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A Systematic Review and Meta-Analysis of the Relationship Between Cognitive Skills and Reading Comprehension

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ABSTRACT

The purpose of this study was to collect and examine studies as to how factors such as vocabulary, fluency, prior/background knowledge, critical thinking and active reading under cognitive skills correlate with reading comprehension (RC) and also to draw out conclusion by synthesizing the results of the studies through systematic review and meta-analysis. Out of 770 studies gathered and examined, a total of 24 datasets (n = 8,390) provided unaccustomed data on the association between cognitive skills and reading comprehension. The collective findings synthesized in the included studies established the following: the variables being correlated to RC had a significant- direct and indirect -relationship to RC; the variables being correlated to RC influenced the continuous growth of RC of the participants; in spite of the fact that the variables being correlated to reading comprehension had a common significant effect, each of the variable had an independent contribution to it; and grade level and age were found to be related to gains in reading comprehension. The findings showed that there was a strong relationship between the variables cognitive skills and reading comprehension, as proven by the synthesis of the studies considered in this investigation.

KEYWORDS: Education, cognitive skills, reading comprehension, systematic review, meta-analysis, Philippines

INTRODUCTION

Background of the Study. Comprehension is a vital life skill, and students' reading comprehension was found to be one of the major concerns of all teachers worldwide. It is one of the focuses at schools, emphasizing its relevance in a students' daily lives. But a lot of factors that have a significant impact on the students' reading comprehension need to be attended. Like the other skills that a student should acquire to excel academically and live a functional life in the future, there are difficulties and adversities arising in their comprehension's development. The cognitive skills that support decoding, such as attention, visual discrimination, visual sequential processing, immediate memory and working memory, must be automatic for successful reading (Peter Kline, n.d.). In other words, attending to the cognitive skills that affect students' comprehension will be helpful to improve efficacy in reading, especially to the researchers, as future teachers.

In the global context, as indicated by the National Assessment of Educational Progress, more than 66% of all 14-year-old students in the United States of America (USA) read below grade level, and more than six million students in the USA between the ages of 12 and 18 are struggling readers (Alliance for Excellent Education, 2006). The USA is not just the only industrialized country concerned about the reading skills. For instance, the Programme for International Students Assessment (PISA) revealed that almost one-fifth of 15-year olds in Germany were reading below grade level expectations (PISA, 2009). The case of the Philippines is no different as more students have manifested a significant decline in their eading comprehension skills. Here in the University of the Immaculate Conception, Davao City, the researchers observed that the cognitive skills affect the reading comprehension of the students, and as observed by UIC's English teacher, Dr. Virgion H. Mamonong, students lack skills in comprehending written text which is essential in performing tasks using their cognitive abilities. If a student does not have any prerequisite knowledge about the words being used in a sentence, he or she is merely reading without comprehension because the words are unfamiliar. Moreover, these national panels recognized a requirement for more research on reading comprehension.

There were some researches which revealed that the educational achievements and the motivation degree of the students with cognitive awareness skills are higher. The study of Boulware-Gooden, Carreker, Thornhill and Joshi

(2007), tried to find out the influence of multiple cognitive strategies teaching on reading comprehension and vocabulary of the students. As a product, they found out that the cognitive strategies have a stimulating influence on the reading comprehension, vocabulary and academic achievements of the students. Reading comprehension is dependent on the reader's ability to associate background knowledge with the information indicated in the text properly (Mason, 1984).

According to reading theory, comprehension is dependent on several cognitive processes, including decoding, word recognition, and knowledge. Jacobvitz, Wood & Albin (1991), state that comprehension requires many basic cognitive skills. They also opine that there was an adequate amount of variance in comprehension scores to permit observation of the relations between comprehension and cognitive skills. Suyitno (2017) also stated that student reading comprehension use various cognitive strategies. Gagne (1977) emphasized that by utilizing cognitive skills, readers are able to control their concentration and comprehension in a text. The different cognitive strategies can be affected by self-factor and student experience in reading and the type of text being read.

