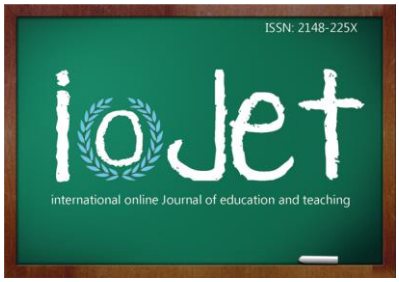

Sümer Dodur, H. M. (2021). Inflectional morphological awareness, word reading and reading comprehension of Turkish students with learning disabilities. *International Online Journal of Education and Teaching (IOJET), 8*(3). 1543-1559.

Received : 18.02.2021
Revised version received : 23.04.2021
Accepted : 25.04.2021

INFLECTIONAL MORPHOLOGICAL AWARENESS, WORD READING AND READING COMPREHENSION OF TURKISH STUDENTS WITH LEARNING DISABILITIES

(Research article)

Halime Miray Sümer Dodur https://orcid.org/0000-0002-1470-8195
Nevşehir Hacı Bektaş Veli University
miraysumer@gmail.com

Biodata: Halime Miray SÜMER DODUR is an Assistant Professor in the Department of Special Education at Nevşehir Hacı Bektaş Veli University in Nevşehir, Turkey. Her research interests include reading comprehension, learning disability, hard of hearing and teaching approaches.

INFLECTIONAL MORPHOLOGICAL AWARENESS, WORD READING AND READING COMPREHENSION OF TURKISH STUDENTS WITH LEARNING DISABILITIES

Halime Miray Sümer Dodur

miraysumer@gmail.com

Abstract

This study investigated the contribution of inflectional morphological awareness to word reading and reading comprehension in the Turkish language. Participants with learning disability (25 sixth-grades, 25 fourth grades) and typical development (25 sixth-grades, 25 fourth grades) were given two tasks of inflectional morphological awareness. Furthermore, word reading and reading comprehension were evaluated. The obtained data were analyzed using two factor Anova, simple correlations, regression analyses. It was revealed that possessive inflectional morphology contributed significantly to reading comprehension for students with learning disability, while two inflectional morphology task had a significant contribution to reading comprehension for all students. In conclusion, inflectional morphological awareness may be an important predictor of reading comprehension in Turkish language.

Keywords: inflectional morphology, morphological awareness, reading comprehension, learning disability

1. Introduction

Students with learning disabilities are defined as individuals that exhibit limited performance in academic skills such as reading, writing, and math despite having normal intelligence, adequate education, and sociocultural opportunities and not having a visual or hearing disability (American Psychiatric Association, 1994). In Turkey, the limitation of phonological skills is the most studied skill to explain the root cause of learning difficulties. Educators are generally much more familiar with the concepts of phoneme and phonological awareness than morpheme and morphological skills. The reason for this is could be that phonological awareness is often considered to be the most important component in acquiring reading skills, and the role of morphology is considered to be less important. Although there is a lot of research on the relationship between phonological limitation and learning disabilities, it is now a well-known fact that phonology is not the only problem affecting reading success (Blomert et al. 2004; Ramus et al. 2003; Lyon et al. 2003). In international literature, there are studies on the effects of phonology, as well as morphology on reading success (Carlisle, 2003; Deacon et al., 2008; Kirby et al., 2012; Kuo & Anderson, 2006; Müller & Brady, 2001; Rothou & Padeliadu, 2011; Rothou & Padeliadu, 2015). Deacon et al. (2008) suggest that the effect of morphological awareness on the reading skill should be taken into consideration independently of phonological skills. Given that decoding alone is not enough for successful reading performance, readers should be able to process the decoded morphemes in line with the structural and semantic features of words to which they are agglutinated for successful comprehension. This brings to the forefront the role and influence of morphology over reading comprehension. It is noted that morphological skills have a significant effect on the development of reading and spelling skills, and play an important

role in the acquisition and teaching of the reading skill (Carlisle, 2003; Deacon et al., 2008; Kirby et al., 2012; Kuo & Anderson, 2006; Müller & Brady, 2001; Rothou & Padeliadu, 2011; Rothou & Padeliadu, 2015).

1.1. Morphological Awareness in Turkish

Morphology deals with the smallest meaningful units in a language and the relationship between these units, and their classification (Shimron, 2006). Morphological awareness is the ability to recognize the inner structure of a word, and to use word derivation rules to make up new words by recognizing prefixes, suffixes, and roots. A morphologically aware individual is expected to recognize roots, inflectional and derivational morphemes of complex words, and to understand the morphological relationships in and between words while reading. Morphological knowledge or awareness begins to develop in children in preschool (Berko, 1958). With time, children realize having this knowledge and start analyzing some morphological structures in words (Carlisle, 2003). For example, they recognize the function of the derivational morpheme "-lik" in words such as "tuz-tuzluk (salt-saltcellar in English), şeker-şekerlik (sugar-sugar bowl in English), göz-gözlük (eye-glasses in English)", realize that words that include this morpheme are made up of two meaningful parts, and start using this morpheme to make up meaningful words. As seen from the example, morphemes are added at the end of root words in Turkish and there are two types of morphemes, namely derivational and inflectional.

Derivational morphemes give multiple meanings words to which they are added, change the meanings of words, and create new words; while inflectional morphemes (possessive, conditional, etc.) allow words to which they are added to perform different grammatical tasks in the sentence. Based on their morphological features, words in Turkish can have more than one derivational and inflectional morphemes added to them (Aksan, 2005; Özcan, 2013). This requires understanding/recognizing the rules and functions of suffixes added to words, especially while reading in Turkish. It is therefore thought that the morphological awareness skill will have a significant impact on both decoding and comprehension dimensions of reading.

