

A predictive study of reading comprehension in third-grade Spanish students

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Abstract

Background: The study of the contribution of language and cognitive skills to reading comprehension is an important goal of current reading research. However, reading comprehension is not easily assessed by a single instrument, as different comprehension tests vary in the type of tasks used and in the cognitive demands required. **Method:** This study examines the contribution of basic language and cognitive skills (decoding, word recognition, reading speed, verbal and nonverbal intelligence and working memory) to reading comprehension, assessed by two tests utilizing various tasks that require different skill sets in third-grade Spanish-speaking students. **Results:** Linguistic and cognitive abilities predicted reading comprehension. A measure of reading speed (the reading time of pseudo-words) was the best predictor of reading comprehension when assessed by the PROLEC-R test. However, measures of word recognition (the orthographic choice task) and verbal working memory were the best predictors of reading comprehension when assessed by means of the DARC test. **Conclusion:** These results show, on the one hand, that reading speed and word recognition are better predictors of Spanish language comprehension than reading accuracy. On the other, the reading comprehension test applied here serves as a critical variable when analyzing and interpreting results regarding this topic.

Keywords: reading; comprehension; orthography; vocabulary; working memory.

Resumen

Estudio predictivo de la comprensión lectora en estudiantes españoles de tercero de Primaria. Antecedentes: el estudio de la contribución de habilidades lingüísticas y cognitivas a la comprensión lectora es un objetivo relevante de la investigación actual de la lectura. Sin embargo, la comprensión lectora no es fácilmente explicada ni medida por una única prueba ya que los diferentes test de comprensión varían en el tipo de tareas utilizadas y en las demandas cognitivas requeridas. **Método:** el presente estudio examina la contribución de habilidades lingüísticas y cognitivas (decodificación, reconocimiento de palabras, velocidad lectora, inteligencia verbal y no verbal y memoria de trabajo) a la comprensión lectora, evaluada por dos test que utilizan diferentes tareas y requieren diferentes habilidades. **Resultados:** la medida de velocidad en pseudopalabras predijo la comprensión evaluada por el test PROLEC-R. Sin embargo, la medida de reconocimiento de palabras (la tarea de elección ortográfica) y la medida de memoria de trabajo verbal predijeron la comprensión medida por el test DARC. **Conclusiones:** estos resultados muestran, por un lado, que la velocidad lectora y el reconocimiento de palabras son mejores predictores de la comprensión en español que la precisión lectora, y por el otro, que el test de comprensión lectora utilizado es una variable crítica cuando analizamos e interpretamos resultados sobre este tema.

Palabras clave: lectura; comprensión; ortografía; vocabulario; memoria de trabajo.

Reading encompasses a variety of processes. These range from the visual identification of letters to the understanding of the content of the written text. There are several reasons to study reading comprehension. Firstly, understanding is the essence and the ultimate goal of reading. Secondly, objective data show reading comprehension to be a serious problem for many students (Essential Knowledge and Skills Test, 2010 [Prueba de Conocimientos y Destrezas indispensables, 2010]; OECD-PISA, 2009). Lastly, most Spanish studies on the acquisition and development of reading have focused on the acquisition of phonological awareness and word decoding (Casillas & Goicoetxea, 2007; Defior, Justicia,

& Martos, 1996; Jiménez & Ortiz, 2000; Lipka & Siegel, 2007), whereas few studies have examined the contribution of cognitive and linguistic processes as predictors of reading comprehension.

The current study examines the relationship of verbal and non-verbal cognitive abilities in two different tests of reading comprehension. The abilities tested are: rapid naming; the time and accuracy of reading words and pseudo-words; word-level lexical segmentation; orthographic choice; verbal working memory; and IQ measured by two kinds of subtests, one verbal and the other manipulative.

Rapid naming (hereafter RN) (Wolf & Denckla, 2005) has been linked in numerous Spanish studies with lexical processes (Aguilar et al., 2010; Gómez-Velázquez, González-Garrido, Zarabozo, & Amano, 2010; Kim & Pallante, 2012). Its relationship to reading comprehension, however, is unknown, due to the fact it has not been widely investigated.

Undoubtedly, reading comprehension is a complex process involving many skills and components that work in coordination.

