in both variables: $F(1.763, 350.879) = 184.47$, $p < .001$, partial $\eta^2 = .48$ for word reading fluency and $F(2, 398) = 7.31$, $p = .001$, partial $\eta^2 = .04$ for vocabulary. In word reading fluency, the participants scored higher at Time 3 than at Time 1 and Time 2 (p's < .001). In vocabulary, they performed better at Time 2 and Time 3 than at Time 1 (p's < .01).

A significant effect for language was obtained, $V = .67$, $F(4, 196) = 98.48$, $p < .001$, partial $\eta^2 = .67$. Cross-language differences were found in both variables: $F(1.573, 312.998) = 160.99$, $p < .001$, partial $\eta^2 = .45$ (with Greenhouse-Geisser adjustment) for word reading fluency and $F(1.684, 335.122) = 13.04$, $p < .001$, partial $\eta^2 = .06$ (with Greenhouse-Geisser adjustment) for vocabulary. In both word reading fluency and vocabulary, the participants scored higher in Filipino (L2) than in Kapampangan (L1) and English (L3), p's < .01. In word reading fluency, they performed better in L1 than in L3, $p < .01$

[25] It should be noted that cross-language comparison of performance is a concern identified earlier in the paper (i.e., introduction, Study 1, and Study 2). Though the results of the comparison are reported, these should be interpreted with caution, in light of the said concern.

There was a significant interaction between time and language, $V = .25$, $F(8, 192) = 8.04$, $p < .001$, partial $\eta^2 = .25$. An interaction was found for vocabulary, $F(3.588, 714.008) = 9.14$, $p < .001$, partial $\eta^2 = .04$ (with Greenhouse-Geisser adjustment), but not for word reading fluency, $F(3.539, 704.228) = 1.84$, $p = .13$, partial $\eta^2 = .01$ (with Greenhouse-Geisser adjustment).

Bivariate Relations Among Variables

Table 15 presents the bivariate correlations among the control variables (rapid automatized naming and phonological awareness) and main variables (vocabulary and word reading fluency) in each of the three languages (Kapampangan, Filipino, and English). All the correlations were statistically significant (*p*'s < .01), with *r*'s ranging from .203 (weak: Kapampangan phonological awareness and Time 2 Kapampangan vocabulary) to .940 (strong: Time 1 and Time 2 Kapampangan word reading fluency). Cross-language correlations in word reading fluency were consistently strong (*r*'s = .838 to .962, *p*'s < .01), while cross-language correlations in vocabulary were generally high (*r*'s = .560 to .854, *p*'s < .01). Across time points, these cross-language relations for word reading remained strong while those for vocabulary remained generally high (See Table 16 and Table 17, respectively.)

Fit of Cross-lagged Models

In the process of model building, statistically non-significant cross-lagged relations were excluded in the subsequent models, and lagged relations from Time 1 to Time 3 were added for vocabulary and word reading fluency, in order to achieve a better fit. Non-significant autoregressive relations and concurrent relations between vocabulary and word reading fluency were retained because their exclusion did not result in any marked improvement in model fit. Three types of model fit were employed to assess the goodness of fit of each model: absolute fit, incremental fit, and parsimonius fit (Awang, 2014). For absolute fit, the criteria used were a non-

significant Chi- Square ($\chi 2$) statistic of $p > .05$ (Barrett, 2007; O' Brien et al., 2019), a Standardised Root Mean Square Residual (SRMR) value < .05 (Hu & Bentler, 1995), and a Root Mean Square Residual (RMSEA) value < .06 (Hu & Bentler, 1999). For incremental fit, a Comparative Fit Index (CFI) value > .95 (Hu & Bentler, 1999) was utilized. For parsimonius fit, a Chi-Square to degrees of freedom ratio ($\chi 2/df$) value < 2 (Schermelleh-Engel et al., 2003) served as the criterion. The freely estimated models were assessed using Mplus Version 7.11 (Muthen & Muthen, 1998-2013), employing the maximum likelihood (ML) procedure.

Fit indices for the models in the three languages are shown in Table 18. Figures 2, 3, and 4 present the best-fitting models for the data in the three languages. The coefficients of the auto-regressive, concurrent, and cross-lagged relations of vocabulary and word reading fluency in the model for each language are summarized in Table 19. In each of the following sections, the relations between the Time 1 control variables (rapid automatized naming and phonological awareness) and Time 1 vocabulary and word reading fluency are reported first. Then the model coefficients for the auto-regressive, concurrent, and cross-lagged relations of the main variables (vocabulary and word reading fluency) are reported, respectively.

Kapampangan Vocabulary and Word Reading Fluency. As shown in the model for Kapampangan in Figure 2, rapid automatized naming uniquely contributed to vocabulary ($\beta = -.178$, $p < .01$) and word reading fluency ($\beta = -.481$, $p < .001$) at Time 1. Phonological awareness significantly predicted Time 1 vocabulary ($\beta = 0.269$, $p < .001$) and word reading fluency ($\beta = 0.275$, $p < .001$).

Vocabulary at Time 1 significantly predicted vocabulary both at Time 2 ($\beta = .598$, $p < .001$) and Time 3 ($\beta = .519$, $p < .001$). Additionally, vocabulary at Time 2 predicted vocabulary at Time 3 ($\beta = .279$, $p < .001$). Time 1 word reading fluency significantly predicted Time 2 word

reading fluency (β =.940, $p < .001$), but not Time 3 word reading fluency. Time 2 word reading fluency significantly predicted Time 3 word reading fluency, β = .932, $p < .001$.

Vocabulary and word reading fluency were significantly related at Time 1 (β = .151, $p < .05$), but not at Time 2 and Time 3.

Cross-lagged coefficients showed a stronger influence of Time 1 word reading fluency on Time 2 vocabulary (β = .193, $p < .001$) than Time 2 word reading fluency on Time 3 vocabulary (β = .099, $p < .05$).

Filipino Vocabulary and Word Reading Fluency. As shown in the model for Filipino in Figure 3, rapid automatized naming significantly predicted Time 1 vocabulary (β = -.183, $p < .05$) and word reading fluency (β = -.446, $p < .001$). Phonological awareness uniquely contributed to Time 1 vocabulary (β = .193, $p < .01$) and word reading fluency (β = .280, $p < .001$).

Vocabulary at Time 1 significantly predicted vocabulary both at Time 2 (β = .564, $p < .001$) and Time 3 (β =.438, $p < .001$). Moreover, vocabulary at Time 2 predicted vocabulary at Time 3 (β = .334, $p < .001$). Time 1 word reading fluency significantly predicted both Time 2 (β = .938) and Time 3 (β = .325) word reading fluency, *p*'s < .001. Time 2 word reading fluency made a significant contribution to Time 3 word reading fluency, β = .611, $p < .001$.

Vocabulary was significantly related to word reading fluency at Time 1 (β = .214, $p < .01$), but not at Times 2 and 3.

Cross-lagged coefficients showed a stronger influence of Time 1 word reading fluency on Time 2 vocabulary (β = .259, $p < .001$) than Time 2 word reading fluency on Time 3 vocabulary (β = .148, $p < .01$).

English Vocabulary and Word Reading Fluency. As shown in the model for English in Figure 4, rapid automatized naming uniquely contributed to vocabulary (β = -.177, $p < .01$) and word reading fluency (β = -.385, $p < .001$) at Time 1. Phonological awareness significantly predicted Time 1 vocabulary (β = .262, $p < .001$) and word reading fluency (β = .350, $p < .001$).

Vocabulary at Time 1 significantly predicted vocabulary both at Time 2 (β = .651) and Time 3 (β = .386), *p*'s < .001. Additionally, vocabulary at Time 2 significantly predicted vocabulary at Time 3, β = .401, $p < .001$. Time 1 word reading fluency made a significant contribution to both Time 2 (β =.911, $p < .001$) and Time 3 (β =.372, $p < .001$) word reading fluency. Time 2 word reading fluency significantly predicted Time 3 word reading fluency, β = .582, $p < .001$.

Vocabulary and word reading fluency were significantly related at Time 1 (β = .386, $p < .001$), but not at Time 2 and Time 3.

Cross-lagged coefficients showed a stronger influence of Time 1 word reading fluency on Time 2 vocabulary (β = .250, $p < .001$) than Time 2 word reading fluency on Time 3 vocabulary (β = .104, $p < .05$).

Summary of Results. At Times 1, 2, and 3, the participants performed best in Filipino and worst in English, in both vocabulary and word reading fluency. From one time point to the next, in all three languages, scores consistently increased in word reading fluency, but not in vocabulary. The best-fitting model for the data was similar across languages. At Time 1, in all languages, phonological awareness (PA) was more strongly related to vocabulary than rapid automatized naming (RAN) was related to vocabulary. During the same time point, RAN contributed more than PA to word reading fluency in Kapampangan and Filipino, while PA contributed most to English word reading fluency. In terms of auto-regressive relations, in all

three languages, Time 1 to Time 2 prediction was stronger than Time 2 to Time 3 prediction, for both vocabulary and word reading fluency. Both Time 1 to Time 2 and Time 2 to Time 3 auto-regressive relations were stronger for word reading fluency than vocabulary, in all languages. Time 1 to Time 3 prediction was stronger for vocabulary than for word reading fluency, in all languages. Time 1 word reading fluency predicted Time 3 word reading fluency in Filipino and English, but not in Kapampangan. In terms of concurrent relations, in all three languages, vocabulary and word reading fluency were significantly related only at Time 1, with the strongest relationship being in English and the weakest in Kapampangan. Finally, in terms of cross-lagged relations, the strongest were in Filipino and the weakest in Kapampangan. In all three languages, there was a stronger cross-lagged relation from Time 1 word reading fluency to Time 2 vocabulary than Time 2 word reading fluency to Time 3 vocabulary. There were no significant cross-lagged relations from vocabulary to word reading fluency in any of the three languages.

Discussion

The present study examined the longitudinal relationship between vocabulary and word reading fluency in multilingual Kapampangan-Filipino-English speakers. At Times 1, 2, and 3, the participants performed best in Filipino (L2) and worst in English (L3), in both vocabulary and word reading fluency. This finding was contrary to the expectation that the best performance would be in the L1. This finding could be explained by the linguistic and educational contexts of the children. Though their L1 is Kapampangan, Filipino (their L2 and the national language) is almost as dominant in their daily lives. It is a language of instruction in school. Though English (their L3) is also a medium of instruction, it plays a very minimal role in their day-to-day living. On the other hand, Kapampangan may be the language most frequently used by the participants

in everyday social interactions, but literacy instruction in this language lasted only until third grade (DepEd, 2016b). There were more children who reported engaging in daily home reading in Filipino than those who did it in Kapampangan. Additionally, it should be noted that though the three languages share the Roman alphabet, Kapampangan and Filipino are both generally transparent, making them easier to read compared to English, an opaque orthography. These results are consistent with the claims of the script-dependent hypothesis (Geva & Siegel, 2000) and the orthographic depth hypothesis (Katz & Frost, 1992). From one time point to the next, in all three languages, word reading fluency scores consistently and significantly increased. The improvement in Filipino and English word reading fluency could be attributed to the continuous literacy instruction in these languages (DepEd, 2016a, 2016c). That the participants' word reading fluency performance in Kapampangan continued to improve (despite the lack of literacy instruction and the limited daily home reading done in this language) could be explained by the central processing hypothesis, which claims that common cognitive and linguistic processes underlie L1 and L2 reading, regardless of orthography (Geva & Siegel, 2000). Relationships between reading skills in two languages are evidence of cross-lingual, common underlying processes (Chung et al., 2019). Word reading fluency performance in Kapampangan and Filipino were consistently and strongly correlated across time points. Cross-language relations in reading are facilitated by shared linguistic features (Chung et al., 2019). Kapampangan and Filipino have phonological, orthographic, and lexical commonalities (Gonzalez, 2005; KWF, 2013; Samson et al., 2016). The above mentioned consistent and significant improvement in word reading fluency across languages and time points was not observed in vocabulary performance. This could be attributed to the participants' general lack of reading habit in any language (which could be connected to the fact that they lived in a socio-economically challenged area with

neither the school nor the community having a library). The lack of reading habit limits children's reading experience. Reading experience affords exposure to words in diverse and rich contexts. This exposure facilitates the development of multifaceted word knowledge, including learning the written form of the word, the acquisition of its meaning, and the activation of its meaning from the written form when the word is read, pronounced, or sounded out (Nation, 2017).

As predicted, the best-fitting model for the within-language relations between vocabulary and word reading fluency over time was similar across the three languages. This finding is consistent with the claim of the central processing hypothesis that reading in different orthographies shares underlying cognitive and linguistic mechanisms (Geva & Siegel, 2000). The strength of the relations between variables in the different languages varied, lending support to the script-dependent hypothesis (Geva & Siegel, 2000).

At Time 1, rapid automatized naming (RAN) and phonological awareness (PA) both significantly and uniquely predicted word reading fluency, in all three languages. This finding confirms the claim of the central processing hypothesis that RAN and PA are common underlying mechanisms in reading in different languages (Geva & Siegel, 2000). It also supports the assertion of the double deficit hypothesis regarding the essential contributions of both factors in skilled reading (Wolf & Bowers, 1999). Across languages, compared to rapid automatized naming (RAN), phonological awareness (PA) was more strongly related to vocabulary. This relationship between PA and vocabulary was previously observed by Gorman (2012). RAN contributed more than PA to word reading fluency in Kapampangan and Filipino, which are generally transparent orthographies. This aligns with previous findings on the relevance of naming speed in reading in consistent orthographies (Kirby et al., 2010; Landerl &

Wimmer, 2008; Mann & Wimmer, 2002). On the other hand, PA contributed most to word reading fluency in English, an opaque orthography. This confirms the results of earlier studies on the salience of PA in reading less transparent orthographies (Landerl et al., 2013). Together, the above results lend support to the script-dependent hypothesis (Geva & Siegel, 2000) and the orthographic depth hypothesis (Katz & Frost, 1992).

In terms of auto-regressive relations, in all three languages, Time 1 to Time 2 prediction was stronger than Time 2 to Time 3 prediction, for both vocabulary and word reading fluency. The greater influence of the baseline performance on performance at the next time point could be attributed to the fact that both time points were within the same school year, without any major or prolonged interruption between the two. Though the interval between Times 2 and 3 was similar to the interval between Times 1 and 2 (six months), there was a full two-month interruption (summer break) between the two. Time 2 was during the last quarter of the school year while Time 3 was during the first quarter of the following school year. The weaker relation from Time 2 to Time 3 might be connected to summer learning loss. Research has shown that students start a new school year with achievement levels lower than those they were at when the summer break began (Alexander et al., 2001; Atteberry & McEachin, 2016; Cooper et al., 1996). Though the participants in the study had been back in school for around two months before Time 3 testing was conducted, this might not have been sufficient for them to recover what they lost during the summer break, and show relative stability in performance in vocabulary and word reading fluency, relative to Time 2 scores.

Another finding was that both Time 1 to Time 2 and Time 2 to Time 3 auto-regressive relations were stronger for word reading fluency than vocabulary, in all languages. This result might be connected to the ongoing instruction provided in the participants' Filipino and English

subjects, which required reading-mediated activities in the following language and literacy domains: vocabulary, oral reading fluency, reading comprehension, study strategy, grammar, and writing. There was no instruction in word reading in both languages in Grades 4-6. Phonics and word recognition instruction stopped at the end of Grade 3 (DepEd, 2016a, 2016c). The previously reported significant improvement in Filipino and English word reading fluency performance between time points, as well as the substantial influence of performance at one time point on the performance at the next time point, might be linked to the above-mentioned reading-mediated activities in different language and literacy domains. As previously described, the participants were at a stage when they were transitioning from learning through oral language and learning to decode to learning through reading, which comes with substantial exposure to print and the use of previously learned reading skills (Chall, 1983). The case of Kapampangan word reading fluency might be connected to the central processing hypothesis (Geva & Siegel, 2000) and language transfer (Chung et al., 2019), as reported earlier.

As previously stated, Time 1 word reading fluency predicted Time 3 word reading fluency in Filipino and English, but not in Kapampangan. Controlling for the very substantial contribution of performance at one time point to the performance at the next time point hardly left any auto-regressive effect on performance between distal time points in Kapampangan. It was unexpected for baseline performance in word reading fluency to have zero influence on performance in word reading fluency after one year. This finding requires further investigation, particularly in light of the following: the transparent orthography of Kapampangan, the lack of literacy instruction in this language beyond the third grade, and the sample's lack of reading habit in this language.

Having a large vocabulary is a top-down advantage in word identification when reading unfamiliar words, because it allows readers to shift from item-by-item phonological recoding to a more direct-access approach (Share, 1995). This is particularly true in English, which has an opaque orthography. However, the participants were unlikely to have used this approach due to the lack of significant and consistent increase in their vocabulary knowledge over time (which was reported earlier). The plateauing of vocabulary might explain why the auto-regressive effects from one time point to the next time point were weaker for vocabulary. This might also be the reason why the Time 1 to Time 3 relations were stronger for vocabulary than for word reading fluency, in all languages. Baseline vocabulary influenced Time 3 vocabulary more than baseline word reading fluency influenced Time 3 word reading fluency, possibly because vocabulary did not consistently improve over time.

In terms of concurrent relations, in all three languages, vocabulary and word reading fluency were significantly related at Time 1. This finding is consistent with the assertion of Perfetti (2010) and the results of earlier studies among bilinguals reading orthographies of different degrees of transparency (Gottardo, 2002; Gottardo et al., 2017). The relationship between vocabulary and word reading was found to be strongest in English, an opaque orthography. This is consistent with an earlier finding of vocabulary knowledge playing a smaller role in word reading in more transparent orthographies (Ziegler et al., 2010). The present study predicted that the strength of the relations of vocabulary and word reading fluency would vary across languages, as a function of orthographic depth. The lack of a significant relation of vocabulary to word reading fluency in all languages at Times 2 and 3 might be due to the significant auto-regressive effects of both variables in all three languages, which were reported

above. The lack of relationship between vocabulary and word reading fluency is not consistent with the findings of earlier studies (e.g., Duff et al., 2015; Ouellette, 2006).