Turkish is separated from other languages as it is an agglutinative one and is morphologically highly complex (Aksan, 2005). Given the lingual structure that allows a word to receive multiple suffixes, it is believed that decoding and understanding of morphological structures of words have very important effects, especially on reading comprehension in Turkish. Even though it has transparent orthography in terms of grapheme-phoneme correspondence, the complex morphological structure that allows words to receive multiple suffixes can prevent readers to make effective use of the advantages of a transparent orthography if they lack adequate morphological awareness knowledge, and skills. For example, in English, the number of suffixes added to words is very limited while in Turkish, this number is virtually unlimited. Again, in English, the number of suffixes in words is limited to one or two while it is quite common for many words in Turkish to receive three or more suffixes (e.g., gözlüklerimden; göz-lük-ler-im-den; from my glasses in English). From this point of view, it is clear that even though they have sufficient phonological awareness skills and decode words correctly, readers must have a certain level of morphological awareness skills to correctly understand what they are decoding, in other words, to move from decoding to understanding what they are reading.

1.2. Inflectional Morphological Awareness and Reading

Different word reading models explain the role of morphology in word reading. It is noted that readers, who are in the final phase of Ehri's (2005) word reading model, are familiar with repeating graphemes in complex words, in particular, orthographic patterns and morphemes. The results of studies with English speakers show that identifying morphemes helps reading. For example, Carlisle and Stone (2005) report that elementary school students cannot read morphologically complex words solely based on grapheme-morpheme correspondence or syllables, and morphemes also play an important role. Nunes, Bryant, and Barros (2012) concluded that the use of morphemes in word recognition by children aged 8 or 9 made a significant contribution to the fluency of word reading at the age of 12 or 13.

It is suggested that the effect of morphological awareness on reading comprehension is perhaps greater than that of any other reading skill (Carlisle, 2003; Kuo & Anderson, 2006). As explained by the theory of the simple view of reading (Gough & Tunmer, 1986; Hoover & Gough, 1990), morphological awareness help understand the language and contributes to reading comprehension greatly. Moreover, using morphological awareness, readers can guess general information about the text using syntactic and semantic cues on the basis of morphological structures of unknown words (Nagy, 2007). Many studies show that morphological awareness is linked to different aspects of word reading and text reading. Kirby et al. (2012) showed that the effect of morphological awareness on reading comprehension was high among English-speaking third graders and it explained 9% of the variance. Morphological awareness accounts for 3 to 5% of the variance in accuracy and speed in word reading. It is an important finding that the greatest effect of morphological awareness is on reading comprehension.

Two studies on English-speaking elementary and secondary school students concluded that morphological awareness has an important effect on decoding and reading comprehension (Jarmulowicz et al., 2008; Proctor et al., 2012). These studies together show that morphological awareness influences many aspects of reading including the speed and accuracy of word reading and reading comprehension. It seems like this correlation has effects beyond word reading extending to reading comprehension. However, since most of these studies are carried out in English, more studies are needed in languages with transparent orthographies such as Turkish.

There are many studies about this topic on Greek, which has a phonologically transparent orthography and a simple syllable structure (Pittas & Nunes, 2014; Rothou & Padeliadu, 2015; Seymour et al., 2003). In a cross-sectional study on Greek-speaking first, second, and third graders, Rothou and Padeliadu (2015) investigated the contribution of inflectional morphological awareness to word reading and reading comprehension. It was concluded that inflectional morphological awareness contributed significantly to both word and nonword reading in the first grade (4% of the variance), but did not in higher grades. It was also found that inflectional morphological awareness contributed to reading comprehension in the third grade (3% of the variance), but did not in lower grades. Another study carried out with Greek-speaking children found that morphological awareness contributed to 3% of the variance in word reading in first-graders, and 7% in third graders (Pittas & Nunes, 2014). Rothou and Padeliadu (2011) suggested that morphological awareness plays an important role in word reading in later stages of reading development in languages with transparent orthographies. Padeliadu et al. (2014) suggest that morphological awareness contributes greatly to both decoding and reading comprehension.

Müller and Brady (2011) investigated the effect of inflectional morphological awareness of 80 Finnish-speaking (highly transparent orthography) first-graders on reading

comprehension and word reading. In the study, students were administered a reading comprehension test, fluency test, phonological awareness test, and morphological knowledge test. It was found that inflectional morphological knowledge performance had a significant effect on reading comprehension and decoding skills. It was also found that in terms of phonological awareness, inflectional morphological awareness had a significant effect on reading comprehension but not on decoding skills. It can be concluded from these findings that inflectional morphological awareness has a positive effect on reading comprehension but not on decoding skills. It is reported that morphological awareness education develops the reading (Lyster, 2002) and its effects continue even after 6 years (Lyster et al., 2016) among preschoolers, whose first language is Norwegian. In a study carried out with Dutch-speaking elementary school children, Rispens, McBride-Chang, and Reitsma (2007) found that morphological awareness contributed to word reading in first and sixth graders by 3 to 4%. Based on the results of studies in different languages, Kuo and Anderson (2006) found that the contribution of morphological awareness on word reading and reading comprehension skills increased with age. To summarize, the effect of morphological awareness on reading skills is evident in various languages such as English (Deacon, 2011; Deacon & Kirby, 2004), French (Casalis & Luis-Alexandre, 2000), Finnish (Muller & Brady, 2001), and Dutch (Rispens et al., 2007). The fact that these languages differ in terms of morphological complexity and orthographic depth makes it more important to conduct research on the relationship between orthographic morphology and reading in a language like Turkish with completely transparent orthography.

