

Comparison of Predictors for Listening and Reading Comprehension in Arabic, Hebrew and English among Typical and Dyslexic Arab Students aged 13-15

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Abstract

Building upon the simple view of reading, this study investigates how listening comprehension subcomponents (vocabulary, morphology, syntax) affect reading comprehension in Arabic, Hebrew, and English. Focusing on 9 to 13-year-old typical and dyslexic learners, it examines the individual and combined roles of these subcomponents in second (Hebrew) and third (English) language contexts. Through tasks assessing vocabulary, morphological awareness, and syntactic knowledge, the study highlights the significant contributions of these subcomponents to reading comprehension. A notable finding is the strong link between vocabulary and morphological awareness, especially in English. These insights provide valuable implications for educational strategies in multilingual environments.

Keywords: Multilingualism. Reading comprehension. Listening comprehension. Vocabulary. Morphological awareness. Syntactic knowledge. Dyslexia.

Introduction

Listening comprehension is central to language skills development and acquisition (Bingol et al., 2014), playing a crucial role in daily communication and learning (Gilakjani & Ahmadi, 2011). As Swanson (1996) emphasizes, listening, arguably more critical than reading, writing, or speaking, is key to learning, with Purdy (1997) defining it as an active process of engagement, interpretation, and response.

Theoretically, listening comprehension involves focusing on spoken inputs to construct meaning and connect details to existing knowledge (O'Malley et al., 1989). Rivers (1971) identifies two essential skills in listening comprehension: recognizing language components (e.g., verbs, other speech parts) and retaining linguistic elements in short-term memory. Rost (2002) views listening comprehension as a process of deducing conclusions, while Breznitz (2006) describes it as a complex problem-solving action influenced by various sub-skills, including scanning for structural clues to understand sentence relationships.

Further, the process encompasses word recognition, understanding syntactic relationships, and discerning the semantic structure of messages within the broader dialogue context (Culter et al., 1997). Poor reading comprehension often stems from deficits in reading fluency and rapid automatized naming (RAN), with several studies highlighting RAN as a key predictor of oral reading fluency (e.g., Clarke et al., 2005; Logan et al., 2011; Norton & Wolf, 2012; Papadopoulos et al., 2016). Additionally, semantic fluency, working memory, and processing speed are closely linked to reading, particularly reading comprehension (Elsayyad et al., 2017; Peng et al., 2018; Wang & Lin, 2019).

Variables affecting listening comprehension

Vocabulary, speech rate, and prior knowledge are key variables influencing listening comprehension (Chiang & Dunkel, 1992; Goh, 1997; Wu, 2005). Vocabulary, particularly unfamiliar words, plays a significant role in learning enjoyment and listening ability (Hung, 1998). A study involving 60 Chinese college students in Hong Kong highlighted vocabulary as

a crucial factor: the broader the vocabulary, the better the listening comprehension. Conversely, teachers identified comprehension cues, complex syntactic structures, stress, and intonation as primary influences (Boyle, 1984).

Professional literature acknowledges variables that impair listening quality, leading to comprehension difficulties. Research shows negative impacts from factors like inadequate vocabulary, limited prior knowledge, ineffective listening strategies, and anxiety (Bingol et al., 2014). Studies on Arabic-speaking children have demonstrated the benefits of regular story listening. For instance, preschoolers and first graders who regularly listened to stories showed better understanding, used more extensive vocabulary, and formed more complex sentences compared to their peers. These children also used language more akin to written forms than everyday speech (Feitelson et al., 1993).

Story listening is thus pivotal in language learning. Iraqi (1993) found similar results in listening comprehension among Arabic-speaking children. Makhoul (2006) emphasized that reading and discussing narrative passages with students is crucial for comprehension development, especially in Arabic due to diglossia and rich vocabulary. Further, a study by Makhoul and Ibrahim (2012) revealed that participating in a reading and writing skills program based on Adams' (1990) interactive model improved various abilities in first graders, including listening comprehension.

Listening comprehension and reading comprehension

Listening and reading comprehension share several characteristics, including similar linguistic information processing and the linear transformation of information into multidimensional semantic representations. Empirical studies have established a connection between these two types of comprehension. Diakidoy et al. (2005) found a strong relationship between reading and listening comprehension from early childhood, intensifying in high school. This pattern is consistent across various languages, including English (Adlof et al., 2006; Joshi et al., 2012; Schatschneider et al., 2004), Korean (Kim et al., 2014; Joshi et al., 2012), and Spanish (Joshi et al., 2012).

Iraqi's (1993) study on Arabic-speaking children echoed these findings, suggesting that sub-components of listening comprehension might influence reading comprehension. This leads to the research question of how listening comprehension sub-components contribute to reading comprehension in Arabic, Hebrew, and English. Second language learners (L2) often show persistent weaknesses in reading comprehension, as evidenced by experimental simulations and standardized tests like the NAEP in the U.S. (National Center for Educational Statistics, 2009) and regional assessments in Ontario, Canada (Ministry of Education, 2012).

There are notable differences between listening and reading comprehension. Firstly, auditory information in speech is

rich and multi-dimensional (time, intensity, frequency), while visual information in reading is orthographically simpler and unambiguous. Secondly, listening involves passive reception of rapidly dissipating information, whereas reading allows control over the pace and repeated access to information (Buck, 2001; Flowerdew, 1994). Thirdly, the modalities differ: speech is auditory, while reading is visual (Breznitz, 2006).

Various studies confirm that listening comprehension significantly contributes to reading comprehension development. For instance, Roch & Levorato (2009) showed that reading comprehension levels can be predicted by listening comprehension levels. Megherbi et al. (2006) and Gottardo et al. (2018) found that listening comprehension is a stronger predictor of reading comprehension than decoding skills from the end of first grade. Interestingly, while decoding skills' contribution diminishes with age, the influence of listening comprehension grows, highlighting its long-term impact on reading proficiency.

The reading process is fundamentally about constructing meaning from written material. It involves accurate text identification to extract embedded meanings, comprising two sub-processes: word recognition and language comprehension. Word recognition entails visually identifying a string of letters as a familiar word and retrieving it from memory (overtly or implicitly). Reading comprehension, on the other hand, hinges on the interaction between the meanings of written and spoken words, aiding sentence comprehension (Vellutino et al., 2004).

Gottardo et al. (2018) suggest that understanding listening comprehension variables can inform reading comprehension models. Their study with fourth-grade Spanish-English speakers indicated a strong correlation between listening comprehension, vocabulary, and reading comprehension, beyond alphabetic knowledge at the word level. Similar findings are noted in English L2 learners in the first and second grades, where listening comprehension is uniquely related to reading comprehension, along with coding-related variables. Reading fluency, too, is linked to reading comprehension across various grade levels (Fuchs et al., 2001; Kim et al., 2011; Klauda & Guthrie, 2008; Santos et al., 2017; Schimmel & Ness, 2017; Solari et al., 2017).

The documented weaknesses in reading and listening comprehension among second language learners underscore the need for a deeper understanding of listening comprehension to develop effective intervention programs. Given time constraints and diverse classroom demands, targeted interventions are essential (Gottardo et al., 2018). The strong correlation between listening and reading comprehension from early reading stages, which strengthens after second grade as word recognition skills become automated, highlights the importance of sound understanding in reading comprehension development (Diakidoy et al., 2005).

