

## Predicting Reading Comprehension by Reading Level and Diglossia: A Comparison Between Diglossic First Grade Students with and Without Learning Disabilities

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### ABSTRACT

This study aimed to study the association between diglossic reading skills and reading comprehension in first grade students with and without learning disabilities. In this study population, students presented diglossia in literary and colloquial Arabic: 30 first grade students with learning disabilities and 30 first grade students without learning disabilities were assessed using a reading test (accuracy and fluency in both languages: literary and colloquial) and a reading comprehension test. This study's findings show significantly better measures of reading skills and reading comprehension in the students without learning disabilities, and significant interaction between reading and reading comprehension in the entire study population. In view of the marked gaps between the two populations of students, it is important to pay special attention to the population with learning disabilities and strive to help these students improve on the measures tested in this study (reading skills and reading comprehension). This could have a positive impact on a variety of other pedagogical-related phenomena, such as academic achievements in school subjects.

**Keywords:** *reading, diglossia, reading comprehension, learning disabilities, first grade*

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## INTRODUCTION

Reading a text is a complex cognitive process—it requires interpreting symbols and text (orthography) to produce or create meaning. Each language has its own set of matching symbols and sounds. The first step in learning to read is becoming familiar with the language's written symbols and their sounds. Diglossia is a sociolinguistic condition in which the literary form of the language used in written texts and in the dictionary is very different from the colloquial language that is used for daily interactions. Thus, two versions of the language exist in parallel, each with its own vocabulary and forms.

Reading comprehension—the ability to extract meaning from text—is a cognitive process too, and it relies on mastering many language skills such as reading, writing, vocabulary, syntax, conversation, and general knowledge. It is considered a fundamental learning skill that is of paramount importance over the course of students' school years. Reading comprehension is also a key tool in acquiring an education and in becoming part of society.

The present study aimed to examine a possible association between diglossic reading skills and reading comprehension level in first-grade students with and without learning disabilities.

### *Reading, phonology, and morphology*

To read text, a complex cognitive process, one must interpret symbols (orthography) to produce or create meaning. The process begins in the eye, when written information is registered by the retina. Next, the information is processed in the primary visual cortex, and then interpreted in Wernicke's area in the cerebral cortex. Readers have strategies to help them interpret symbols, and they use morphemes, syntax, and context—designed to help assimilate words more effectively into their lexicon—to identify meanings of unfamiliar words (Katzir et al., 2006).

Reading is acquired in a gradual process that varies depending on the orthographic depth of the language. Orthography is the system of symbols and rules used to graphically represent a language (e.g. letters, diacritics for vowelization, and punctuation). When reading words with transparent orthography (i.e. consistent grapheme-phoneme correspondence) the reader relies on the phonological information provided by the smallest orthographic units (phonemes, letters, vowels). But when reading words with deep orthography (i.e. inconsistent grapheme-phoneme correspondence) the reader relies on the phonological information provided by larger orthographic units in the words (e.g. syllables, morphemes, words) to achieve correct pronunciation (Geva & Wade-Woolley, 2004; Saiegh-Haddad & Geva, 2008).

Phonology means the information about a language's word sounds. Phonological awareness is the ability to distinguish, process, and apply sub-lexical units of the spoken language such as syllables, rhymes, and phonemes. Phonological awareness manifests in the ability to perform mental operations on parts of speech, such as dropping the beginning, middle or end of a word (Koda, 1997).

Phonological development can be described as the ability to perform graphophonemic coding by applying letter-to-phoneme conversion rules. Phonological awareness manifests in an ability to rhyme, identify repetitive phonic patterns, break down words into syllables, and merge syllables into sounds and words. It begins developing at preschool age, when children are first exposed to acquisition of reading, and gains momentum in elementary school when they actually start reading. In other words, phonological awareness supports a normal reading process, and learning to read affects the development of phonological awareness (Reiner, 2000).