1.3. Morphological awareness and learning disability

There are research findings suggesting that morphological decoding strategies play an important role in reading word recognition, especially in learning disability (Elbro & Arnbak, 1996). Children with learning disabilities were found to perform lower in various MA tasks in both alphabetic and non-alphabetic languages than their chronological age-matched peers (Deacon et al, 2016; Vender et al., 2017). Children with learning disabilities have limitations in derivational and inflectional morphologies in different languages depending on the complexity of orthographic systems and of morphology.

A number of studies on different languages suggest that compared to good readers, readers with learning disabilities have greater limitations in various morphological tasks. Joanisse et al. (2000) found that those with dyslexia had difficulties in tasks relating to inflectional morphology. Carlisle (1987) reported significant differences between the morphological structure tests of normal students and those with learning disability. Shankweiler et al. (1995) found that children with learning disabilities aged between 7.5 and 9.5 were insufficient in generating morphologically related forms. In their study, Casalis et al. (2004) compared the performance of 33 children with dyslexia with 33 students in the same reading level and 33 students of the same chronological age. Results showed that children with dyslexia scored lower on morphological awareness tasks. Siegel's (2008) results showed that sixth-graders with dyslexia scored significantly lower in morphological awareness tasks than good readers. The results of Abu-Rabia's (2007) study on Arabic showed that morphological skills are lower in individuals with dyslexia compared to normal readers. Morphological awareness is one of the strongest predictors of both reading accuracy and reading comprehension among those with learning disabilities and normal readers in different age groups. Chung et al. (2010) examined morphological awareness in Chinese adolescents with and without dyslexia and found that those with dyslexia scored lower than the those with the same chronological age.

Another study carried out by Rothou and Padelidaou (2019) sought to answer these two questions: Whether Greek-speaking third-graders with dyslexia showed deficiency in noun and adjective inflections and verb conjugations based on sentences, or not? And whether morphological awareness, phonological awareness, and vocabulary knowledge could distinguish children with dyslexia from good readers at the same age, or not? The results showed that third-graders with dyslexia experienced difficulties in morphological awareness skills. The results of this study demonstrate that children with dyslexia have poorer morphological awareness skills even in languages with transparent orthography and rich morphology. As a result, it is safe to say that morphological awareness is pivotal to reading comprehension and individuals with dyslexia have limitations in this skill.

1.4. The present study

Even though the findings of the studies mentioned above show the limitation in the morphological awareness skills of individuals with learning disabilities, little is known about the role of morphology in languages with fully transparent orthographies such as Turkish. The results of research carried out to date reveal that more research is needed on the relationship between morphological awareness and reading from early elementary to secondary school years. These years are pivotal to the development of reading skills. In summary, studies that discuss in detail the relationship between reading comprehension and MA are in different orthographic systems, especially in English. To our knowledge, there is no published study on morphological awareness of readers with learning disabilities in a language that have fully transparent orthographies and a rich morphology such as Turkish. Studies conducted in Turkish are insufficient in explaining the source of challenges faced by readers with learning disabilities. The majority of the studies carried out on this topic in literature tries to explain the challenges faced by such readers using the findings obtained from the studies conducted in foreign languages. However, it is obvious that the challenges faced by readers reading in a language with transparent orthography and exact grapheme-phoneme correspondence such as Turkish cannot be explained by findings in a language that does not have a similar orthography. From this point of view, more studies are needed to fill this important gap in the national literature, and to identify the relationship between morphological awareness and reading skills of readers reading in a language with fully transparent orthography such as Turkish. The purpose of this study is to examine the morphological awareness skills of children with learning disabilities for the Turkish language.

2. Method

This cross-sectional study is a descriptive study that aims to examine word reading and reading comprehension performances of students with and without learning difficulties in terms of inflectional morphological awareness skills.

2.1. Participants

The study group consists of fourth (n=25) and sixth-grade (n=25) students, whose native language is Turkish and are diagnosed with learning disability, and typical development fourth (n=25) and sixth-grade (n=25) students, which are noted to have a normal reading performance according to their classroom teachers. Children in the control group study are in the same class as those with learning disabilities and not diagnosed with a disorder or a learning disability.

2.2. Materials

2.2.1. Evaluation of Word Reading Skills

The real word and non-word reading procedure, which was developed by Güldenoğlu (2016), was adopted in this study to identify the word reading performances of children with and without learning disabilities. During the procedure, the participants were presented with real words and non-word pairs written in both plain text writing and handwriting and asked to read the words they see on the screen as soon as possible and to tell if they are the same or not (Figure 1).

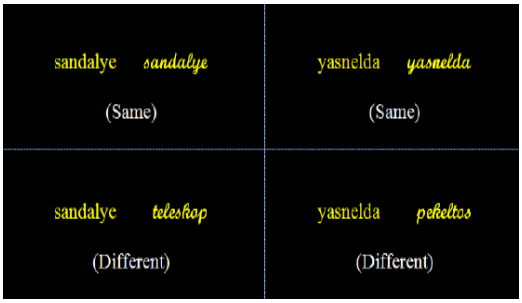

Figure 1. Screenshot examples of meaningful real word and non-word reading skills evaluation paradigms

This procedure consists of 84 word pairs, of which 42 is made up of the same two words (real word and non-word) and the other 42 is of different two words (real word and non-word). Two words in pairs that are made up of different words are selected among those that have a similar number of letters and syllables. For example, when forming pairs, real words such as “sandalye-sandalye (same), sandalye – teleskop (different)" and nonwords such as “yasnelda-yasnelda (same), yasnelda – pekeltos (different)” were used, all of which are made up of 8 letters and 3 syllables. By using two different types of writing (plain text writing and handwriting), participants were made to decide whether word pairs are different or not by not only looking at them visually but also by making use of their word decoding skills.

