



## Examining the Morphological Awareness of Deaf Turkish Readers

### İşitme Engelli Okuyucuların Biçimbilim Farkındalık Becerilerinin İncelenmesi

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#### Öz

Bu araştırmada, işitme engelli öğrencilerin biçimbilim farkındalık becerilerinin işiten akranlarıyla karşılaştırmalı olarak incelenmesi amaçlanmıştır. Araştırmaya Ankara ilindeki dört farklı lisede öğrenim gören 112 (53 işitme engelli - 59 işiten) öğrenci katılmıştır. Çalışma içerisinde öğrencilerin biçimbilim farkındalık becerilerinin değerlendirilmesi amacıyla iki farklı boşluk doldurma işlemi geliştirilmiştir. Her iki işlemde öğrencilerden, hedef sözcüklere uygun ekleri ekleyerek cümlelerde yer alan boşlukları doldurmaları istenmiştir. İşlemler, öğrencilerin kendi okulları içerisinde belirlenmiş bir ortamda yaklaşık 10-15 dakikalık bireysel oturumlarla uygulanmıştır. Yapılan uygulamalardan elde edilen veriler, MANOVA ile analiz edilmiştir. Analizden elde edilen sonuçlar, işitme engelli öğrencilerin işitene göre biçimbilim farkındalık becerilerinde ciddi sınırlılıkları olduğunu göstermiştir. Tartışma bölümünde ortaya çıkan bu bulgu işitme engelli öğrencilerin sahip oldukları dil ve okuma becerileri temelinde tartışılmıştır.

#### Anahtar Kelimeler

biçimbilim  
biçimbilim farkındalığı  
işitme engelli okuyucular  
okuma ve okuduğunu anlama

#### Keywords

morphology  
morphological awareness  
deaf readers  
reading and reading  
comprehension

#### Abstract

The purpose of this study was to comparatively examine the morphological awareness skills of Turkish deaf and normal hearing readers. The study group consisted of 112 students (53 were deaf students and 59 were students with normal hearing) who were enrolled in high schools in Ankara. Two different fill-in the blank tasks were developed in order to assess students' morphological awareness skills in this study. For both of the tasks the students were asked to fill-in the blanks in the sentences by adding appropriate suffixes to the target words. The tasks were carried out in a predetermined place in students' schools during one-to-one sessions and lasted about 10 to 15 minutes in average. MANOVA was used to analyze the data collected from the tasks. The results of the analyses showed that deaf students had significant limitations in morphological awareness skills compared to their hearing counterparts. This finding is discussed in terms of language skills and its impacts on reading acquisition of deaf students.

## 1. Introduction

Due to the fact that deaf individuals can receive limited auditory input, they show delay in the developmental processes especially in language acquisition. Deaf children who follow a similar path as their normally developing peers in the developmental stages during the first months after birth start to have a delay in language acquisition skills with increased age (Marschark, Rhoten, and Fabich, 2007; Makaroğlu, 2012; Roberts, 2000; Schimer, 2001; Tüfekçioğlu, 2007). The delays during this stage in which language acquisition is very critical cause limitations in some of the language related knowledge and skills (e.g., morphology, syntax, phonology, pragmatics, and semantics) which deaf children need to acquire (Makaroğlu & Ergenç, 2016; Tüfekçioğlu, 2007). Researchers have reported an average of 4.5 years delay in language development by the time deaf children enter high school (Blamey, et al., 2001; Kyle & Harris, 2010; Roberts, 2000; Schimer, 2001).

Reading skill is a skill structured on the voices, syntax, meaning and usage information that are gained by the development of speaking and listening skills. In various studies, it has been reported that the level of literacy of deaf students is often behind those of normal hearing (Kyle & Harris, 2006; 2010), and that the delay is at least five years for deaf students and is explained by the difference between the incomplete oral language system (Geers, 2003, Johnson & Goswami, 2010) and the oral language-based reading system (Geers, 2003).