Ziegler and Goswami (2005) argue that language acquisition affects the development of phonological representations, awareness of sounds, and familiarity with the sounds of phonemes. Developing phonemic awareness at grain level requires direct teaching. Consequently, learning to write letters, syllables, and words contributes to the development of phonological awareness. They also believe that understanding the association between the sounds of a language and their written representations (symbols) contributes significantly to developing literacy and spelling skills. Acquiring this understanding

facilitates an increased vocabulary. The process of interpreting a sound by its symbol during reading is called phonological coding. For children to successfully internalize the notion of a letter-sound relationship and apply it correctly when reading and spelling, they must achieve a normal level of phonological awareness of sounds and word structures in their language.

Morphological awareness, the ability to recognize the internal structure of words, is necessary in reading acquisition, because it contributes to an enlarged vocabulary and correct reading and writing. A study that compared normally-developed children with children with a reading disability, found that the latter were less successful at performing tasks that required morphological awareness. The nature of the association between morphology and reading is reflected in a child's ability to analyze words and morphological constituents of words in order to produce meaning (Ben-Dror et al., 1995).

Elbro and Arnbak (1996) explored the importance of morphological awareness in controlling reading and spelling processes. They believe that morphological awareness facilitates learning the orthographic structures that are important to the acquisition of reading and spelling: this awareness is instrumental in using morphological categories and whole-word patterns to predict the meaning of words and organize an orthographic mental lexicon. By organizing the orthographic lexicon according to morphology, morphological awareness makes it easier to understand the meaning of words during reading.

### *Diglossia and the Arabic language*

The term diglossia usually serves to describe a condition in which the spoken language is markedly different from the written language. In the case of Arabic, diglossia is a sociolinguistic condition in which the official language—as used in writing and in the dictionary—is very different from the colloquial language that is used for daily interactions (Myhill, 2009; Leikin, Eghbaria & Ibrahim, 2014). Literary Arabic is uniform throughout the Arab world (Holes, 2004) and its phonology, morphology, syntax, and lexicon make it distinct from the colloquial dialects. Different geographical regions have their own colloquial Arabic, but all the different dialects are linguistically distinct from literary Arabic (although the degree of difference varies) (Asadi-Ibrahim, 2014; Henkin, 2010).

Diglossia is frequently misrepresented as a two-language dichotomy, one spoken and one written. However, Arabic is better described as a spectrum on which speakers move between colloquial and standardized (literary) forms of the same language (Schiff & Saiegh-Haddad, 2017).

Diglossia in Arabic is unique, because Arabic-speaking children grow up in a dual language context: they first acquire a local, colloquial Arabic dialect at home and in their local environment and only start learning the literary language as their language of reading and writing at school. Arabic speakers learn that each language variety serves different communication purposes. As native Arabic speakers struggle to acquire literary Arabic in school, they keep the colloquial dialect for day-to-day communications. The great linguistic distance between colloquial and literary Arabic has an important effect on the development of reading (Mutlak-Abu Dahud, Ibrahim & Shany, 2015; Saiegh-Haddad, 2012). Children's exposure and experience with the literary language can also affect how their reading develops.

A psycholinguistic study has shown that the linguistic distance between the two language varieties affects the development of basic linguistic and meta-linguistic abilities and poses language acquisition challenges similar to those observed with second-language acquisition. A neuro-cognitive study in Arabic speakers has shown that literary Arabic has a cognitive status similar to that of a second language (Ibrahim, 2009).

Being a unique case, Arabic diglossia is challenging researchers to understand the effect of diglossic complexity and of distance between colloquial and literary Arabic on acquisition of reading and other skills that are required for reading literary Arabic. Saiegh-Haddad and Spolsky (2014) empirically tested the phonological lexical distance between colloquial Arabic and literary Arabic and found that 40.6% of the words in their word pool were lexically common to colloquial and literary Arabic, but were

phonologically different. Also, 38.2% of the words in their word pool had only a colloquial Arabic version, and only 21.2% were both phonologically and lexically common to the two varieties of Arabic. The researchers concluded that almost 80% of the words in the vocabulary of a five-year old child are completely or partially different from their equivalent in literary Arabic, and only 20% are shared by the two language varieties. This underscores the challenge facing Arabic-speaking children in first grade who are taught to read literary Arabic only. These first-grade children, who are native speakers of colloquial Arabic, are faced with having to develop linguistic awareness of literary Arabic and an ability to read its linguistic structures, which at their age and stage of education may be as unfamiliar as a foreign language. This makes diglossia a key player for native Arabic speakers learning to read.