2.2.2. Assessment of Inflectional Morphological Awareness

The texts used in the study are developed under the TÜBİTAK-114K643 (2017) reading project to evaluate third, fourth, sixth, seventh, ninth, and tenth-grade students from a developmental perspective and are appropriate for third and fourth-graders. To make use of the texts, necessary permission was received from the implementer of the relevant project. The purpose of this procedure was to evaluate the level of knowledge of children on derivational and inflectional morphemes. Children were given a sentence and were asked to fill the gap in the sentence by adding the proper morpheme to the word provided in brackets. The procedure consists of 27 items, 9 of which use derivational morphemes, and 18 of which use inflectional morphemes (9 possessives and 9 conditionals). The answers of participants were calculated by the implementer at the end of administration by giving 1 point for each correct answer and 0 points for each false answer. Total score for each morpheme was noted down in the appropriate section.

One example for the structure of inflectional awareness is the following:

Senin kızın ……*çayı*……şekerli içiyor. (çay) / You daughter drinks tea with sugar. (Tea)

Benim ……*abim*…… eve kiracı arıyor (abi) / My brother is looking for a tenant. (brother)

In the examples above, appropriate morphemes were added to the words in brackets to fill the gap with correct words.

2.2.3. Reading Comprehension Assessment Tool

Two different texts and five comprehension items for each of these texts were used to evaluate the reading comprehension skills of students. The texts used in the study are developed under the TÜBİTAK-114K643 (2017) reading project to evaluate third, fourth, sixth, seventh, ninth, and tenth-grade students from a developmental perspective and are appropriate for third and fourth-graders. To make use of the texts, necessary permission was received from the implementer of the relevant project. In this procedure, students were presented with two paragraphs with different morpho-syntactic structures, 5 comprehension questions for each paragraph, and answer options. Students were then asked to read the paragraphs and questions in order and to mark the option they thought was correct for each question.

2.3. Data Collection and Analysis

Testing occurred in three sessions in children's schools in the first semester of the school year. Each child was individually tested in a quiet room by the author; testing session lasted approximately 45 minutes. In the first session, the word reading tests were presented to the children in a group session. Then children were seen individually to assess morphological awareness in that order in the second session. In the third and final session, children completed the reading comprehension tests.

A description of the materials used point out above. As for the coding procedure, all tests were coded twice by the first and an expert on a her field; the few disagreements in the coding were resolved after a discussion between the coders. Measures of interrater reliability have been provided for each of the tasks administered. This study was analyzed using two factor Anova, simple correlations, regression analyses.

3. Results

The descriptive statistics for all measures are shown in Table 1. Analyses were carried out using two factor ANOVA (Table 2).

Table 1. *Means (standard deviations) for possessive inflection, conditional inflection, word reading and reading comprehension for participants in Grades 4–6*

	Learning Disability		*Typical Development*	
	4th Grade (n=25)	*6th Grade (n=25)*	*4th Grade (n=25)*	*6th Grade (n=25)*
Measures	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Possessive Inflectional	4.84 (2,51)	4.12 (2.68)	8 (1.25)	8,2 (1.25)
Conditional Inflectional	4.44 (2.43)	4,32 (2.30)	8.4 (1)	8.52 (.91)
Word reading accuracy	70.60 (7.55)	69.16 (14.38)	70.96 (8.57)	74.96 (5.68)
Word reading speed*	122691.21 (39578.67)	118573.33 (29591.12)	143881.55 (33683.23)	106442.35 (16535.55)
Reading comprehension	3.04 (1.24)	2.44 (.91)	4.64 (.86)	4.92 (.27)

**Word reading speed were in milliseconds.*

It can be seen that the performance of the children with a learning disability was consistently worse than that of the control group, for all tasks.

Table 2. *ANOVA results for possessive inflection scores by student group and grade*

	possessive inflection		
	F	p	n^2
Group	78,626	.000	.45
Grade	.406	.526	.004
Group*grade	1.270	.263	.013
	conditional inflection		
Group	127.298	.000	.57
Grade	.000	1.000	.000
Group*grade	.110	.741	.001

First, it was found that average scores of two groups, one showing normal development and one with learning disabilities, show a statistically significant difference in both possessive morphological difference (F(1, 96)=78.626, p<.05, n2=.45) and conditional morphological difference (F(1, 96)=127.298, p<.05, n2=.57). Table 1 shows that compared to students with learning disabilities, typical development children performed better in both tasks. Secondly, student performances did not show a statistically significant difference by grade for both tasks (F(1, 96)=.406, p>.05, n2=.004 and F(1, 96)=,000 p>.05, n2=.000). The analysis results showed no significant common effect between student groups and grades in both tasks (F(1, 96)=.263, p>.05, n2=.013 and F(1, 96)=.110, p>.05, n2=.001). This showed that the morphological awareness score differences of students in both groups were similar at all grades.

The overall evaluation of the study findings clearly show differences between the morphological awareness skills of students with learning disabilities and those showing normal development. The results highlight that there are significant differences between the two groups in terms of morphological awareness and that these differences are shaped independently of grade. Correlations between skills are reported separately for each group in Table 3.