Significant cross-lagged relations were found from word reading fluency to vocabulary, in all languages. However, there were no significant cross-lagged relations from vocabulary to word reading in the three languages. The absence of bidirectional relations between vocabulary and word reading was contrary to the claim of Perfetti (2010) and the findings of Hulme and colleagues (2019) and Verhoeven and colleagues (2011) that the two are reciprocally related. In the present study, it appears that word reading fluency and vocabulary are more dissociated than related in this sample. An explanation to the unidirectional relations could be the sample's characteristics. As previously reported, at Time 1, the participants were in Grades 4-5 and most of them were 9-10 years old. Developmentally, they were transitioning from learning new vocabulary through listening (oral language) and learning to decode, to learning it through reading (print exposure/reading practice). However, there was no significant increase in the participants' vocabulary knowledge across time points, in all three languages. This relative weakness in vocabulary might explain the lack of cross-lagged relations from vocabulary to word reading fluency. As stated earlier, this weakness could be attributed to the participants' general lack of reading habit in any language. A lack of reading habit limits print exposure and reading experience, which hinders vocabulary growth (Stanovich, 1986) and reading development (Anderson et al., 1985). Independent reading practice develops reading fluency and increases vocabulary knowledge. Fluency and vocabulary are linked to reading progress (Anderson et al., 1985). Independent reading is likely to be important to gain vocabulary beyond conversational vocabulary in Filipino and Kapampangan and to be the only source of English vocabulary outside of school. Once children have learned to decode written words, the

development of expertise in word reading and vocabulary is no longer about the acquisition of vocabulary through oral language experience, but through meaningful reading experience that exposes children to words in diverse and rich contexts (Nation, 2017). Finally, results showed that the cross-lagged relations were strongest in Filipino and weakest in Kapampangan, which was consistent with the prediction that the strength of the relations of vocabulary and word reading fluency would vary across languages as a function of the participants' linguistic and educational contexts. The results could be explained by the prominence of Filipino in the participants' academic lives, as contrasted to Kapampangan's minimal role in school. As reported above, among the three languages, the participants performed best in Filipino in both vocabulary and word reading fluency, across the three time points. Aside from being a language of literacy instruction, Filipino was also a medium of instruction in school and is encountered through the community, popular culture, and the media. On the other hand, no literacy or any other academic instruction was conducted in Kapampangan for the duration of the study, though it is the participants' L1. First language development could stagnate due to the lack of broader linguistic input (Kravin, 1992; Sheng et al., 2011), the lack of a solid foundation (Bahrick et al., 1994), or another language's dominance (Foroodi-Nejad & Paradis, 2009). Finally, few children engaged in any activities in English outside of school.

Overall, the generally similar pattern of results in the study of vocabulary and word reading fluency across time and languages of varying orthographic depth lends support to the central processing hypothesis, though the strength of the relations varied across languages. In the three languages, rapid automatized naming and phonological awareness predict vocabulary and word reading fluency. Taken together, the autoregressive, concurrent, and cross-lagged relations of vocabulary and word reading fluency suggest a unidirectional relationship from word reading

fluency to vocabulary. The level of the children's vocabulary knowledge is not sufficient for it to substantially contribute to the development of word reading fluency, over and above its function as an autoregressor. This vocabulary deficiency implies that the amount of reading that the children do in and outside school is too limited for their vocabulary to grow to an extent that will benefit efficient word recognition. The provision of resources and opportunities for the children to have adequate reading practice is a necessary step towards establishing reciprocity in the relationship. This is particularly urgent to do in light of the children's socio-economically challenging context and the concomitant language and literacy disadvantages, in hopes of stemming the tide for them in learning and development. Additionally, it is important to identify children with poor word reading skills in each language and across languages. Due to the prominence of word reading fluency and its relationship with vocabulary, children with poor word reading skills are at-risk for vocabulary deficiency. Thus, there is a need to address this deficit as well. Finally, some unexpected findings connected to vocabulary and word reading fluency in the children's first language suggest a need for further research, particularly in light of the mother tongue-based multilingual education policy, its implementation, and the achievement of desired language and literacy outcomes.

Limitations and Future Directions

While this study contributes to the discussion on multilingual reading development, its findings and implications should be interpreted with caution. They may not apply to other readers and reading contexts. Specifically, the following limitations are noted. First, all variables studied were manifest, with only a single measure for each one. Future research could examine both observed variables and latent constructs through the inclusion of more measures or tasks. Second, despite their high internal consistency, all the Kapampangan and Filipino measures were

not standardized, while the standardized English measures were not normed on the present sample or a similar one. The measures might not be comparable to each other due to the diverse psycholinguistic properties of the languages, which were not adequately accounted for in the construction of the measures nor in the analysis of the data. The local measures should be improved by using them in other studies, analyzing their psychometric properties, and revising them accordingly. Other variables and relationships could influence word reading fluency and vocabulary (e.g., effect of L1 performance on L2 or L3 performance) but these variables were not examined. These variables could have led to the similar pattern of results across languages, but require further study. Finally, because the quality of lexical representations has been linked to reading comprehension, the relations among word reading fluency, vocabulary, and reading comprehension across languages and time should be investigated.

Despite these limitations, the study contributes to an understanding of the relationship between vocabulary and word reading fluency across languages and time, particularly among learners in socio-economically and educationally challenging situations. The results can inform curriculum planning, instruction, and teacher education, especially within the context of the study. The timing of the introduction of (an) additional language/s in the curriculum should be examined carefully in light of students' low levels of word reading fluency and vocabulary not only in their second and third languages, but in their first language as well. The impact and rationale behind the discontinuation of first language literacy instruction at the end of grade 3 should also be examined. Word reading skills should be consolidated due to their influence on vocabulary. There is also a need to provide the students with purposive vocabulary building activities to address their vocabulary deficits. Dedicated time for students to engage in assessment-free sustained silent reading in school can improve both word reading skills and

vocabulary knowledge. Finally, pre-service and in-service teacher education can pay more attention to the teaching of context-specific methods and strategies that address reading and learning issues that socio-economically disadvantaged students face, such as how home and environmental print can be used by teachers and parents to develop children's reading skills in the absence of both a school library and a community library.

Conclusion

In conclusion, the findings of the present study suggest that among older multilingual children who are past the stage of beginning literacy, word reading fluency has relational predominance on vocabulary in all their three alphabetic languages. Making the relationship reciprocal implies that the relative weakness in vocabulary should be addressed, so these skills could grow to a level that would allow them to influence word reading fluency, which, in turn, would facilitate vocabulary growth. Overall, this study contributes to an understanding of the skills and processes involved in multilingual word reading and vocabulary development, particularly within the context of less-researched languages and learners. Anything that helps people recognize and make sense of words and text is important, because words are powerful.

General Discussion

The present studies aimed to fill the gap in the literature on multilingual reading, particularly among those who speak less researched languages and live in challenging situations. Collectively, these investigations explored whether the major theories of reading in English that are preeminent in the literature could explain reading processes among low-income speakers of Kapampangan (L1), Filipino (L2), and English (L3) in the Philippines, a developing country with limited resources.

The first study examined the influence of phonological awareness on word reading fluency across the participants' three languages: Kapampangan, Filipino, and English. It determined the shared and unique contributions of phonological awareness to word reading fluency in both transparent and opaque orthographies. Moreover, it described the relation between vocabulary and word reading fluency in English, the language with the most inconsistent orthography and learners' weakest language. The second study investigated the roles of word reading fluency and vocabulary in reading comprehension across Kapampangan, Filipino, and English. It ascertained the unique contributions of word reading fluency and vocabulary to reading comprehension in each language, as well as exploring whether the product of word reading fluency and vocabulary contributed to reading comprehension over and above their own unique contributions. The third study examined the longitudinal relationship between word reading fluency and vocabulary in Kapampangan, Filipino, and English. It also determined whether this relationship was similar across languages and over time.

The Roles of Phonological Awareness and Orthography in Word Reading Fluency

The psycholinguistic grain size theory (PGST) asserts that phonological awareness (PA) plays a central role in word reading across languages, whether the orthography is transparent or

opaque (Ziegler & Goswami, 2005). This is supported by the results of Study 1, where PA predicted word level reading fluency not only in Kapampangan and Filipino, which both have generally transparent orthographies, but also in English, which has an opaque orthography. These findings are consistent with previous studies conducted with bilingual children learning English as a second language, whose first languages were more transparent (e.g., Estrera & Uno, 2017; Gottardo et al., 2016).

English phonological awareness showed the highest unique variance regardless of which language was being read, despite the participants' PA being poorest in English. This finding is consistent with previous studies regarding the stronger role of phonological awareness in orthographies that are less transparent (e.g., Georgiou et al., 2008; Ziegler et al., 2010). These results suggest a common underlying construct in relation to phonological awareness across these languages, which use the same Roman alphabet. Phonological awareness skills in English might be a proxy for general underlying phonological awareness ability. English was the learners' weakest language due to lack of exposure and the relevant difficulty in reading an opaque script. Children who have relatively higher phonological awareness in their weakest language might be better language learners and better readers.

Results showed that participants' word reading fluency performance was lowest in English, an opaque orthography. The PGST posits that learning to read is relatively easier in transparent than in opaque orthographies (Ziegler & Goswami, 2005). These results are consistent with the findings of Seymour et al. (2003) in their study of reading acquisition in 13 alphabetic European languages of varying orthographic depth.

The Role of Vocabulary in Word Reading Fluency

The PGST also claims that in less transparent orthographies, readers employ recoding strategies at both small and large grain sizes due to inconsistencies in grapheme-phoneme/ phoneme-grapheme correspondences (Ziegler & Goswami, 2005). This explains the results in Study 1, which showed that in addition to PA, vocabulary predicted English word reading fluency, but not Kapampangan and Filipino word reading. A rich vocabulary helps in pronouncing or decoding irregular or unfamiliar words through partial phonological recoding (Share, 1995). Thus, vocabulary knowledge is linked to reading acquisition in less transparent orthographies. This relationship is not expected in more transparent orthographies where readers generally rely on small-grain-size recoding strategies (Ziegler & Goswami, 2005). Similar results have been found in research conducted among bilinguals/multilinguals learning English as an L2 (e.g., Gottardo, 2002; Mirza et al., 2017).

Though the PGST does not expect vocabulary to play a significant role in reading words in transparent orthographies, in Study 1, English vocabulary was significantly related not only to English word reading fluency, but to Kapampangan and Filipino word reading fluency as well. Using the lexical quality hypothesis (Perfetti & Hart, 2002), this otherwise unexpected finding may be due to the quality of lexical representations in English, the participants' weakest language, being more strongly related to variability in their English vocabulary and phonological awareness. These robust lexical representations in English are linked to better phonological awareness in English (Perfetti & Hart, 2002), as well as better phonological awareness and linguistic skills in other languages (Koda, 2008).

The Roles of Word Reading Fluency and Vocabulary in Reading Comprehension

The simple view of reading (SVR) claims that decoding and linguistic comprehension will substantially contribute to the variance in reading comprehension, but that their product will further explain variation in reading comprehension over that provided by their linear (additive) combination (Gough & Tunmer, 1986; Hoover & Gough, 1990). When other factors were not considered, word reading fluency (decoding) and vocabulary (linguistic comprehension) each predicted reading comprehension in Kapampangan, Filipino, and English. However, when one of them or their product was included in the analysis, the results changed signifcantly. In Kapampangan (L1) and Filipino (L2), neither one of the two factors nor their product substantially contributed to reading comprehension, when all were considered as predictors. This is contrary to the claims of the simple view of reading (SVR). However, these results are consistent with the findings of some previous research on L1 reading comprehension (e.g., Kershaw & Schatschneider, 2012; Silverman et al., 2013) and L2 reading comprehension (e.g., Paige & Smith, 2018; Sparks, 2019).

On the other hand, in English (L3), word reading fluency and vocabulary, as well as the product of word reading fluency and vocabulary, contributed unique variance to reading comprehension. These results lend support to the SVR. English, with its inconsistent orthography, was the most difficult language to read and was also the participants' weakest language. The participants had poor word reading fluency and vocabulary scores. Having no mastery in either component, they were likely relying on whatever skills or knowledge they had in their effort to understand what they were reading.

Compared to word reading fluency, vocabulary contributed a larger unique variance to reading comprehension. This suggests a decreasing impact of decoding and an increasing impact

of linguistic comprehension on reading comprehension as children progressed in school (Lonigan et al., 2018; Verhoeven & van Leeuwe, 2012). The unique variance in reading comprehension contributed by the product of word reading fluency (D) and vocabulary (L) is consistent with the SVR's claim regarding the multiplicative relationship of the two components and their central role in reading comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990).

The Relationship Between Word Reading Fluency and Vocabulary

The relationship between vocabulary and word reading fluency became generally more similar over time across the three languages, Kapampangan, Filipino, and English, regardless of the depth of the languages' orthographies. This finding lends support to the claim of the central processing hypothesis that reading in different orthographies shares underlying cognitive and linguistic mechanisms (Geva & Siegel, 2000). At Time 1, in all three languages, vocabulary and word reading fluency were significantly related. This finding is consistent with the assertion of Perfetti (2010) and the results of earlier studies among bilinguals reading orthographies of different degrees of transparency (Gottardo, 2002; Gottardo et al., 2017). The relationship between vocabulary and word reading fluency was found to be strongest in English, an opaque orthography. This finding is consistent with an earlier finding of vocabulary knowledge playing a smaller role in word reading in more transparent orthographies (Ziegler et al., 2010). The strength of the relationship between word reading fluency and vocabulary in the different languages varied, lending support to the script-dependent hypothesis (Geva & Siegel, 2000). At Time 2 and Time 3, vocabulary and word reading fluency were not related. This finding is not consistent with the lexical quality hypothesis (LQH). It is consistent with findings in earlier studies which showed that 1) expressive vocabulary predicted word recognition (e.g., Ouellette,

2006) and 2) word reading skill was significantly related to vocabulary growth (Duff et al., 2015).

Significant cross-lagged relations were found from word reading fluency to vocabulary, in all languages. However, there were no significant cross-lagged relations from vocabulary to word reading fluency in the three languages. The absence of bidirectional relations between vocabulary and word reading was contrary to the claim of Perfetti (2010) and the findings of Hulme et al. (2019) and Verhoeven et al. (2011) that the two are reciprocally related. In the LQH, word reading fluency and vocabulary are not completely dissociated from each other; they are interconnected aspects of word knowledge. The phonological and orthographic representations are implicated in word reading, while semantic representations are related to vocabulary or word meaning (Perfetti, 2007; Perfetti & Hart, 2002). However, results suggest that word reading fluency and vocabulary are more dissociated than related in this sample, which might be due to low vocabulary or the poor quality of lexical representations.

The Role of Context in Reading Acquisition and Development

Overall, the participants did not perform well across measures and languages, at Time 1 and beyond. These and other findings could be explained by the socioeconomic, linguistic, and educational contexts of the children. Contrary to expectation, they did not perform best in Kapampangan (L1). Instead, they performed best in Filipino (L2). As expected, they performed worst in English (L3). Though the participants' L1 is Kapampangan, Filipino, the L2 and the national language, is also commonly used in their daily lives. It is a language of instruction in school. Though English, the L3, is also a medium of instruction, it plays a very minimal role in the day-to-day lives of the children. It is their least used language. In addition, English has a less transparent orthography, making it more difficult to read (Ziegler & Goswami, 2005). On the

other hand, Kapampangan may be the language most frequently used by the participants' everyday social interaction, but literacy instruction in this language lasted only until third grade and had ceased by Time 1 testing (DepEd, 2016b).

From one time point to the next, in all three languages, word reading fluency scores consistently increased, though they remained generally low. The improvement in Filipino and English word reading could be attributed to the continuous literacy instruction in these languages (DepEd, 2016a, 2016c). Despite the lack of literacy instruction in Kapampangan (DepEd, 2016b), Kapampangan word reading fluency consistently improved across time points. This result could be explained by the central processing hypothesis, which claims that common cognitive and linguistic processes underlie L1 and L2 reading, regardless of orthography (Geva & Siegel, 2000). Relationships between reading skills in two languages are evidence of cross-linguistic, common underlying processes (Chung et al., 2019). Cross-language relations in reading are facilitated by shared linguistic features (Chung et al., 2019). Kapampangan and Filipino have phonological, orthographic, and lexical similarities (Gonzalez, 2005; KWF, 2013; Samson et al., 2016). Additionally, Kapampangan and Filipino are the dominant languages in the participants' daily lives.

Vocabulary performance did not significantly improve across languages and time points. This finding could be attributed to the participants' general lack of reading habit in any language, which could be connected to the fact that they lived in a socio-economically challenged area with neither the school nor the community having a library. They likely did not have sufficient reading materials at home either, except for textbooks and similar learning materials. They probably did not have good reading models in their families either. Additionally, the potentially

lower levels of parental education, which would be associated with poverty, might have limited the type and complexity of vocabulary used in the homes.

In sum, the participants' generally low level of performance in the three languages could be traced to their poor Kapampangan (L1) skills. Language and reading skills acquired in the L1 can facilitate the development of similar skills in another language when the L1 is supported. However, when the L1 proficiency is low and underdeveloped, it can limit the development of other languages (Cummins, 1979, 2001). Though the participants' L1 proficiency was not measured, their poor performance in Kapampangan in all the variables and time points suggests low language proficiency. This might also be the case in terms of their performance in the Filipino and English measures and their proficiency in these languages. Additionally, it is possible that the children were taught reading in Filipino (L2) and English (L3) even before they had achieved a threshold reading level in their L1 (Kapampangan) (see Nakamura et al., 2019).

Reading acquisition and development is challenging in multilingual education contexts (Romaine, 2008). In the present studies, these challenges could be linked to the new mother tongue-based multilingual education policy and its implementation, particularly in the participants' classes (Metila at al., 2016; Padilla, 2018). Though teacher knowledge and instructional practices in language and reading were not examined in the three studies, past research has shown that what teachers bring (e.g., content knowledge) and do (e.g., teaching methods/strategies) in the classroom is linked to student performance (e.g., Metzler & Woessmann, 2012; Pashler et al., 2007). Another factor could be their lack of out-of-school reading engagement, which could be connected to the limited reading resources in school, at home, and in the community. Reading engagement is related to reading performance. Those who read a lot, read better (Ho & Lau, 2018; Kirsch et al., 2002). All these factors are connected to

the children's context. Contextual/ecological factors are linked to reading performance (Aaron et al., 2008; Li et al., 2020; Sparks, 2019).

Limitations and Future Directions

To understand multilingual reading better, the Kapampangan and Filipino measures used in these studies should be further validated, revised, and refined to be more effective and efficient in assessing target language and reading constructs or variables. For comprehensiveness, the assessment of a research construct should not be limited to only one measure (e.g., phonological awareness: syllable awareness, onset and rime awareness, phonemic awareness; language comprehension: vocabulary, syntactic awareness, listening comprehension; word reading: word reading accuracy, word reading fluency; vocabulary: morphological awareness, receptive and expressive vocabulary, vocabulary depth). Other factors that influence reading performance (e.g., cognitive: listening comprehension; psychological: reading motivation; ecological: instructional practice) should be accounted for in order to have a wholistic picture of reading development and a reader's performance. Including more participants in the sample and more time waves for data collection, as well as examining the cross-lingual relations of different constructs between age groups and across time points, will also help in understanding multilingual reading better.