### *Reading comprehension and its link with phonology and morphology*

Reading comprehension is a cognitive process that constructs meaning from written text. To achieve reading comprehension, the reader must master several abilities: (a) reading (technically decode the orthography into spoken language); (b) vocabulary (understand the semantic meaning of the written words); (c) syntax (understand the relationships between words, sentences, and paragraphs); (d) general knowledge (be familiar with the terminology in the content domain); (e) pragmatics (understand meaning in context); (f) cognitive skills (information processing, logical and abstract thinking). Reading comprehension is an essential component of learning, as it is students' main channel for acquiring an education. This means that acquiring this basic learning skill will affect students throughout their school years and how they and take their place in a literate society (Saiegh-Haddad, 2003).

Understanding what one reads opens up possibilities for expanding knowledge and independent learning. Various cognitive and meta-cognitive factors affect reading comprehension, including attention, memory, processing and recall speed, as well as educational, social, cultural, and emotional factors (Geva & Farnia, 2012; Katzir et al., 2006; Lesaux et al., 2006; Perfetti et al., 2005) is also linked to Phonological abilities—also linked to reading comprehension—can be used to predict reading comprehension abilities in elementary school both in normal and slow readers. It has also been established that phonological awareness training can improve reading comprehension abilities (Maamouri, 1998; Reiner, 2000).

Stanovich (1990) emphasizes the importance of phonological awareness in learning to read and in reading comprehension. Not all the components of phonological awareness develop equally among children. Phonologically competent children progress faster in reading and children with poorer phonological awareness lag behind, with the result that the competent children acquire stronger reading skills, and the weaker children get weaker. Phonological awareness precedes both reading and reading comprehension, but it is also the result of practicing reading (Stanovich, 1990). Children with poorer phonological awareness starting in the educational system experience difficulty understanding the idea of an alphabet and are held back by difficulties with grapheme-phoneme decoding. As a result, they read little, if at all, which in turn engenders poor vocabulary, limited knowledge of syntax, and limited general knowledge.

A study that compared normally reading first graders to peers with learning disabilities found an association between phonological awareness and the ability to identify written words. However, in both normal readers and poor readers, phonological abilities contributed to the explained variance in reading comprehension independently of the ability to identify words (Engen & Høien, 2002). The association between phonological competence and reading successfully may be viewed as bi-directional: On the one hand, phonological awareness is a pre-requisite of reading acquisition, and on the other, learning to read helps develop awareness of the phonic components of spoken language due to the visual representation (Abu-Rabia, 2008; Saiegh-Haddad & Geva, 2008).

Also morphological awareness is important to the acquisition of reading, and contributes greatly to a richer vocabulary and to correct reading, writing, and reading comprehension skills. A study that compared normally developed children to children with reading disabilities found that the latter were less

successful at performing tasks that required morphological awareness. The nature of the association between morphology and reading explains, in part, a child's ability to analyze words and morphological constituents of words in order to produce meaning (Ben-Dror et al., 1995; Saiegh-Haddad & Geva, 2008). Levi-Shimon (2005) found that morphological awareness significantly contributed to explaining the variance in reading comprehension, more so than children's age and vocabulary. Her study shows a significant positive correlation between morphological knowledge and reading comprehension among children finishing first grade even after controlling for verbal and non-verbal cognitive abilities. Morphological awareness becomes increasingly important to reading comprehension processes as children grow older and as their vocabulary expands and the words they use become morphologically more complex. As they grow older, children are exposed to higher-register words that they are unfamiliar with from their everyday language. To understand them they must use morphological tools. The ability to identify roots and affixes and recognize their semantic significance can help children read complex words and work out the meaning of new words, thus enhancing their ability to understand text (Abu-Rabia, 2008, 2009).