In language skills, word meaning comprehension is crucial for listening comprehension (LC), explaining the reported correlation with vocabulary in previous studies (Cheng & Matthews, 2018; Florit et al., 2009; Kim, 2016; Perfetti, 2007; Sénéchal et al., 2006). Syntactic knowledge also plays a role in text meaning construction and contributes to LC by aiding in understanding word relationships and sentence grammar (Kim, 2016; Oakhill et al., 2003; Pizzioli & Schelstraete, 2013). Studies have shown that morphological knowledge also contributes to LC (Fong & Ho, 2017; Fracasso et al., 2016), particularly relevant in Arabic, where lexicons in Semitic languages are morpheme-based (Boudelaa et al., 2011).

Despite the curriculum's emphasis on developing listening comprehension (Ministry of Education, 2009) and its proven impact on literacy development (Roch & Levorato, 2009; Megherbi et al., 2006), this skill remains underpromoted, especially beyond early elementary grades. Contrasting studies exist; for instance, Copti's study (2013) found no significant difference in listening comprehension skills between proficient readers and those with difficulties, differing from Makhoul and Avraham's (2012) findings of disparities in comprehension skills between at-risk and normative development first graders.

A Comparison between Arabic, Hebrew and English morphology

Morphemes, the smallest meaningful units in any language, are central to morphological awareness, which involves understanding grammatical unit meanings and perceiving morphemic relationships (Perfetti, 1985). Language morphology encompasses inflectional, derivational, and compound morphemes. Inflectional morphemes modify a word's form without changing its part of speech, while derivational morphemes alter the part of speech. Compound morphemes involve combining two distinct morphemes. Mastering morphological awareness, with its intricate symbol-to-morpheme mappings, is a gradual process (Koda, 2008; Park, 2004), interlinked with other linguistic abilities due to the semantic, phonological, orthographic, and syntactic properties of morphemes (Kuo & Anderson, 2008; Nagy et al., 2003).

English, Arabic, and Hebrew, unlike monomorphemic languages like Chinese or Vietnamese, have complex morphologies. In Indo-European languages like English, morphemes form by linearly stringing together a sequence of letters or phonemes. Morphologically complex words in English are created by concatenating morphemes linearly, attaching prefixes or suffixes to a base morpheme while preserving the base form's orthographic integrity (e.g., unemployment).

However, Semitic languages like Arabic and Hebrew have nonlinear, nonconcatenative morphological systems (root-and-pattern morphology or introflexion) (Bauer, 2004). Their morphology is considered more complex and vital in visual word recognition (Boudelaa & Marslen-Wilson, 2005).

Arabic and Hebrew are characterized by a nonconcatenative, highly productive derivational morphology, sharing many features (Ravid, 2003; Shimron, 2003; Berman, 1978).

English morphology differs notably from Hebrew and Arabic. Many English words consist of a semantic stem that aids in recognizing the word's basic meaning, typically retaining the stem for decoding semantic meaning. Even in less morpho-phonologically transparent words, the stem's morpheme, comprising consonants and vowels of the stem, remains integral. In English, the stem's morphemes are usually discernible auditorily. Its morphology is serial/sequential, with prefixes and suffixes linearly attached to the stem. The morphological structure is visually represented by preserving the stem's spelling and consistently writing linguistic affixes (Frost & Bentin, 1992; Kahn-Horwitz et al., 2005).

Morphological awareness contributes to English literacy in that affix knowledge results in higher word recognition and reading comprehension scores (Grabe, 2009; Koda, 2008). Poor morphological awareness may indicate reading disabilities (Ben-Dror et al., 1995). Languages differ regarding morphological typology. English inflectional morphology is rather limited, in contrast to Arabic inflectional morphology, which is considered to be rich.

Semitic language reading, for example, Arabic (Abu-Rabia et al., 2003) and Hebrew (Ben-Dror et al., 1995), involves morphological processing whereby word identification is dependent upon one's understanding of constituent morphemes, such as roots, word patterns and affixes. Arabic words are composed of two abstract morphemes—the root morpheme and affix pattern—which provide phonological, orthographic and morpho-syntactic information (noun, verb or adjective forms) (Saiegh-Haddad & Geva, 2008). Arabic roots are comprised of three to four consonants, which are not pronounceable in themselves, and represent an abstract meaning. The affix word patterns incorporate vowels or consonants before, between, or after the root morpheme consonants (Fender, 2008). Research has indicated a strong relationship between derivational morphological awareness and reading acquisition in additional languages (Kahn-Horwitz et al., 2005; Kuo & Anderson, 2008; Lam et al., 2012).

The Arabic morphology

Arabic is one of the Semitic languages, which share a similar phonological and morphological structure (Mahfoudhi et al., 2011). In Arabic, word formation requires the use of nonconcatenative morphology, similar to the Hebrew language (Ravid & Malenky, 2001). As a result, the phonological and orthographic identity of the words is not preserved. Accordingly, we can see that morphology is divided into derivational morphology and inflectional morphology. The derivational morphology refers to the production of a new word from an existing root and a pattern, where the root gives the basic meaning of the word.

There are three ways to produce the patterns (Abu-Rabia, 2012): (A) short vowels embedded within the pattern itself that do not interfere with the orthographic sequence of the root ; (لَبَق , لَبَق) (B) long vowels that enter the root and thus disrupt the orthographic sequence of the consonant root ; (حَاجَان - حَاجَن) (C) Affixes (prefixes, infixes, or suffixes) that connect to the basic root and give it a new semantic meaning (e.g. قَسَرَدَم - قَسَر د). As opposed to the derivational morphology, the inflectional morphology refers to inflection in tense, gender, person, and number. This inflection is done by adding affixes to the word. Admittedly, the inflection is not linear, but it is always a matter of connecting two morphemes (root and suffix). In addition to the complexity of the derivational and inflectional morphology, one word in Arabic can represent an entire sentence in English (for example -اومبت يار - You have seen her), a fact that adds another layer to the complexity of Arabic morphology.

A growing body of evidence shows that morphological awareness predicts vocabulary in a variety of languages. For example, by examining the Arabic language specifically, we can see that the morphology is based on the “root and pattern” method that characterizes the Semitic languages. The roots usually consist of three or four consonants, and there are few roots consisting of two or five consonants. The root represents the basic meaning of the word. The pattern contains vowels and consonants that give specific lexical meaning and syntactic information to the words. In addition, the pattern classifies the words by number and gender and defines the morphological form. According to Madkor (1987), there are two types of morphemes: 1- bound morpheme and 2- free morpheme.

In general, we can see that in Arabic, unlike some other languages, each word can be constructed of one morpheme, such as: (darasa, learn), or from several morphemes, such as: (yadruswn, learn(plural)), which is made up of three morphemes together. There are two types of morphology: 1. Derivational Morphology. 2. Inflectional Morphology (Khalil, 1993). Morphology of Arabic derivation refers to the basic verb (mujarrad) which contains the three basic consonants of the root (fa’ala), together with the affixes and changes that are added to the same basic root, we get the verb (mazyd), for example: (fought, taqaatala) derived from the root (qatala) The suffix is ت, ا (t, aa). This way, morphemes that are added to the basic root create a new meaning for existing words or change the grammatical category (Khalil, 1993).

Accordingly, we can see that intuitively, syntactic knowledge is related to reading comprehension, since it is necessary to understand the structure of sentences in order to understand the text. That is, syntactic knowledge is also a key factor in creating a situation model in that syntax signals which meaning-based components are most important. In comparing different measures of reading comprehension, sentence processing skills were found to be related to some but not all measures of reading comprehension. For example, in examining the interrelationship between reading comprehension, vocabulary, morphology, and syntax, it was

found that there is a direct and indirect connection between morphology and syntax and reading comprehension, with the indirect effects mediated by the vocabulary (Gottardo et al., 2018).