Doyle (2018) explains that cognitive skills incorporate the skill to learn, to process and to apply knowledge, to analyze and reason, and to evaluate and decide. Mainly, they are based on skills that appear to be intrinsic, in which few people can develop abilities that others cannot. Cognitive skills should be enhanced and rehearsed to reach their full potential. Otherwise, Hart (2018) mentioned that someone can be skillful with a little hard work. Reading comprehension includes different cognitive factors, for example, background knowledge, vocabulary and fluency, active reading skills and critical thinking that must cooperate.

Armbruster (2001) defined that comprehension is the reason for reading. If readers can read the words but do not understand what they are reading, they are not really reading. Reading comprehension is a complex skill (Kintsch& Rawson, 2005; Perfetti, Landi & Oakhill, 2005). Readers need to recognize each word to retrieve their meanings and interpret it. Reading comprehension in some studies considered some components. In the research synthesis "A Review of the Current Research on Comprehension Instruction" (2010), the search terms are "comprehension" or "reading comprehension" to be included in their research. While Sticht and his colleagues have advanced the position that listening comprehension and reading comprehension are highly interrelated (Sticht, Beck, Hauke, Kleinman, & James, 1974). Their extensive review of the available studies

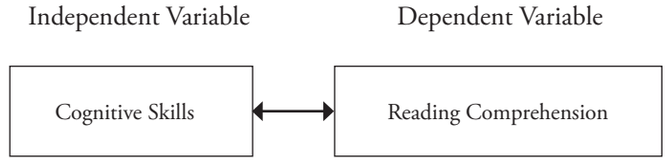
led them to conclude that both listening and reading comprehension depend on the same general comprehension process. Moreover, listening comprehension level represents a potential for reading comprehension. Specifically, they have argued that listening comprehension skill facilitates the acquisition and predicts the level of skill that will be achieved in reading (Sticht et al., 1974; Sticht & James, 1984). Herewith, is the account for the use of comprehension, listening comprehension, and reading comprehension, as indicated in the dependent variable.

For decades, extensive number of studies has revealed the importance of reading comprehension and its determinants. However, there has been no study that established a general relationship between cognitive skills and reading comprehension. Furthermore, the numbers of researches involving these variables do not show a clear summary of their correlations as well. Inconsistency of the result might create confusion. Despite the uncountable research studies, the issues about comprehension of the students are still unresolved. There is still a continuous deteriorating performance of students in terms of reading comprehension skills. Thus, to address the problems regarding the said variables- a concrete basis was needed, yet no study was done with findings that could be used as a support. Therefore, there was a need to conduct a systematic review and meta-analytical study.

Review Question. This investigation endeavored to conduct a systematic review and meta-analysis on the relationship between reading comprehension and cognitive skills. Specifically, the researchers ascertained the degree of relationship between these two variables. A positive association may serve as a reliable source of relevant information needed by the different concerned academic-based stakeholders to strengthen the idea that cognitive skills are critical factors to improve reading comprehension of the learners; thus, the conceptualization of a plan for curriculum enhancement.

Theoretical Framework. This study was anchored in the Schema Theory. According to this theory, understanding a text is a responsive process between the reader's background knowledge and the text. Barlett was utilized first the expression "schema" in psychology as "a dynamic organization of previous reactions or encounters" (1932, p.201). The underlying concept of this theory presumes that written texts do not carry meaning by itself but instead gives directions only for readers as to how they should create sense from their own prior knowledge (An, 2013).

Conceptual Framework



Michelon (2006) explains that cognitive skills are brain-based skills required to carry out any task from easy to difficult. They are associated with the way a person absorbs an information, recalls, problem-solves, and focuses, rather than with any authentic knowledge. On the other hand, reading comprehension is the level of understanding of a text or message. This understanding comes from the interaction between the words that are written, and how they trigger knowledge outside the text or message (Rayner, Foorman, Perfetti, Pesetsky& Seidenberg, 2001). According to Ooi and Ismael (2011), association between cognitive process and overall reading performance shows a significant relationship. These provide that cognitive skills highly predict the reading comprehension in a text process. Gagne (1977) also stated that by utilizing cognitive skills, readers are able to control their concentration and comprehension in a text.