To help the multilingual readers in the present studies, the timing of the introduction of (an) additional language/s in the curriculum should be examined carefully. The impact and rationale behind the discontinuation of first language literacy instruction at the end of grade 3 should also be examined. In relation to this, studies on the following can be conducted: 1) transfer threshold mechanisms in multilingual reading (see Nakamura et al., 2019); 2) teachers' language ideologies and teaching practices (see Parba, 2018), as well as language

bridging strategies (see Perfecto, 2020), and 3) parents' language and reading beliefs and practices in general, and their attitudes towards the MTB-MLE policy in particular (see Mahboob & Cruz, 2013). In light of the participants' poor performance, studying the type and quality of instruction they receive at home and in school can provide information that can be used to help the children become better readers. Whether reading develops as expected depends, to a substantial extent, on the instruction provided at home and/or in school (Chall, 1983).

To support the development of the learners' language and reading skills, evidence-based instruction (e.g., explicit instruction [NRP, 2000]) targeting phonological awareness, word reading fluency, vocabulary, and reading comprehension should be implemented. In teaching phonological awareness, teachers can be guided by this developmental trajectory:

1). recognizing and manipulating segments of sound (i.e., syllable and onset and rime),

2). identifying letter-sound relations, and

3). linking letter-sound relations with phonemes (Foorman et al., 2016).

To develop word reading fluency, teachers can systematically teach basic word recognition and word analysis skills (Pikulski & Chard, 2005) daily and repeatedly for students to learn to read words accurately and quickly (Kuhn & Stahl, 2003). Additionally, teachers can provide multiple opportunities for students to experience words in different contexts to develop their word reading skill (Nation, 2017). Such opportunities are also key to vocabulary growth. Teachers can give students opportunities to practice hearing, saying, reading, and writing words in various contexts (e.g., within the language arts subjects and across subject areas), to build breadth and depth of vocabulary knowledge (Beck et al., 2013). Teaching word reading and vocabulary improves reading comprehension. Teachers can also teach students active comprehension (e.g., predicting, asking questions, summarizing), monitoring (e.g., noting whether the text makes sense), and fix-

up strategies (e.g., using context clues when something is not clear) (Pressley, 2000), with the help of graphic organizers (NRP, 2000). Ongoing assessment of the above skills can inform the delivery of instruction. Identifying students' strengths and weaknesses is necessary in planning good instruction (Wren, 2004). Providing dedicated time for students to engage in test-free sustained silent reading in school can increase students' reading motivation (Gambrell, 2011) and reading skills (Pilgreen, 2000). Sustained silent reading provides students reading practice (Krashen, 2006). Reading practice provides opportunities to develop word recognition and vocabulary, which are key to comprehension (Cunningham & Stanovich, 1997). Finally, their teachers can be trained to use context-appropriate strategies that address issues that socio-economically disadvantaged and learning challenged students face. The training sessions can be school-based, to be conducted within the context of the DepEd-mandated learning action cell (LAC), which is defined as "a group of teachers who engage in collaborative learning sessions to solve shared challenges in the school facilitated by the school head or a designated LAC leader" (DepEd, 2016d, p.3). This way, teacher development becomes more relevant and practicable, which can increase the possibility of improving the teaching-learning process – leading to improved learning outcomes. If teachers could train parents to become active partners in working towards the reading development of their children (even just in small, doable ways like using environmental print at home for practice reading), facilitating student learning might be a little less challenging.

General Conclusion

The three studies advance current understanding of multilingual reading, especially in less researched languages and socio-economically and educationally challenging situations. Findings suggest that dominant models of reading like the central processing hypothesis, script-

dependent hypothesis, psycholinguistic grain size theory, and a modified simple view of reading only partially explain the processes and mechanisms involved in multilingual reading.

Some results suggest that the transparency of the orthography of a language is connected to the development of phonological awareness and word reading fluency. These linguistic attributes may be useful to teaching-learning contexts that require reading in more than one orthography or language. Other results suggest that the level of proficiency and reading ability in the first language could influence the rate and quality of acquisition and development of the same skills in (an) additional language/s. These could serve as an initial basis in determining when children should start learning an/other language/s. Immigrant children in more developed countries and other learners in bilingual/multilingual educational contexts could be facing similar challenges. Other findings suggest that cognitive mechanisms like nonverbal intelligence and especially naming speed could be implicated in reading performance, regardless of the linguistic properties of writing systems. Learning more about the contributions of these non-linguistic variables may benefit readers in general, no matter what language/s they read. The relations between word reading fluency and vocabulary could be complementary at some point but not necessarily reciprocal over time. Together, these mechanisms may not even be enough to comprehend well what is being read. Because the goal of reading is comprehension, further investigation of the underpinnings of reading comprehension stands to benefit students and teachers alike. Finally, though personal reading engagement may be central to the acquisition of language and reading skills beyond what any curriculum or instruction could provide, it is inextricably linked to the socio-economic resources readers have and the current level of their reading ability. Raising good readers amidst such a difficult situation requires the concerted effort of all stakeholders.

Indeed, readers and their reading performance do not exist in a vacuum. Context matters. Reading theory, research, and practice should take into consideration matters of context. These are matters of consequence, especially among readers in challenging contexts.

Addressing the needs of learners in challenging contexts, worldwide, is important to facilitate success for these learners and other multilingual readers so that they are able to fully celebrate reading, language, and life. All learners should have the opportunity to achieve their potential.

References

Aaron, P. G., Joshi, R. M., Gooden, R., & Bentum, K. E. (2008). Diagnosis and treatment of reading disabilities based on the component model of reading: An alternative to the discrepancy model of LD. *Journal of Learning Disabilities, 41*(1), 67–84. https://doi.org/10.1177/0022219407310838

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print.* MIT Press.

Alexander, K.L., Entwisle, D.R., & Olson, L.S. (2001). Schools, achievement, and inequality: A seasonal perspective. *Educational Evaluation and Policy Analysis, 23*(2), 171–191. https://doi.org/10.3102/01623737023002171

Allington, R. L. (1983). Fluency: The neglected reading goal in reading instruction. *The Reading Teacher, 36*(6), 556–561.

Anderson, R., Hiebert, E., Scott, J., & Wilkinson, I. (1985). *Becoming a nation of readers: The report of the Commission on Reading.* The National Institute of Education (US Department of Education). https://files.eric.ed.gov/fulltext/ED253865.pdf

Anthony, J., & Lonigan, C. (2004). The nature of phonological awareness: Converging evidence from four studies of preschool and early grade school children. *Journal of Educational Psychology, 96*(1), 43–55. https://doi.org/10.1037/0022-0663.96.1.43

Araújo, S., Reis, A., Petersson, K. M., & Faísca, M. (2015). Rapid automatized naming and reading performance: A meta-analysis. *Journal of Educational Psychology, 107*(3), 868–883. https://doi.org/10.1037/edu0000006

Asadi, I.A., Khateb, A., & Shany, M. (2017). How simple is reading in Arabic? A cross-sectional investigation of reading comprehension from first to sixth grade. *Journal of Research in Reading, 40*(S1), S1–S22. https://doi.org/10.1111/1467-9817.12093

Atteberry, A., & McEachin, A. (2016). School's out: Summer learning loss across grade levels and school contexts in the United States today. In Alexander, K., Pitcock, S., & Boulay, M. (Eds.), *Summer learning and summer learning loss* (pp. 35–54). Teachers College Press.

August, D., Carlo, M., Dressler, C., & Snow, C. (2005). The critical role of vocabulary development for English language learners. *Learning Disabilities Research & Practice*, *20*(1), 50–57. https://doi.org/10.1111/j.1540-5826.2005.00120.x

Awang, Z. (2014). *A handbook on SEM (2nd Edition).* MPWS Publisher.

Bahrick, H. P., Hall, L. K., Goggin, J. P., Bahrick, L. E., & Berger, S. A. (1994). Fifty years of language maintenance and language dominance in bilingual Hispanic immigrants. *Journal of Experimental Psychology: General*, *123*(3), 264–283. https://doi.org/10.1037/0096-3445.123.3.264

Baklanova, E. (2017). Types of borrowings in Tagalog/Filipino. *Kritika Kultura, 28,* 35–54. https://doi.org/10.13185/KK2017.02803

Balhinez, R., & Shaul, S. (2019). The relationship between reading fluency and arithmetic fact fluency and their shared cognitive skills: A developmental perspective. *Frontiers in Psychology, 10*, Article 1281. https://doi.org/10.3389/fpsyg.2019.01281

Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Personality and Individual Differences, 42*(5), 815–824. https://doi.org/10.1016/j.paid.2006.09.018

Bautista, M.C.R.B., Bernardo, A.B.I., & Ocampo, D. (2008). When reforms don't transform: A review of institutional reforms in the Department of Education. *Human Development Network Discussion Paper Series, 2,* 1–64. Human Development Network. https://hdn.org.ph/wp-content/uploads/2009/05/dp02_bautista_etal.pdf

Beck, I.L., McKeown, M.G., & Kucan, L. (2013). *Bringing words to life: Robust vocabulary instruction (Second Edition).* Guildford Press.

Bérubé, D., & Marinova-Todd, S.H. (2012). The development of language and reading skills in the second and third languages of multilingual children in French Immersion. *International Journal of Multilingualism, 9*(3), 272–293. https://doi.org/10.1080/14790718.2011.631708

Bialystok, E., Majumder, S., & Martin, M. (2003). Developing phonological awareness: Is there a bilingual advantage? *Applied Psycholinguistics, 24*(1), 27–44. http://doi.org/10.1017/S014271640300002X

Bjaalid, I-K., Hoien, T., & Lundberg, I. (1997). Dual-route and connectionist models: A step towards a combined model. *Scandinavian Journal of Psychology, 38*(1), 73–82. https://doi.org/10.1111/1467-9450.00011

Branum-Martin, L., Tao, S., Garnaat, S., Bunta, F., & Francis, D. J. (2012). Meta-analysis of bilingual phonological awareness: Language, age, and psycholinguistic grain size. *Journal of Educational Psychology, 104*(4), 932–944. https://doi.org/10.1037/a0027755

Breznitz, Z. (2003). Speed of phonological and orthographic processing as factors in dyslexia: Electrophysiological evidence. *Genetic, Social, and General Psychology Monographs, 129*(2), 183–206.

Brownell, R. (2000). *Expressive one-word picture vocabulary test (EOWPVT).* Academic Therapy Publications.

Castro, F.L., Zarate, C.I.T., Gaite, F., Cullamat, E.C., Brosas, A.D., & Elago, S.J.I. (2019). *An act regulating class size in all public schools and appropriating funds therefor* (House Bill 227). Eighteenth Congress of the Philippines First Regular Session.

http://www.congress.gov.ph/legisdocs/basic_18/HB00227.pdf

Catts, H. W. (2018). The Simple View of Reading: Advancements and false impressions. *Remedial and Special Education, 39*(5), 317–323. https://doi.org/10.1177/0741932518767563

Catts, H. W., Herrera, S., Nielsen, D., & Bridges, M. (2015). Early prediction of reading comprehension within the Simple View framework. *Reading and Writing: An Interdisciplinary Journal, 28,* 1407–1425. https://doi.org/10.1007/s11145-015-9576-x 07–1425

Cenoz, J. (2003). Cross-linguistic influence in third language acquisition: Implications for the organization of the multilingual mental lexicon. *Bulletin Suisse de Linguistique Appliquée*, 78, 1–11. https://doc.rero.ch/record/18298/files/04_Cenoz.pdf

Chall, J. (1983). *Stages of reading development.* McGraw Hill.

Chung, C. S., Chen, X., & Geva, E. (2019). Deconstructing and reconstructing cross-language transfer in bilingual reading development: An interactive framework. *Journal of Neurolinguistics, 50,*149–161. https://doi.org/10.1016/j.jneuroling.2018.01.003

Cohen, J. (1988) *Statistical power analysis for the behavioral sciences 2nd ed.* Lawrence Erlbaum Associates Publishers.

Coltheart, M. (1980). Reading, phonological recoding, and deep dyslexia. In M. Coltheart, K.E. Patterson, & J. C. Marshall (Eds.), *Deep dyslexia* (pp. 197–226). Routledge and Kegan Paul.

Congress of the Philippines. (1994). *An act providing for the establishment of congressional, city and municipal libraries and barangay reading centers throughout the Philippines, appropriating the necessary funds therefor and for other purposes (Republic Act No.*

7743). Congress of the Philippines. http://www.congress.gov.ph/legisdocs/ra_09/RA07743.pdf

Congress of the Philippines. (2013). *An act enhancing the Philippine basic education system by strengthening its curriculum and increasing the number of years for basic education, appropriating funds therefor and for other purposes (Republic Act No. 10533)*. Congress of the Philippines. https://www.officialgazette.gov.ph/2013/05/15/republic-act-no-10533/

Cook, V. (2003). The changing L1 in the L2 user's mind. In V. Cook (Ed.), *Effects of the second language on the first*, 1–18. Multilingual Matters.

Cooper, H., Nye, B., Charlton, K., Lindsay, J., & Greathouse, S. (1996). The effects of summer vacation on achievement test scores: A narrative and meta-analytic review. *Review of Educational Research*, *66*(3), 227–268. http://journals.sagepub.com/doi/10.3102/00346543066003227

Cummins, J. (2001). Bilingual children's Mother Tongue: Why is it important for education? *Sprogforum*, *19*, 15–20. http://www.lavplu.eu/central/bibliografie/cummins_eng.pdf

Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research*, *49*(2), 222–251. https://doi.org/10.3102/00346543049002222

Cummins, J. (2005, September). *Teaching for cross-language transfer in dual language education: Possibilities and pitfalls* [Paper]. TESOL Symposium on Dual Language Education: Teaching and learning in two languages in the EFL setting, Istanbul, Turkey. https://www.tesol.org/docs/default-source/new-resource-library/symposium-on-dual-language-education-3.pdf

Cunningham, A. E., & Stanovich, K. E. (1997). Early reading acquisition and its relation to

reading experience and ability 10 years later. *Developmental Psychology, 33*(6), 934–945. https://doi.org/10.1037/0012-1649.33.6.934

Daniels, P., & Bright, W. (Eds.). (1996). *The world's writing systems*. Oxford University Press.

De Jong, P.F. (2006). Units and routes of reading in Dutch. *Developmental Science*, *9*(5), 441–442. https://doi.org/10.1111/j.1467-7687.2006.00524.x

Dekker, D. (2017). *Finally shedding the past: Filipino teachers negotiate their identities within a new Mother Tongue-Based Multilingual Education policy landscape* [Doctoral dissertation, University of Toronto]. University of Toronto TSpace Repository. http://hdl.handle.net/1807/77454

Department of Education. (n.d.). *Batayang talasalitaan I at II.* Department of Education.

Department of Education. (2012). *Guidelines on the implementation of the Mother Tongue-Based Multilingual Education (Department Order No. 16, series 2012).* Department of Education. https://www.deped.gov.ph/2012/02/17/do-16-s-2012-guidelines-on-the-implementation-of-the-mother-tongue-based-multilingual-education-mtb-mle/

Department of Education. (2016a). *Curriculum guide English (Grade 1 to Grade 10).* Department of Education. https://www.deped.gov.ph/wp-content/uploads/2019/01/English-CG.pdf

Department of Education. (2016b). *K to 12 Curriculum guide Mother Tongue (Grade 1 to Grade 3).* Department of Education. https://www.deped.gov.ph/wp-content/uploads/2019/01/Mother-Tongue-CG.pdf

Department of Education. (2016c). *K to 12 Gabay pangkurikulum Filipino (Baitang 1 to 10).* Department of Education.

https://www.deped.gov.ph/wp-content/uploads/2019/01/Filipino-CG.pdf

Department of Education. (2016d). *The learning action cell as a K to 12 basic education program school-based continuing professional development strategy for the improvement of teaching and learning (DepEd Order No. 35, s. 2016).* Department of Education. https://www.deped.gov.ph/wp-content/uploads/2016/06/DO_s2016_035.pdf

Dörnyei, Z., & Csizér, K. (2002). Some dynamics of language attitudes and motivation: Results of a longitudinal nationwide survey. *Applied Linguistics, 23*(4), 421–462. https://doi.org/10.1093/applin/23.4.421

Droop, M., & Verhoeven, L. (2003). Language proficiency and reading ability in first- and second-language learners. *Reading Research Quarterly, 38,* 78–103. https://doi.org/10.1598/RRQ.38.1.4

Duff, D., Tomblin, J.B., & Catts, H. (2015). The influence of reading on vocabulary growth: A case for a Matthew Effect. *Journal of Speech, Language, and Hearing Research,58*(3), 853–864. https://doi.org/10.1044/2015_JSLHR-L-13-0310

Duncan, G.J., & Murnane, R.J. (2014). *Restoring opportunity: The crisis of inequality and the challenge for American education.* Harvard Education Press.

Durgunoğlu, A. Y. (2002). Cross-linguistic transfer in literacy development and implications for language learners. *Annals of Dyslexia, 52,* 189–204. https://doi.org/10.1007/s11881-002-0012-y

Durgunoğlu, A.Y. (2006). Learning to read in Turkish. *Developmental Science, 9* (5), 437–439. https://doi.org/10.1111/j.1467-7687.2006.00522.x

Ehri, L. (1999). Phases of development in learning to read words. In J. Oakhill & R. Beard

(Eds.), *Reading development and the teaching of Reading: A psychological perspective* (pp. 79-108). Blackwell Publishers.