Table 3. *Simple correlations between variables for children with learning disabilities*

learning disability students					
possessive inflection	-				
conditional inflection	.51**	-			
Reading comprehension	.45**	.37**	-		
word reading accuracy	-.12	.04	.28*	-	
word reading speed	-.00	-.12	-.02	-.12	-
typical development students					
1.possessive inflection	-				
2.conditional inflection	.20	-			
3.Reading comprehension	.26	.04	-		
4.word reading accuracy	.36**	-.22	.34*	-	
5.word reading speed	.24	-.12	.19*	-.13	-

*p < .05. **p < .01.

The correlation coefficients ranged from weak (.19) to moderate (.51). Conditional inflection was significantly and moderately correlated with possessive inflection. Reading comprehension correlated significantly with both morphological tasks only learning disability students. Reading comprehension correlated significantly word reading accuracy. For typical development students; possessive inflection correlated significantly with word reading accuracy. Reading comprehension correlated significantly with both word reading accuracy and reading speed.

Separate standard multiple regression analyses within each group were used to explore the predictive value of each aspect of inflectional morphological awareness. Word reading, possessive inflection, and conditional inflection were entered into the equation at the same time. The results of these analyses are indicated Table 4.

Table 4. *Regression analyses with possessive inflection, conditional inflection, word reading as predictors*

	Reading comprehension			
Predictors	B	SE B	β	p
Learning Disability				
conditional inflection	.110	.069	.229	.117
possessive inflection	.143	.062	.332	.026
word reading	-.022	.012	-.229	.07
Typical development students				
conditional inflection	.137	.103	.202	.191
possessive inflection	-.065	.086	-.126	.453
word reading	.046	.014	.528	.002
All students				
conditional inflection	.214	.051	.425	.000
possessive inflection	.194	.051	.386	.000
word reading	-.002	.01	-.017	.804

The analysis showed that learning disability did possessive inflection make a statistically significant contribution to reading comprehension. Word reading was the predictor of reading comprehension in typical development students. In all groups did possessive inflection make a statistically significant contribution to reading comprehension ($\beta = 0.386$), which however was smaller than the contribution of conditional inflection ($\beta = 0.425$). The model of all the predictor variables explained a greater amount of variance in reading comprehension in all students and learning disability than in typical development students, Learning Disability: $R^2 = .308$, $F (3, 46) = 6.828$, $p < .01$; Typical development students: $R^2 = .224$, $F (3, 46) = 4.424$, $p < .01$; All students: $R^2 = .571$, $F (3, 96) = 42.537$, $p = .000$.

4.DISCUSSION

In the current study, we investigated the contribution of two aspects of inflectional morphology to word reading and reading comprehension in Turkish-speaking children (Grades 4–6). Possessive inflection was found to predict both learning disability and reading comprehension in the whole student group while conditional inflection was found to predict only reading comprehension in the whole student group. The purpose of this study was to present findings for the development of possessive and conditional inflection awareness in Turkish.

Consistent with relevant literature, our findings show that Turkish-speaking fourth and sixth-graders with learning disabilities exhibit limitations in morphological awareness compared to their typical development peers (Duranovic et al., 2014; Grammenou & Miller, 2020; Joanisse et al., 2000; Robertson & Deacon, 2019; Rothou & Padeliadu, 2019; Vender et al., 2017). This limitation in morphological awareness skills of children with learning disabilities could be linked to the limited information-processing skills that prevent them from applying the rules accurately (Rothou & Padeliadu, 2019; Vender et al., 2017). Compared to typical development fourth and sixth-graders, children with learning disabilities had trouble forming possessive and conditional inflections. In addition, the evaluation process only involves meaningful words and the formation of inflectional morphemes was evaluated within the context of sentences. In their study, Joanisse et al. (2000) found that English-speaking children with dyslexia exhibited poorer performance in inflectional morpheme-related tasks compared to their typical development peers. In their study on Greek, Rothou and Padeliadu (2019) concluded that compared to their peers, third-graders with dyslexia had limitations in inflectional morpheme-related tasks, which were evaluated within the context of sentences. Grammenou and Miller (2020) examined the inflectional morphological awareness of sixth-graders with dyslexia and of typical development peers at the same age and concluded that students with dyslexia performed worse. Although the findings are consistent with literature, another explanation for the reason for the difference between the two groups of readers in Turkish may be related to the structure and content of the morphological awareness task. With that being said, it is well known that morphological awareness can be evaluated through various tasks. The possessive and conditional inflectional morpheme task in the study included words that students often encountered in verbal and written language, and target inflectional morphemes were included in sentences with a simple syntactic structure. Therefore, it can be said that the difficulty experienced by students with learning disabilities is not caused by the content of the MA task, but by their limitations in morphological awareness skills. But longitudinal and/or intervention studies are still needed to confirm this hypothesis. Based on the findings, it can be concluded that children with learning disabilities will also experience difficulty in languages with a different orthographic depth and inflectional morphological complexity. Since inflectional morphological awareness was measured with a relatively low number of items in this study, attention must be paid when generalizing the existing findings for children with learning disabilities. Given the difference between Turkish and other languages in terms of morphological structure, attention must be paid when comparing the findings with the results of other studies in languages such as English and Greek.