While aware that no single variable involved in reading can itself explain how reading comprehension functions, many researchers nevertheless suggest that word recognition indeed plays a critical role in the development of reading comprehension in English (LaBerge & Samuels, 1974; Perfetti, 2007; Stanovich, 2000) and Spanish (Elosúa et al., 2012).

Currently, researchers distinguish between different aspects of word recognition. According to the “Lexical Quality Hypothesis” (Perfetti, 2007), the quality of word representation has implications for reading comprehension. A high-quality lexical representation, according to this hypothesis, includes the form of the word (phonologically and orthographically automated) and its semantic representation. As such, these all form associative networks that enable fast and reliable access to the word.

In a similar vein, Tannenbaum, Torgesen, and Wagner (2006) proposed another aspect according to which, reading comprehension may depend on word recognition. They distinguish between the size of one’s mental lexicon, or number of words that are known (its *amplitude*), and the wealth of knowledge that an individual has about the words he or she knows (its *depth*).

Moreover, working memory is also expected to perform an important function in reading comprehension. Indeed, children who have difficulty in reading comprehension also experience difficulties in working memory tasks that require switching between the functions of storing and processing verbal material (words and phrases) (Baddeley, 1986; Daneman & Carpenter, 1980).

Additionally, research on intellectual ability and reading across age groups, from kindergarten to high school, have illustrated that IQ is not associated with better outcomes in reading (Francis et al., 2005; Rodrigo & Jiménez, 2000; Share, McGee, & Silva, 1989).

In summary, it seems that IQ measured by tests of a manipulative character is not a good predictor of reading ability. Additionally, the relationship between Rapid Naming (RN) and reading comprehension is currently unknown. However, the current literature on reading processes does propose several critical predictors of reading comprehension at the lexical level: verbal working memory, word identification (phonological and orthographic routes), knowledge of vocabulary, and the fluency or automaticity in accessing word meaning.

Besides the importance of knowing and understanding the different skills that contribute to reading comprehension, it would be interesting to know how effective the instrument used to measure this ability is, given that comprehension tests vary widely in the kind of tasks set out as well as the cognitive demands they require. In fact, predictive studies of reading comprehension in the English language have found substantial differences in the percentage of variance, from 25 to 81%, explaining how words are decoded across various kinds of tests. These differences might be explained by understanding the way in which comprehension is being measured, given that some test formats require more bottom-up abilities than do others (Cutting & Scarborough, 2006). Recent studies show that the use of different reading comprehension tests may in fact even demonstrate different patterns of genetic co-variation (Betjemann, Keenan, Olson, & DeFries, 2011).

The current study examines two very different tests of reading comprehension: the comprehensive test battery PROLEC-R (the Evaluation of Reading Processes for Children – Revised Edition) (Cuetos, Rodríguez, Ruano, & Arribas, 2007) and DARC (the Diagnostic Reading Comprehension Assessment) (Francis et al., 2006).

The comprehension test PROLEC-R introduces texts of both a narrative and expository character, each with a certain amount of cultural baggage, and each of which poses four open questions that assess memory and inference processes related to information given in the text.

The DARC is a measure designed originally in English (August, Francis, Hsu, & Snow, 2006) and later adapted into Spanish. Its aim is to assess the processes central to understanding reading comprehension: memory of the text, the completion of inferences related to the text, access to relevant information within long-term memory, and the completion of inferences that require the integration of prior knowledge with information in the text. As the authors show (Francis et al., 2006), this measure does not require prior knowledge and is designed to minimize its impact on word reading accuracy, reading speed, vocabulary and syntactic structure in reading comprehension.

In line with everything discussed up to now, the current study raises the following questions:

- In what way are the skill sets examined here related both to each other and with the two tests of reading comprehension used?
- What skills best predict reading comprehension in each of the two tests used in this study?
- And lastly, what practical and theoretical implications does the current study have in regards to the future of research into reading comprehension, and in regards to ways of assessing, developing and improving this ability in the early grades at school?

Method

Participants

Data for this study were obtained from 33 students in the third grade in a middle class public school in Madrid. Table 1 shows the number of children and the average age of the participants.

Instruments

In what follows below we would like to set out and describe the tests used in this research. Four tests were administered to participants collectively, and four tests were also administered to participants individually.