Research in which variables that affect reading and reading comprehension skills of deaf students are examined, generally focus on basic language based skills (phonological awareness, vocabulary, and syntax). These skills are suggested to be important however morphological awareness - an important factor of understanding of morpho-syntactic relationships- is emphasized to be as an equally important variable for decoding and comprehension (Brown, 1984; Clark, Gilbert, & Anderson, 2011; Cooper, 1967; Gaustad, 2000; Gaustad, Kelly, Payne, & Lylak, 2002; Gaustad & Kelly, 2004; Hoogmoed, Verhoeven, Schreuder, & Knoors, 2011; Izzo, 2002; Kemps, Wurm, Ernestus, Schreuder, & Baayen, 2005; Norbury, Bishop, & Briscoe, 2001; Makaroğlu, 2012; Makaroğlu & Ergenç, 2016; McGuckian & Henry, 2007). It is even stated that there is a positive correlations between the morphological awareness and word decoding and reading comprehension for both deaf (Fabbretti, Volterra, & Pontecorvo, 1998; Gaustad & Kelly, 2004; Waters & Doehring, 1990; Volterra & Bates, 1989) and hearing readers (Carlisle, 1995, 2000; Deacon & Bryant, 2006; Mahony, Singson, & Mann, 2000; Singson, Mahony, & Mann, 2000). For normally developing hearing children, morphological awareness develops through spoken communication prior to literacy acquisition. However, for deaf individuals it usually develops from print exposure with literacy.

In the recent studies, it has been frequently indicated that morphological awareness is one of the primary/predictive skills to explain the limitations of deaf readers in reading comprehension (Breadmore, 2007; Gaustad, 2000; Gaustad et al., 2002; Gaustad & Kelly, 2004; Kelly & Gaustad, 2007; Makaroğlu, 2012). Contrary to what is believed, morphological awareness is not only related to the comprehension of one single word but comprehension of the whole text and with this aspect it is the key for proper comprehension (Deacon & Kirby, 2004; Makaroğlu & Ergenç, 2016; Mahony et al., 2000). In a study conducted by Gaustad and Kelly (2004) it was found that morphological awareness skills of university deaf students (19 to 34 years old) approximately overlapped with skills of normally developing secondary school students (11 to 12 years old). It was also indicated that deaf students were especially successful at simple inflectional and derivational morphemes, however they had difficulty in understanding complex derivational relationships and structure of the words which had more than one morpheme (Gaustad & Kelly, 2004; Gaustad et al., 2002; Makaroğlu & Ergenç, 2016).

As a result, based on the aforementioned information it is clear that morphological awareness is a critical predictor of reading comprehension performance of deaf readers. Review of the research has shown that there is a significant gap in the deaf literature related to this topic and there is a limited number of studies in which it has been thoroughly examined in deaf children. Nevertheless, in the research conducted on reading performance of deaf readers the most controversial topic has been their limited reading comprehension skills, and examining all the variables affecting these skills in detail has become very critical. Moreover, when the research related to the morphological awareness skills of deaf readers are examined, there is not any experimental studies which was conducted in a language likewise Turkish which has highly transparent and agglutinating language. Turkish orthography – entirely transparent with respect to grapheme-to-phoneme conversion processes –represents an agglutinated language that relies on rich and sophisticated morpho-syntactic processes to exchange information between its speakers. Instead Turkish words are articulated in coalescence with several morphemes that modify their core meaning to express meaning that in other languages is often conveyed by means of an entire sentence (e.g. *gelemeyeceklermis* = It is said that they won't be able to come). In terms of this linguistic characteristics, Turkish is a unique language which contains complex morphological structures and in which unlimited number of suffixes can be added to a word. Because of this linguistic differences results of studies which are conducted in different languages cannot be sufficient in explaining the difficulties encountered in morphological awareness skills by deaf readers who are reading in transparent and agglutinating languages. Because of all of the aforementioned reasons the purpose of this study was to comparatively examine the morphological awareness skills of Turkish deaf and hearing readers and results of this study could explain the difficulties encountered generally in morphology and specifically in reading and reading comprehension skills for deaf readers and could serve a function in developing intervention programs in effective reading for these individuals.