METHOD

Research Design. This research employed a systematic review to determine whether cognitive skill significantly correlated to reading comprehension. Also, this study measured the extent of relationship between these variables. CCACE (2013) defines that a systematic review answers a defined research question by collecting and summarising all empirical evidence that fits pre-specified eligibility criteria. This approach is the most appropriate methods that must be applied in this study because of the primary objective which is to ascertain the significance of the relationship between cognitive skills and reading comprehension out of the many available researches from online databases and from several universities as well in Davao City.

Research Locale. The researchers conducted a survey on undergraduate and graduate theses and dissertations that deals with the relationship between cognitive skills and reading comprehension, from the libraries of selected colleges and universities in Davao City, like Ateneo de Davao University (AdDU),

University of Southeastern Philippines (USEP), and University of Mindanao (UM), and specifically, in the University of the Immaculate Conception (UIC). The researchers utilized electronic databases found inside the libraries and in the available resources in the World Wide Web (e.g. Google scholar) for more references to limit the time used for looking through the theses. After gathering all the correlation studies about the variables, the student researchers and the Education faculty researchers then used the PAASCU or Graduate School Room in the University of the Immaculate Conception, for the discussion on the inclusion and exclusion criteria to be implemented in the selection of studies.

Data Sources and Study Selection. The following online resources such as: Google Scholar, Research Gate, Eric, JSTOR, Springer Link, JSLHR, Science Direct, SAGE Journals, Cambridge University Press, APA PsycNET, Defense Technical Information Center, Ingenta Connect, InformIt and Tandfonline were used to search or to collect and identify relevant studies. The researchers took into consideration the idea of Boolean logic, which can help bridge the semantical difference between machine language, which is merely a combination of ones and zeros, and a syntactical code language, which includes elements of human written words. Boolean logic is a form of algebra in which all values are reduced to either TRUE or FALSE. All studies with titles containing the independent variable along with dependent variable were listed, as well as their links and abstracts. Moreover, the researchers signed up and provided the necessary information to be able to have an access to more studies that are exclusively published in a specific online resource. The search items were based on these established terminologies: reading comprehension and cognitive skills or vocabulary, fluency, active reading, prior/background knowledge, and critical thinking. The titles and/or abstract were reviewed to exclude all obvious irrelevant studies. The full text of the included studies were then retrieved and read by the researchers independently to determine whether the studies met the inclusion criteria. The UIC education faculty were the ones who finalize whether or not the studies were to be included in the final review.

Criteria for Inclusion into the Review. An inclusion criteria are the characteristics that the prospective studies must have and must be reflective of the review question, or what the researchers were trying to answer in their systematic review. The inclusion criteria helped ensure that the ends of the study were focused. It also prevented biases in the selection of studies before including the titles in the list. Abstracts were considered eligible for full manuscript data extraction if the study met all the following criteria: studies were about

cognitive skills and reading comprehension; the studies took into account any of these cognitive skills components: background knowledge/ prior knowledge, vocabulary, fluency, active reading, and critical thinking; they are undergraduate or graduate, published or unpublished studies that investigated the said variables; they reflected or specified the correlation coefficients and the sample size of the data; and the studies may have the same level of significance. Studies which did not correlate with the two variables were not be included.

Data Extraction. Using a standardized data extraction sheet, the following information (if available) were extracted and recorded from studies: title; authors; nationality of the authors; count of authors; year of publication; country of origin; school or institution; level of academic paper (Doctoral, Masteral or College study); total sample size (n); correlation coefficients (r); and level of significance. An attempt to retrieve missing or incomplete data in the published study was made by e-mail to at least two co-authors on at least two occasions.

Quality Assessment. There is no consensus as to the best standardized method for assessing the quality of studies to be reviewed and a specific quality assessment for systematic review is used to examine the quality of studies. These include adequacy of focused question, eligibility criteria, literature search, dual review for determining which studies to include and exclude, quality appraisal for internal validity, publication bias, and heterogeneity. In particular, a study was considered to be of a high quality if the study design was quantitative correlation which turned out as significant; the total sample sizes are the same or might be almost the same, the level of significances are alike, the authors have peer-reviewed articles in international journals, the levels of academic paper are high and was published.