Another purpose of this study is to demonstrate the correlation between morphological awareness and reading comprehension of Turkish-speaking students with learning disabilities. There was no study found on the inflectional morphological awareness of Turkish-speaking children with learning disabilities however, the correlation between inflectional morphology and reading skills have been investigated in other studies in languages with complex inflectional systems such as French, Dutch, English, and Greek (Casalis & Luis-Alexandre, 2000; Deacon & Kirby, 2004; Rispens et al., 2008; Rothou & Padeliadu, 2014). Therefore, it is possible to say that the current study offers some preliminary findings regarding the inflectional morphological awareness of Turkish-speaking children with learning disabilities. The effect of morphological awareness on reading comprehension is consistent with previous studies in English (Deacon & Kirby, 2004), and in languages with a different orthography (Müller & Brady, 2001; Rothou & Padeliadu, 2015) The effect size found as a result of the study is not high, however, it is consistent with previous studies in English (Deacon & Kirby, 2004), Dutch (Rispens et al., 2007), and Greek (Pittas & Nunes, 2014; Rothou & Padeliadu, 2014). Considering the results of this study and

of previous ones, there seems to be a consistent model of the contribution of morphological awareness in reading in alphabetical languages.

The finding that morphological awareness is not a meaningful predictor of reading comprehension for the typical development group may be due to sample size and research design. For example, a study conducted with Finnish children employed a longitudinal approach (Torppa et al., 2010). In addition, further research with a wider sample group and various morphological awareness tasks is needed to investigate whether morphological awareness skills predict the word reading and reading comprehension skills of Turkish-speaking children with learning disabilities and typical development readers. Given the importance of the correlation between morphological awareness and reading (Deacon et al., 2008), a second control group, which is appropriate to reading age, should be included in another study. Such a study could come up with different conclusions on the morphological awareness skills of Turkish-speaking children with learning disabilities and good readers.

Since there is not such a study in the Turkish language, the results are new in terms of showing the correlation between morphological awareness and reading comprehension in children with learning disabilities within the context of a transparent orthography and extend the scope of previous studies. There are few explanations on this correlation. One possibility is that morphological awareness is a part of comprehension (Kirby & Savage, 2008), which affects reading comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990). Another possibility is that morphological awareness helps children to have a general understanding of the text by making use of syntactic and semantic clues for unknown words in the text. These possibilities should be explored in future studies. All students included in the study appear to have a similar level of word reading skills. This suggests that the differences in reading comprehension among student groups are not due to their word reading skills, but rather due to their limitations in morphological awareness skills.

Finally, this study shows the contribution of morphological awareness to reading comprehension in line with the results of other studies conducted on different orthographies (De Freitas et al., 2018; Deacon & Kirby, 2004; Pittas & Nunes, 2014; Rispens et al., 2007; Rothou & Padeliadu, 2015). Given that morphological awareness will have different levels of effect in different orthographies, we believe that identifying the universal aspects of reading development is important for future research. In addition, differences between those with and without learning disabilities highlight the importance of gaining morphological awareness skills for improving reading comprehension. In their study, Bowers, Kirby, and Deacon (2010) describe the positive effects of teaching morphological awareness skills on reading skills. In addition, in their meta analysis on morphological awareness-related interventions, Goodwin and Ahn (2010) underline that morphological awareness training can improve the reading skills of children with literacy difficulties.

Another result obtained by the study is that student performances have no statistically significant differences according to grade. Prior to the study, it was expected that students' performance would be positively affected as their experience would increase with their grade. The first possibility suggesting this is that in both grades, typical development students reached the highest score, while the second one is that students with learning disabilities in two different grades showed very limited and similar behaviors in terms of morphological awareness skills. This result of the study is valuable for students with learning disabilities. Because although they are at the same level as their peers, who have normal development in their word reading skills, given that sixth-graders will have more reading experience, the lack of improvement in morphological awareness and reading comprehension scores is worrisome. The findings also show us that these skills cannot directly be acquired through

experience and teachers should devote separate time to teaching strategies relating to these skills.

This study expands the research on learning disabilities by providing data on a transparent language with a wide range of inflectional morphology. However, this study has some limitations. The sample size does not allow to fully explain the causal relationships between variables. Another limitation is that morphological awareness on nonwords was not evaluated to understand inflectional awareness skills of children. Finally, a control group of the appropriate reading age was not included in the study. This is not sufficient to explain the correlation between morphological awareness and reading and to suggest that the limitation in the morphological awareness skills of students with learning disabilities is caused by their learning disabilities.

References

Abu-Rabia, S. (2007). The role of morphology and short vowelization in reading Arabic among normal and dyslexic readers in grades 3, 6, 9, and 12. *Journal of Psycholinguistic Research, 36,* 89–106. https://doi.org/10.1007/s10936-006-9035-6

Aksan, D. (2005). *Türkçenin zenginlikleri incelikleri*. Ankara: Bilgi Yayınevi.

American Psychiatric Association. (1994). *Diagnostic and statistical manual on mental disorders (4th ed. DSM-IV)*. Washington, DC: American Psychiatric Press.