Research on syntactic processing has also differentiated between syntactic knowledge and syntactic awareness as well as between types of syntactic knowledge. Brimo, Apel, and Fountain (2017) found direct effects of syntactic knowledge and indirect effects of syntactic awareness on reading comprehension in adolescent English speakers. In conclusion, it can be seen that in accordance with all of the above, listening comprehension, including all the sub-categories contained in it, is an essential and important factor in improving and expanding reading comprehension. Specifically, this importance can be seen manifested among children with multiple languages. Based on studies done in the field, which examined and focused mainly on the English language as an L2, the present study will examine the issue regarding children whose Arabic language is their first language, Hebrew is their second language, and English is their third language.

Dyslexia

Developmental dyslexia is diagnosed in children with normal development but significantly lower reading skills than their peers of the same intelligence and educational background. It is marked by challenges in accurate and/or fluent word recognition, poor spelling, and decoding abilities (Lyon et al., 2003; Vellutino et al., 2004).

Research shows that unlike dyslexic readers, normal readers develop age-appropriate morphological abilities and awareness of word structures, understanding morphological links between words. Dyslexic readers struggle with grasping morphological relationships and performing morphological manipulations (Abu-Rabia, 2007; McBride-Chang et al., 2003). Strong morphological awareness aids reading by enabling morphological word processing and efficient new word identification through morphological analogies (Wattad & Abu-Rabia, 2020; Berninger et al., 2010; Roman et al., 2009). Sensitivity to word roots and patterns is crucial for word identification and fluent reading in both normal and dyslexic readers (Wattad & Abu-Rabia, 2020; Saiegh-Haddad, 2018; Tibi et al., 2019).

Abu-Rabia and Abu-Rahmoun (2012) assessed the role of phonology and morphology in reading skill development in dyslexic and normal Arabic-speaking sixth and eighth graders. They found significant performance differences in tests encompassing phonology, orthography, reading, spelling, syntax, and working memory, with better outcomes in vowelized versions, indicating reliance on morphology for reading accuracy. Syntax, reading measures, morphology, and spelling were key predictors of reading accuracy in both groups.

Taha and Haddad (2016) investigated the effects of phonological and morphological intervention programs on

Arabic-speaking skilled and poor readers. In dyslexic Arabic readers, mental lexicon development relies more on roots than word patterns, differing from non-dyslexic readers. This reliance impacts their mental lexicon structure, phonological and orthographic processing, and grapheme-phoneme correspondence knowledge (Wattad & Abu-Rabia, 2020; Abu-Rabia, 2007).

In conclusion, listening comprehension, encompassing sub-components like vocabulary, morphological awareness, syntax, working memory, and processing speed, is crucial in enhancing reading comprehension, particularly in multilingual children. The present study focuses on Arabic (L1), Hebrew (L2), and English (L3) speakers, aged 13–15, including both typical and dyslexic students. It aims to explore the unique and shared variances of listening comprehension subcomponents in relation to reading comprehension. The study particularly addresses how these sub-components contribute to reading comprehension among Arabic-speaking students with reading disabilities, providing novel insights into listening and reading comprehension in a multilingual context.

Therefore, the main Research question is: How does the impact of listening comprehension and its constituent components (vocabulary, morphological awareness, and syntax) manifest in relation to reading comprehension among typical and dyslexic Arabic as L1, Hebrew as L2 and English as L3?

The additional sub-question:

1. How do the three components of listening comprehension (vocabulary, morphological awareness, and syntax) manifest when comparing typical and dyslexic Arabic learners?
2. Is there a distinction in the levels of reading comprehension and listening comprehension when comparing the three languages (Arabic as L1, Hebrew as L2, and English as L3)?
3. Does a variance exist in the degree of influence exerted by the three components of listening comprehension (vocabulary, morphological awareness, and syntax) on reading comprehension?

Given the research questions and the review of relevant literature, this study will explore the following hypotheses:

- H1: A correlation will be established between vocabulary, morphological awareness, syntax, and reading comprehension across the three languages (Arabic, Hebrew, and English). Higher vocabulary proficiency, greater morphological awareness, and enhanced syntactic understanding will correspond to higher levels of reading comprehension among the participants.
- H2: Significantly varying levels of impact will be identified among the components of listening comprehension (vocabulary, morphological awareness, and syntax) on reading comprehension between the typical and dyslexic Arabic learners.
- H3: Significant differences will be detected in the reading comprehension skills between students with normative development and those with reading disabilities. The group with reading disabilities will demonstrate lower levels of reading comprehension skills.
- H4: Significant differences will be detected in the listening comprehension levels and its components (vocabulary, morphological awareness, and syntax) between students with reading disabilities and those with normative development. The reading-disabled group will exhibit higher levels of listening comprehension proficiency.

Method Participants

The study based on a sample of three different age groups, between the ages of 13 and 15, belonging to one Arab middle school and one Arab special education school and two elementary schools from the northern region of Israel. Students without reading or learning disabilities chosen to participate in the control groups. In addition, made sure that their vision is normal, or corrected with glasses, and that none of them stayed a year in grade school or kindergarten and that they do not suffer from hearing, vision, or any other physiological or mental problems. All students participated in the study have normal intelligence, which tested using the Rey test, and made certain that they are without attention and/or concentration problems, or any other neurological problems, as reported by their teachers and parents.

Table 1: The distribution of the subjects to the research groups

Graders	7th	8th	9th
Experimental group: dyslexic student readers	30	30	29
First control group: normal readers matched by chronological age	31	31	30
Second control group: younger normal readers matched by reading level. Their reading level is the same as that of the students with dyslexia who are about two years older than they are.	29 4 th	29 5 th	30 6 th

The screening of the three groups conducted based on reading measures and some general ability measures in order to differentiate between the normal readers and the dyslexic students group. Students assigned to the dyslexic

group based on a report from their teachers and based on the existence of a valid didactic diagnosis indicating a reading disability. To confirm the distinction, students given the following tests:

Background tests

To ensure a matched comparison between dyslexic readers and their reading-age counterparts and to identify any other difficulties that could affect performance on study tasks, all subjects underwent a series of background tests in Arabic. These tests were designed to provide a comprehensive evaluation of the participants' reading and cognitive abilities.

Reading Measures:

The reading ability of the subjects was assessed using tests developed and evaluated by three Arabic language teachers, tailored for 7th, 8th, and 9th graders. The specific reading measures included:

1. Word-Level Reading Test: Developed by Wattad (2017), this test assesses the ability to read and understand words in isolation.
2. Phonology Test – “Logat Elkaraa”: Created by Asadi et al. (2016), this test evaluates phonological processing skills critical for reading.

General Ability Measures:

To assess broader cognitive abilities, the following general tests were administered:

1. RCFT – Rey Complex Figure Test (1941): This test measures visual-spatial ability and memory, requiring participants to reproduce a complex line drawing, first by copying it and then from memory.
2. RAVLT – Rey Auditory Verbal Learning Test (1964): This test assesses short-term auditory-verbal memory, attention, and learning ability.

These measures were selected to provide a comprehensive assessment of each participant's reading and cognitive skills, ensuring a robust and reliable comparison between the dyslexic group and their reading-age matched peers.

Tools

The study employed a comprehensive set of tests in Arabic, Hebrew, and English, selected to align with the curriculum and the medium level of difficulty. The tools were chosen in consultation with language teachers and were of high interest to students. The tests were administered in three sessions, each lasting about 50 minutes, with each session focusing on one language. The tests did not differentiate between levels of verbal abilities concerning reading disabilities.