Ethical Consideration. This study underwent a thorough, critical evaluation and ethical review by the Research Ethics Committee (REC)of the University of the Immaculate Conception to ensure that this study followed the vital and necessary ethical procedures, standards and considerations. Based on the 2017 National Ethical Guidelines, which aims to balance the need to protect human participants from harm with the imperative to facilitate the conduct of beneficial health research. Specifically, this study was qualified to be in the exempt category of the UIC REC since no human participant was involved in the study, as this only aimed to provide a firm conclusion regarding the correlation between reading comprehension and cognitive skills to address the unresolved issues regarding the variables, by using completed studies that are already publicly available.

RESULTS AND DISCUSSION

This section presents the summary of the included studies, analysis and interpretation of the research findings based on the research question. The presentation begins with the study selection with the schematic diagram, followed by table 1 then the qualitative summary, an explanation on the features of the studies. And lastly, the descriptive analysis of the included studies which contains the mean effect sizes and heterogeneity tests followed by the corresponding Forest Plot, Funnel Plot, and Classic and Orwin's Fail-Safe of the correlation of Cognitive Skills and Reading Comprehension. This chapter farther examines the correlational value of the relationship between Cognitive Skills and Reading Comprehension.

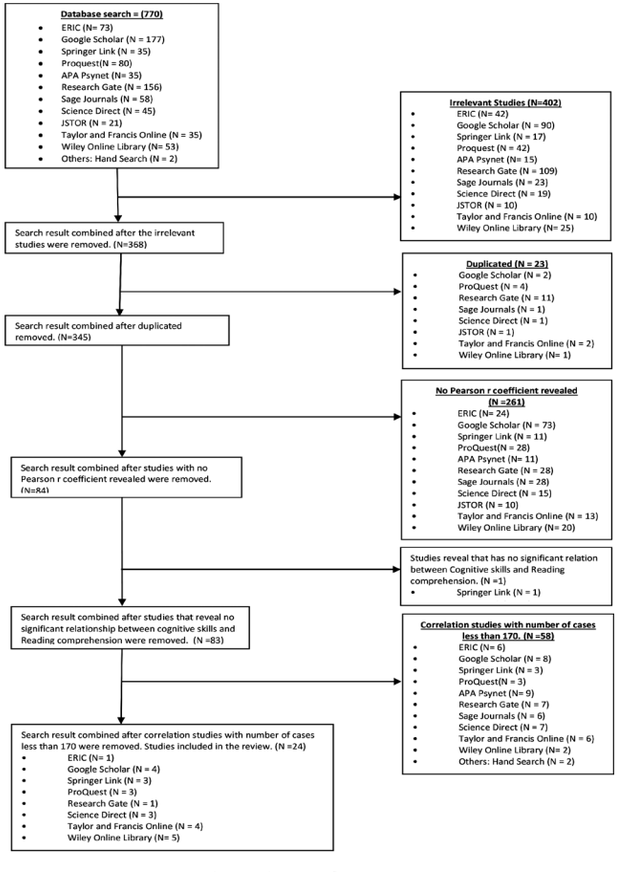


Figure 1. Flow chart of systematic review

Study Selection

The gathering of studies from different databases and libraries in Davao City resulted to 770 pieces of research. The schematic diagram in figure 1, showed the process of deliberating the titles and abstracts. First, 402 studies were excluded from the selection since the titles were irrelevant. Second, out of the 368 studies left, there were 23 duplicated studies excluded. The remaining studies of 345 were deducted with 261 titles because it showed no Pearson r coefficient and excluded another study for showing an insignificant relationship between the variables. 83 studies remain, out of these, 58 studies were excluded from the systematic review as they no longer met the inclusion criteria of the sample size greater than 170. A total of 24 studies are included in the systematic review, and the extracted data were summarized in Table1.