We first describe the tests administered *collectively*:

- *DARC (Diagnostic Assessment of Reading Comprehension)* (Francis et al., 2006). This test consists of three brief narratives describing transitive relationships among a set of real and imaginary terms. The objective is to evaluate the processes we have described as being central to reading comprehension: memory of the text, the completion of inferences related to

Table 1
Participant demographics (N= 33)

Age (years; months)		Age range (years; months)		Sex	
M	DT	Min.	Max.	Girls	Boys
8;9	.46	8;1	9;4	13	20

the text, access to relevant information within long-term memory, and the completion of inferences that require the integration of prior knowledge with information in the text. An analysis of internal consistency amongst the 44 items making up the test produced a Cronbach alpha coefficient of .87.

- *PROLEC-R (Evaluation of Reading Processes for Children – Revised Edition)* (Cuetos, Rodríguez, Ruano, & Arribas, 2007). To assess reading comprehension, we used the Reading Comprehension Test consisting of this battery (from here on forward, known as PROLEC-C). This test consists of four short narrative texts that participants have to read silently and about which they then must respond to a total of 16 open inferential questions. Cronbach’s alpha reliability index reported for the norm of this test is .79.
- *Orthographic Choice Task (OCT)*. This task consists of a text adapted from the *Orthographic Rules* subtext taken from the Reading Assessment Battery [Batería de Evaluación de la Lectura] of López-Higes, Mayoral, and Villoria (2002). In this task, participants must choose the word that is spelled correctly after being given one word alongside two pseudo-words, both pseudo-homophones phonologically identical. For instance, we have the word “zanahoria” [carrot] and this word contrasts with the two pseudo-words “sanahoria” and “zanaoria.” The reliability of this test, using a split-half method of reliability, is .77 for the first 10 word triplets and .60 for the last 10 triplets.
- *Rapid Word Segmentation Task (RWS)*. The RWS task was adapted into Spanish from the original test the Paced Orthographic Segmentation Task, of Braten, Lie, Andreassen, and Olaussen (2009). This is a task in which participants have to recognize and identify as quickly and accurately as possible three independent words mashed up into one grouping with no spaces. For example, “carpearpine” [cocheperapino] would be segmented as “car/pear/pine” [coche/pera/pino]. Participants have to use a pen or pencil and draw a vertical line between the words. The score in this test corresponds to the number of words separated correctly in 90 seconds.

We now describe the four tests administered *individually*:

- *KBIT (the Brief Intelligence Test)* (Kaufman & Kaufman, 2000). This test assesses verbal (expressive vocabulary and definitions subtest) and nonverbal (matrices subtest) intelligence to obtain an IQ compound. It is administered to people between 4 and 90 years of age. Studies of validity and reliability show that the reliability coefficient of this test varies by age range, but in no case is below that of .76.
- *RST (Reading Span Test)* (Daneman & Carpenter, 1980). The RST was adapted into Spanish from the original test. In this task the participants read aloud a series of unrelated sentences presented by the experimenter on the computer screen. They subsequently try to remember the last word of each sentence previously read according to the serial order of presentation. The number of sentences increases its level progressively, from that of two sentences to that of six sentences. Three series are always presented at each level. The task ends when the participant fails at least 2 of the 3 series that make up the same level.

- *Rapid Automatized Naming of Letters (RAN-L)*. This task was selected from the RAN / RAS test (Wolf & Dencka, 2005). The task is to, as quickly as possible, read or name 5 letters that are repeated 10 times. These letters are distributed across a page consisting of five rows and ten columns. It has 50 letters in total. The test-retest reliability standard reported for this test is .90.
- *PROLEC-R*. (Cuetos, Rodríguez, Ruano, & Arribas, 2007). To assess the accuracy and the reading time of words and pseudo-words, we used a battery of word and pseudo-word reading tests that consists of reading 40 words and 40 pseudo-words respectively. We took the total word reading time (WRT) and pseudo-word reading time (PWRT) along with the number of errors committed when reading in order to measure word reading precision (from here on, WRP) and pseudo-word reading precision (PWRP). The index of reliability measured with Cronbach’s alpha for this standardized test is reported to be .79.

Procedure

All students performed four tests collectively and four individually. The four collective tests were administered in classrooms and consisted of two one-hour sessions on different days. The four individual tests were administered in spaces reserved especially for this purpose within the school, in sessions of approximately 50 minutes.