#### *Learning disabilities in school children*

Learning disability is generally defined as a learner's inability to learn a specific academic skill as fast and as correctly as expected by age, education opportunities, and overall cognitive ability. The DSM-V defines specific learning disabilities as learning difficulties that emerge at an early age, persist despite targeted intervention, and manifest as significantly lower skills than expected by age. The DSM-V notes that learning disabilities are not caused by mental, neurological, or psychological disorders, nor are they due to language-related disabilities (APA, 2013). The ICD-10 (International Classification of Diseases) emphasizes that the academic difficulty associated with the developmental disorders in learning skills is not due to absence of opportunity, nor is it solely due to intellectual disability, brain injury or trauma. Similarly, specific learning disabilities are not due to inappropriate teaching or poor vision (World Health Organization, 2016).

A further distinction can be made between developmental learning disability and academic learning disability. Developmental learning disabilities are usually discovered at pre-school age and include delayed acquisition of fundamental skills such as attention, memory, language, perception and motor disability, and cognitive disorders. Academic learning disability includes impairment of skills that are usually acquired during the early stages of school: reading, writing, spelling, reading comprehension, and arithmetic (NJCLD, 2013).

The differences between existing definitions of learning disabilities are reflected in the variation in diagnosis of learning disabilities. Despite this, there are four generally accepted diagnostic criteria: exceptionally low academic achievements, mismatch between ability and achievements, low (or no) response to intervention and instructions, and weakness in a specific, identifiable learning skill (e.g., in a reading disability only, despite average IQ, basic word decoding is impaired) (Hostutler et al., 2018).

#### *Association between reading, diglossia, and reading comprehension among students with learning disabilities*

Current research of reading, diglossia, and reading comprehension in schoolchildren suggests that these variables are connected. For example, a study of 90 first-grade students in Israel found that first-grade students exposed to Hebrew diglossia through studying texts in biblical Hebrew in addition to modern Hebrew, scored significantly higher than students in the control group who had not been exposed to biblical Hebrew on the following linguistic abilities: phonological and morphological knowledge, as well as on reading skills: accuracy, fluency, and reading comprehension. This finding corresponds with earlier studies of Arabic diglossia which show that the linguistic distance between the two language varieties

contributes to development in all linguistic areas: phonology, morphology, syntax, and lexicon (Eviatar & Ibrahim, 2000; Saiegh-Haddad, 2003; Saiegh-Haddad et al., 2011).

Regarding students with learning disabilities, Schiff & Saiegh-Haddad (2017) set out to (a) assess word decoding in colloquial Arabic and in literary Arabic in sixth-grade native Arabic speakers with developmental dyslexia and (b) establish whether the ability to read colloquial Arabic among children with dyslexia is a predictor of fluency in literary Arabic in both orthographies (with and without vowelization). According to their findings, diglossia has a strong effect on reading ability in children with dyslexia. Moreover, vowelization plays a central role in these children's ability to read both colloquial Arabic and literary Arabic, as evidenced in the performance patterns of participants with dyslexia compared with the control group when assessed for word decoding (Schiff & Saiegh-Haddad, 2017).

### **Research questions**

1. Is there a difference in level of reading between students with and without learning disabilities? Does the expected difference change with diglossia?
2. Is there a difference in level of reading comprehension between students with and without learning disabilities? Does the expected difference change with diglossia?
3. Is there an association between reading level and reading comprehension in the study population?

### **Study hypotheses**

1. A significant difference in reading level (accuracy, fluency) will be found between students with and without learning disabilities, and the difference will be diglossia (literary, colloquial) dependent. Specifically, students with learning disabilities will present poorer reading (accuracy, fluency) than students without learning disabilities.
2. A significant difference in reading comprehension level (open questions, closed questions) will be found between students with and without learning disabilities, and the difference will be diglossia (literary, colloquial) dependent. Specifically, students with learning disabilities will present a lower level of reading comprehension (open, closed questions) than students without learning disabilities.
3. An association will be found between reading level (accuracy, fluency) and reading comprehension (open, closed questions) in the study population. In other words, better reading ability (accuracy, fluency) will correspond with better reading comprehension (open, closed questions).