Table 1. The selected studies on cognitive skills and reading comprehension

Title	Author	Country	n	R	p-value
1. A path analytic test of the reading strategies mediation model: Relating cognitive competences and motivational influences to individual differences in fifth graders' reading comprehension.	Vanessa A. Völlinger, Nadine Spörer, Dirk Lubbe & Joachim C. Brunstein	Germany	1,105	0.534	p<0.01
2. Causal Relationships Between Phonics, Reading Comprehension, and Vocabulary Achievement in the Second Grade	J. Lloyd Eldredgea, Bill Quinna & Dennie D. Butterfield	USA	504	.506 - 0.757	0.01
3. Cross-language transfer in English immersion programs in Germany: Reading comprehension and reading fluency	Sandra Kristina Gebauer, Anna C.M. Zaunbauer & Jens Möller	Germany	220	0.44	p <.01

4. Developmental changes in the nature of language proficiency and reading fluency paint a more complex view of reading comprehension in ELL and EL1	Esther Geva & Fataneh Farnia	USA	539	.48	P=.01
5. Developmental relations between reading fluency and reading comprehension: A longitudinal study from Grade 1 to Grade 2	Young-Suk Kim, Richard K. Wagner & Danielle Lopez	USA	270	0.79	P<.001
6. Developmental Relations Between Vocabulary Knowledge and Reading Comprehension: A Latent Change Score Modeling Study	Jamie M. Quinn, Richard K. Wagner, Yaacov Petscher, and Danielle Lopez	USA	316	0.496 0.371 0.663	P=0.05
7. Effects of Elaboration Modification on Second Language Reading Comprehension and Incidental Vocabulary Learning	HyuNroo Chunc	USA	507	.406 .458 .409	P=0.01
8. Effects of Meta-linguistic Awareness on Reading Comprehension and the Mediator Role of Reading Fluency from Grades 2 to 4	Liping Li	China	415	.58	p<.001
9. Effects of motivational and cognitive variables on reading comprehension	Ana Taboada, Stephen M. Tonks, Allan Wigfield & John T. Guthrie	USA	205	.31	p<.001
10. Effects of prosodic modeling and repeated reading on poor readers' fluency and comprehension	Arlene R. Young, Patricia Greig Bowers, & G.E. Mackinnon	USA	199	0.52	p <.05

11. Examining the relations between reading fluency and reading comprehension for english language learners.	Matthew Quirk & Sofie Beem	USA	171	0.56	p < .01
12. Grade-Level Invariance of a Theoretical Causal Structure Predicting Reading Comprehension With Vocabulary and Oral Reading Fluency	Paul Yovanoff, Luke Duesbery, Julie Alonzo & Gerald Tindal	USA	558	0.63	p < .01
13. Investigating Cognitive and Linguistic Abilities that Influence the Reading Comprehension Skills of Children from Diverse Linguistic Backgrounds	Nonie K. Lesaux, Orly Lipka & Linda S. Siegel	Canada	480	0.331	P=0.01
14. Motivational and Cognitive Predictors of Text Comprehension and Reading Amount	John T. Guthrie, Allan Wigfield, Jamie L. Metsala & K.E. Cox	USA	242	.36	p<001
15. Predictors of reading skills for kindergartners and first grade students in Spanish: a longitudinal study	Young-Suk Kim & Daniel Pallante	USA	305	0.24	P=0.05
16. Prior Knowledge and Reading Comprehension Test Bias. Technical Report No. 289.	Johnston, Peter	USA	207	0.23	P<.01
17. Relations Among Oral Reading Fluency, Silent Reading Fluency, and Reading Comprehension: A Latent Variable Study of First-Grade Readers	Young-Suk Kim, Richard K. Wagner & Elizabeth Foster	USA	316	0.89	p< .001
18. Relationships Between Word Knowledge and Reading Comprehension in Third-Grade Children	J. Lloyd Eldredge,Bill Quinn & Dennie D. Butterfield	USA	203	.539 & .613	0.01