Data analysis

The descriptive analysis of the mean scores obtained in the present study (see Table 2) show that the children scored within

	M	Min.	Max.	DT
RAN-L (seconds)	32.64	21	80	10.42
WRT (seconds)	42.48	17	93	16.67
PWRT (seconds)	73.91	30	142	20.97
WRP (40)	39.58	36	40	0.90
PWRP (40)	37.09	28	40	2.17
RWS (number words segmented in 90 seconds)	47.42	22	77	13.75
OCT (20)	15.18	7	19	2.83
RST	2.68	2	4	0.52
KBIT (Vocabulary)	116.56	95	136	9.58
KBIT (Matrices)	111.13	84	137	12.13
PROLEC-C (16)	10.85	5	15	2.27
DARC (40)	27.09	17	39	5.55

Note: Maximum scores in parentheses. RAN-L= Rapid automatized naming of letters; WRT= Word reading time; PWRT= Pseudo-word reading time; WRP= Word reading precision; PWRP= Pseudo-word reading precision; RWS= Rapid word segmentation task; OCT= Orthographic choice task; RST= Reading span test; KBIT (Vocabulary)= Kaufman brief intelligence test of vocabulary; KBIT (Matrices)= Kaufman brief intelligence test of matrices; PROLEC-C= PROLEC Reading comprehension sub-test; DARC= Diagnostic Assessment of reading comprehension.

the range of normality on the intelligence variable. This proved so both on the KBIT vocabulary subtest (with a range of 95-136), as well as on the KBIT Matrices (with a range of 84-137).

If we compare the mean scores obtained by the participants across the different PROLEC-R tasks with normative data from the same age group on the same tasks, we find very similar scores. This is true for the Reading Comprehension Test PROLEC-C scores, as well as for the other PROLEC-R scores of WRP, PWRP, WRT and PWRT. Across all of these tests, participants scored within in the normal range.

Table 3 shows the correlations obtained between all of the measures included in the study. The PROLEC-C reading comprehension test moderately correlated with the DARC, and in a distinct way from other measurements. However, both PROLEC-R and DARC also correlated with PWRT, while the PROLEC-R alone correlated with the KBIT vocabulary subtest, and the DARC with both the RST and the OCT. The measures of lexical and phonological access, as expected, were correlated.

Two stepwise multiple linear regression analyses were completed in order to determine the variables that best explain reading comprehension.

In the first model (see Table 4), given that PWRT and KBIT (vocabulary subtest) consistently correlated with PROLEC-C, these variables were selected as the most likely predictors of the PROLEC-C reading comprehension measures. Despite the correlation that exists between PROLEC-C and KBIT (vocabulary

subtest), this vocabulary measure alone did not explain any of the variance in the model. The results suggest that PWRT is the only measure to significantly predict Reading Comprehension in the PROLEC-C test ($R^2 = .14, F = 4.99, p = .03$)

In the second model (see Table 5), given that OCT and RST were highly correlated with the DARC test, these two variables were chosen to determine which variables explained the most variance in reading comprehension measured by DARC. The results suggest that OCT ($R^2 = .18, F = 6.73, p = .01$) and RST ($R^2 = .11, F = 4.8, p = .03$) significantly predict reading comprehension when measured by the DARC test.

Discussion

The main objective of this study was to examine the contribution of different linguistic and cognitive skills to two different reading comprehension tests in a sample of third grade children with no special educational needs. According to the results obtained, we respond to the following questions that might be raised.

In what way are the skills we examined (RAN-L, WRT, PWRT, WRP, PWRP, RWS, OCT and RST) related, both amongst themselves and with the two reading comprehension tests, PROLEC-C and DARC?

After examining the correlations between the different skill sets studied, and in line with previous research in the Spanish language

Table 3
Correlations between the different variables

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. RAN-L	–											
2. WRT	.57**	–										
3. PWRT	.52**	.87**	–									
4. WRP	-.68**	-.27	-.30	–								
5. PWRP	-.28	-.23	-.21	.47**	–							
6. RWS	-.54**	-.65**	-.48**	.29	.35*	–						
7. OCT	-.23	-.56**	-.45**	.23	.15	.46**	–					
8. RST	.26	-.15	-.06	-.16	.15	-.03	.17	–				
9. KBIT (Voc.)	-.32	-.24	-.28	.11	.19	.11	.18	.17	–			
10. KBIT (Mat)	-.04	-.24	-.15	-.04	-.12	-.25	.53**	.31	-.05	–		
11. PROLEC-C	-.26	-.34	-.37*	.15	.03	.15	.34	.28	.37*	.20	–	
12. DARC	-.20	-.34	-.38*	.26	.12	.16	.42*	.41*	.24	.17	.37*	–