Estrera, L., & Uno, A. (2017). Investigation of cognitive factors related to Filipino and English reading literacy of third-grade Filipino children. *Asia Pacific Journal of Developmental Differences*, *4*(2), 145–166. https://doi.org/10.3850/S2345734117000090

Foorman, B., Beyler, N., Borradaile, K., Coyne, M., Denton, C. A., Dimino, J., … Wissel, S. (2016). *Foundational skills to support reading for understanding in kindergarten through 3rd grade (NCEE 2016-4008)*. National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/wwc_foundationalreading_040717.pdf

Forman, M. (1971). *Kapampangan grammar notes*. University of Hawai'i Press. https://doi.org/10.2307/j.ctv9hvsmc

Foroodi-Nejad, F., & Paradis, J. (2009). Crosslinguistic transfer in the acquisition of compound nouns in Persian-English bilinguals. Bilingualism: *Language and Cognition, 12*, 411–427. https://doi.org/10.1017/S1366728909990241

Francis, D.J., Kulesz, P.A., & Benoit, J.S. (2018). Extending the Simple View of Reading to account for variation within readers and across texts: The Complete View of Reading (CVR). *Remedial and Special Education*, *39*(5), 274–288. https://doi.org/10.1177/0741932518772904

Fraser, C., Gottardo, A., & Geva, E. (2017). Vocabulary profiles and reading comprehension in young bilingual children. OLBI Working Papers. *Cahiers De L'ILOB, 8,* 71–94. https://doi.org/10.18192/olbiwp.v8i0.2118

Frost, R. (2006). Becoming literate in Hebrew: The grain size hypothesis and Semitic

orthographic systems. *Developmental Science, 9*(5), 439–40. https://doi.org/10.1111/j.1467-7687.2006.00523.x

Gaillard, J-C. (2008). Differentiated adjustment to the 1991 Mt. Pinatubo resettlement program among lowland ethnic groups of the Philippines. *The Australian Journal of Emergency Management, 23*(2), 31–39. https://www.preventionweb.net/files/8661_GaillardAJEM2008.pdf

Gambrell, L. B. (2011). Seven rules of engagement: What's most important to know about motivation to read. *The Reading Teacher, 65*(3), 172–178. https://doi.org/10.1002/TRTR.01024

Garcia, J. R., & Cain, K. (2014). Decoding and reading comprehension: A meta-analysis to identify which reader and assessment characteristics influence the strength of the relationship in English. *Review of Educational Research, 84*, 74–111. https://doi.org/10.3102/0034654313499616

Gathercole, V.C.M. (2013). Assessment of multitasking wonders: Music, Olympics, and language. In V.C.M. Gathercole (Ed.), *Issues in the assessment of bilinguals* (pp. 1–19). Multilingual Matters. https://doi.org/10.21832/9781783090105

Georgiou, G. K., Parrila, R., & Papadopoulos, T. C. (2008). Predictors of word decoding and reading fluency across languages varying in orthographic consistency. *Journal of Educational Psychology, 100*(3), 566–580. https://doi.org/10.1037/0022-0663.100.3.566

Geva, E. (2006). Second-language oral proficiency and second-language literacy. In D. August & T. Shanahan (Eds.), *Developing literacy in second-language learners: A report of the National Literacy Panel on Language-Minority Children and Youth* (pp. 123–139). Lawrence Erlbaum Associates Publishers.

Geva, E., & Siegel, L. (2000). Orthographic and cognitive factors in the concurrent development of basic reading skills in two languages. *Reading and Writing: An Interdisciplinary Journal*, *12*, 1–30. https://doi.org/10.1023/A:1008017710115

Geva, E., & Zadeh, Z.Y. (2006). Reading efficiency in native English-speaking and English-as-a-Second-Language children: The role of oral proficiency and underlying cognitive-linguistic Processes. *Scientific Studies of Reading*, *10*(1), 31–57. https://doi.org/10.1207/s1532799xssr1001_3

Gonzalez, A. (2005). Contemporary Filipino (Tagalog) and Kapampangan: Two Philippine languages in contact. In H. Liao and C. Rubino (Eds.), *Current issues in Philippine linguistics and anthropology: Parangal kay Lawrence A. Reid* (pp. 93–114). Linguistic Society of the Philippines and Summer Institute of Linguistics. https://www.sil.org/system/files/reapdata/80/50/85/80508527429099278775743740705115414820/Gonzalez.pdf

González-Valenzuela, M. J., Díaz-Giráldez, F., & López-Montiel, M. D. (2016). Cognitive predictors of word and pseudoword reading in Spanish first-grade children. *Frontiers in Psychology*, *7*(774), 1–12. https://doi.org/10.3389/fpsyg.2016.00774

Good, R. H., Kaminski, R. A., & Smith, S. (2007). Phoneme segmentation fluency (PSF). In R. H. Good & R. A. Kaminski (Eds.), *Dynamic indicators of basic early literacy skills (DIBELS) 6th ed.* (pp. 16–22). Institute for Development of Educational Achievement.

Gorman, B. K. (2012). Relationships between vocabulary size, working memory, and phonological awareness in Spanish-Speaking English Language Learners. *American Journal of Speech-Language Pathology*, *21*(2), 109–123. https://doi.org/10.1044/1058-0360(2011/10-0063)

Gottardo, A. (2002). The relationship between language and reading skills in bilingual Spanish-English speakers. *Topics in Language Disorders, 22*(5), 46–70. https://doi.org/10.1097/00011363-200211000-00008

Gottardo, A., Chiappe, P., Siegel, L.S., & Stanovich, K.E. (1999). Patterns of word and nonword processing in skilled and less-skilled readers. *Reading and Writing: An Interdisciplinary Journal*, 11, 456–487. https://doi.org/10.1023/A:1008034802088

Gottardo, A., Javier, C., Farnia, F., Mak, L., & Geva, E. (2014). Bidirectional cross-linguistic relations of first and second language skills in reading comprehension of Spanish-speaking English learners. *Written Language & Literacy, 17*(1), 62–88. https://doi.org/10.1075/wll.17.1.04got

Gottardo, A., Koh, P.W., Chen, X., & Jia, F. (2017). Models of English and Chinese word reading for adolescent Chinese-English bilinguals. *Reading and Writing, 30* (7), 1377– https://doi.org/10.1007/s11145-017-9728-2

Gottardo, A., Mirza, A., Koh, P.W., Ferreira, A., & Javier, C. (2018). Unpacking listening comprehension: The role of vocabulary, morphological awareness, and syntactic knowledge in reading comprehension. *Reading and Writing, 31*(8), 1741–1764. https://doi.org/10.1007/s11145-017-9736-2

Gottardo, A., & Mueller, J. (2009). Are first- and second-language factors related in predicting second-language reading comprehension? A study of Spanish-speaking children acquiring English as a second language from first to second grade. *Journal of Educational Psychology*, *101*(2), 330–344. https://doi.org/10.1037/a0014320

Gottardo, A., Pasquarella, A., Chen, X., & Ramirez, G. (2016). The impact of language on the

relationships between phonological awareness and word reading in different orthographies: A test of the psycholinguistic grain size theory in bilinguals. *Applied Psycholinguistics, 37*(5), https://doi.org/1083–1115. 10.1017/S0142716415000508

Gottardo, A., Yan, B., Siegel, L. S., & Wade-Woolley, L. (2001). Factors related to English reading performance in children with Chinese as a first language: More evidence of cross-language transfer of phonological processing. *Journal of Educational Psychology, 93*(3), 530–542. https://doi.org/10.1037/0022-0663.93.3.530

Gough, P.B., & Tunmer, W. E. (1986). Decoding, reading, and reading Disability. *Remedial and Special Education, 7*(1), 6–10. https://doi.org/10.1177/074193258600700104

Hammer, C. S., Hoff, E., Uchikoshi, Y., Gillanders, C., Castro, D., & Sandilos, L. E. (2014). The language and literacy development of young dual language learners: A critical review. *Early Childhood Research Quarterly, 29*(4), 715–733. https://doi.org/10.1016/j.ecresq.2014.05.008

Hammill, D. D. (2004). What we know about correlates of reading. *Exceptional Children, 70*(4), 453–468. https://doi.org/10.1177/001440290407000405

Higby, E., Kim, J., & Obler, L.K. (2013). Multilingualism and the brain. *The Annual Review of Applied Linguistics, 33*, 68–101. https://doi.org/10.1017/S0267190513000081

Hirsch, E. D. Jr. (2013). A wealth of words. *City Journal, Winter 2013,* 1–14. https://www.city-journal.org/html/wealth-words-13523.html

Ho, E.S.C., & Lau, K. (2018). Reading engagement and reading literacy performance: Effective policy and practices at home and in school. *Journal of Research in Reading, 41* (4), 657–679. https://doi.org/10.1111/1467-9817.12246

Ho, C.S.-H., Zheng, M., McBride, C., Hsu, L.C.J., Waye, M.M.Y., & Kwok, J.C.-Y. (2017).

Examining an extended simple view of reading in Chinese: The role of naming efficiency for reading comprehension. *Contemporary Educational Psychology, 51,* 293–302. https://doi.org/10.1016/j.cedpsych.2017.08.009

Hoover, W.A., & Gough, P. (1990). The simple view of reading. *Reading and Writing: An Interdisciplinary Journal, 2,* 127–160. https://doi.org/10.1007/BF00401799

Hoover, W. A., & Tunmer, W. E. (2018). The Simple View of Reading: Three assessments of its adequacy. *Remedial and Special Education, 39*(5), 304–312. https://doi.org/10.1177/0741932518773154

Hu, L., & Bentler, P. M. (1995). Evaluating model fit. In R. Hoyle (Ed.), *Structural equation modeling: Issues, concepts, and applications* (pp. 76–99). Sage.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hudson, B., Hunter, D., & Peckham, S. (2019). Policy failure and the policy-implementation gap: Can policy support programs help? *Policy Design and Practice*, *2*(1), 1–14. https://doi.org/10.1080/25741292.2018.1540378

Hulme, C., Zhou, L., Tong, X., Lervåg, A., & Burgoyne, K. (2019). Learning to read in Chinese: Evidence for reciprocal relationships between word reading and oral language skills. *Developmental Science*, *22*(1), 1-11. https://doi.org/10.1111/desc.12745

Hutzler, F., Ziegler, J.C., Perry, C., Wimmer, H., & Zorzi, M. (2004). Do current connectionist learning models account for reading development in different languages? *Cognition,91*(3), 273–296. https://doi.org/10.1016/j.cognition.2003.09.006

Jenkins, J., Fuchs, L., van den Broek, P., Espin, C., & Deno, S. (2003). Sources of

individual differences in reading comprehension and reading fluency. *Journal of Educational Psychology, 95*(4), 719–729. https://doi.org/10.1037/0022-0663.95.4.719

Jiménez-González, J.E. (1997). A reading-level match study of phonemic processes underlying reading disabilities in a transparent orthography. *Reading and Writing: An Interdisciplinary Journal*, *9*, 23-40. https://doi.org/10.1023/A:1007925424563

Joshi, R.M., & Aaron, P.G. (2011). Assessment of reading problems among English language learners based on the Component Model. In A.Y. Durgunoglu & C. Goldenberg (Eds.), *Language and literacy development in bilingual settings* (pp. 304–334). The Guilford Press.

Joshi, R. M., Ji, X. R., Breznitz, Z., Amiel, M., & Yulia, A. (2015). Validation of the simple view of reading in Hebrew—A Semitic language. *Scientific Studies of Reading, 19*(3), 243–252. https://doi.org/10.1080/10888438.2015.1010117

Kaminski, R. A., & Good, R. H. III. (1996). Toward a technology for assessing basic early literacy skills. *School Psychology Review, 25*(2), 215–227.

Kang, Y., Choi, Y., Lee, B., & Nam, K. (2011). Prediction of Korean EFL learners' English reading comprehension abilities: An examination of the Simple View of Reading. *English Teaching, 66*(1), 23–38. https://doi.org/10.15858/engtea.66.1.201103.23

Katz, L., & Frost, L. (1992). Reading in different orthographies: The Orthographic Depth Hypothesis. In R. Frost, & L. Katz (Eds.), *Orthography, phonology, morphology, and meaning* (pp. 67–84). Elsevier.

Kearney, M. W. (2017). Cross lagged panel analysis. In M. R. Allen (Ed.), *The SAGE encyclopedia of communication research methods* (313–314). Sage. https://doi.org/10.4135/9781483381411.n117

Keenan, J. M., Betjemann, R. S., & Olson, R. K. (2008). Reading comprehension tests vary in the skills they assess: Differential dependence on decoding and oral comprehension. *Scientific Studies of Reading, 12*(3), 281–300. https://doi.org/10.1080/10888430802132279

Kendeou, P., Papadopoulos, T. C., & Kotzapoulou, M. (2013). Evidence for the early emergence of the simple view of reading in a transparent orthography. *Reading and Writing, 26,* 189–204. https://doi.org/10.1007/s11145-012-9361-z

Kershaw, S., & Schatschneider, C. (2012). A latent variable approach to the Simple View of Reading. *Reading and Writing, (25)*2, 433–464. https://doi.org/10.1007/s11145-010-9278-3

Kirby, J. R., Desrochers, A., Roth, L., & Lai, S. S. V. (2008). Longitudinal predictors of word reading development. *Canadian Psychology/Psychologiecanadienne, 49*(2), 103–110. https://doi.org/10.1037/0708-5591.49.2.103

Kirby, J.R., Georgiou, G., Martinussen, R. & Parrila, R. (2010). Naming speed and reading: From prediction to instruction. *Reading Research Quarterly, 45*, 341–362. https://doi.org/10.1598/RRQ.45.3.4

Kirby, J.R., & Savage, R.S. (2008). Can the simple view deal with the complexities of reading? *Literacy*, *42*(2), 75–82. https://doi.org/10.1111/j.1741-4369.2008.00487.x

Kirsch, I., de Jong, J., Lafontaine, D., McQueen, J., Mendelovits, J., & Monseur, C. (2002). *Reading for change: Performance and engagement across countries: Results from PISA 2000.* Organization for Economic Co-operation and Development (OECD). https://www.oecd.org/education/school/programmeforinternationalstudentassessmentpisa/33690904.pdf

Koda, K. (2008). Impacts of prior literacy experience on second-language learning to read. In K. Koda, & A. M. Zehler (Eds.), *Learning to read across languages: Crosslinguistic relationships in first- and second-language literacy development* (pp. 68–96). Routledge. https://www.oise.utoronto.ca/gevalab/UserFiles/File/20142015_Publications/2008_Geva_in_Koda_Zehler_Eds.pdf

Komisyon sa Wikang Filipino (KWF). (2013). *Ortograpiyang pambansa.* Komisyon sa Wikang Filipino.

Krashen, S. (2006). Free reading: Is it the only way to make kids more literate? *School Library Journal, 52*(9), 42–45. https:// www. psd1. org/ cms/ lib4/ WA01001055/ centricity/ domain/34/ admin/free%20reading%20(2).pdf

Kravin, H. (1992). Erosion of a language in bilingual development, *Journal of Multilingual & Multicultural Development, 13*(4), 307–325. https://doi.org/10.1080/01434632.1992.9994499

Kuhn, M.R., & Stahl, S. (2003). Fluency: A review of developmental and remedial strategies. *The Journal of Educational Psychology, 95*(1), 3–21. https://doi.org/10.1037/0022-0663.95.1.3

LaBerge, D., & Samuels, S.J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology, 6*(2), 293–323. https://doi.org/10.1016/0010-0285(74)90015-2

Lam, K., Chen, X., & Deacon, S.H. (2020). The role of awareness of cross-language suffix correspondences in second-language reading comprehension. *Reading Research Quarterly, 55*(1), 29–43. https://doi-org.libproxy.wlu.ca/10.1002/rrq.257

Landerl, K., Ramus, F., Moll, K., Lyytinen, H., Leppänen, P.H.T., & Lohvansuu, K. (2013).

Predictors of developmental dyslexia in European orthographies with varying complexity. *Journal of Child Psychology and Psychiatry, 54*, 686–694. https://doi.org/10.1111/jcpp.12029

Landerl, K., & Wimmer, H. (2008). Development of word reading fluency and spelling in a consistent orthography: An 8-year follow-up. *Journal of Educational Psychology, 100*(1), 150-161. https://doi.org/10.1037/0022-0663.100.1.150

Language and Reading Research Consortium, & Chiu, Y.D. (2018). The Simple View of Reading across development: Prediction of Grade 3 reading comprehension from prekindergarten skills. *Remedial and Special Education, 39*(5), 289–303. https://doi.org/10.1177/074193251876205

Lee, K., & Chen, X. (2019). An emergent interaction between reading fluency and vocabulary in the prediction of reading comprehension among French immersion elementary students. *Reading and Writing: An Interdisciplinary Journal, 32*, 1657–1679. https://doi.org/10.1007/s11145-018-9920-z

Lesaux, N. K., Crosson, A. C., Kieffer, M. J., & Pierce, M. (2010). Uneven profiles: Language minority learners' word reading, vocabulary, and reading comprehension skills. *Journal of Applied Developmental Psychology, 31*(6), 475–483. https://doi.org/10.1016/j.appdev.2010.09.004

Li, M., Koh, P. W., Geva, E., Joshi, R. M., & Chen, X. (2020, January 30). The Componential Model of Reading in bilingual learners. *Journal of Educational Psychology, 112*(8), 1532–1545. https://doi.org/10.1037/edu0000459

Liu, Y., & Liu, D. (2018). Noncompound and compound Chinese character reading: Are they the

same for second-grade Hong Kong Chinese children? *Learning and Individual Differences,62,* 62–68. https://doi.org/10.1016/j.lindif.2018.01.009

Lonigan, C.J., Burgess, S.R., & Schatschneider, C. (2018). Examining the Simple View of Reading with elementary school children: Still simple after all these years. *Remedial and Special Education, 39*(5), 260–273. https://doi.org/10.1177/0741932518764833

López-Escribano, C., Ivanova, A., & Shtereva, K. (2018). Rapid automatized naming (RAN) and vocabulary are significant predictors of reading in consisting orthographies: A comparison of reading acquisition procedures in Bulgarian and Spanish. *Electronic Journal of Research in Educational Psychology, 16*(44), 147–173. http://ojs.ual.es/ojs/index.php/EJREP/article/view/1941/2538

Lorente, B. (2013). The grip of English and Philippine language policy. In L. Wee, R.B.H. Goh, & L. Lim (Eds.), *The Politics of English: South Asia, Southeast Asia and the Asia Pacific* (pp. 187–204). John Benjamins. https://doi.org/10.1075/wlp.4.13lor

Lugo-Neris, M. J., Jackson, C.W., & Goldstein, H. (2010). Facilitating vocabulary acquisition of young English language learners. *Language, Speech, and Hearing Services in Schools, 41*, 314–327. https://doi.org/10.1044/0161-1461(2009/07-0082)

Mahboob, A., & Cruz, P. (2013). English and mother-tongue-based multilingual education: Language attitudes in the Philippines. *Asian Journal of English Language Studies, 1,* 1–19. https://ajels.ust.edu.ph/wp-content/uploads/2018/09/1-English-and-mother-tongue-based-multilingual-education-Language-attitudes-in-the-Philippines.pdf

Malabonga, V., & Marinova-Todd, S. (2007). Filipino speech acquisition. In S. McLeod (Ed.), *The international guide to speech acquisition* (pp. 340–350). Thomson Delmar Learning.