19. The prediction of reading comprehension by cognitive and motivational factors: Does text accessibility during comprehension testing make a difference?	Ellen Schaffner, Ulrich Schiefele	Germany	424	.31/.34	p<.001
20. The Relationship Among Receptive and Expressive Vocabulary, Listening Comprehension, Pre-Reading Skills, Word Identification Skills, and Reading Comprehension by Children with Reading Disabilities	Justin C. Wise, Rose A. Sevcik, Robin D. Morris, Maureen W. Lovett & Maryanne Wolf	USA and Canada	279	0.80	P=0.05
21. The Relationship between Vocabulary Size, Reading Strategies, and Reading Comprehension of EFL Learners in Saudi Arabia	Abdulkarim Hamad Al-Nujaidi	USA	226	0.6	P=0.01
22. The role of word decoding, vocabulary knowledge and meta-cognitive knowledge in monolingual and bilingual low-achieving adolescents' reading comprehension	van Steensel, R., Oostdam, R., van Gelderen, A. & van Schooten, E.	Nether-lands	328	0.54	p≤.001
23. Vocabulary and Grammar Knowledge in Second Language Reading Comprehension: A Structural Equation Modeling Study	Dongbo Zhang	United Kingdom	190 181	0.42	P=0.05
24. Which component reading skills predict reading comprehension gains in a adult literacy students?	Martin G. Murphy	New York		.19 .18	p < .01

Shown in table 1 were the 24 studies that passed all the inclusion criteria in the systematic review. The titles, country, author/s, N, r-values, and p-values are presented in the table. As shown, the different studies were authored by different experts from around the world and of different nationalities. The r-values are less than 1 and the p-values are less than or equal to .05. The major features, values correlated, highlights of the findings, participants of the study, and implications of the studies are discussed below.

Qualitative Summary

On Major Features. Twenty-four (24) studies were included in the systematic review. These studies were correlational studies with a sample size of 170 or more and significant relationship having a p-value of .05 or less . The studies were generated from around the world, with eighteen from North America, five from Europe, and only one from Asia. The studies were authored by various numbers of entities with different nationalities. There were six studies authored by a single person, four were authored by two persons, seven were authored by three persons, while another seven were authored by four persons. The R-values of the studies ranged from as low as 0.18 and as high as 0.89. Finally, in terms of the number of populations, the smallest sample size is 171 while and the largest sample size is 1,105.

On Variables Correlated. Majority of the studies were multivariate, there was only one univariate study subjected to systematic review. The variables of the studies being correlated were cognitive skills and reading comprehension. The common indicators that were most likely to correlate are the vocabulary, reading fluency, decoding, and background/prior knowledge. Both variables were categorical where we analyzed an association through a comparison of conditional probabilities and graphically represented the data using contingency tables. A correlation could be positive, meaning both variables move in the same direction, or negative, meaning that when one variable's value increases, the other variables' values decrease. Correlation can also be neutral or zero, meaning that the variables are unrelated.

On Highlights of the Findings. The collective findings synthesized in the included studies were the following: the variables being correlated to RC has a significant- direct and indirect -relationship to RC; the variables being correlated to RC influenced the continuous growth of RC of the participants; in spite of the fact that the variables being correlated to RC has a common significant effect,

each of the variable has an independent contribution to it; and grade level and age were found to be related to gains in reading comprehension.

On the Participants of the Studies. The participants of the studies were mostly students but there were two studies with adults as participants. This was not surprising since the variable of this investigation is about the reading comprehension of students.

On the Implications of the Study. The studies had a common implication that would say mostly about considering and improvising other text materials to be used in measuring RC. It is also unique to consider teachers' RC which might have an impact on the students' RC. Moreover, investigations to compare or synthesize the effects of the different cognitive factors of reading comprehension as cognitive factors have a vast implication for RC, using longitudinal data collection so that causal statements are more appropriate, may be investigated. Another possibility for further research might involve the construction of a task that assesses breadth, depth, and fluency of word knowledge using the same words.

Meta-Analysis. A total of 24 datasets (n = 8,390) provided unaccustomed data on the association between cognitive skills and reading comprehension.