## **METHODOLOGY**

### **Research method**

The tests were administered randomly to first-grade students in elementary schools in the Arab community in Israel. First, the students were asked to read aloud the literary words and the colloquial words (accuracy and fluency). Next, they were given a reading comprehension text in which they were asked to answer the questions following the text (open questions, closed questions). The data obtained was used to determine reading level and reading comprehension scores for each student.

### **Participants**

This study assessed a sample of 60 first-grade students, aged five to six years old, who attend integrated classrooms in elementary schools in the Arab community. Participants were split into two groups: The first included 30 students with diagnosed learning disabilities (50%) of which 18 (60%) were

boys and 12 (40%) were girls. The second group included 30 students without learning disabilities (50%) of which 16 (53%) were boys and 14 (47%) girls.

The participants that were classified as having learning disabilities had undergone a psychological evaluation by their local Counseling Services independently of this study. These evaluations include diagnosis by a psychologist of the type of disability and a Wechsler IQ test. They also include a didactic assessment for reading, reading comprehension, mathematics, and English by qualified didactic evaluators using accepted instruments, and additional developmental evaluation of visual-motor, visual, hearing, language, memory, cognitive, and attention skills. Based on these records, the author concluded that the students have comprehensive difficulties with learning. But their cognitive abilities were within the normal range and they had no overt or underlying sensory disabilities. Most participants come from middle-class homes with large families, in which most mothers are housewives, and most fathers are employed earning an average wage.

### Research instruments

Data was collected in both groups of students using two instruments: a test for reading (accuracy and fluency) and a test for reading comprehension (open, closed) by diglossia (literary and colloquial)

1. Test for reading level: reading words in literary and colloquial Arabic using a word decoding test (Carmel, 2015), composed of two lists of 30 words each, one in literary Arabic and one in colloquial Arabic. The goal of this test was to assess reading accuracy and fluency. The Cronbach's alpha test indicated reliability of  $\alpha=.77$  for literary words and  $\alpha=.84$  for colloquial words.
2. Reading comprehension test: A Ministry of Education reading comprehension test (Rama, 2020) was used. The test includes a text in Arabic and questions for the students to answer. The questions assess reading comprehension at word, sentence, and text level. Some of the questions are open so students must fill in their own answer, and others are closed, and students must select the best answer. The alpha coefficient of reliability for this test was  $\alpha=.72$ .

### Data processing

Averages and standard deviations were calculated. Associations between the study variables were tested using Pearson correlations. Differences in reading level and in reading comprehension were tested using t-tests for independent samples. All data were processed using SPSS version 25.

## RESULTS

Descriptive statistics of the study's variables were calculated in the preliminary analysis. Table 1 shows the averages and standard deviations for the study groups.

Table 1: Average and standard deviation of reading level and reading comprehension by diglossia and study group (N=60)

		Diglossia	With learning disability		Without learning disability		N
			M	SD	M	SD	
Reading	Accuracy	Literary	75.12	.27	75.43	.22	60
		Colloquial	81.13	.35	88.50	.29	60
	Fluency	Literary	68.54	.28	76.34	.21	60
		Colloquial	72.34	.31	85.91	.27	60
Reading comprehension	Open	Literary	70.10	.41	80.77	.31	60
		Colloquial	80.70	.39	83.20	.32	60
	Closed	Literary	66.67	.32	72.32	.28	60

Colloquial	72.90	.35	73.22	.35	60
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The score range was 1-100. A higher score indicates a higher level of reading or reading comprehension, as appropriate. As seen in Table 1, on average, the students with learning disabilities scored lower than the students without learning disabilities on all measures.

*Differences in reading level between students with and without learning disabilities*

Based on the first hypothesis, the study tested for differences in level of reading between students with and without learning disabilities and checked whether the expected difference changes with diglossia. The hypothesis was tested using averages, standard deviations, and t-tests for independent samples. The results are shown in Table 2.