Mann V., & Wimmer, H. (2002). Phoneme awareness and pathways into literacy: A comparison of German and American children. *Reading and Writing: An Interdisciplinary Journal, 15*(7–8), 653–682. https://doi.org/10.1023/A:1020984704781

Marinelli, C. V., Romani, C., Burani, C., McGowan, V. A., & Zoccolotti, P. (2016). Costs and benefits of orthographic inconsistency in reading: Evidence from a cross-linguistic comparison. *PloS one, 11*(6), e0157457. https://doi.org/10.1371/journal.pone.0157457

Massonnié, J., Bianco, M., Lima, L., & Bressoux, P. (2018). Longitudinal predictors of reading comprehension in French at first grade: Unpacking the oral comprehension component of the simple view. *Learning and Instruction, 60,* 166–179. https://doi.org/10.1016/j.learninstruc.2018.01.005

McBride-Chang, C., Tong, X., Shu, H., Wong, A. M.-Y., Leung, K., & Tardif, T. (2008). Syllable, phoneme, and tone: Psycholinguistic units in early Chinese and English word recognition. *Scientific Studies of Reading, 12*(2), 171–194. https://doi.org/10.1080/10888430801917290

McCabe, A., Tamis-LeMonda, C. S., Bornstein, M. H., Brockmeyer Cates, C. B., Golinkoff, R., Wishard Guerra, A., Hirsh-Pasek, K., Hoof, E., Kuchirko, Y., Melzi, G., Mendelsohn, A., Paez, M., & Song, L. (2013). Multilingual children: Beyond myths and toward best practices. *Society for Research in Child Development Social Policy Report, 27*(4), 2–37. https://doi.org/10.1002/j.2379-3988.2013.tb00077.x

Mcdowell, K., Carroll, J., & Ziolkowski, R. (2013). Relations between phonological awareness and vocabulary in preschoolers. *International Journal of Liberal Arts and Social Sciences, 1*(2), 75–84. https://ijlass.org/data/frontImages/October2013/8.pdf

Metila, R., Pradilla, L., & Williams, A. (2016). *Investigating best practice in Mother Tongue-*

Based Multilingual Education (MTB-MLE) in the Philippines, Phase 2 progress report: Patterns of challenges and strategies in the implementation of mother tongue as medium of instruction in the early years: A nationwide study. Report prepared for Australian Department of Foreign Affairs and Trade and Philippine Department of Education. Assessment, Curriculum and Technology Research Centre (ACTRC). https://actrc.files.wordpress.com/2018/10/09-17-2018-mtb-mle-report-phase-3-v5.pdf

Metzler, J., & Woessmann, L. (2012). The impact of teacher subject knowledge on student achievement: Evidence from within-teacher within-student variation. *Journal of Development Economics, 99*(2), 486–496. https://doi.org/10.1016/j.jdeveco.2012.06.002

Mirza, A., Gottardo, A., & Chen, X. (2017). Reading in multilingual learners of Urdu (L1), English (L2), and Arabic (L3). *Reading and Writing: An Interdisciplinary Journal, 30,* 187–207. https://doi.org/10.1007/s11145-016-9669-1

Mitchell, A., & Brady, S. (2013). The effect of vocabulary knowledge on novel word identification. *Annals of Dyslexia*, *63*(3), 201–216. https://doi.org/10.1007/s11881-013-0080-1

Moats, L., & Tolman, C. (2005). *Language essentials for teachers of reading and spelling (LETRS): The speech sounds of English: Phonetics, phonology, and phoneme awareness* (Module 2). Sopris West.

Muthén, L. K., & Muthén, B. O. (1998–2013). *Mplus Demo (Version 7.11).* Muthén&Muthén. https://www.statmodel.com/demo.shtml#Windows

Nag S. (2014). Alphabetism and the science of reading: From the perspective of the akshara languages. *Frontiers in Psychology, 5,* 866. https://doi.org/10.3389/fpsyg.2014.00866

Nag, S., & Snowling, M. J. (2012). Reading in an alphasyllabary: Implications for a language

universal theory of learning to read. *Scientific Studies of Reading, 16*(5), 404–423. https://doi.org/10.1080/10888438.2011.576352

Naglieri, J.A. (1985). *Matrix analogies test - Expanded form (MAT-EF).* The Psychological Corporation.

Naglieri, J. A., & Ronning, M. E. (2000). The relationship between general ability using the Naglieri Nonverbal Ability Test (NNAT) and Stanford Achievement Test (SAT) reading achievement. *Journal of Psychoeducational Assessment, 18*(3), 230–239. https://doi.org/10.1177/073428290001800303

Nakamura, P.R., de Hoop, T., & Holla, C.U. (2019). Language and the learning crisis: Evidence of transfer threshold mechanisms in multilingual reading in South India. *The Journal of Development Studies, 55*(11), 2287–2305. https://doi.org/10.1080/00220388.2018.1493192

Nation K. (2017). Nurturing a lexical legacy: Reading experience is critical for the development of word reading skill. *NPJ Science of Learning, 2* (3), 1–4. https://www.nature.com/articles/s41539-017-0004-7

Nation, K. (2019). Children's reading difficulties, language, and reflections on the simple view of reading. *Australian Journal of Learning Difficulties, 24*(1), 47–73, https://doi.org/10.1080/19404158.2019.1609272

National Library of the Philippines. (2018). *Status of Philippine public libraries & librarianship (Final Research Report).* National Library of the Philippines. http://web.nlp.gov.ph/nlp/sites/default/files/14Jun2019/Status%20of%20Philippine%20Public%20Libraries%20and%20librarianship.pdf

National Reading Panel. (2000). *Teaching children to read: An evidence-based assessment of the*

Scientific research literature on reading and its implications for reading instruction (NIH Pub. No. 00–4769). National Institutes of Health, National Institute of Child Health and Human Development.

Natividad, P.E. (1967). *A taxonomic phonological analysis of Tagalog and Pampango* [Master's thesis, University of British Columbia]. University of British Columbia Theses and Dissertations. http://hdl.handle.net/2429/36685

Niyozov, S., & Tarc, P. (2015). Introduction. In S. Niyozov, & P. Tarc (Eds.), *Working with, against, and despite global "best practices": Educational conversations around the globe* (pp.1-16). Ontario Institute for Studies in Education University of Toronto and Western University. https:// www.oise.utoronto.ca/ cidec/UserFiles/File/ Website/ Compendium_GBP_Final_Jan_2016.pdf

Nolasco, R. (2007, August 31). *Ang Filipino at Tagalog, hindi ganoong* kasimple [Speech]. Pampinid na Palatuntunan ng Buwan ng Wikang Pambansa 2007, Manila, Philippines. http://wika.pbworks.com/f/Ang+Filipino+at+Tagalog+Hindi+Ganoong+Kasimple.pdf

O'Brien, B., & Wallot, S. (2016). Silent reading fluency and comprehension in bilingual children. *Frontiers in Psychology, 7*, 1–12. https://doi.org/10.3389/fpsyg.2016.01265

O'Brien, B., Lim, N.C., Mohamed, M.B., & Arshad, N.A. (2019). Cross-lag analysis of early reading and spelling development for bilinguals learning English and Asian scripts. *Reading and Writing*, 33, 1859–1891.https://doi.org/10.1007/s11145-019-09999-8

Ocampo, D. (2002). *Effects of bilingualism on literacy development* [Doctoral dissertation, University of Surrey]. Surrey Research Insight. http://epubs.surrey.ac.uk/id/eprint/2817

O'Dwyer, L. M., & Parker, C. E. (2014). *A primer for analyzing nested data: Multilevel modeling in SPSS using an example from a REL study* (REL 2015–046).

U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Northeast & Islands. https:// ies.ed. gov/ ncee/ edlabs/ regions/ northeast/ pdf/ REL_2015046.pdf

Organisation for Economic Co-operation and Development [OECD]. (2012). *Equity and quality in education: Supporting disadvantaged students and schools*. OECD Publishing. https://doi.org/10.1787/9789264130852-en

Organisation for Economic Co-operation and Development [OECD]. (2019). *Programme for International Student Assessment (PISA) 2018 Results (Volume I): What students know and can do.* OECD Publishing. https://doi.org/10.1787/5f07c754-en

Ouellette, G. P. (2006). What's meaning got to do with it: The role of vocabulary in word reading and reading comprehension. *Journal of Educational Psychology, 98*(3), 554–566. https://doi.org/10.1037/0022-0663.98.3.554

Özdemir, F., Haznedar, B., & Babür, N. (2012). The development of reading in early bilingualism: Evidence from Turkish-Child L2 learners of English. *Boğaziçi University Journal of Education, 29*(1), 1–26. https://dergipark.org.tr/tr/download/article-file/43794

Padilla, P. (2018). *Knowing the need to intervene but not doing it: The case of a Philippine public elementary school* [Unpublished manuscript]. Department of Psychology, Wilfrid Laurier University, Ontario, Canada.

Paige, D.D., & Smith, G.S. (2018). Indian students learning to read English: An analysis using the Simple View of Reading. *Journal of Research in Reading, 41*(2), 312–328. https://doi.org/10.1111/1467-9817.12105

Pangilinan, M. R.M. (2012). *An introduction to Kulitan, the indigenous Kapampangan script*.

Center for Kapampangan Studies.

Papadimitriou, A. M., & Vlachos, F. M. (2014). Which specific skills developing during preschool years predict the reading performance in the first and second grade of primary school? *Early Child Development Care, 184*(11), 1706–1722. https://doi.org/10.1080/03004430.2013.875542

Parba, J. (2018). Teachers' shifting language ideologies and teaching practices in Philippine mother tongue classrooms. *Linguistics and Education, 47*, 27–35. https://doi.org/10.1016/j.linged.2018.07.005

Pashler, H., Bain, P., Bottge, B., Graesser, A., Koedinger, K., McDaniel, M., & Metcalfe, J. (2007). *Organizing Instruction and Study to Improve Student Learning (NCER 2007-2004)*. National Center for Education Research, Institute of Education Sciences, U.S. Department of Education. https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/20072004.pdf

Perfecto, M.R.G. (2020). English language teaching and bridging in mother tongue-based multilingual education. *International Journal of Multilingualism,* 1-17. https://doi.org/10.1080/14790718.2020.1716771

Pilgreen, J.L. (2000). *The SSR handbook: How to organize and manage a sustained silent reading program*. Boynton/Cook Publishers.

Poe, G. (2019). *An act regulating class size in all public schools and appropriating funds therefor (Senate Bill 1190).* Eighteenth Congress of the Philippines First Regular Session. http://legacy.senate.gov.ph/lisdata/3191028763!.pdf

Paulesu, E. (2006). On the advantage of 'shallow' orthographies: Number and grain size of the orthographic units or consistency per se? *Developmental Science, 9*(5), 443–444. https://doi.org/10.1111/j.1467-7687.2006.00525.x

Perfetti, C. A. (1985). *Reading ability.* Oxford University Press.

Perfetti, C. A. (2007). Reading ability: Lexical quality to comprehension. *Scientific Studies of Reading*, *11*(4), 357-383. https://doi.org/10.1080/10888430701530730

Perfetti, C. A. (2010). Decoding, vocabulary, and comprehension. The golden triangle of reading skill. In M. G. McKeown, & L. Kucan (Eds.), *Bringing reading research to life* (291–302). Guilford.

Perfetti, C. A., & Hart, L. (2002). The lexical quality hypothesis. In L. Verhoeven, C. Elbro, & P. Reitsma (Eds.), *Precursors of functional literacy* (pp. 189–213). John Benjamins. https://doi.org/10.1075/swll.11.14per

Phil. Const. art. XIV § 6, 7. https://www.officialgazette.gov.ph/constitutions/1987-constitution/

Philippine Statistics Authority. (2019a). *Population and migration* [Data set]. Philippine Statistics Authority. http://openstat.psa.gov.ph/PXWeb/pxweb/en/DB/DB__1A__PO/1001A6DTPG0.px/table/tableViewLayout1/?rxid=c7797471-aa9d-40ce-ac87-2bd94b1b236c

Philippine Statistics Authority. (2019b). *Child poverty in the Philippines* [Infographic]. Philippine Statistics Authority. https://openstat.psa.gov.ph/Portals/0/downloads/ChildPoverty.pdf?%20ver=2018-11-10-001824-813&timestamp=1553672022425

Pikulski, J.J., & Chard, D.J. (2005). Fluency: Bridge between decoding and comprehension. *The Reading Teacher*, *58*(6), 510–519. https://doi.org/10.1598/RT.58.6.2

Piper, B., Schroeder, L., & Trudell, B. (2016). Oral reading fluency and comprehension in Kenya: reading acquisition in a multilingual environment. *Journal of Research in Reading*, *39*(2),133–152. https://doi.org/10.1111/1467-9817.12052

Pressley, M. (2000). Comprehension instruction: What makes sense now, what might make sense soon. In M.L. Kamil, P. Mosenthal, P.D. Pearson, & R. Barr (Eds.*), Handbook of Reading Research* (*Volume III)*. Longman.

Pretorius, E.J., & Currin, S. (2010). Do the rich get richer and the poor poorer?: The effects of an intervention programme on reading in the home and school language in a high poverty multilingual context. *International Journal of Educational Development, 30*(1), 67–76. https://doi.org/10.1016/j.ijedudev.2009.06.001

Protopapas, A., Mouzaki, A., Sideridis, G.D., Kotsolakou, A., & Simos, P.G. (2013). The role of vocabulary in the context of the simple view of reading. *Reading & Writing Quarterly, 29*(2):168–202. https://doi.org/10.1080/10573569.2013.758569

Ramanujan, K., & Weekes, B.S. (2019). What is an akshara? In Joshi R., & McBride, C. (Eds.), *Handbook of Literacy in Akshara Orthography. Literacy Studies (Perspectives from Cognitive Neurosciences, Linguistics, Psychology and Education)* (pp. 43–52). Springer. https://doi.org/10.1007/978-3-030-05977-4_1

RAND Reading Study Group (Catherine Snow, Chair). (2002). *Reading for understanding (Toward an R&D program in reading comprehension)*. RAND Corporation. https://www.rand.org/content/dam/rand/pubs/monograph_reports/2005/MR1465.pdf

Rasinski, T.V. (2003). *The fluent reader.* Scholastic.

Reid, L. (2005). Tagalog and Philippine languages. In P. Strazny (Ed.), *Encyclopedia of linguistics* (pp. 1–4). Routledge. http://www2.hawaii.edu/~reid/Combined%20Files/A59.%202005.%20Tagalog%20and%20Philippine%20Languages.pdf

Reid, L., & Schachter, P. (2008). Tagalog. In B. Comrie (Ed.), *The world's major languages 2nd edition* (pp. 833–855). Routledge. http://hdl.handle.net/10125/33012

Romaine, S. (2008). Multilingualism. In M. Aronoff & J. Rees-Miller (Eds.), *The handbook of linguistics* (pp. 512–532). Blackwell Publishing Company.

Ruan, Y., Georgiou, G. K., Song, S., Li, Y., & Shu, H. (2017). Does writing system influence the associations between phonological awareness, morphological awareness, and reading? A meta-analysis. *Journal of Educational Psychology*, *110*(2), 180–202. https://doi.org/10.1037/edu0000216

Samson, L.P., del Corro, A.H., &Dizon Henson, J. (2016). *Bayung ortograpiyang Kapampangan.* Komisyon sa Wikang Filipino.

Samuels, S.J. (2006). Toward a model of reading fluency. In Samuels, S.J., & Farstrup A.E. (Eds.), *What research has to say about fluency instruction* (pp. 24–46). International Reading Association.

San Francisco, A.R., Carlo, M., August, D., & Snow, C.E. (2006). The role of language of instruction and vocabulary in the English phonological awareness of Spanish-English bilingual children. *Applied Psycholinguistics, 27*(2), 229–246. https://doi.org/10.1017/S0142716406060267

Schermelleh-Engel, K., Moosbrugger, H., and Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online, 8*(2), 23–74. http://www.stats.ox.ac.uk/~snijders/mpr_Schermelleh.pdf

Schroeder, S. R., & Marian, V. (2017). Cognitive consequences of trilingualism. *The International Journal of Bilingualism, 21*(6), 754–773. https://doi.org/10.1177/1367006916637288

Schwartz, M., Geva, E., Share, D. L., & Leikin, M. (2007). Learning to read in English as third language. The cross-linguistic transfer of phonological processing skills. *Written Language & Literacy*, *10*(1), 25–52. https://doi.org/10.1075/wll.10.1.03sch

Scott, W. *H. (1984). Prehispanic source materials for the study of Philippine history*. *New Day Publishers.*

Seidenberg, M. S. (2005). Connectionist models of word reading. *Current Directions in Psychological Science*, *14*(5), 238-242. https://doi.org/10.1111/j.0963-7214.2005.00372.x

Seidenberg, M. S., & McClelland, J. L. (1989). A distributed, developmental model of word recognition and naming. *Psychological Review*, *96*(4), 523–568. https://doi.org/10.1037/0033-295X.96.4.523

Seymour, P. H. K., Aro, M., & Erskine, J. M. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology*, *94*(2), 143–174. https://doi.org/10.1348/000712603321661859

Share, D.L. (1995). Phonological recoding and self-teaching: *Sine qua non* of reading acquisition. *Cognition*, *55*(2), 151–218. https://doi.org/10.1016/0010-0277(94)00645-2

Share, D.L. (2008). On the Anglocentricities of current reading research and practice: The perils of overreliance on an "outlier" orthography. *Psychological Bulletin*, *134*(4), 584–615. https://doi.org/10.1037/0033-2909.134.4.584

Shechter, A., Lipka, O., & Katzir, T. (2018). Predictive models of word reading fluency in Hebrew. *Frontiers in Psychology*, *9*, 1882. https://doi.org/10.3389/fpsyg.2018.01882

Sheng, L., Lu, Y., & Kan, P. F. (2011). Lexical development in Mandarin-English bilingual children. Bilingualism: *Language and Cognition*, *14*(4), 579-587. https://doi.org/10.1017/S1366728910000647

Shu, H., Peng, H., & McBride-Chang, C. (2008). Phonological awareness in young Chinese children. *Developmental Science, 11*(1), 171–181. https://doi.org/10.1111/j.1467-7687.2007.00654.x

Silverman, R.D., Speece, D.L., Harring, J.R., & Ritchey, K.D. (2013). Fluency has a role in the Simple View of Reading. Scientific Studies of Reading, *17*(2), 108–133. https://doi.org/10.1080/10888438.2011.618153

Simons, G. F., & Fennig, C. D. (Eds.). (2018). *Ethnologue: Languages of the world* (21st ed). SIL International. https://www.ethnologue.com/

Singer, M., & Crouse, J. (1981). The relationship of context-use skills to reading: A case for an alternative experimental logic. *Child Development, 52*(4), 1326-1329. https://doi.org/10.2307/1129525