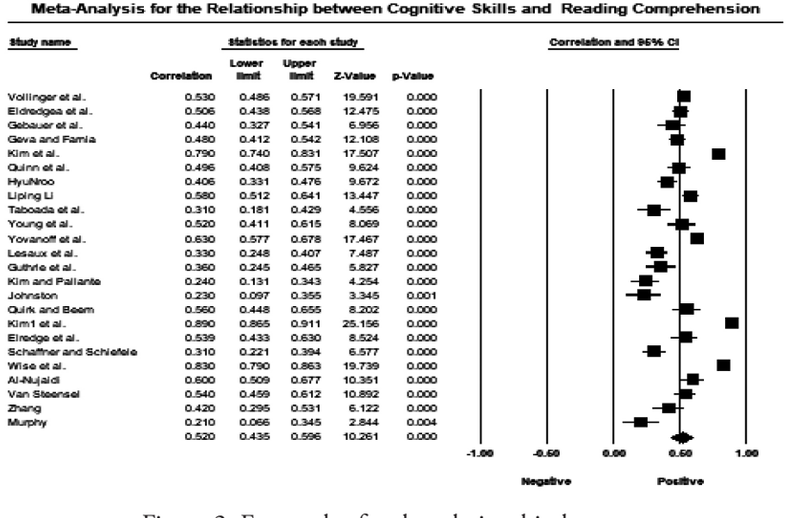


Figure 2. Forest plot for the relationship between cognitive skills and reading comprehension

Studies Included in Meta-analysis. Shown in Figure 2 is the forest plot for the relationship between cognitive skills and reading comprehension. The analysis is based on 24 studies that gave Pearson r coefficients to describe the correlations between the two variables mentioned. The "box and whisker" plots represent the individual values of the Pearson product-moment correlation coefficients for the studies investigated while the diamond at the bottom represents the mean correlation coefficient (r = 0.52) that results from this meta-analysis. Evidently, all the correlations reveal positive relationship from which 11 of them are greater than .50, which indicates strong to very strong linear relationship. The plot revealed that three correlation coefficients (r = 0.24, r = 0.23, and r = 0.21) were described as weak.

Mean Effect Size. The mean correlation is 0.52. These studies were sampled from a universe of possible studies defined by certain inclusion/exclusion rules as outlined in the study selection process. The mean reported here is an estimate of the true mean in these 24 studies. On the other hand, the true mean in these 24 studies is an estimate of the mean in the universe from which these studies were sampled. The confidence interval for the mean correlation is 0.435 to .596. The mean correlation in this universe probably falls somewhere in this range. The mean correlation of .520 indicates a strong positive relationship between cognitive skills and reading comprehension. This finding means that the higher the cognitive skills are of the students, the higher also is their comprehension ability, as supported by 24 studies drawn from a universe determined by the researchers.

Heterogeneity. Two statistical tests were computed to assess the heterogeneity of the studies in this meta-analysis. The values are the following: Q = 589.74, and I2 = 96.10. The Q-statistic provides a test of the null hypothesis that all studies in the analysis share a common effect size. If all studies shared the same effect size, the expected value of Q would be equal to the degrees of freedom (the number of studies minus 1). Thus, for a Q-value of 589.74 with 23 degrees of freedom and a p-value of 0.000, there is a statistical evidence that indeed the effect size, correlation coefficient in this case, indeed varies across the studies. Meanwhile, the I2 statistic measures what proportion of the observed variance reflects differences in true effect sizes rather than the sampling error. More clearly, this value provides context for understanding the variation that is seen in the forest plot. Thus, for this meta-analysis, an I2 = 96.10, would indicate a considerable heterogeneity across the studies included in the meta-analysis.