Tests in Arabic: (9 tests)

Most of the tests in Arabic build according to the “Logat Elkaraa” tests for middle school (Asadi et al., 2016) and were selected after consultation with three Arabic language teachers in middle school, according to the curriculum (Ministry of Education, 2013)

1. Reading comprehension tools:

- Word-Level Reading: A 15-word reading test with ascending difficulty, based on Asadi et al. (2018). Reading stops after six consecutive errors.
- Reading Comprehension: Reading aloud a text followed by 10 multiple-choice questions, based on the “Mitz'av exam” 2004.

2. Listening comprehension tools:

- Vocabulary: A 25-word test chosen from Asadi's vocabulary test (Asadi et al., 2016), where participants select appropriate images for heard words.
- Syntactic Knowledge: A 20-word test based on Asadi's tools for elementary school (Asadi et al., 2014), requiring oral responses.
- Morphological Awareness: A 16-word and sentence test from Asadi et al. (2018), involving sentence completion

Tests in Hebrew: (9 tests)

All the tests in Hebrew build after consultation with three Hebrew language teachers in middle schools and with sectoral language supervisor, according to the curriculum (Ministry of Education, 2016).

1. Reading comprehension tools:

- Word-Level Reading: Similar to the Arabic test, with 15 words of increasing difficulty.
- Reading Comprehension: Reading aloud a text followed by 10 multiple-choice questions, developed by Hebrew teachers.

2. Listening comprehension tools:

- Vocabulary: A 20-keyword test requiring the selection of the most appropriate meaning.
- Syntactic Knowledge: A 10-sentence oral cloze test based on Siegel and Ryan (1988).
- Morphological Awareness: A test based on Ben-Dror et al. (1995), involving word group identification.

Tests in English: (9 tests)

The tests in English build according to the tools in Kahn-Horwitz's (2016) and selected after consultation with three English language teachers in middle schools, according to the curriculum (Ministry of Education, 2020).

1. Reading comprehension tools:

- Word-Level Reading: A 15-word ascending difficulty test.
- Reading Comprehension: Reading aloud a text followed by multiple-choice questions, using materials from Kahn-Horwitz (2016).

2. Listening Comprehension Tools:

- Vocabulary: A 20-keyword test from Kahn-Horwitz (2016), with a choice of meanings.
- Syntactic Knowledge: Arranging words into grammatically correct and meaningful sentences, based on Kahn-Horwitz (2016).
- Morphological Awareness: Determining tense or choosing correct word forms using materials from Kahn-Horwitz (2016).

These tests were carefully selected and designed to evaluate various aspects of reading and listening comprehension across the three languages, ensuring a comprehensive assessment of the participants' skills.

Procedure

The tests administered to the participants at their schools in quiet rooms during morning hours by the researcher and two native Arabic-speaking research assistants after received approval. First, the Rey tests administered, followed

by a reading test and phonology test in the Arabic. This preliminary group testing was designed to determine group membership. The repository of tests administered over four sessions, each lasting 45–90 minutes. In the first session, participants were examined in the Rey tests, and then the achievement tests. In the other sessions, the following tests in the three languages administered: Word-level reading, Reading comprehension, Vocabulary, Syntactic knowledge, Morphological awareness.

Screening Results

As part of testing the characteristics of the sample groups, screening tests were performed which were used as a comparative tool both between the three groups in each age group and compared to the norm according to the age of the participants.

Analysis for 7th Graders:

In the background assessments for the 7th-grade cohort, notable differences emerged between the groups. Dyslexic 7th graders exhibited consistently lower performance in word reading level tests, both at their current grade level and compared to 4th graders. A significant disparity was also apparent in the phonological screening test and at stages 7, 8, and 9 of the Rey Auditory Verbal Learning Test (RAVLT).

Analysis for 8th Graders:

The screening for 8th graders revealed that dyslexic students in this grade scored significantly lower than both typical 8th graders and 5th graders in the RAVLT (stages 1-5, 6, 7, 9, and 10). Moreover, substantial differences were observed in the phonological screening and word reading level tests.

Analysis for 9th Graders:

In the 9th-grade group, clear distinctions were evident between dyslexic and typical students, as well as compared to 6th graders. These differences were noticeable in all

tests, except for the RAVLT-Level 10. In this particular test, dyslexic 9th graders showed a higher average of success than both the typical 9th graders and the 6th graders. However, in other tests, the dyslexic group's scores were lower than those of the other groups.

Results

As part of the current study, the unique contributions of five key sub variables - Reading comprehension, Word level (accuracy per minutes), Vocabulary, Morphological awareness, and Syntactic knowledge were examined Relative to reading comprehension among bilingual Arabic-Hebrew speakers divided into three age groups - 7th grade, 8th grade and 9th grade. In the study, a comparison was made in each of the age groups between typical students of the age group, dyslexic students of the age group and younger typical students of the 4th grades, to create a comparison between the groups according to their knowledge levels. The hypothesis was that each of the five components would contribute both independently and jointly to reading comprehension. Examining the research questions and hypotheses was done through a series of correlation tests and hierarchical regressions.

Overview of sample performance

Table 1a shows the three sub variables that examined listening comprehension - vocabulary, morphological awareness, knowledge, and syntactic knowledge - as well as another variable of word level. All of these were tested in addition to the dependent variable - reading comprehension. The five variables were analyzed according to the three age groups - 4th grade, 7th grade and 7th grade dyslexics. Also, a comparison was made of all the research variables according to the language being tested - Hebrew, Arabic and English, to examine the difference between the three age groups according to the three types of language

Table 1a - Description (mean, SD, median and minimum-maximum) of the two research variables divided into age and language groups

Measure	Age group	Language	Mean	SD	Median	Min-Max
Word level	4th grade (N=29)	Hebrew	8.51	4.30	8.56	2.09-23.03
		Arabic	12.30	5.33	11.41	6.74-35.19
		English	--	--	--	--
	7th grade (N=31)	Hebrew	34.08	17.82	31.76	0.57-99.16
		Arabic	24.16	10.24	22.68	7.05-52.88
		English	29.79	19.44	25.37	7.73-93.21
	7th grade- dyslexics (N=30)	Hebrew	4.52	8.06	1.19	0.00-31.68
		Arabic	7.08	6.90	4.76	0.00-27.25
		English	5.36	7.57	2.90	0.00-32.92
Vocabulary	4th grade (N=29)	Hebrew	32.41	12.79	35.00	5.00-55.00
		Arabic	70.21	14.60	72.00	28.00-92.00
		English	--	--	--	--

	7th grade (N=31)	Hebrew	64.35	13.8	65.00	35.00-85.00
		Arabic	78.32	19.64	88.00	28.00-100.00
		English	90.65	11.24	95.00	40.00-100.00
	7th grade- dyslexics (N=30)	Hebrew	41.33	14.38	40.00	20.00-65.00
		Arabic	64.67	19.29	72.00	24.00-88.00
		English	39.50	21.31	30.00	15.00-100.00
Morphological awareness	4th grade (N=29)	Hebrew	85.86	24.28	100.00	20.00-100.00
		Arabic	87.28	19.44	93.75	25.00-100.00
		English	--	--	--	--
	7th grade (N=31)	Hebrew	99.35	2.50	100.00	90.00-100.00
		Arabic	98.19	4.02	100.00	81.25-100.00
		English	74.41	23.32	80.00	26.67-100.00
	7th grade- dyslexics (N=30)	Hebrew	66.67	35.44	80.00	10.00-100.00
		Arabic	73.13	19.22	75.00	6.25-93.75
		English	14.11	12.49	13.33	0.00-56.67
Syntactic knowledge	4th grade (N=29)	Hebrew	22.76	15.79	20.00	0.00-60.00
		Arabic	77.24	18.50	80.00	40.00-100.00
		English	--	--	--	--
	7th grade (N=31)	Hebrew	73.87	18.74	80.00	30.00-100.00
		Arabic	57.74	16.68	50.00	40.00-100.00
		English	81.61	13.75	85.00	35.00-95.00
	7th grade- dyslexics (N=30)	Hebrew	5.67	8.98	0.00	0.00-30.00
		Arabic	49.67	22.51	50.00	10.00-90.00
		English	31.33	15.92	30.00	10.00-65.00
Reading comprehension	4th grade (N=29)	Hebrew	25.69	14.44	25.00	0.00-55.00
		Arabic	61.30	23.31	55.56	11.11-100.00
		English	--	--	--	--
	7th grade (N=31)	Hebrew	72.58	17.79	80.00	15.00-95.00
		Arabic	79.57	23.15	88.89	11.11-100.00
		English	87.39	21.34	90.91	9.09-100.00
	7th grade- dyslexics (N=30)	Hebrew	28.33	16.83	30.00	0.00-65.00
		Arabic	34.07	24.75	38.89	0.00-77.78
		English	26.97	26.31	18.18	0.00-90.91