Smidfelt, L. (2018). An intercomprehension study of multilingual Swedish L1 speakers reading and decoding words in text in Italian, an unknown language. *Lingua, 204*, 62–77. https://doi.org/10.1016/j.lingua.2017.11.003

Song, S., Georgiou, G. K., Su, M., & Hua, S. (2016). How well do phonological awareness and rapid automatized naming correlate with Chinese reading accuracy and fluency? a meta-analysis. *Scientific Studies of Reading, 20*(2), 99–123. https://doi.org/10.1080/10888438.2015.1088543

Sparks, R.L. (2019). Why reading is a challenge for U.S. L2 learners: The impact of cognitive, ecological, and psychological factors in L2 comprehension. *Foreign Language Annals, 52*(4), 727–743. https://doi.org/10.1111/flan.12432

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21*(4), 360–407.

https://doi.org/10.1598/RRQ.21.4.1

Stevenson, H. W., Stigler, J. W., Lucker, G. W., Lee, S. Y., Hsu, C. C., & Kitamura, S. (1982). Reading disabilities: The case of Chinese, Japanese, and English. *Child Development, 53*(5), 1164–1181. https://doi.org/10.2307/1129005

Su, I.F., Klingebiel, K., & Weekes, B. S. (2010). Dyslexia in Chinese: Implications for connectionist models of reading. In N. Brunswic, S. McDougall, & P. D. Davies (Eds.), *Reading and dyslexia in different orthographies* (pp. 199–216). Psychology Press. https://doi.org/10.4324/9780203858462

Tilstra, J., McMaster, K., Van den Broek, P., Kendeou, P., & Rapp, D. (2009). Simple but complex: Components of the simple view of reading across grade levels. *Journal of Research in Reading, 32*(4), 383–401. https://doi.org/10.1111/j.1467-9817.2009.01401.x

Tobia, V., & Bonifacci, P. (2015). The Simple View of Reading in a transparent orthography: The stronger role of oral comprehension. *Reading and Writing, 28*(7), 939–957. https://doi.org/10.1007/s11145-015-9556-1

Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1997). Prevention and remediation of severe reading disabilities: Keeping the end in mind. *Scientific Studies of Reading, 1*(3), 217–234. https://doi.org/10.1207/s1532799xssr0103_3

Tunmer, W., & Chapman, J. (2012). The Simple View of Reading redux: Vocabulary knowledge and the independent components hypothesis. *Journal of Learning Disabilities, 45*, 453–466. https://doi.org/10.1177/0022219411432685

Tupas, R. (2015). Inequalities of multilingualism: Challenges to mother tongue-based multilingual education. *Journal Language and Education, 29* (2), 112–124. https://doi.org/10.1080/09500782.2014.977295

United Nations Development Programme (UNDP). (2018). *Human development indices and indicators: 2018 statistical update*. UNDP. http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf

United Nations Educational, Scientific, and Cultural Organization Institute for Statistics (UNESCO UIS). (2017, September). *More than one-half of children and adolescents are not learning worldwide*. UIS Fact Sheet No. 46. http://uis.unesco.org/sites/default/files/documents/fs46-more-than-half-children-not-learning-en-2017.pdf

United Nations Children's Fund (UNICEF), & Southeast Asian Ministers of Education Organization (SEAMEO). (2020). *SEA-PLM 2019 Main Regional Report, Children's learning in 6 Southeast Asian countries.* UNICEF & SEAMEO – SEA-PLM Secretariat. https://www.seaplm.org/PUBLICATIONS/regional%20results/SEA-PLM%202019%20Main%20Regional%20Report.pdf

Vaessen, A., Bertrand, D., Tóth, D., Csépe, V., Faísca, L., Reis, A., et al. (2010). Cognitive development of fluent word reading does not qualitatively differ between transparent and opaque orthographies. *Journal of Educational Psychology*, *102*(4), 827–842. https://doi.org/10.1037/a0019465

Verhoeven, L., & van Leeuwe, J. (2012). The simple view of second language reading throughout the primary grades. *Reading and Writing: An Interdisciplinary Journal, 25,* 1805–1818. https://doi.org/10.1007/s11145-011-9346-3

Verhoeven, van Leeuwe, J., & Vermeer, A. (2011). Vocabulary growth and reading development across the elementary school years. *Scientific Studies of Reading, 15*(1), 8-25. https://doi.org/10.1080/10888438.2011.536125

Wagner, R. K., & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychological Bulletin, 101*(2), 192–212. https://doi.org/10.1037/0033-2909.101.2.192

Wagner, R.K., Torgesen, J.K., & Rashotte, C.A. (1999a). *Comprehensive test of phonological processing (CTOPP).* PRO-ED.

Wagner, R.K., Torgesen, J.K., & Rashotte, C.A. (1999b). *Test of word reading efficiency (TOWRE).* PRO-ED.

Wang, Y., Yin, L., & McBride, C. (2015). Unique predictors of early reading and writing: A one-year longitudinal study of Chinese kindergarteners. *Early Childhood Research Quarterly, 32* (3rd Quarter), 51-59. https://doi.org/10.1016/j.ecresq.2015.02.004

Whitehurst, G. J., & Lonigan, C. J. (2001). Emergent literacy: Development from pre-readers to readers. In Neuman, S. B., & Dickinson, D. K. (Eds.), *Handbook of early literacy research* (Vol. 1, pp. 11–29). Guilford Press.

Williams, K.T. (2001). *Group Reading Assessment and Diagnostic Evaluation (GRADE).* Pearson.

Wimmer, H. (2006). Don't neglect reading fluency! *Developmental Science, 9*(5), 447–448. https://doi.org/10.1111/j.1467-7687.2006.00527.x

Wolf, M., & Bowers, P. G. (1999). The double-deficit hypothesis for the developmental dyslexias. *Journal of Educational Psychology, 91*(3), 415–438. https://doi.org/10.1037/0022-0663.91.3.415

Wolf, M., & Katzir-Cohen, T. (2001). Reading fluency and its intervention. *Scientific Studies of Reading, 5*(3), 211–238. https://doi.org/10.1207/S1532799XSSR0503_2

Wren, S. (2004, November). *Descriptions of early reading assessments.* Southwest Educational

Development Laboratory. https://balancedreading.com/assessment/assessment.pdf

Yeung, P., Ho, C.S., Chan, D.W., & Chung, K. K. (2016). A Componential Model of Reading in Chinese. *Learning and Individual Differences, 45,* 11–24. https://doi.org/10.1016/j.lindif.2015.11.007

Yoon, H.-K., Bolger, D. J., Kwon, O.-S., & Perfetti, C. A. (2002). Subsyllabic units in reading. In L. Verhoeven, C. Elbro, & P. Reitsma (Eds.), *Precursors of functional literacy* (Vol. 11, pp. 139–163). Benjamins. http://www.pitt.edu/~perfetti/PDF/Subsyllabic%20units%20reading.pdf

Ziegler, J. C., Bertrand, D., T´oth, D., Cs´epe, V., Reis, A., Fa´ısca, L., Saine N., Lyytinen, H., Vaessen, A., & Blomert, L. (2010). Orthographic depth and its impact on universal predictors of reading: A cross-language investigation. *Psychological Science, 21*(4), 551–559. https://doi.org/10.1177/0956797610363406

Ziegler, J. C., & Goswami, U. (2005). Reading acquisition, developmental dyslexia, and skilled reading across languages: A Psycholinguistic Grain Size Theory. *Psychological Bulletin, 131*(1), 3–29. https://doi.org/10.1037/0033-2909.131.1.3

Table 1

Participants' Language Use in Study 1 (N = 326)

Questions/items	Responses
Kapampangan	
Best language	63%
Main language spoken at home	63%
Secondary language at home	14%
Language frequently used with friends at school	63%
Language frequently used with friends in the community	64%
Language used when watching TV/videos/internet at least 1-2 hours/day	34%
Language used when reading at home at least 1-2 hours/day	35%
Filipino	
Best language	36%
Main language spoken at home	36%
Secondary language at home	43%
Language frequently used with friends in school	44%
Language frequently used with friends in the community	43%
Language used when watching TV/videos/internet at least 1-2 hours/day	35%
Language used when reading at home at least 1-2 hours/day	34%
English	
Best language	1%
Main language spoken at home	1%
Secondary language at home	0%
Language frequently used with friends in school	1%
Language frequently used with friends in the community	1%
Language used when watching TV/videos/internet at least 1-2 hours/day	23%
Language used when reading at home at least 1-2 hours/day	19%

Table 2

Descriptive Data on Developmental, Cognitive, Language, and Reading Variables in Study 1 (N = 326)

Variable	Maximum	Mean	SD
Grade level	6	5.02	0.83
Nonverbal intelligence	64	29.96 (47)	11.56
Rapid automatized naming	-	35.74	13.43
Kapampangan phonological awareness	96	26.29 (27)	15.90
Kapampangan vocabulary	170	58.10 (34)	14.97
Kapampangan word reading fluency	167	94.85 (57)	33.49
Filipino phonological awareness	98	20.82 (21)	13.98
Filipino vocabulary	170	59.52 (35)	13.53
Filipino word reading fluency	167	100.60 (60)	34.86
English phonological awareness	75	14.17 (19)	10.50
English vocabulary	170	54.85 (32)	14.96
English word reading fluency	167	88.40 (53)	32.38

Note. Maximum indicates the maximum number of items in that measure; raw scores are reported, with % correct in parentheses

Table 3

Bivariate Correlations of the Variables Within and Across Languages in Study 1 (*N = 326)*

	1	2	3	4	5	6	7	8	9	10	11	12
1. Grade level	-											
2. Nonverbal intelligence	.206**	-										
3. Rapid automatized naming	-.167**	.287**	-									
4. Kapampangan phonological awareness	.094	.311**	-.242**	-								
5. Filipino phonological awareness	.169**	.314**	-.306**	.538**	-							
6. English phonological awareness	-.029	.327**	-.232**	.472**	.419**	-						
7. Kapampangan vocabulary	.403**	.491**	-.293**	.322**	.361**	.280**	-					
8. Filipino vocabulary	.396**	.497**	-.249**	.276**	.317**	.240**	.769**	-				
9. English vocabulary	.366**	.489**	-.248**	.335**	.332**	.321**	.653**	.823**	-			
10. Kapampangan word reading fluency	.240**	.397**	-.612**	.330**	.328**	.453**	.358**	.337**	.400**	-		
11. Filipino word reading fluency	.237**	.388**	-.598**	.328**	.344**	.454**	.355**	.340**	.407**	.923**	-	
12. English word reading fluency	.215**	.423**	-.579**	.368**	.340**	.472**	.382**	.383**	.464**	.929**	.909**	-

**$p < 0.01$

Table 4

Within-Language Variables Related to Word Reading Fluency in Each Language in Study 1 (N = 326)

Step	Dependent variable	ΔR^2	β	Final β
Kapampangan word reading fluency (Total R^2 = .457)				
1	Grade level		.105*	.088
	Nonverbal intelligence	.439	.223***	.169**
	Rapid automatized naming		-.530***	-.502***
2	Kapampangan phonological awareness	.017	.139**	.131**
3	Kapampangan vocabulary	.002	.051	.051
2	Kapampangan vocabulary	.004	.079	.051
3	Kapampangan phonological awareness	.015	.131**	.131**
Filipino word reading fluency (Total R^2 = .434)				
1	Grade level		.106*	.075
	Nonverbal intelligence	.419	.217***	.162**
	Rapid automatized naming		-.518***	-.488***
2	Filipino phonological awareness	.012	.117*	.107*
3	Filipino vocabulary	.004	.074	.074
2	Filipino vocabulary	.006	.093	.074
3	Filipino phonological awareness	.009	.107*	.107*
English word reading fluency (Total R^2 = .525)				
1	Grade level		.078	.059
	Nonverbal intelligence	.413	.266***	.100*
	Rapid automatized naming		-.490***	-.427***
2	English phonological awareness	.087	.319***	.278***
3	English vocabulary	.025	.198***	.198***
2	English vocabulary	.050	.270***	.198***
3	English phonological awareness	.063	.278***	.278***

*$p < 0.05$; **$p < 0.01$; *** $p < 0.001$

Table 5

Cross-Language Relationship of Phonological Awareness and Vocabulary to Word Reading Fluency in Study 1 (N = 326)

Step	Dependent variable	ΔR^2	β	Final β
Filipino word reading fluency (Total R^2 = .442)				
1	Grade level	.419	.106*	.079
	Nonverbal intelligence		.217***	.148**
	Rapid automatized naming		-.518***	-.482***
2	Kapampangan phonological awareness	.020	.133**	.108*
	Kapampangan vocabulary		.055	.007
3	Filipino phonological awareness	.004	.056	.056
	Filipino vocabulary		.062	.062
English word reading fluency (Total R^2 = .530)				
1	Grade level	.413	.078	.071
	Nonverbal intelligence		.266***	.111*
	Rapid automatized naming		-.490***	-.431***
2	Kapampangan phonological awareness	.033	.168***	.056
	Kapampangan vocabulary		.082	-.019
3	Filipino phonological awareness	.006	.018	-.037
	Filipino vocabulary		.121	-.072
4	English phonological awareness	.078	.267***	.267***
	English vocabulary		.256***	.256***
Kapampangan word reading fluency (Total R^2 = .528)				
1	Grade level		.105*	.122**
	Nonverbal intelligence	.439	.223***	.106*
	Rapid automatized naming		-.530***	-.481***
2	Filipino phonological awareness	.010	.083	-.030
	Filipino vocabulary		.066	-.082
3	English phonological awareness	.079	.286***	.281***
	English vocabulary		.171*	.169*
4	Kapampangan phonological awareness	.000	.020	.020
	Kapampangan vocabulary		-.005	-.005
Filipino word reading fluency (Total R^2 = .514)				
1	Grade level		.106*	.117**
	Nonverbal intelligence	.419	.217***	.092
	Rapid automatized naming		-.518***	-.463***
2	Kapampangan phonological awareness	.020	.133**	.008
	Kapampangan vocabulary		.055	-.015
3	English phonological awareness	.073	.283***	.279***
	English vocabulary		.142*	.186*
4	Filipino phonological awareness	.001	.000	.000
	Filipino vocabulary		-.079	-.079

*$p < 0.05$; **$p < 0.01$; *** $p < 0.001$

Table 6

Commonality Coefficients for Kapampangan Word Reading Fluency with Phonological Awareness Across Three Languages in Study 1 (N = 326)

Variance component	Predictor variable		
	Kapampangan phonological awareness (% total)	Filipino phonological awareness (% total)	English phonological awareness (% total)
U_1	.0055 (2.34)		
U_2		.0113 (4.83)	
U_3			.0933 (39.87)
C_{12}	.0118 (5.06)	.0118 (5.06)	
C_{13}	.0277 (11.83)		.0277 (11.83)
C_{23}		.0206 (8.81)	.0206 (8.81)
C_{123}	.0639 (27.28)	.0639 (27.28)	.0639 (27.28)
Unique	.0055	.0113	.0933
Common	.1034	.0963	.1122
Total	.1089	.1076	.2055

Full model R^2 = .2341

Table 7

Commonality Coefficients for Filipino Word Reading Fluency with Phonological Awareness Across Three Languages in Study 1 (N = 326)

Variance component	Predictor variable		
	Kapampangan phonological awareness (% total)	Filipino phonological awareness (% total)	English phonological awareness (% total)
U_1	.0039 (1.65)		
U_2		.0160 (6.70)	
U_3			.0917 (38.45)
C_{12}	.0126 (5.29)	.0126 (5.29)	
C_{13}	.0247 (10.38)		.0247 (10.38)
C_{23}		.0235 (9.84)	.0235 (9.84)
C_{123}	.0660 (27.69)	.0660 (27.69)	.0660 (27.69)
Unique	.0039	.0160	.0917
Common	.1034	.1021	.1142
Total	.1073	.1181	.2059

Full model R^2 = .2385

Table 8

Commonality Coefficients for English Word Reading Fluency with Phonological Awareness Across Three Languages in Study 1 (N = 326)

Variance component	Predictor variable		
	Kapampangan phonological awareness (% total)	Filipino phonological awareness (% total)	English phonological awareness (% total)
U_1	.0118 (4.55)		
U_2		.0091 (3.52)	
U_3			.0953 (36.80)
C_{12}	.0153 (5.92)	.0153 (5.92)	
C_{13}	.0365 (14.09)		.0365 (14.09)
C_{23}		.0192 (7.41)	.0192 (7.41)
C_{123}	.0717 (27.71)	.0717 (27.71)	.0717 (27.71)
Unique	.0118	.0091	.0953
Common	.1235	.1063	.1274
Total	.1353	.1154	.2227

Full model R^2 = .2589

Table 9

Participants' Language Use in Study 2 (N = 203)

Questions/items	Responses
Kapampangan	
Best language	52%
Main language spoken at home	52%
Secondary language at home	14%
Language frequently used with friends at school	51%
Language frequently used with friends in the community	54%
Language used when watching TV/videos/internet at least 1-2 hours/day	35%
Language used when reading at home at least 1-2 hours/day	20%
Filipino	
Best language	47%
Main language spoken at home	47%
Secondary language at home	20%
Language frequently used with friends in school	58%
Language frequently used with friends in the community	57%
Language used when watching TV/videos/internet at least 1-2 hours/day	41%
Language used when reading at home at least 1-2 hours/day	28%
English	
Best language	1%
Main language spoken at home	1%
Secondary language at home	0%
Language frequently used with friends in school	1%
Language frequently used with friends in the community	1%
Language used when watching TV/videos/internet at least 1-2 hours/day	26%
Language used when reading at home at least 1-2 hours/day	12%

Table 10

Descriptive Data on the Language and Reading Variables in Study 2 (N = 203)

Variable	Maximum	Mean	SD
Kapampangan			
Word reading fluency	167	54.54	19.96
Vocabulary	170	31.96	7.72
Reading comprehension	9	57.20	20.32
Filipino			
Word reading fluency	167	58.01	20.47
Vocabulary	170	32.91	6.61
Reading comprehension	9	61.58	22.39
English			
Word reading fluency	167	50.79	19.23
Vocabulary	170	29.95	7.17
Reading comprehension	24/28	40.72	17.43

Note. Maximum indicates the maximum number of items in that measure; percentages are reported for the mean and standard deviation (SD).