Table 2: Average, standard deviation, and t-test for reading level in students with and without learning disabilities (N=60)

	Diglossia	With learning disability		Without learning disability		t
		M	SD	M	SD	
Reading Accuracy	Literary	75.12	.27	75.43	.22	22.50
	Colloquial	81.13	.35	88.50	.29	29.11*
Reading Fluency	Literary	68.54	.28	76.34	.21	11.50*
	Colloquial	72.34	.31	85.91	.27	28.23*

\*p<.05, \*\*p<.01, \*\*\*p<.001

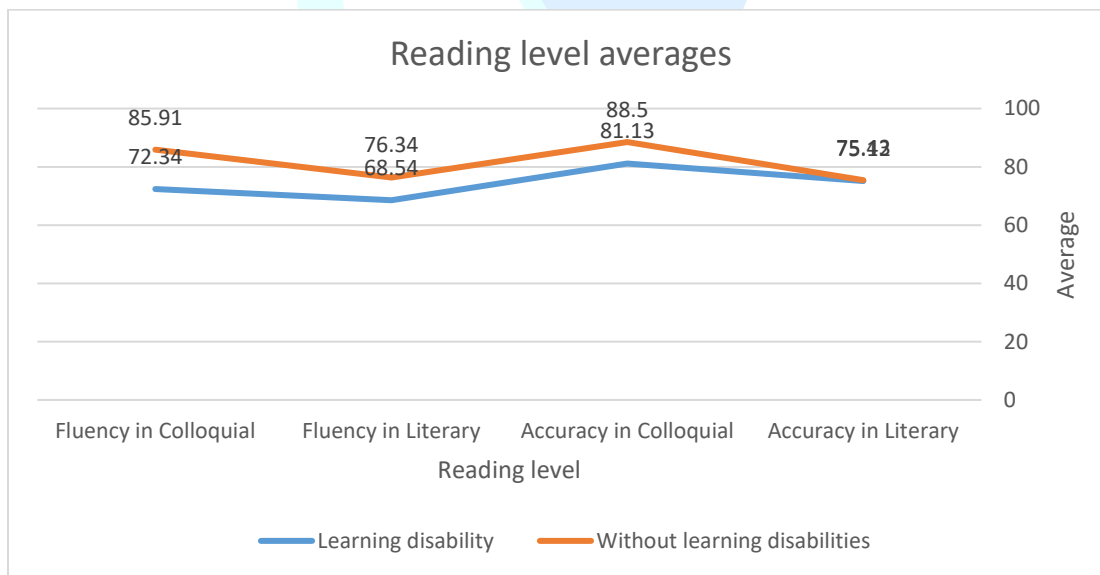


Figure 1. Average reading level in students with and without learning disabilities

The averages shown in Table 2 and Figure 1 show that students with learning disabilities scored significantly lower than students without learning disabilities on most measures (accuracy in colloquial Arabic and fluency in both language varieties). There was no significant difference in performance between the two groups in reading accuracy of the literary variety.

*Differences in reading comprehension between students with and without learning disabilities*

Based on the second hypothesis, the study tested for differences in level of reading comprehension between students with and without learning disabilities and checked whether the expected difference changed with diglossia. The results are shown in Table 3.



Table 3: Average, standard deviation, and t-test for reading comprehension in students with and without learning disabilities (N=60)

		Diglossia	With learning disability		Without learning disability		t
			M	SD	M	SD	
Reading comprehension	Open	Literary	70.10	.41	80.77	.31	16.22
		Colloquial	80.70	.39	83.20	.32	18.59*
	Closed	Literary	66.67	.32	72.32	.28	15.21*
		Colloquial	72.90	.35	73.22	.35	17.90*