Note: RAN-L= Rapid automatized naming of letters; WRT= Word reading time; PWRT= Pseudo-word reading time; WRP= Word reading precision; PWRP= Pseudo-word reading precision; RWS= Rapid word segmentation task; OCT= Orthographic choice task; RST= Reading span test; KBIT (Vocabulary)= Kaufman brief intelligence test of vocabulary; KBIT (Matrices)= Kaufman brief intelligence test of matrices; PROLEC-C= PROLEC Reading comprehension sub-test; DARC= Diagnostic assessment of reading comprehension
** p<.01; * p<.05

Table 4
Predictions of Reading Comprehension (PROLEC-C): Multiple Regression Results (stepwise methodology)

Step	Variable	R	Change R ²	Change F
1	PWRT	.37	.14	4.99*
Excluding	KBIT (Voc.)			

Note: PWRT= Pseudo-word reading time; KBIT (Vocabulary)= Kaufman brief intelligence test of vocabulary
* p= .03

Table 5
Predictions of Reading Comprehension (DARC): Multiple Regression Results (stepwise methodology)

Step	Variable	R	Change R ²	Change F
1	OCT	.42	.18	6.73**
2	RST	.54	.11	4.80*

Note: OCT= Orthographic choice task.
RST= Reading span test
** p= .01; * p= .03

(Aguilar et al., 2010; Escribano, 2010; Gómez-Velázquez, González-Garrido, Zarabozo, & Amano, 2010; Kim & Pallante, 2012), we found that the rapid automatized naming of letters (RAN-L) is highly correlated with both WRP (Word Reading Precision) and WRT (Word Reading Time). This study confirms once again that the RAN-L is a good measure for predicting both the accuracy and the time spent in reading words, two skills considered key in reading comprehension.

The rapid automatized naming of letters (RAN-L) itself, however, did not correlate with either of the two tests of reading comprehension used (PROLEC-C and DARC).

As we have cited above, previous research such as the Lexical Quality Hypothesis (Perfetti, 2007), or the “vocabulary breadth and depth” theory (Tannenbaum, Torgesen, & Wagner, 2006) has suggested that recognition, decoding and fluency in reading words are all related to reading comprehension. The present study makes a similar suggestion. We argue that the two reading comprehension tests are related to two distinct measures, lexical access and phonological access. In particular, both of these test correlate with PWRT (Pseudo-word Reading Time). Additionally, DARC also correlated with the Orthographic Choice Tasks (OCT), and the PROLEC-C with the KBIT vocabulary subtest.

There are few Spanish studies that have contemplated the relationship between fluency and reading comprehension. However, recent research (Kim & Pallante, 2012), also conducted with Spanish-speaking children, uncovered results very similar to those of the present study. They show that fluency in the phonological decoding of nonsense words or pseudo-words was significantly related to reading comprehension, after taking word recognition and vocabulary into account.

In the current study and according to the “Lexical Quality Hypothesis” (Perfetti, 2007) or the “vocabulary breadth and depth” theory (Tannenbaum, Torgesen, & Wagner, 2006), fluency in the use of the phonological route (PWRT), automating the orthographic route (OCT) and a mastery of vocabulary (KBIT vocabulary) all have positive influence on the results of the different reading comprehension tasks.

The DARC test correlated with the lexical, orthographic and sub-lexical pseudo-word recognition (PWRT) variables. These results differ from those found in the English language, which show that DARC correlated to a lesser extent than did other tests of reading comprehension incorporating measures of lexical access or word decoding (August et al., 2006; Francis et al., 2006).

These two reading comprehension tests were moderately correlated with one another. This indicates, on the one hand, that these are two tests that measure the same construct. Yet, the moderate nature of this correlation may also suggest, on the other hand, that these two tests are actually measuring different aspects of reading comprehension.

Even though both tests correlated with PWRT scores, the correlation matrix contains a few differences that are worth some explanation. PROLEC-C also correlated with the KBIT vocabulary subtest, and DARC with OCT and RST. In the current case, PROLEC-C deals more in the presentation of expository texts containing more cultural weight and requiring better vocabulary skills than the DARC. The texts of the DARC are about everyday situations for children and deal with topics that do not require a special vocabulary, such as pets or games.