Table 11

Bivariate Correlations of the Variables Within and Across Languages in Study 2 (N = 203)

	1	2	3	4	5	6	7	8	9	10
1. Grade level	-									
2. Kapampangan word reading fluency	.192**	-								
3. Kapampangan vocabulary	.365**	.323**	-							
4. Kapampangan reading comprehension	.078	.483**	.223**	-						
5. Filipino word reading fluency	.218**	.939**	.315**	.466**	-					
6. Filipino vocabulary	.393**	.317**	.790**	.214**	.321**	-				
7. Filipino reading comprehension	.284**	.441**	.334**	.444**	.424**	.338**	-			
8. English word reading fluency	.174*	.937**	.351**	.446**	.917[88]	.347**	.430**	-		
9. English vocabulary	.352**	.437**	.648**	.251**	.443**	.746**	.366**	.502**	-	
10. English reading comprehension	.119	.494**	.394**	.434**	.471**	.411**	.415**	.531**	.607**	-

*$p < 0.05$; **$p < 0.01$

Table 12

Within-Language Variables Related to Reading Comprehension in Each Language in Study 2 (N = 203)

Step	Dependent variable	ΔR^2	β	Final β
Kapampangan reading comprehension (Total R^2 = .249)				
1	Grade level	.006	.078	-.051
2	Kapampangan word reading fluency	.227	.486***	-.042
3	Kapampangan vocabulary	.006	.089	-.327
2	Kapampangan vocabulary	.043	.224**	-.327
3	Kapampangan word reading fluency	.190	.462***	-.042
4	Kapampangan word reading fluency X Kapampangan vocabulary	.010	.759	.759
Filipino reading comprehension (Total R^2 = .242)				
1	Grade level	.081	.284***	.144*
2	Filipino word reading fluency	.137	.380***	.434
3	Filipino vocabulary	.024	.174*	.244
2	Filipino vocabulary	.060	.267***	.244
3	Filipino word reading fluency	.101	.337***	.434
4	Filipino word reading fluency X Filipino vocabulary	.000	-.138	-.138
English reading comprehension (Total R^2 = .488)				
1	Grade level	.014	.119	-.095
2	English word reading fluency	.269	.526***	-.852**
3	English vocabulary	.164	.493***	-.569*
2	English vocabulary	.364	.645***	-.569*
3	English word reading fluency	.068	.302***	-.852**
4	English word reading fluency X English vocabulary	.042	1.928***	1.928***

*p < 0.05; **p < 0.01; ***p < 0.001

Table 13

Participants' Language Use in Study 3 (N = 200)

Questions/items	Responses
Kapampangan	
Best language	52%
Main language spoken at home	52%
Secondary language at home	15%
Language frequently used with friends at school	51%
Language frequently used with friends in the community	53%
Language used when watching TV/videos/internet at least 1-2 hours/day	35%
Language used when reading at home at least 1-2 hours/day	18%
Filipino	
Best language	47%
Main language spoken at home	47%
Secondary language at home	19%
Language frequently used with friends in school	60%
Language frequently used with friends in the community	59%
Language used when watching TV/videos/internet at least 1-2 hours/day	40%
Language used when reading at home at least 1-2 hours/day	25%
English	
Best language	1%
Main language spoken at home	1%
Secondary language at home	0%
Language frequently used with friends in school	1%
Language frequently used with friends in the community	1%
Language used when watching TV/videos/internet at least 1-2 hours/day	25%
Language used when reading at home at least 1-2 hours/day	10%

Table 14

Descriptive Data on the Variables in Study 3 (N = 200)

Variable	Maximum	Mean	SD
Rapid automatized naming	-	37.37	12.70
Kapampangan phonological awareness	96	27.37 (29)	14.75
Filipino phonological awareness	98	20.49 (21)	11.92
English phonological awareness	75	18.16 (24)	7.99
Kapampangan			
T1 Vocabulary	170	54.24 (32)	13.46
T2 Vocabulary	170	55.44 (33)	12.58
T3 Vocabulary	170	55.12 (32)	11.94
T1 Word reading fluency	167	90.06 (54)	35.07
T2 Word reading fluency	167	97.51 (58)	34.29
T3 Word reading fluency	167	104.03 (62)	32.97
Filipino			
T1 Vocabulary	170	56.42 (33)	12.11
T2 Vocabulary	170	57.11 (34)	13.10
T3 Vocabulary	170	56.34 (33)	12.34
T1 Word reading fluency	167	96.16 (58)	36.42
T2 Word reading fluency	167	106.35 (64)	34.62
T3 Word reading fluency	167	110.54 (66)	32.24
English			
T1 Vocabulary	170	51.62 (30)	13.69
T2 Vocabulary	170	55.78 (33)	14.80
T3 Vocabulary	170	55.48 (33)	13.15
T1 Word reading fluency	167	84.26 (50)	34.47
T2 Word reading fluency	167	93.63 (56)	32.72
T3 Word reading fluency	167	98.14 (59)	32.98

Note 1. Maximum indicates the maximum number of items in that measure; raw scores are reported, with % correct in parentheses
Note 2. T1 = Time1; T2 = Time 2; T3 = Time 3

Table 15

Bivariate Correlations of the Variables in Study 3 (N = 200)

Measure	1	2	3	4	5	6	7	8
Kapampangan								
1. RAN	-							
2. PA	-.232**	-						
3. T1 Vocabulary	-.240**	.310**	-					
4. T2 Vocabulary	-.268**	.203**	.659**	-				
5. T3 Vocabulary	-.248**	.331**	.733**	.657**	-			
6. T1 Word reading fluency	-.545**	.386**	.313**	.380**	.385**	-		
7. T2 Word reading fluency	-.502**	.336**	.299**	.385**	.361**	.940**	-	
8. T3 Word reading fluency	-.501**	.340**	.305**	.354**	.358**	.880**	.935**	-
Filipino								
1. RAN	-							
2. PA	-.343**	-						
3. T1 Vocabulary	-.249**	.256**	-					
4. T2 Vocabulary	-.320**	.248**	.654**	-				
5. T3 Vocabulary	-.310**	.296**	.705**	.683**	-			
6. T1 Word reading fluency	-.542**	.433**	.345**	.453**	.453**	-		
7. T2 Word reading fluency	-.529**	.413**	.332**	.442**	.441**	.938**	-	
8. T3 Word reading fluency	-.482**	.408**	.306**	.383**	.411**	.898**	.915**	-
English								
1. RAN	-							
2. PA	-.278**	-						
3. T1 Vocabulary	-.249**	.311**	-					
4. T2 Vocabulary	-.293**	.358**	.776**	-				
5. T3 Vocabulary	-.295**	.306**	.747**	.754**	-			
6. T1 Word reading fluency	-.482**	.456**	.497**	.572**	.536**	-		
7. T2 Word reading fluency	-.502**	.467**	.489**	.558**	.517**	.911**	-	
8. T3 Word reading fluency	-.447**	.425**	.458**	.502**	.499**	.903**	.920**	-

**$p < .01$

Note. RAN = rapid automatized naming; PA = phonological awareness; T1 = Time1; T2 = Time 2; T3 = Time

Table 16

Correlations for Cross-language Word Reading Fluency in Study 3 (*N = 200)*

Measure	1	2	3	4	5	6	7	8	9
Time 1									
1. T1 Kap WRF	-								
2. T1 Fil WRF	.946**	-							
3. T1 Eng WRF	.893**	.903**	-						
Time 2									
4. T2 Kap WRF	.940**	.946**	.881**	-					
5. T2 Fil WRF	.913**	.938**	.869**	.962**	-				
6. T2 Eng WRF	.901**	.920**	.911**	.920**	.913**	-			
Time 3									
7. T3 Kap WRF	.880**	.913**	.838**	.935**	.931**	.888**	-		
8. T3 Fil WRF	.858**	.898**	.853**	.908**	.915**	.870**	.955**	-	
9. T3 Eng WRF	.884**	.904**	.903**	.904**	.896**	.920**	.905**	.893**	-

**$p < .01$

Note. T1 = Time1; T2 = Time 2; T3 = Time 3; Kap = Kapampangan; Fil = Filipino; Eng = English; WRF = word reading fluency

Table 17

Correlations for Cross-language Vocabulary in Study 3 (*N = 200)*

Measure	1	2	3	4	5	6	7	8	9
Time 1									
1. T1 Kap Voc	-								
2. T1 Fil Voc	.729**	-							
3. T1 Eng Voc	.623**	.785**	-						
Time 2									
4. T2 Kap Voc	.659**	.653**	.560**	-					
5. T2 Fil Voc	.649**	.654**	.647**	.801**	-				
6. T2 Eng Voc	.603**	.655**	.776**	.731**	.784**	-			
Time 3									
7. T3 Kap Voc	.733**	.650**	.644**	.657**	.675**	.652**	-		
8. T3 Fil Voc	.674**	.705**	.665**	.614**	.683**	.668**	.854**	-	
9. T3 Eng Voc	.637**	.604**	.747**	.585**	.643**	.754**	.785**	.790**	-

**$p < .01$

Note. T1 = Time1; T2 = Time 2; T3 = Time 3; Kap = Kapampangan; Fil = Filipino; Eng = English; Voc = vocabulary

Table 18

Model Fit Indices in Study 3 (*N = 200)*

	$\chi 2$ (*df*)	SRMR	RMSEA	CFI	χ^2/df
Kapampangan	14.090 (*12*) *p* = .295	.015	.030	.998	1.174
Filipino	6.584 (*12*) *p* = .884	.012	.000	1.000	0.549
English	19.456 (*12*) *p* = .078	.018	.056	.994	1.621

Note. χ^2 = Chi-Square; df = degrees of freedom; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Residual; CFI = Comparative Fit Index

Table 19

Coefficients for Different Relations of Vocabulary and Word Reading Fluency in the Models in Study 3 (N = 200)

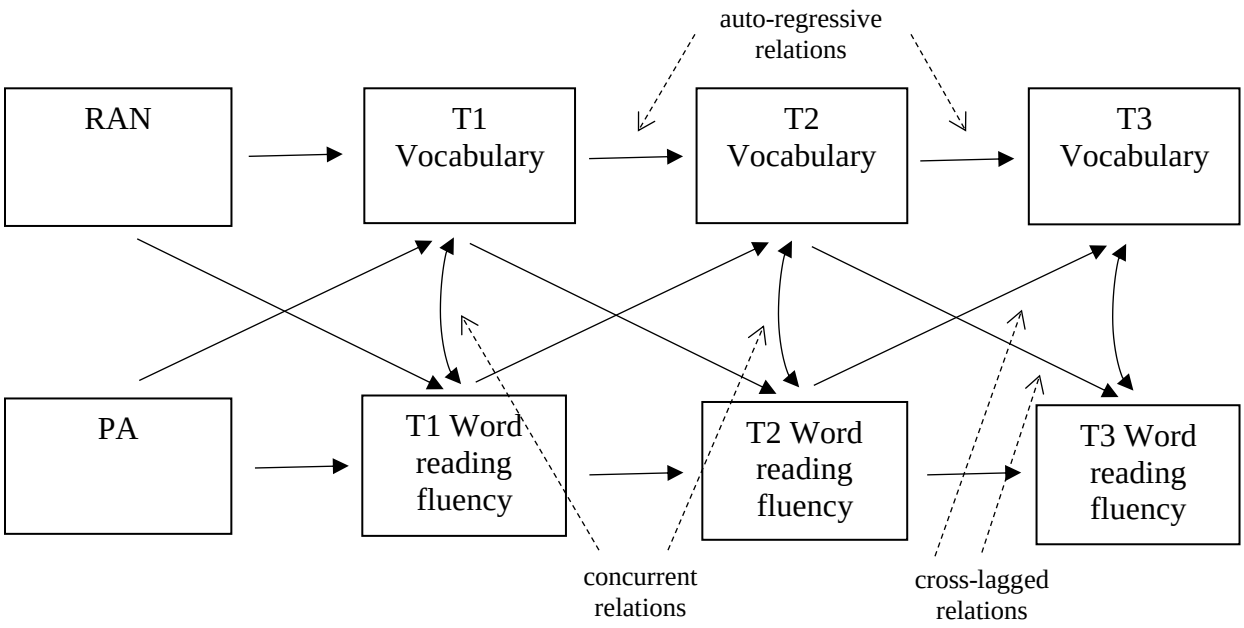
	Kapampangan	Filipino	English
Auto-regressive relations			
T1 Vocabulary → T2 Vocabulary	.598***	.564***	.651***
T2 Vocabulary → T3 Vocabulary	.279***	.334***	.401***
T1 Vocabulary → T3 Vocabulary	.519***	.438***	.386***
T1 Word reading → T2 Word reading fluency	.940***	.938***	.911***
T2 Word reading → T3 Word reading fluency	.932***	.611***	.582***
T1 Word reading → T3 Word reading fluency	.003	.325***	.372***
Concurrent relations			
T1 Vocabulary ↔ T1 Word reading fluency	.151*	.214**	.386***
T2 Vocabulary ↔ T2 Word reading fluency	.100	.052	.054
T3 Vocabulary ↔ T3 Word reading fluency	.040	.041	.085
Cross-lagged relations			
T1 Word reading → T2 Vocabulary	.193***	.259***	.250***
T2 Word reading → T3 Vocabulary	.099*	.148**	.104*

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Note. T1 = Time1; T2 = Time 2; T3 = Time 3

Figure 1

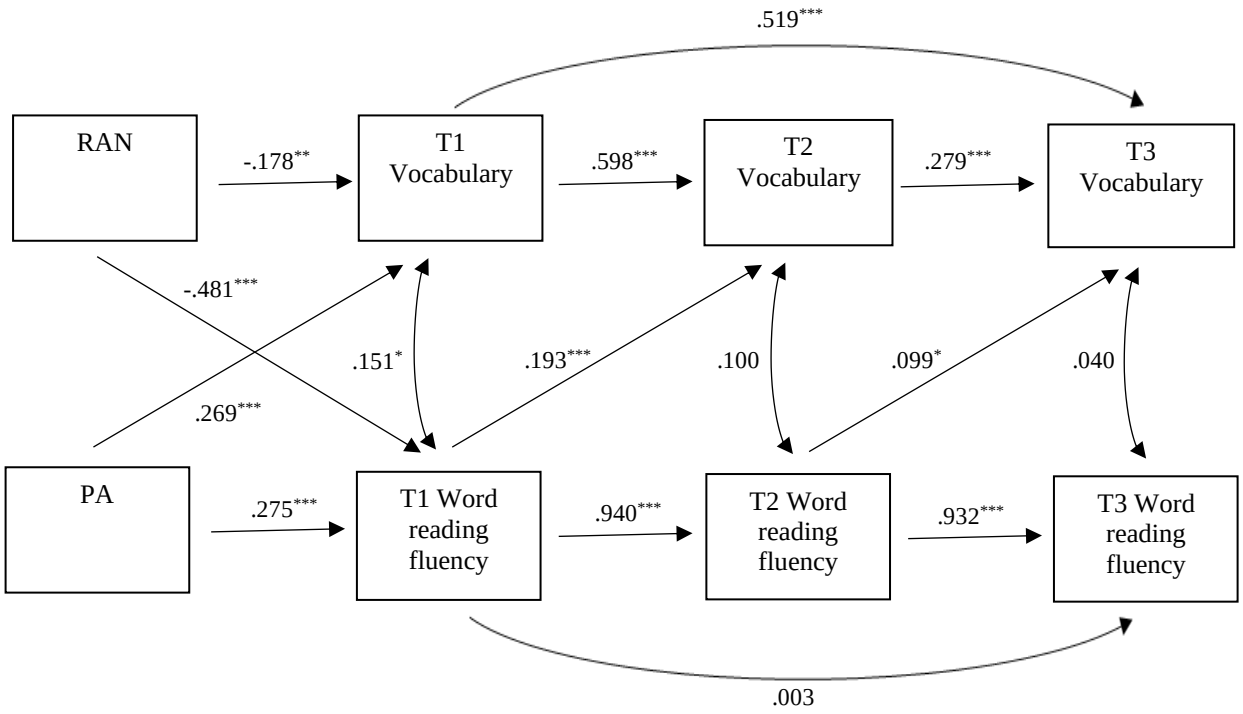
Baseline Cross-lagged Panel Model for Each Language in Study 3



Note. RAN = Rapid automatized naming; PA = phonological awareness; T1 = Time1; T2 = Time 2; T3 = Time 3

Figure 2

Best-fitting Model for Kapampangan in Study 3

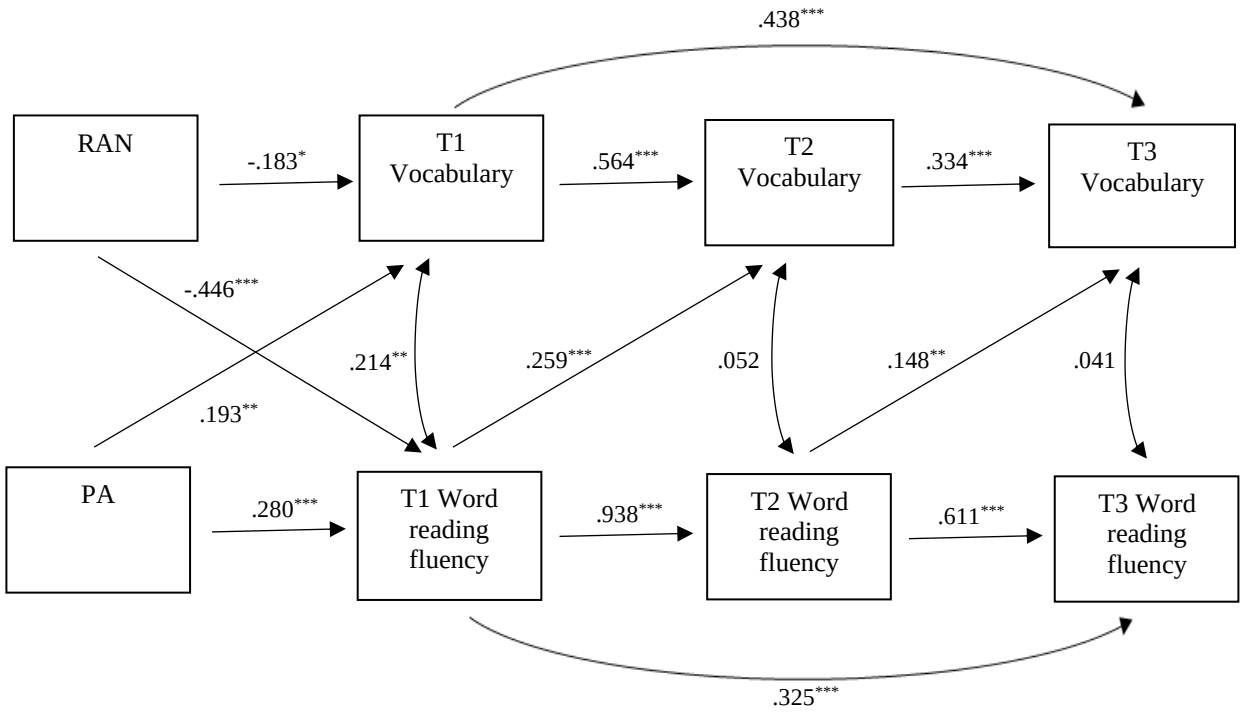


*p < 0.05; **p < 0.01; ***p < 0.001

Note. RAN = Rapid automatized naming; PA = phonological awareness; T1 = Time1; T2 = Time 2; T3 = Time 3