\*p<.05, \*\*p<.01, \*\*\*p<.001

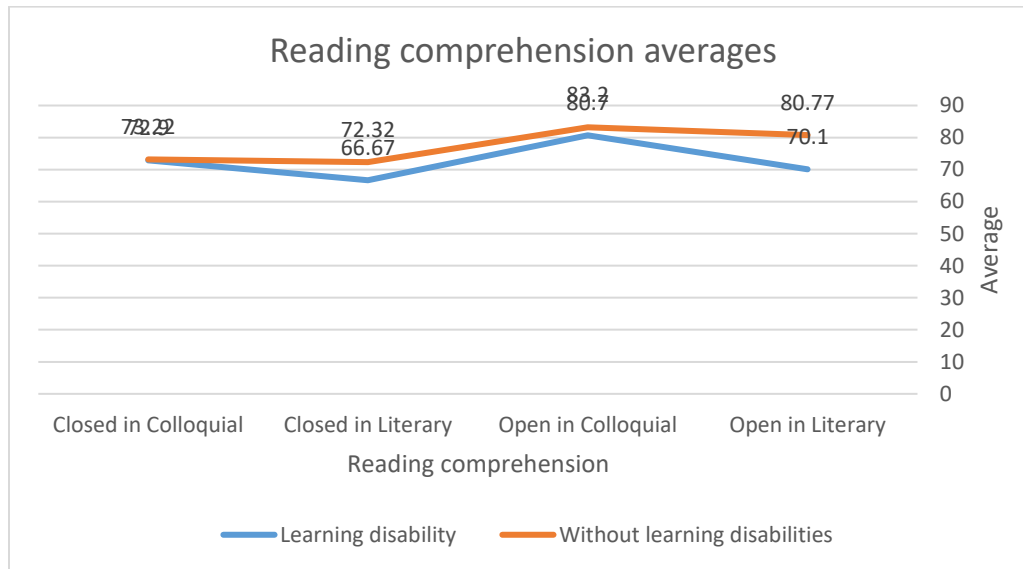


Figure 2. Average reading comprehension score in students with and without learning disabilities

The averages shown in Table 3 and Figure 2 show that students with learning disabilities scored significantly lower than students without learning disabilities on most measures (open questions in colloquial Arabic and closed questions in both language varieties). There was no significant difference in performance between the two groups in the open questions in the literary variety.

*Association between level of reading and reading comprehension*

To test the third hypothesis regarding significant correlations between level of reading and reading comprehension Pearson correlations were calculated for the test variables. Table 4 shows correlations between general levels of reading and reading comprehension in the two groups.

Table 4: Correlation between general levels of reading and reading comprehension (N=60)

		Reading comprehension			
		With learning disability		Without learning disability	
		Open questions	Closed questions	Open questions	Closed questions
Reading	Accuracy	.131*	.188*	.176*	.145*
	Fluency	.166*	.187	.188*	.038

\*p<.05, \*\*p<.01, \*\*\*p<.001

Looking at the correlations shown in Table 4, significant associations are evident between reading accuracy and open and closed questions in both student groups, and between fluency in reading and open

questions in both groups. No significant associations were found between fluency in reading and closed questions.

## DISCUSSIONS

This study aimed to assess the association between diglossic reading skills and reading comprehension in first grade students with and without learning disabilities. To do so, this study examined differences and patterns of linear association within and between these variables. Although much is known about how well children with and without learning disabilities read and comprehend texts, little is known about the role diglossia may have in these populations.

### *Differences in level of reading*

As proposed in the first hypothesis, students with learning disabilities scored significantly lower than students without learning disabilities on most measures (accuracy in colloquial Arabic and fluency in both language varieties). There was no significant difference in performance between the two groups in accuracy of reading literary Arabic.

These findings are compatible with the findings of previous studies. For example, in a study of Arabic-speaking sixth-grade students with developmental dyslexia, diglossia had a strong effect on reading ability in the children with dyslexia, and vowelization played a central role in these children's ability to read both language varieties. This role was evident in the performance patterns of participants with dyslexia compared with the control group when assessed for word decoding (Schiff & Saiegh-Haddad, 2017).

### *Differences in reading comprehension*

The findings of this study support the second hypothesis, which proposed there would be a significant difference in reading comprehension between students with and without learning disabilities.