Berko, J. (1958). The child's learning of English morphology. *Word,* 14, 150-177. https://doi.org/10.1080/00437956.1958.11659661

Blomert, L.,Mitterer, H.,&Paffen, C. (2004). In search of the auditory, phonetic, and/or phonological problems in dyslexia: Context effects in speech perception. *Journal of Speech, Language, and Hearing Research, 47*, 1030–1047. https://doi.org/10.1044/1092-4388(2004/077)

Bowers, P. N., Kirby, J. R., & Deacon, S. H. (2010). The effects of morphological instruction on literacy skills: A systematic review of the literature. *Review of Educational Research, 80*(2), 144–179. https://doi.org/10.3102%2F0034654309359353

Carlisle, J. F. (1987). The use of morphological knowledge in spelling derived forms by learning-disabled and normal students. *Annals of Dyslexia, 27,* 90–108. https://doi.org/10.1007/BF02648061

Carlisle, J. F. (2003). Morphology matters in learning to read: a commentary. *Reading Psychology, 24*, 291–322. https://doi.org/10.1080/02702710390227369

Carlisle, J. F., & Stone, C. A. (2005). Exploring the role of morphemes in word reading. *Reading Research Quarterly, 40*, 428–449. https://doi.org/10.1598/RRQ.40.4.3

Casalis, S., & Luis-Alexandre, M. F. (2000). Morphological analysis, phonological analysis and learning to read French: A longitudinal study. *Reading & Writing, 12*, 303–335. https://doi.org/10.1023/A:1008177205648

Casalis, S., Colé, P., & Sopo, D. (2004). Morphological awareness in developmental dyslexia. Annals of Dyslexia, 54(1), 114–138. https://doi.org/10.1007/s11881-004-0006-z.

Chung, K. K. H., Ho, C. S. H., Chan, D.W., Tsang, S. M., & Lee, S. H. (2010). Cognitive profiles of Chinese adolescents with dyslexia. *Dyslexia, 16,* 2–23. https://doi.org/10.1002/dys.392

De Freitas Jr, P. V., da Mota, M. M. P. E., & Deacon, S. H. (2018). Morphological awareness, word reading, and reading comprehension in Portuguese. *Applied Psycholinguistics*, *39*(3), 507-525. https://doi.org/10.1017/S0142716417000479

Deacon, H. S., Parrila, R., & Kirby, J. R. (2008). A review of the evidence on morphological processing in dyslexics and poor readers: A strength or weakness? In F. Manis, A. Fawcett, G. Reid, & L. Siegel (Eds.), *The sage handbook of dyslexia* (pp. 212–237). London: Sage.

Deacon, S. H. (2011). Sounds, letters and meanings: The independent influences of phonological, morphological and orthographical skills on early word reading accuracy. *Journal of Research in Reading*. Advance online publication. https://doi.org/10.1111/j.1467-9817.2011.01496.x

Deacon, S. H., Tong, X., & Mimeau, C. (2016). Morphological and semantic processing in developmental dyslexia across languages: A theoretical and empirical review. In C. Perfetti, K. Pugh, & L. Verhoeven (Eds.), *Dyslexia across languages and writing systems: A handbook.* Cambridge: Cambridge University Press.

Deacon, S. H., & Kirby, J. R. (2004).Morphological awareness: Just "more phonological"? The roles of morphological and phonological awareness in reading development. *Applied Psycholinguistics, 25*, 223–238. https://doi.org/10.1017/S0142716404001110

Duranovic, M., Tinjak, S., & Turbic-Hadzagic, A. (2014). Morphological knowledge in children with dyslexia. *Journal of Psycholinguistic Research, 43*, 699–713. https://doi.org/10.1007/s10936-013-9274-2

Ehri, L. C. (2005). Learning to read words: Theory, findings, and issues. *Scientific Studies of Reading, 9*(2), 167–188. https://doi.org/10.1207/s1532799xssr0902_4.

Elbro, C., & Arnbak, E. (1996). The role of morpheme recognition and morphological awareness in dyslexia. *Annals of dyslexia, 46*(1), 209-240. https://doi.org/10.1007/BF02648177

Goodwin, A. P., & Ahn, S. (2010). A meta-analysis of morphological interventions: Effects on literacy achievement of children with literacy difficulties. *Annals of Dyslexia, 60*, 183–208. https://doi.org/10.1007/s11881-010-0041-x

Gough, P. B., & Tunmer,W. E. (1986).Decoding, reading, and reading disability. *Remedial and Special Education, 7*, 6–10. https://doi.org/10.1177%2F074193258600700104

Güldenoğlu, B. (2016). The effects of syllable-awareness skills on the word-reading performances of students reading in a transparent orthography. *International Electronic Journal of Elementary Education, 8*(3), 425-442. https://www.iejee.com/index.php/IEJEE/article/view/123/120

Grammenou, A., & Miller, N. (2020). Morphological awareness of 11 year old Greek children with dyslexia: Investigation of an under-researched area. *ARECLS, 17*, 116-164. https://research.ncl.ac.uk/arecls/currentvolume/

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

Jarmulowicz, L., Hay, S. E., Taran, V. L., & Ethington, C. A. (2008). Fitting derivational morphophonology into a developmental model of reading. *Reading and Writing, 21*, 275–297. https://doi.org/10.1007/s11145-007-9073-y

Joanisse, M. F., Manis, F. R., Keating, P., & Seidenberg, M. S. (2000). Language deficits in dyslexic children: Speech perception, phonology and morphology. *Journal of Experimental Child Psychology, 77*, 30–60. https://doi.org/10.1006/jecp.1999.2553

Kirby, J. R., Deacon, H. S., Bowers, P. N., Izenberg, L., Wade-Woolley, L., & Parrila, R. (2012). Children's morphological awareness and reading ability. *Reading & Writing: An Interdisciplinary Journal*, 25, 389–410. https://doi.org/10.1007/s11145-010-9276-5

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

Kuo, L., & Anderson, R. C. (2006). Morphological awareness and learning to read: A cross-language perspective. *Educational Psychologist, 41*, 161–180. https://doi.org/10.1207/s15326985ep4103_3