Figure 3

Best-fitting Model for Filipino in Study 3

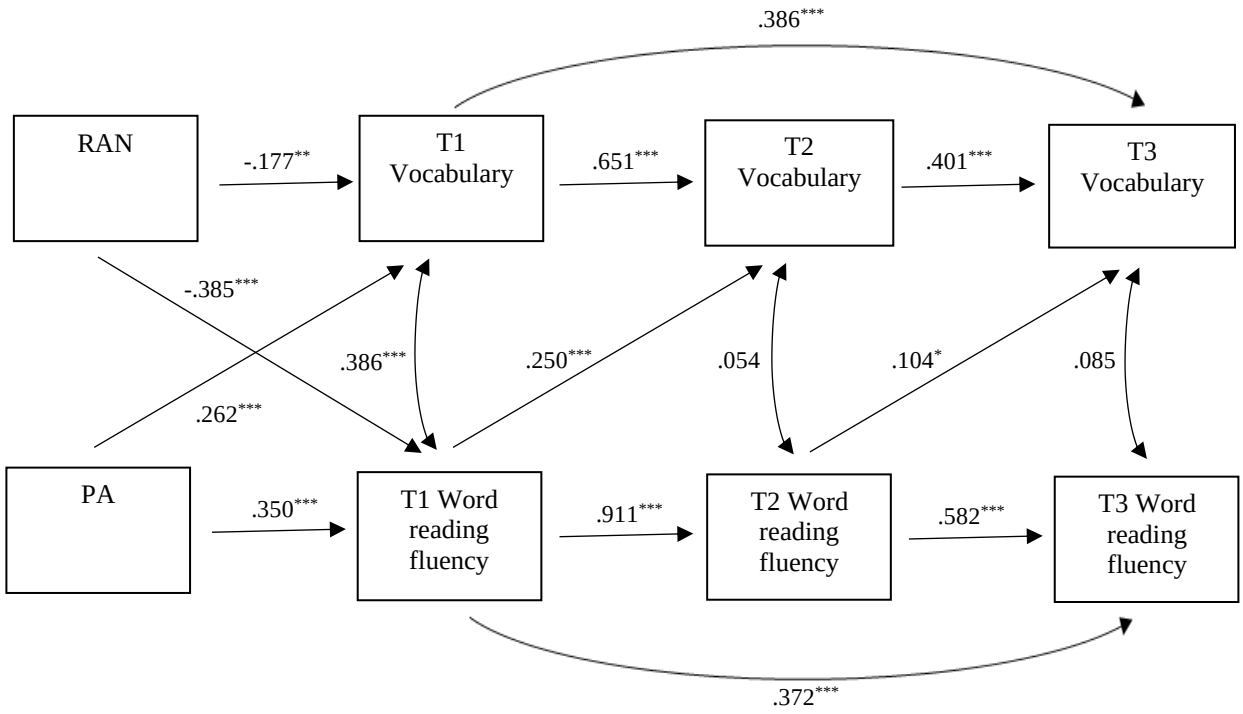


*p < 0.05; **p < 0.01; ***p < 0.001

Note. RAN = Rapid automatized naming; PA = phonological awareness; T1 = Time1; T2 = Time 2; T3 = Time 3

Figure 4

Best-fitting Model for English in Study 3



*p < 0.05; **p < 0.01; ***p < 0.001

Note. RAN = Rapid automatized naming; PA = phonological awareness; T1 = Time1; T2 = Time 2; T3 = Time 3

Appendix A

Development Phonological Awareness and Word Reading Fluency Measures in Kapampangan and Filipino

Measures patterned after the TOWRE were constructed to assess word reading fluency in Kapampangan and Filipino. For the sight word reading subtest, the words were randomly selected from the DepEd's corresponding lists of common/basic words in Kapampangan and Filipino (DepEd, n.d.). These lists contained different phoneme and syllable combinations in the said languages. For the phonemic decoding subtest, the pseudowords were formed based on the respective languages' properties in terms of phoneme and syllable combinations. Each word was a non-word in both languages. In the validation process, first, two experts from the DepEd evaluated the measures in terms of psycholinguistic representation (i.e., how well the selected words reflected the different phoneme and syllable combinations in the respective languages), as well as difficulty and curriculum match (i.e., how readable the words were vis-à-vis what the Kapampangan and Filipino curriculum guides and learning materials contained). The measures were consequently improved based on their feedback. Then, the revised measures were evaluated by two Kapampangan and Filipino teachers using the same bases as above. Next, the measures were refined based on their feedback. Finally, the measures were pilot tested. Cronbach's α for the pilot sample for Kapampangan was .91 and for Filipino, .94.

Measures patterned after the DIBELS PSF were constructed to assess phonological awareness in Kapampangan and Filipino. The monosyllabic and disyllabic words from two to five phonemes were chosen based on the respective languages' properties in terms of phoneme and syllable combinations. The validation and revision processes were similar to those used in

the Kapampangan and Filipino measures for word reading fluency previously described. Cronbach's α for the pilot sample for Kapampangan was .87 and for Filipino, .82.

Appendix B

Questions on Parents' Demographic and Language-Related Information

1. What is your Parent 1's first language(s)? _____

2. For each of the following Kapampangan language skills, please say if you feel that your Parent 1 can currently perform the skill or not.

	Yes	No
Understand		
Speak		
Read		
Write		

3. For each of the following Filipino language skills, please say if you feel that your Parent 1 can currently perform the skill or not.

	Yes	No
Understand		
Speak		
Read		
Write		

4. For each of the following English language skills, please say if you feel that your Parent 1 can currently perform the skill or not.

	Yes	No
Understand		
Speak		
Read		
Write		

5. What is the highest level of education that your Parent 1 attained?

_____ Elementary school
_____ Some high school studies
_____ Completed high school
_____ Some college or university studies
_____ Completed undergraduate degree
_____ Some postgraduate studies
_____ Completed graduate or professional degree

6. What is your Parent 1's occupation: _____

7. What is your Parent 2's first language(s)? _____

8. For each of the following Kapampangan language skills, please say if you feel that your Parent 2 can currently perform the skill or not.

	Yes	No
Understand		
Speak		
Read		
Write		

9. For each of the following Filipino language skills, please say if you feel that your Parent 2 can currently perform the skill or not.

	Yes	No
Understand		
Speak		
Read		
Write		

10. For each of the following English language skills, please say if you feel that your Parent 2 can currently perform the skill or not.

	Yes	No
Understand		
Speak		
Read		
Write		

11. What is the highest level of education that your Parent 2 attained?

_____ Elementary school
_____ Some high school studies
_____ Completed high school
_____ Some college or university studies
_____ Completed undergraduate degree
_____ Some postgraduate studies
_____ Completed graduate or professional degree

12. What is your Parent 2's occupation: _____

Appendix C

Questions on Child's Language Use

1. a) What is your first language?

   b) What is your second language?

   c) What is your third language?

   d) What is/are your other language(s)?

2. What is your best language?

3. What language or languages are spoken at home?

   Main language:

   Other(s), please specify:

4. a) How often do you speak to friends in Kapampangan?

	Always	Frequently	Sometimes	Rarely	Never
Friends at school					
Friends in the community					

b) How often do you speak to friends in Filipino?

	Always	Frequently	Sometimes	Rarely	Never
Friends at school					
Friends in the community					

c) How often do you speak to friends in English?

	Always	Frequently	Sometimes	Rarely	Never
Friends at school					
Friends in the community					

5. How often do you watch TV, videos, or Internet in each language?

	More than 2 hours per day	1-2 hours per day	2-5 hours per week	Less than 2 hours per week	Never
Kapampangan					
Filipino					
English					
Other(s), please specify:					

6. How often do you read at home in each language?

	More than 2 hours per day	1-2 hours per day	2-5 hours per week	Less than 2 hours per week	Never
Kapampangan					
Filipino					
English					
Other(s), please specify:					

Appendix D

Summary of Age-related Results in Study 1

Performance of the Sample

Multiple analysis of variance (MANOVA) results revealed that there was a statistically significant difference in performance based on a participant's age, $F = 2.92$, $p < .001$; $V = .56$. Specifically, age had a significant effect on non-verbal intelligence, rapid automatized naming (RAN), Filipino phonological awareness (PA), word reading fluency across languages, and vocabulary across languages (*F*'s = 2.89 to 11.96, *p*'s < .01). Age had no effect on Kapampangan and English phonological awareness. Post hoc tests were not performed for age because at least one group had fewer than two cases.

Relations Among the Developmental, Cognitive, Language, and Reading Variables

Most of the measures were significantly related to each other, with the exception of age and RAN, Kapampangan and English PA, and Filipino and English word reading fluency. Correlations ranged from .12 (weak: age and Kapampangan word reading fluency) to .93 (strong: Kapampangan and English word reading fluency). Vocabulary was also highly related across languages (*r*'s = .65 to .82). Finally, phonological awareness was moderately correlated across languages (*r*'s = .42 to .54) (Cohen, 1988).

Contribution of Phonological Awareness to Word Reading Fluency in Each Language

Hierarchical regression analyses were conducted examining within-language variables uniquely related to word reading fluency. Age, nonverbal intelligence, and RAN were entered as control variables in the first step, given that they have been linked to word reading performance. Vocabulary and phonological awareness were entered as separate steps, as the second and third steps. The order of the final two steps was then reversed to determine unique predictors of word

reading fluency. This was done for each of the three languages. Table 1 presents a summary of these results.

Table 1

Within-Language Variables Related to Word Reading Fluency in Each Language (N = 326)

Step	Dependent variable	ΔR^2	β	Final β
Kapampangan word reading fluency (Total R^2 = .453)				
1	Age		.076	.048
	Nonverbal intelligence	.434	.231***	.172***
	Rapid automatized naming		-.544***	-.511***
2	Kapampangan phonological awareness	.016	.135**	.126**
3	Kapampangan vocabulary	.003	.067	.067
2	Kapampangan vocabulary	.005	.091	.067
3	Kapampangan phonological awareness	.013	.126**	.126**
Filipino word reading fluency (Total R^2 = .430)				
1	Age		.053	.016
	Nonverbal intelligence	.412	.229***	.162**
	Rapid automatized naming		-.531***	-.494***
2	Filipino phonological awareness	.012	.121**	.109*
3	Filipino vocabulary	.006	.097	.097
2	Filipino vocabulary	.009	.115*	.097
3	Filipino phonological awareness	.010	.109*	.109*
English word reading fluency (Total R^2 = .523)				
1	Age		.058	.028
	Nonverbal intelligence	.410	.272***	.103*
	Rapid automatized naming		-.500***	-.434***
2	English phonological awareness	.085	.313***	.272***
3	English vocabulary	.028	.209***	.209***
2	English vocabulary	.052	.277***	.209***
3	English phonological awareness	.061	.272***	.272***

*$p < 0.05$; **$p < 0.01$; *** $p < 0.001$

Cross-language Contributions of Phonological Awareness to Word Reading Fluency

Cross-language hierarchical regression analyses were performed to examine the unique contributions to word reading fluency of the control variables: age, nonverbal intelligence, and rapid automatized naming (Step 1) and within-language phonological awareness and vocabulary (last step), over and above the contributions of the same skills in the other languages (Steps 2–3, i.e., L1 on L2; L1, L2, and L3 on L3; L1, L2, and L3 on L1; and L1, L2, and L3 on L2). Vocabulary was included because it was related to English word reading fluency in this sample. Though it did not predict Kapampangan and Filipino word reading fluency, vocabulary could still play a role in word reading fluency in these two languages as a proxy for linguistic ability. This set of hierarchical regression analyses examined the universality of phonological awareness as key to word reading fluency in any language, as well as the contribution of vocabulary above phonological awareness. Moreover, these analyses were necessary to conduct because of the cross-linguistic and cross-modal transfer of language and reading skills (Koda, 2008). Table 2 presents a summary of these results.

Table 2

Cross-Language Relationship of Phonological Awareness and Vocabulary to Word Reading Fluency (N = 326)

Step	Dependent variable	ΔR^2	β	Final β
Filipino word reading fluency (Total R^2 = .437)				
1	Age	.412	.053	.012
	Nonverbal intelligence		.229***	.147**
	Rapid automatized naming		-.531***	-.487***
2	Kapampangan phonological awareness	.021	.128**	.102*
	Kapampangan vocabulary		.082	.023
3	Filipino phonological awareness	.005	.059	.059
	Filipino vocabulary		.077	.077
English word reading fluency (Total R^2 = .527)				
1	Age	.410	.058	.035
	Nonverbal intelligence		.272***	.112*
	Rapid automatized naming		-.500***	-.438***
2	Kapampangan phonological awareness	.034	.165***	.053
	Kapampangan vocabulary		.095	-.010
3	Filipino phonological awareness	.007	.019	-.033
	Filipino vocabulary		.128	-.067
4	English phonological awareness	.076	.260***	.260***
	English vocabulary		.261***	.261***
Kapampangan word reading fluency (Total R^2 = .521)				
1	Age		.076	.077
	Nonverbal intelligence	.434	.231***	.110*
	Rapid automatized naming		-.544***	-.494***
2	Filipino phonological awareness	.011	.083	-.025
	Filipino vocabulary		.078	-.074
3	English phonological awareness	.076	.276***	.272***
	English vocabulary		.176*	.174*
4	Kapampangan phonological awareness	.000	.014	.014
	Kapampangan vocabulary		.005	.005
Filipino word reading fluency (Total R^2 = .505)				
1	Age		.053	.044
	Nonverbal intelligence	.412	.229***	.094
	Rapid automatized naming		-.531***	-.474***
2	Kapampangan phonological awareness	.021	.128**	.003
	Kapampangan vocabulary		.082	.003
3	English phonological awareness	.071	.269***	.264***
	English vocabulary		.158**	.197**
4	Filipino phonological awareness	.001	.007	.007
	Filipino vocabulary		-.070	-.070

*$p < 0.05$; **$p < 0.01$; *** $p < 0.001$

Appendix E

Development of Reading Comprehension Measures in Kapampangan and Filipino

Measures patterned after the GRADE Passage Comprehension Subtest were constructed to assess reading comprehension in Kapampangan and Filipino. Passages for the tests were sourced from existing print and online materials. These passages were edited as needed, to suit the purposes of the tests. Initially, a different test was constructed for each grade level, for each language. Each of these tests was evaluated by two DepEd experts and two classroom teachers in terms of difficulty and curriculum match (i.e., whether the type and length of the passage and the comprehension skills the questions were measuring were reflected in the Kapampangan and Filipino curriculum guides and learning materials), as well as multiple choice test construction guidelines (e.g., plausibility of all options, lack of unintended clues). The test was consequently improved based on their feedback before it was pilot tested. After the pilot, the test was revised, guided by the indices of discrimination and difficulty and Cronbach's reliability. This whole process was performed three times because both the students' mean scores (below 50%) and the Cronbach's alpha (negative and/or below .30) were very low. Consequently, the best items from the three graded/levelled tests were chosen to create a new test. Once again, this measure went through the same expert validation process described above. Next, the measure was revised, before it was pilot tested. Then the test underwent a final revision process, similar to the one previously described.

Appendix F

Summary of Age-related Results in Study 2

Performance of the Sample

Multiple analysis of variance (MANOVA) results revealed that there was a statistically significant difference in performance based on a participant's age, $F = 2.32$, $p < .001$; $V = .392$. Specifically, age had a significant effect on Filipino word reading fluency, $F = 3.86$, $p < .05$ (with 10-year-olds significantly outperforming 9-year-olds); on vocabulary across languages, F's = 8.05 to 10.01, p's < .01 (with 10-year-olds outscoring the younger groups); and on Filipino reading comprehension, F's = 3.57, $p < .01$ (with 10-year-olds performing better than the younger children).

Correlations of the Variables Within and Across Languages

Age was significantly related to vocabulary across languages with r's ranging from .30 to .34 (p's < .01) and to Filipino reading comprehension ($r = .22$, $p < .01$). Word reading fluency was related across languages (r's = .92 to .94, p's < .01). Additionally, vocabulary (r's = .65 to .79, p's < .01) and reading comprehension were related across languages (r's = .42 to .44, p's < .01). Finally, word reading, vocabulary, and reading comprehension were related to each other in Kapampangan (r's =.22 to .48, p's < .01), Filipino (r's = .32 to .42, p's < .01), and English (r's = .50 to .61, p's < .01).

Contributions of Word Reading Fluency, Vocabulary, and Their Product to Reading Comprehension in Each Language

Hierarchical regressions were conducted to examine the unique contribution of each variable over and above those explained by the other variables. Age was entered as a control variable in the first step, in light of the age effect on performance across the three languages. Word reading fluency and vocabulary were entered as the second and third steps, respectively.

The order of these two steps was then reversed. As a final step, the product of these two variables was entered. Table 1 presents a summary of these results.

Table 1

Within-Language Variables Related to Reading Comprehension in Each Language (N = 203)

Step	Dependent variable	ΔR^2	β	Final β
Kapampangan reading comprehension (Total R^2 = .253)				
1	Age	.000	-.005	-.081
2	Kapampangan word reading fluency	.236	.488***	-.044
3	Kapampangan vocabulary	.008	.098	-.317
2	Kapampangan vocabulary	.055	.247**	-.317
3	Kapampangan word reading fluency	.188	.458***	-.044
4	Kapampangan word reading fluency X Kapampangan vocabulary	.010	.755	.755
Filipino reading comprehension (Total R^2 = .241)				
1	Age	.048	.218**	.136*
2	Filipino word reading fluency	.168	.410***	.365
3	Filipino vocabulary	.026	.180*	.186
2	Filipino vocabulary	.080	.298***	.186
3	Filipino word reading fluency	.114	.357***	.365
4	Filipino word reading fluency X Filipino vocabulary	.000	-.012	-.012
English reading comprehension (Total R^2 = .493)				
1	Age	.003	.051	-.123*
2	English word reading fluency	.279	.531***	-.806**
3	English vocabulary	.174	.513***	-.502
2	English vocabulary	.392	.666***	-.502
3	English word reading fluency	.061	.288***	-.806**
4	English word reading fluency X English vocabulary	.037	1.832***	1.832***

*p < 0.05; **p < 0.01; ***p < 0.001