These findings are in line with existing research of reading comprehension and learning disabilities. As noted in the literature review above, several cognitive and meta-cognitive factors affect reading comprehension (Geva & Farnia, 2012; Katzir et al., 2006; Lesaux et al., 2006; Perfetti et al., 2005). Phonological awareness may also be related to the level of reading comprehension: e.g. when they start school, children with poorer phonological awareness experience difficulty understanding the idea of an alphabet, and struggle with grapheme-phoneme decoding and identifying written words. As a result, they read little, if at all, which entails a poorer vocabulary, limited knowledge of syntax, and limited general knowledge (Engen & Høien, 2002; Stanovich, 1990). Morphological awareness contributes greatly to a richer vocabulary and normal reading and reading comprehension skills, e.g. children with a reading disability have been shown to be less successful at performing tasks that require morphological awareness. The association between morphology and reading explains in part a child's ability to analyze words and morphological constituents of words in order to produce meaning (Ben-Dror et al., 1995; Saiegh-Haddad & Geva, 2008).

Added to this are the unique features of the learning disability, which may manifest in delayed acquisition of fundamental skills as in the case of impaired attention, memory, language, perceptual and motor disabilities, and cognitive disorders. There may also be delayed acquisition of skills taught during early school years: reading, writing, spelling, reading comprehension, and arithmetic (NJCLD, 2013). Considering the above, the present findings support the professional and research literature regarding differences in reading comprehension between children with and without learning disabilities, and also indicate that the difference is independent of the types of questions asked—open or closed.

### *Association between level of reading and reading comprehension*

This study's findings support the third hypothesis which proposed that there is a link between level of reading and level of reading comprehension in both study populations.

The present findings are in line with earlier reports of a link between reading, diglossia, and reading comprehension. For example, the study of first-grade students exposed to Hebrew diglossia by studying biblical texts in classical Hebrew in addition to modern Hebrew, which showed significantly better scores for diglossic students than the non-diglossic control group on phonological and morphological knowledge, reading accuracy and fluency, and reading comprehension. Studies of the Arabic language show that the linguistic distance between the two language varieties contributes to students' linguistic development (Eviatar & Ibrahim, 2000; Saiegh-Haddad, 2003; Saiegh-Haddad et al., 2011). Based on this, it is safe to assume that the linguistic development deriving from diglossia eventually produces improved reading comprehension. Also, this is consistent with the findings of the present study.

## **CONCLUSIONS**

### *Conclusions and pedagogical implications*

The present study may contribute to a better understanding of the needs of students who experience difficulty acquiring a language. Schools can help first by identifying the challenged students, diagnosing them, and collating the data required for a clinical synthesis, and then establishing a child-specific intervention. Schools should have a post-intervention monitoring program.

As level of reading and presence of diglossia have been shown to be related to development of reading comprehension ability, and acquiring a lexicon and orthographies, it follows that schools would do well develop students' orthographies and lexicons as part of their language curriculum—particularly by focusing on familiarity with word constituents and their different roles. Developing these processes in students both with and without learning disabilities as part of the language curriculum could improve language acquisition as well as raise the level of reading and of reading comprehension.

### *Study limitations and suggested future research*

The limited scope of this study precluded testing all the linguistic variables that may also be linked to mastering reading comprehension, notably lexical level, syntactic structure, and orthographic structure. Future studies are indicated to confirm the present findings in larger samples. In addition, the participants in this study attend schools in the urban center of the country. Future studies conducted among participants from schools around the entire country, may contribute to the ability to generalize from the present results.

As a correlative study, no intervention was included. Future studies could include a controlled intervention that would test the differential efficacy of various methods for improving level of reading and reading comprehension in students with learning disabilities. Future studies could benefit from a comparison between populations in Israel whose children speak native languages other than Arabic and attend separate school system which may affect children's linguistic abilities and achievements.

Finally, the author proposes examining the potential effect of diglossia on reading and on reading comprehension among high school students with learning disabilities. To this end, the level of exposure to both languages (colloquial Arabic and literary Arabic) in the parental home must be evaluated as well.

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