Lyon, R. G., Shaywitz, S. E., & Shaywitz, B. A. (2003). Defining dyslexia, comorbidity, teachers knowledge of language and reading. *Annals of Dyslexia, 53*, 1–14. http://dx.doi.org/10.1007/s11881-003-0001-9

Lyster, S. A. H. (2002). The effects of a morphological versus a phonological awareness training in kindergarten on reading development. *Reading and Writing, 15*, 261–294. https://doi.org/10.1023/A:1015272516220

Lyster, S.-A. H., Lervåg, A. O., & Hulme, C. (2016). Preschool morphological training produces long-term improvements in reading comprehension. *Reading and Writing, 29*, 1269–1288. https://doi.org/10.1007/s11145-016-9636-x

Müller, K., & Brady, S. (2001). Correlates of early reading performance in a transparent orthography. *Reading & Writing, 14*, 757–799. https://doi.org/10.1023/A:1012217704834

Nagy, W. (2007). Metalinguistic awareness and the vocabulary-comprehension connection. In R. K.Wagner, A. Muse, & K. Tannenbaum (Eds.), *Vocabulary development and its implication for reading comprehension* (pp. 52–77). New York: Guilford Press.

Nunes, T., Bryant, P., & Barros, R. (2012). The development of word recognition and its significance for comprehension and fluency. *Journal of Educational Psychology, 4*, 959–973. https://psycnet.apa.org/doi/10.1037/a0027412

Özcan, H. (2013). Çocukta dil ve kavram gelişimi. S. Topbaş (Ed.), *Biçimbirim ve sözdizimi gelişimi* içinde (ss. 114-124). Eskişehir: Anadolu Üniversitesi.

Padeliadu, S., Rothou, K. M., & Sideridis, G. (2014). Component skills of beginning readers in Greek: Morphological awareness, phonological awareness and vocabulary skills. In *Proceedings from the 17th European Conference on Reading*.

Pittas, E., &Nunes, T. (2014). The relation between morphological awareness and reading and spelling in Greek:Alongitudinal study. *Reading and Writing, 27*, 1507–1527. https://doi.org/10.1007/s11145-014-9503-6

Proctor, C. P., Silverman, R. D., Harring, J. R.,&Montecillo, C. (2012). The role of vocabulary depth in predicting reading comprehension among English monolingual and Spanish–English bilingual children in elementary school. *Reading and Writing, 25*, 1635–1664. https://doi.org/10.1007/s11145-011-9336-5

Ramus, R., Rosen, S., Dakin, S., Day, B., Castellote, J., White, S., et al. (2003). Theories of developmental dyslexia: Insights from a multiple case study of dyslexic adults. *Brain, 126*, 841–865. https://doi.org/10.1093/brain/awg076

Rispens, J., McBride-Chang, C., & Reitsma, P. (2007). Morphological awareness and early and advanced word recognition and spelling in Dutch. *Reading and Writing, 21*, 587–607. https://doi.org/10.1007/s11145-007-9077-7

Robertson, E. K., & Deacon, S. H. (2019). Morphological awareness and word-level reading in early and middle elementary school years. *Applied Psycholinguistics*, *40*(4), 1051-1071. https://doi.org/10.1017/S0142716419000134

Rothou, K. M., & Padeliadu, S. (2015). Inflectional morphological awareness and word reading and reading comprehension in Greek. *Applied Psycholinguistics, 36*(4), 1007–1027. https://doi.org/10.1017/S0142716414000022

Rothou, K. M., & Padeliadu, S. (2019). Morphological processing influences on dyslexia in Greek-speaking children. *Annals of dyslexia*, *69*(3), 261-278. https://doi.org/10.1007/s11881-019-00184-8

Rothou, K. M., & Padeliadu, S. (2011). *Predictions of reading in Greek based on compound awareness, phonological awareness and vocabulary skills*. Poster presented at the First Eldel International Conference on Reading, Spelling and Writing Development, Prague. Retrieved from http://www.eldel.eu/noneldelpublications

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

Shankweiler, D., Crain, S., Katz, L., Fowler, A. E., Liberman, A. M., Brady, S. A., ... & Shaywitz, B. A. (1995). Cognitive profiles of reading-disabled children: Comparison of language skills in phonology, morphology, and syntax. *Psychological Science*, *6*(3), 149-156. https://doi.org/10.1111%2Fj.1467-9280.1995.tb00324.x

Shimron, Y. (2006). *Reading Hebrew: The language and the psychology of reading it.* Mahwah, N.J: Lawrence Erlbaum.

Siegel, L. S. (2008). Morphological awareness skills of English language learners and children with dyslexia. *Topics in Language Disorders*, *28*(1), 15–27. https://doi.org/10.1097/01.adt.0000311413.75804.60.

Torppa, M., Lyytinen, P., Erskine, J., Eklund, K., & Lyytinen, H. (2010). Language development, literacy skills, and predictive connections to reading in Finnish children with and without familial risk for dyslexia. *Journal of Learning Disabilities*, *43*(4), 308–321. https://doi.org/10.1177%2F0022219410369096

TÜBİTAK-114K643. (2017). *İşitme engelli ve işiten öğrencilerin, morfolojik farkındalık bilgi ve becerilerinin okuma performansları üzerindeki rolünün incelenmesi*.

Vender, M., Mantione, F., Savazzi, S., Delfitto, D., & Mlloni, C. (2017). Inflectional morphology and dyslexia: Italian children's performance in a nonword pluralization task. *Annals of Dyslexia, 67*, 401–426. https://doi.org/10.1007/s11881-017-0152-8