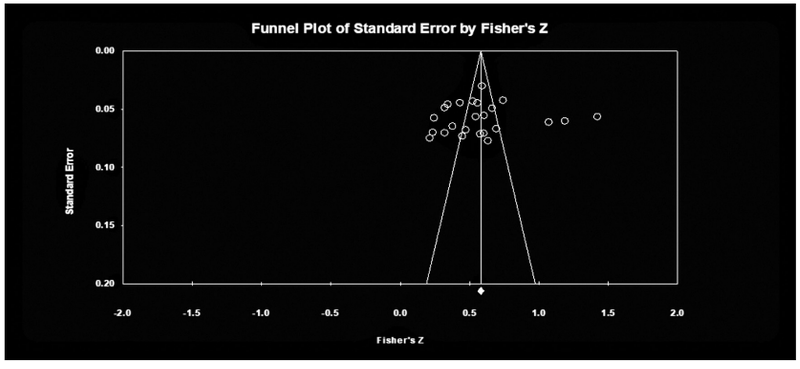


Figure 3. Funnel plot of standard error by Fisher's Z

Figure 3 shows the funnel plot to describe the publication bias with respect to the 24 studies selected for this meta-analysis. First of all, a publication bias pertains to the failure to include all relevant studies because they were not published and were therefore not accessible. Publication bias which resulted to asymmetry of the funnel plot. As shown in the figure, there is evidently a publication bias since the dots representing the studies selected do not establish a symmetry with respect to the vertical line, which represents the total overall estimate or the mean of the effect sizes revealed by the 24 studies.

Table 2. Classic & Orwin's fail-safe N

Classic fail-safe N	
Z-value for observed studies	51.19248
P-value for observed studies	0.00000
Alpha	0.05000
Tails	2.00000
Z for alpha	1.95996
Number of observed studies	24.00000
Number of missing studies that would bring p-value to > alpha	6349.00000
Orwin's fail-safe N	
Correlation in observed studies	0.52321
Criterion for a 'trivial'correlation	0.00000
Mean correlation in missing studies	0.00000

Table 2 presents the generated data from the CMA (Comprehensive Meta-Analysis) software. These values reveal important information to measure the publication bias of this meta-analysis done in the 24 studies selected. Shown in the tabular presentation is that there are 6, 349 studies that are missing that would bring the p-value to a number greater than 0.05. That implies the estimated number of studies with non-significant effects that would be needed to make the overall effect or mean correlation non-significant.

CONCLUSION AND RECOMMENDATIONS

This reaction presents the conclusion drawn from the findings of the study and the corresponding recommendations.

Conclusion. In this study, the following are deduced:

1. The higher the cognitive skills the students master, the higher also is their comprehension ability, as supported by 24 studies drawn from a universe determined by the researchers.
2. Developing the cognitive skills of the students resulted in the improvements in their reading comprehension as well.
3. Reading comprehension is a stronger factor of general vocabulary growth.
4. The relationship between the indicators is static but somewhat progressive as children develop reading skills.
5. The systematic review and meta-analysis regarding the relationship between the variables cognitive skills and reading comprehension, has strengthen the claim regarding their strong linear relationship.

Recommendations. Based on the findings and the conclusions drawn from the 24 studies, the following recommendations are offered:

1. Future studies may examine the variables' relations developmentally, to see when they begin to emerge and whether they get stronger as children get older.
2. Future research that include the younger readers in grades 2 and 3 would be informative. Since at the earlier grades/level, fluency skills are developing and would offer considerable variability in performance

that are probably not observed in later grades.

3. Future studies may consider the effect of status as a second language learner on reading comprehension performance, and the possible differential impact of particular linguistic skills on comprehension due to language status.
4. Future researchers may continue to explore alternative ways to measure reading motivation.
5. Future studies may replicate the present findings by using different text materials and by including improved tests of the variables.

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Effect of Alternative Reading Materials on the Communicative Competence of Freshmen

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ABSTRACT

This descriptive study aimed at finding out the effect of exposure to alternative reading materials on the communicative competence of college freshmen. Casual comparative method was employed in gathering the data for the alternative reading materials and a communicative competence test was administered to measure the effect of exposure to the materials. Samples of the study were 263 freshmen of four colleges of the University of Southeastern Philippines in its Obrero Campus. The objectives of the study were to find out the alternative reading materials college freshmen read, the features and content of those materials, the level of communicative competence of those who were more exposed less exposed to the reading materials, and to determine the significant difference in the level of communicative competence those readers. The researcher found out that the college freshmen read newspapers, magazines, journals, periodicals, pocketbooks, Bible, dictionary, comics, and pamphlets/booklets; on the average, college freshmen read the materials because of their content, language used, and layout. The three most interesting contents of the materials were adventure, fiction, and history; the level of communicative competence of those who were more exposed to the alternative reading materials was above average while that of the less exposed was average. It was also found that there was a significant difference in the level of communicative competence between those who were more exposed and less exposed to alternative reading materials.

KEYWORDS: Alternative reading materials, communicative competence, freshmen, USEP