According to the table, it was found that among the 7th grade students with dyslexia, their scores were found to be significantly lower than those of typical 7th graders, and it was also found that in some parameters (such as morphological awareness, word level, syntactic knowledge) the average of the 7th grade students with dyslexia was low

or equal to the average of typical fourth graders.

The same analysis was also done for the two additional age groups that were examined in this study - 8th and 9th grades, as can be seen in tables 1b and 1c

Table 1b - Description (mean, SD, median and minimum-maximum) of the two research variables divided into age and language groups

Measure	Age group	Language	Mean	SD	Median	Min-Max
Word level	5th grade (N=29)	Hebrew	20.49	13.59	16.72	5.80-52.90
		Arabic	17.61	8.18	15.36	6.28-41.97
		English	19.98	13.48	17.37	4.00-69.88
	8th grade (N=31)	Hebrew	41.22	24.40	32.68	9.98-100.00
		Arabic	28.81	15.88	25.37	9.79-83.43
		English	41.07	27.57	32.46	10.59-100.00
	8th grade- dys-lexics (N=30)	Hebrew	6.48	7.66	3.56	0.00-24.99
		Arabic	7.14	4.85	5.99	0.00-22.70
		English	6.67	6.23	5.25	0.00-23.52
Vocabulary	5th grade (N=29)	Hebrew	32.41	12.79	35.00	5.00-55.00
		Arabic	82.21	10.34	80.00	60.00-96.00
		English	55.69	17.20	55.00	25.00-90.00
	8th grade (N=31)	Hebrew	76.61	5.97	75.00	60.00-85.00
		Arabic	78.45	24.41	88.00	20.00-100.00
		English	96.61	5.38	100.00	85.00-100.00
	8th grade- dys-lexics (N=30)	Hebrew	46.83	17.83	40.00	15.00-85.00
		Arabic	71.33	15.15	76.00	32.00-92.00
		English	51.17	21.52	52.50	10.00-100.00
Morphological awareness	5th grade (N=29)	Hebrew	85.86	24.28	100.00	20.00-100.00
		Arabic	90.30	14.99	93.75	31.25-100.00
		English	48.97	19.62	50.00	20.00-93.33
	8th grade (N=31)	Hebrew	99.68	1.80	100.00	90.00-100.00
		Arabic	97.58	6.18	100.00	68.75-100.00
		English	79.57	17.86	86.67	30.00-100.00
	8th grade- dys-lexics (N=30)	Hebrew	81.50	32.09	100.00	0.00-100.00
		Arabic	71.67	23.77	78.13	18.75-100.00
		English	23.33	13.90	40.00	0.00-90.00
Syntactic knowledge	5th grade (N=29)	Hebrew	43.79	29.81	40.00	0.00-90.00
		Arabic	80.69	15.80	80.00	40.00-100.00
		English	53.45	24.28	55.00	0.00-100.00
	8th grade (N=31)	Hebrew	86.45	14.27	90.00	40.00-100.00
		Arabic	97.10	6.43	100.00	80.00-100.00
		English	86.13	15.58	90.00	50.00-100.00
	8th grade- dys-lexics (N=30)	Hebrew	16.67	19.18	10.00	0.00-95.00
		Arabic	68.00	26.96	80.00	0.00-100.00
		English	40.67	25.01	40.00	0.00-90.00
Reading comprehension	5th grade (N=29)	Hebrew	34.14	12.18	35.00	10.00-65.00
		Arabic	65.52	22.29	66.67	22.22-100.00
		English	50.78	26.56	54.55	0.00-100.00
	8th grade (N=31)	Hebrew	70.81	23.31	75.00	20.00-100.00
		Arabic	86.74	12.96	88.89	44.44-100.00

	8th grade- dys-lexics (N=30)	English	87.10	21.99	100.00	36.36-100.00
		Hebrew	28.33	16.83	30.00	0.00-65.00
		Arabic	34.07	23.33	22.22	0.00-77.78
		English	57.58	31.07	63.64	0.00-90.91

Table 1c - Description (mean, SD, median and minimum-maximum) of the two research variables divided into age and language groups

Measure	Age group	Language	Mean	SD	Median	Min-Max
Word level	6th grade (N=29)	Hebrew	27.26	15.48	2303	5.62-71.71
		Arabic	20.94	7.74	21.53	3.81-35.87
		English	22.72	11.71	23.90	5.38-45.00
	9th grade (N=30)	Hebrew	51.27	24.37	44.80	10.42-100.00
		Arabic	30.06	10.88	26.90	11.99-54.72
		English	47.62	27.02	43.66	5.08-100.00
	9th grade- dys-lexics (N=29)	Hebrew	6.66	7.45	2.95	0.00-23.32
		Arabic	10.72	18.22	7.05	0.00-100.00
		English	14.56	22.42	7.62	0.00-100.00
Vocabulary	6th grade (N=29)	Hebrew	51.33	12.52	50.00	20.00-75.00
		Arabic	85.60	13.44	88.00	44.00-100.00
		English	39.67	16.24	40.00	10.00-70.00
	9th grade (N=30)	Hebrew	75.33	8.90	75.00	50.00-90.00
		Arabic	90.80	8.74	92.00	64.00-100.00
		English	83.17	15.28	90.00	45.00-100.00
	9th grade- dys-lexics (N=29)	Hebrew	38.45	11.73	40.00	20.00-60.00
		Arabic	66.62	18.89	72.00	24.00-96.00
		English	40.17	17.50	35.00	10.00-90.00
Morphological awareness	6th grade (N=29)	Hebrew	99.33	3.65	100.00	80.00-100.00
		Arabic	99.79	1.14	100.00	93.75-100.00
		English	51.67	20.64	50.00	0.00-93.33
	9th grade (N=30)	Hebrew	99.67	1.83	100.00	90.00-100.00
		Arabic	98.54	3.55	100.00	87.50-100.00
		English	59.11	22.88	66.67	13.33-93.33
	9th grade- dys-lexics (N=29)	Hebrew	55.52	36.53	50.00	0.00-100.00
		Arabic	66.16	25.58	75.00	25.00-100.00
		English	21.84	17.90	20.00	0.00-80.00
Syntactic knowledge	6th grade (N=29)	Hebrew	57.33	23.33	55.00	10.00-100.00
		Arabic	88.67	11.67	90.00	60.00-100.00
		English	36.22	15.63	33.33	13.33-86.67
	9th grade (N=30)	Hebrew	89.67	12.73	90.00	50.00-100.00
		Arabic	77.00	23.36	85.00	30.00-100.00
		English	78.00	14.10	80.00	43.33-100.00
	9th grade- dys-lexics (N=29)	Hebrew	16.21	20.77	10.00	0.00-90.00
		Arabic	61.38	24.89	60.00	20.00-100.00