DARC also correlated with the RST, which is a measure of working memory. This is not surprising given that the types of

tasks set out by this test require higher levels of reasoning in order to solve problems of transitive inference. Such tasks impose high demands on working memory and require one to shift between the functions of storing verbal material and processing it.

As substantiated in previous research (Cuttin & Scarborough, 2006; Francis et al., 2005; Rodrigo & Jiménez, 2000; Share, McGee, & Silva, 1989), the present study found no relationship between IQ measured by tests of a manipulative character and reading comprehension.

What are the skills that are able to predict reading comprehension best in each of the two comprehension tests used in this study?

The skill that predicted reading comprehension best as measured by the PROLEC-C was the PWRT (Pseudo-word reading time); that is, after controlling for vocabulary scores (KBIT vocabulary subtest).

The measures that predicted reading comprehension best as measured by the DARC were the OCT and the RST (a measure related to verbal working memory). Between them, they accounted for 29% of the variance. As explained above, the kind of transitive inference task set out by this test requires high levels of reasoning that imposes high demands on working memory.

In the English language, decoding or accuracy in reading words is usually considered to be a good measure in the prediction of reading comprehension (Catts, Key, Zhang, & Tomblin, 1999; Cutting & Scarborough, 2006; Share & Leikin, 2004). However, in the present study, neither WRP (Word Reading Precision) nor PWRP (Pseudo-word Reading Precision) correlated with reading comprehension.

In this regard, we need to take into account the fact that English is a language with a complex orthography given its relative inconsistency in grapheme to phoneme correspondence. In contrast, the Spanish writing system is characterized by a high consistency of grapheme-phoneme correspondence. Additionally, most Spanish children learn to read through the application of a phonological method within the first years of school. For these reasons, the role of accuracy in decoding words plays a smaller role in Spanish orthography than it does in English orthography. Inter-cultural studies (Goswami, 2010) have also illustrated that a distinctive feature of readers learning Spanish is problems with reading speed and spelling. Spelling problems, according to this author, are due to the fact that a consistent orthography for reading, as in Spanish, may not be so consistent for that of writing. This is because different spelling patterns may represent one particular sound. For instance, the /b/ sound may be represented by the letters “b” and “v”. This fact generates difficulties in readers unable to automate this orthographic route.

In this sense, the present study confirms, similar to previous work on the topic, that fluency in decoding (i.e., fluency with pseudo-words) and measures of orthographic choice are better predictors of reading in Spanish than decoding and accuracy in word reading is (Davies, Cuetos, & González-Seijas, 2007; Escribano, 2007; Goswami, 2010).

What practical and theoretical implications does this study bring to the evaluation, development and improvement of reading comprehension in early childhood education?

Our findings suggest, similar to previous research (Perfetti, 2007; Tannenbaum, Torgesen, & Wagner, 2006), that measures of lexical access or word recognition, as well as the fluency in the use of the phonological route (PWRT), automation of word recognition, the orthographic route (OCT), and semantic knowledge (K-BIT

Vocabulary) explain the most variance in measures of reading comprehension.

As we have seen, the two tests of reading comprehension used here make different demands on one's knowledge of vocabulary, on phonological and orthographic access, and on verbal working memory. In view of these results, we believe it necessary to consider the way this construct is measured in future research given that different results and interpretations are possible depending on which tests are utilized.

Reading comprehension requires different cognitive and linguistic skills. For this reason, when intervening in difficulties of reading comprehension it is important to propose different kinds of tasks and activities in the classroom. These activities should range from training in the quick and automatic access of letters and words, to vocabulary depth and breadth training, to activities that improve the processes involved in working memory and in making different kinds of inferences across various levels of difficulty.

We understand that the sample used in the present study is not very large, and that, for this reason, the results should be interpreted

with caution. With small samples, regression analytics are less stable and hence, results become less generalizable to the wider population. Nevertheless, we still argue this study is novel in that we are now analysing the relationship between different cognitive skill sets with two different kinds of reading comprehension tests. This makes us think about the complexity involved in measuring the comprehension of reading textual material. This is a skill of great importance both for a child's success at school, but also for lifelong personal fulfilment.

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