		English	28.05	15.87	26.67	6.67-66.67
Reading comprehension	6th grade (N=29)	Hebrew	32.33	17.16	30.00	0.00-80.00
		Arabic	59.72	16.53	66.67	25.00-83.33
		English	49.09	29.20	45.45	0.00-109.09
	9th grade (N=30)	Hebrew	3.67	25.39	35.00	10.00-90.00
		Arabic	64.17	29.45	66.67	0.00-100.00
		English	87.27	39.49	109.09	0.00-136.36
	9th grade- dyslexics (N=29)	Hebrew	33.28	17.13	35.00	0.00-90.00
		Arabic	54.31	24.76	50.00	0.00-100.00
		English	28.84	25.61	27.27	0.00-100.00

Here too, it was found that students with dyslexia, both in the 8th and 9th grades, have a lower average than their peers in the three languages in all the research variables; And in most cases even lower than those of the younger age group that was tested as a control group (5th grade vs. 8th grade and 6th grade vs. 9th grade).

Relationships between the listening comprehension and their relationship to reading comprehension

The study conducted correlation and hierarchical regression analyses to explore the relationship and influence of various research variables on reading comprehension. The analysis was divided into two main groups. The first group examined the collective contribution of word reading and three listening comprehension variables (vocabulary, morphological awareness, and syntactic knowledge) to reading comprehension. The second group analyzed each variable individually to assess its separate impact on reading comprehension.

Analysis for the 7th Grade:

Tables 2a-i (see appendix 1) detail the relationship strength between the variables and reading comprehension across different age groups and languages. For 4th graders, no significant relationship was found in either Hebrew or Arabic (English was not assessed as 4th graders hadn't started learning it). For typical 7th graders, significant positive relationships were noted between reading comprehension and vocabulary in Hebrew and English, morphological awareness in Arabic, and syntactic knowledge (positive in English and negative in Arabic).

Analysis for the 8th Grade:

For 5th graders, despite no significant relation between reading comprehension and research variables, a positive relationship was observed between syntactic knowledge, word level reading, and morphological awareness in Hebrew. In Arabic and English, significant relationships emerged between reading comprehension and research variables; in Arabic, with morphological awareness, and in English, with all variables except syntactic knowledge. Additional relationships among the variables were also noted in Arabic and Hebrew.

For 8th graders, significant relationships were observed between reading comprehension and word level in Hebrew, morphological awareness in Arabic, and vocabulary and morphological awareness in English. Among dyslexic 8th graders, significant relationships were noted with syntactic knowledge in Hebrew and Arabic, word level in Arabic, and all research variables except word level in English. Clear differences were found between dyslexics and typical students in their relationships with other research variables across all languages

Analysis for the 9th Grade:

Among 6th graders, significant relationships were found between reading comprehension and vocabulary and syntactic knowledge in Hebrew. For 9th graders, significant relationships existed with vocabulary in Hebrew and only syntactic knowledge among dyslexics. In Arabic, significant relationships were observed between reading comprehension and word level among 6th graders, and morphological awareness among dyslexic 9th graders (with no significant findings in typical 9th graders). In English, the strongest relationships were found: 6th graders showed significant relationships with all research variables, typical 9th graders with morphological awareness, and dyslexic 9th graders with vocabulary and morphological awareness. Additional relationships among the variables varied across languages and grades.

Regression Tests

The hierarchical regression tests were conducted to examine the influence of four research variables on reading comprehension, segmented by age group and language. These tests were performed in two stages: initially assessing word reading alone and subsequently evaluating the three sub-variables of listening comprehension (vocabulary, morphological awareness, and syntactic knowledge).

Tables 3a-i (see Appendix 2) show the regression results for the research variables relative to reading comprehension. Tables 4a-i present two additional regression models evaluating the effect of listening comprehension sub-variables on reading comprehension: one analyzing each sub-variable separately and another assessing the collective impact of these variables as a single composite score

representing overall listening comprehension.

Analysis for 7th Grade:

For 4th and dyslexic 7th graders, variables did not significantly predict reading comprehension. For typical 7th graders, in Arabic, the four variables predicted 71.2% of variance in reading comprehension ($R^2=.712$), with morphological awareness being a significant predictor. In English, these variables predicted 40.7% of variance ($R^2=.407$), with vocabulary showing a significant relationship with reading comprehension. For typical 7th graders in Hebrew, the three covariates explained 22% of variance in reading comprehension ($R^2=.220$), with vocabulary being significantly related. In Arabic, the three variables explained 50.2% ($R^2=.502$), with morphological awareness strongly correlated with reading comprehension. In English, the three variables explained 40.7% ($R^2=.407$), with vocabulary significantly related.

Analysis for 8th Grade:

For 5th graders, no significant prediction of reading comprehension in Hebrew and Arabic. In English, the variables predicted 44.7% of variance ($R^2=.447$). For 8th graders, the models were significant across languages, with varying influential variables. For typical 8th graders, significant models were found in Arabic and English. In Arabic, morphological awareness was influential, while in English, vocabulary was the significant predictor. For dyslexic 8th graders, significant models were found across languages with varying influential variables.

Analysis for 9th Grade:

For 6th graders, the regression model found significance in Arabic and English with varying influential variables. No significant model was found for dyslexic 9th graders in any language. For typical 9th graders in English, a significant model was found. For 6th graders, the manipulation variable significantly explained variance in Hebrew and English. For 9th graders, the English language model was significant. These analyses reveal that the impact of the research variables on reading comprehension varies across age groups and languages. The relationship between these variables and reading comprehension is complex, with different variables being more influential in different languages and among different groups (dyslexic vs. typical students).

In conclusion, the analysis of the models showed in general that for the three age groups (7th grade, 8th grade, and 9th grade), the reading comprehension of the dyslexic students in each age group was significantly affected by the combination of the three listening comprehension variables in both the English language and the Arabic language. For the Hebrew language, the effect was only for eighth graders. In addition, the findings showed that this figure is also relevant for the typical classes in all age groups. For the comparison to the lower grades, it seems that the models presented a difference between the 4th grades and the 5th and 6th grades, where in the 4th grade the manipulation variable had no effect at all in any of the languages, while in the other grades it had an effect

in at least one language. Regarding the effect of each of the tomorrow sub-variables separately, it seems that the level of effect of each of the variables on reading comprehension was different both according to the age of the participants and according to the language in which they were tested without presenting a fixed pattern.

Discussion

The primary objective of this quantitative study was to investigate the intricate relationship between listening comprehension, its sub-variables (vocabulary, morphological awareness, and syntactic knowledge), and reading comprehension among typical and dyslexic Arabic learners proficient in Arabic as L1, Hebrew as L2, and English as L3. The study aimed to shed light on how these linguistic components interact and contribute to comprehension skills across different age groups and linguistic contexts.

The study yielded a multitude of findings that collectively emphasize the multifaceted nature of language acquisition and comprehension skills. Firstly, across all languages assessed - Hebrew, English, and Arabic - there was no consistent correlation between reading comprehension and the sub-variables of listening comprehension and word reading. However, distinct correlations emerged for each age group, dependent on the language under investigation. The study's context specificity highlights the complexity of unraveling uniform results and underscores the nuances associated with these interrelationships.

A pivotal outcome of the study was the identification of vocabulary and morphological awareness as the highest-ranking correlation across all variables, primarily manifested in the English context. Moreover, an analysis of the participants' basic knowledge across the three study groups unveiled those dyslexic students exhibited a lower level of proficiency compared to their peers in the same age group and, in certain instances, even comparable to the lower age group. This disparity highlighted the developmental lag experienced by dyslexic readers in comparison to their typical peers.

The regression analysis of participants' comprehension skills revealed significant variations in the extent of influence across different age groups. Interestingly, among typical 7th-grade students, morphological awareness wielded a significant influence on reading comprehension in Arabic, while vocabulary was more pivotal in English. In contrast, dyslexic students in the same age group displayed negligible influence on reading comprehension from any of the sub-variables. This discrepancy underscores the distinctive impact of linguistic components on dyslexic learners and the necessity for tailored instructional approaches.

Research Findings in Light of Literature

Vocabulary and Reading Comprehension:

This study's findings draw a direct line between vocabulary and reading comprehension, echoing the importance of lexical knowledge in text comprehension. The robust

correlation across Arabic, Hebrew, and English reinforces vocabulary's universal role in understanding written texts. This ties in with existing literature underscoring vocabulary as a cornerstone in comprehension processes (Cheng & Matthews, 2018; Kim, 2016). Our study supports the idea that a strong vocabulary base is crucial for accessing word meanings and constructing coherent mental representations of texts (Florit et al., 2009; Perfetti, 2007; Sénéchal et al., 2006). The variation in vocabulary's impact, particularly pronounced in English, aligns with its complex orthographic system (Ziegler & Goswami, 2005). The "Matthew effect" concept (Stanovich, 1986) is further substantiated by our findings, as a robust vocabulary base enhances reading proficiency and contributes to the development of other language skills.

Syntactic Knowledge and Reading Comprehension:

The study also sheds light on the significant role of syntactic knowledge in reading comprehension across all three languages. This finding aligns with prior research that emphasizes syntactic awareness as key to decoding grammatical relationships and extracting meaning from complex structures (Kim, 2016; Oakhill et al., 2003; Pizzioli & Schelstraete, 2013). The stronger correlation in Arabic, a language with complex morphosyntactic features, suggests a heightened benefit from mastering intricate sentence structures. The universality of this component's influence, transcending linguistic boundaries, emphasizes the need for explicit instruction in syntactic structures as part of literacy education.

Morphological Awareness and Reading Comprehension:

The study's findings underscore morphological awareness as a significant factor in reading comprehension. This is particularly evident in Arabic, a language with a complex morphological system. These results resonate with research highlighting the importance of morphological processing in languages with rich morphological structures (Boudelaa et al., 2011; Carlisle, 2000). The ability to recognize and manipulate morphemes is crucial for understanding word meanings and deriving semantic relationships within texts.

Differential Effects on Dyslexic Learners:

The differential relationships between linguistic components and reading comprehension among dyslexic learners offer a novel perspective on adjustments made due to developmental delays associated with dyslexia. Dyslexic learners' heightened reliance on morphological awareness and vocabulary aligns with previous research indicating that these learners leverage their morphological and lexical strengths to compensate for decoding difficulties (Abu-Rabia, 2002; Taha & Hadad, 2016). This pattern underscores the adaptive strategies employed by dyslexic learners to overcome challenges and highlights the role of specific linguistic components in supporting their comprehension skills. The findings related to dyslexic learners' distinct utilization of linguistic components emphasize the role of compensatory mechanisms in enhancing reading

comprehension. These insights resonate with Abu-Rabia's (2002) argument that dyslexic readers capitalize on their morphological knowledge to navigate linguistic challenges. The study underscores the flexibility of dyslexic learners' cognitive resources and their capacity to optimize linguistic skills to bolster comprehension abilities.

The language-specific effects extend to syntax, as dyslexic learners in Arabic and Hebrew exhibit distinct patterns in their correlation with reading comprehension. The reliance on syntax among these learners suggests that grammatical cues may offer compensatory strategies for overcoming phonological challenges. Such findings align with prior research emphasizing the role of syntax in supporting text comprehension among dyslexic readers (Kim, 2016; Oakhill et al., 2003). Educational implications emerge from these differential effects, particularly for supporting dyslexic learners in multilingual contexts. Recognizing the distinct linguistic features of each language can inform targeted interventions that capitalize on learners' linguistic strengths while addressing their challenges. Instructional strategies that emphasize morphological awareness and vocabulary enrichment, combined with syntactic analysis, can equip dyslexic learners to navigate complex linguistic structures and enhance their reading comprehension.

Cumulative Influence of Linguistic Components:

The stronger impact of the combined influence of listening comprehension sub-variables compared to their individual effects resonates with research emphasizing the synergy between linguistic processes in driving comprehension (Wolf et al., 2019). This finding underscores the complex interplay of linguistic skills and their cumulative contribution to the comprehension process. These interconnections emphasize the need for comprehensive interventions that address various linguistic components to foster holistic reading comprehension development.

Our study's findings align with Wolf et al.'s (2019) perspective on the collective influence of linguistic components. This resonates with theoretical frameworks that emphasize the interdependence of listening comprehension sub-variables and their collaborative role in constructing meaning from text. These insights hold significant implications for educators, highlighting the need to cultivate a well-rounded skill set encompassing vocabulary, morphological awareness, syntactic knowledge, and listening comprehension for optimal reading comprehension outcomes.

Language-Specific Influences

The multilingual context of this study provides valuable insights into language-specific influences on comprehension skills. The distinct correlations between linguistic components and comprehension in different languages highlight the intricate interplay between linguistic features and comprehension skills. These findings align with studies emphasizing the role of language-specific factors in shaping reading and listening comprehension (Kim et al., 2014; Saiegh-

Haddad, 2018; Tibi et al., 2019). The specific relationship between vocabulary and English reading comprehension further underscores the linguistic idiosyncrasies of each language and their implications for reading processes. Our study's alignment with Kim et al.'s (2014) observations regarding language-specific influences enriches our understanding of cross-linguistic comprehension processes. The findings underscore the intricate interplay between linguistic properties and comprehension outcomes, emphasizing that these relationships are shaped by both the linguistic structure of the target language and the individual's developmental stage.

In summary, the results of the present study, similar to other studies in the field, indicate a relationship between listening comprehension and its sub-variables (vocabulary, morphological awareness, and syntactic knowledge), reading level and comprehension.

The results of this study show that all components of listening comprehension are important and contribute to reading comprehension at different levels, with the weight of each component changing and being adjusted according to the reading language and age of the reader. In addition, results have shown that for dyslexic students, aspects of morphological awareness and vocabulary are the most important factors for reading comprehension compared to the group of typical students, because their level of knowledge at the beginning is at the level of a lower age group.

Previous studies in this area have shown that reading and listening comprehension are closely related from an early age, and that the relationship between them strengthens in high school. Moreover, other studies have shown a similar pattern of increasing influence of listening comprehension on reading comprehension in English-speaking children (Adlof et al., 2006; Joshi et al., 2012; Schatschneider et al., 2004), as well as in Korean-speaking children (Kim et al., 2014; Joshi et al., 2012) and Spanish-speaking children (Joshi et al., 2012).

At a theoretical level, it is generally assumed that in order to understand what is read, a reader must accurately identify the text in order to extract the meanings it contains. This process consists of two sub-processes: the word recognition process and the language comprehension process (Vellutino et al., 2004). These processes are composed of the same sub-variables of listening comprehension (e.g., morphological awareness, syntactic knowledge, and vocabulary) such that reading fluency correlates with reading comprehension of texts at different levels, especially when second languages are involved (Fuchs et al., 2001; Kim et al., 2011; Klauda & Guthrie 2008; Santos et al., 2017; Schimmel & Ness 2017; Solari et al., 2017).

Therefore, both the results of the present study and other studies in the field show that both reading and listening comprehension are correlated with decoding, while

decoding being based on phonological skills and listening being based on language comprehension (Cain & Oakhill, 2007). Likewise, there is a strong correlation between listening comprehension and reading comprehension from the beginning of reading acquisition, and it becomes stronger after second grade as word decoding and recognition skills become automatic (Diakidoy et al., 2005). Therefore, it is impossible to ignore listening comprehension as an important and necessary foundation for the acquisition and development of reading comprehension.

In terms of linguistic skills, understanding the meaning of words is crucial for LC, so the relationship with vocabulary reported in previous studies is not surprising (Cheng & Matthews, 2018; Florit et al., 2009; Kim, 2016; Perfetti, 2007; Sénéchal et al., 2006). In addition, syntactic knowledge is involved in the construction of meaning from a text and may help to understand the relationship between words and the internal grammatical structure within sentences, which could explain the contribution of syntactic knowledge to LC (Kim, 2016; Oakhill et al., 2003; Pizzioli & Schelstraete, 2013).

Conclusions and Implications

The results of this study and similar studies from the field indicate that early identification of deficits in aspects of listening comprehension and focusing and working on these aspects in dyslexic students can help readers develop self-efficacy and improve their reading skills. The large difference between dyslexic and normal students in different language groups demonstrates how difficult it is to identify at-risk students in a timely manner when dyslexia is in the early stages in formal learning of written language. Given the documented weaknesses in reading and listening comprehension of second language learners', a better understanding of listening comprehension will be helpful in developing intervention programs (e.g., Fracasso et al., 2016; Kim, 2016). In particular, understanding the multiple linguistic components associated with reading comprehension is important for developing targeted support programs. Given the limited education time and the wide variety of learning tasks and demands in the classroom, interventions must be targeted to maximize education time (Gottardo et al., 2018).

Despite the need to promote listening comprehension according to the curriculum (Ministry of Education, 2009) and the importance of listening comprehension in the development of literacy (Asadi et al., 2017; Megherbi et al., 2006), this skill is still not adequately promoted. The word-stem is usually preserved and helps in deciphering the semantic meaning. Although many English words are not morpho-phonologically transparent, the stem morpheme is preserved as an integral unit, since the morpheme consists of both consonants and vowels belonging to the stem.

Accordingly, it is of great importance to adapt the curriculum and help dyslexic students adjust their learning style to facilitate better acquisition of a second English language.

There is growing evidence that morphological awareness predicts vocabulary in a variety of languages. For example, looking at Arabic, it is apparent that morphology is based on the “root and pattern” method that is characteristic of Semitic languages. Based on this understanding, this study highlights and presents the importance of improving listening comprehension and morphological awareness, especially in Arabic speakers when learning a second language.

The study also shows that when comparing different indicators of reading comprehension, sentence processing skills were found to be related to some indicators of reading comprehension but not all. For example, when examining the relationship between reading comprehension, vocabulary, morphology, and syntax, it was found that there is a direct and indirect relationship between morphology, syntax and reading comprehension, with the indirect effects mediated by vocabulary. That is, reading comprehension is a product of accurate and efficient word reading and language comprehension. The language comprehension component (sometimes called “language understanding” or “listening comprehension”) includes all the linguistic knowledge and skills a listener needs to understand a text when it is read aloud, including vocabulary and semantic processing. Therefore, listening comprehension, which includes all subcategories, is an essential and important factor to improve and enhance reading comprehension.

Informing Multilingual Instruction

Given the documented challenges faced by second language learners in reading and listening comprehension, a nuanced understanding of listening comprehension becomes paramount in designing effective intervention programs. The findings offer insights into the multiple linguistic components intertwined with reading comprehension. As such, educators can design targeted support programs that harness the strengths of each linguistic component, maximizing education time and fostering more efficient learning outcomes.

Promoting Listening Comprehension in Multilingual Settings

The current educational landscape places significant emphasis on listening comprehension, as endorsed by curricula and its role in literacy development. Despite this, the study highlights the need for more comprehensive promotion of listening comprehension skills, especially in the lower grades of elementary school. Developing strong listening comprehension skills lays a foundation for proficient reading comprehension, bridging the gap between the spoken and written language domains. This underscores the importance of interventions that facilitate the transfer of listening comprehension skills to reading comprehension abilities, enhancing overall literacy development.

Language-Specific Insights and Cross-Linguistic Comparisons

The study’s exploration of language-specific effects on listening comprehension and reading comprehension offers

valuable insights into the role of linguistic characteristics. The distinct patterns observed among Arabic, Hebrew, and English learners highlight the influence of morphology, vocabulary, and syntax within each language. This underscores the need for tailored interventions that cater to the linguistic nuances of each language, enabling dyslexic learners to leverage their linguistic strengths while addressing challenges. Furthermore, the comparisons between the mother tongue and second languages illuminate the significance of listening comprehension in facilitating the acquisition of reading skills, particularly among dyslexic learners.

In conclusion, the study’s comprehensive analysis of the associations between listening comprehension sub-components and reading comprehension enhances our comprehension of the multifaceted interplay between linguistic factors and literacy development. The implications for educational practice, intervention strategies, and multilingual settings underscore the significance of promoting strong listening comprehension skills as a foundation for proficient reading comprehension across languages. The study encourages educators, researchers, and policymakers to collaborate in fostering comprehensive literacy development by embracing the pivotal role of listening comprehension in learners’ journey towards mastery of written language.

Research contribution

The expected theoretical contribution of this research is reflected in the empirical scientific contribution to the existing international literature on the study of listening comprehension, which can add another layer of knowledge to the reading comprehension process in Arabic, Hebrew, and English in the auditory field. The study is expected to be a preliminary study and a cornerstone in examining the sub-components of listening comprehension in Arabic that have not yet been examined in the literature.

In addition, there is a practical contribution: the research will contribute to understanding the benefits of the sub-components of listening comprehension to reading comprehension in the above-mentioned three languages and to the understanding of how students can be assisted in acquiring listening comprehension skills.

Also, this research can contribute greatly to the examination of the connections between listening comprehension and reading comprehension, and lead to information that may have an impact on many other languages.

Implications of the research on the professional field

This research can contribute greatly to the field of teaching in particular and in the field of therapy and research as a whole. By examining the connections between listening comprehension and reading comprehension, it will be possible to develop targeted intervention programs, which will lead to maximum utilization of school hours as well as the abilities of the teaching staff. When teachers will know what to focus on in order to improve the level of

reading comprehension in their students, the ability to act accordingly will be better.

The contribution can also be expressed in different therapeutic frameworks, since improving and focusing on listening comprehension may help in examining various anxieties or difficulties as well as learning disabilities and focus the treatment accordingly so that it is effective and fits the problem. Children who encounter working memory problems will need a different work plan than those who encounter difficulty in developing vocabulary, and so on.

In addition, in terms of measuring the three sub-variables of listening comprehension, this study can emphasize the importance of examining their balance together, as well as deepen the importance of the ramifications of all the components within listening comprehension at different levels. The results of this study emphasize that each of the sub-variables, if examined separately, has different effects on reading comprehension depending on the age of the learners and the language in which it is examined.

As far as the implications for the intervention are concerned, it can be seen that the results of the present study emphasize that the three sub-variables are related to reading comprehension and therefore should be considered in the development of knowledge among students in foreign language studies. Vocabulary development and training can be combined with morphological awareness by practicing breaking down morphologically complex words to determine their meaning, as well as by learning to create complex words by adding root morphemes and affixes.

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