## Aim

The purpose of this study was to comparatively examine the morphological awareness skills of Turkish deaf and hearing readers. In the scope of this general purpose, morphological awareness skills of deaf students were assessed via pictorial and non-pictorial two fill in the blank tasks and findings were comparatively analyzed in the scope of three basic research hypotheses.

### Hypotheses

- 1) Deaf students would have lower performance than their hearing counterparts in both of the task levels (pictorial and non-pictorial).
- 2) Deaf students would have a better performance in pictorial tasks than non-pictorial tasks.
- 3) Difference in the performance between pictorial and non-pictorial task levels will be higher for deaf students than their hearing counterparts.

## 2. Method

### Participants

A total of 112 students (53 were deaf students and 59 were hearing controls) who were attending 10th and 11th grades in four different high schools in Ankara participated in this study (Table 1). In terms of a number of criteria given below, deaf participants were chosen from one high school for the deaf and the hearing group from other three high schools located the same area where the school for deaf is.

For deaf students;(a) they all had unaided pure tone hearing losses of 85 dB or higher (ANSI 1989) in the better ear; (b) they all reported using Turkish Sign Language (TSL) as the preferred means of communication with their parents and peers; (c) none was diagnosed as having an additional disability beyond the deafness.

Two basic stages were followed in choosing deaf students. Firstly, school files of the students were examined and students who met the criteria for participating in this research were listed. Secondly, whether the students had basic reading skills were confirmed via consulting the school counselor. Identification of reading skills of deaf students were limited to teacher opinions due to the fact that there is not any standardized assessment tools to evaluate reading skills of deaf students in Turkey. Having completed this process, 60 deaf students who met the criteria for this study were identified. However, the study was conducted with 53 deaf students due to reluctance to be a volunteer and a number of issues encountered in the data collection process (overexcitement, anxiety, and discontinuation, etc.).

For normally developing controls; (a) they all had average performance in the grade level, (b) none of them had a diagnosed disability (learning disability, emotional and behavioral disorders, intellectual disability, etc.). A similar process to choosing deaf students was followed in choosing normally developing controls. Firstly, school files of the students were examined and then school counselor was consulted to identify 60 students. However, due to a similar issues encountered in the data collection process (overexcitement, anxiety, and discontinuation, etc.) the study was conducted with only 59 students.

**Table 1. Participant distribution by reader profile, gender and level of education**

Reader Profile	(10 <sup>th</sup> Grade)		(11 <sup>th</sup> Grade)		All		Overall
	M	F	M	F	M	F	
Deaf	14	12	15	12	29	24	53
Hearing	14	16	15	14	29	30	59
Total	28	28	30	26	58	54	112

### Instrument

In this study two fill-in the blank tasks were used that were developed by the researcher in order to assess morphological awareness of students. For both of the tasks the students were presented with sentences with blanks and target words to be used to fill-in the blank at the end of the sentences and they were asked to fill-in the blanks in the sentences by adding the correct suffixes to the target words. The main difference between the two tasks was that in one of them the sentences presented to the students were provided with pictures which depict the case in the sentences, in the other however only sentences were presented without pictures and students were asked to appropriately fill-in the blanks (See Table 2 for sample items).

**Table 2. Sample items for pictorial and non-pictorial sentences**

Pictorial sentences	Non-pictorial sentences
	
<b>Question.</b> Çocuk..... takıyor. (göz) The child is wearing.... (eye)	<b>Question.</b> Adam.....takıyor. (göz) The man is wearing ..... (eye)
<b>Answer.</b> Çocuk <b>gözlük</b> takıyor. The child is wearing <b>eyeglasses</b> .	<b>Answer.</b> Adam <b>gözlük</b> takıyor. The man is wearing <b>eyeglasses</b>
	
<b>Question.</b> Kız..... takıyor. (kulak) The girl is wearing.... (ear)	<b>Question.</b> Çocuk..... alıyor. (kulak) The child is buying.... (ear)
<b>Answer.</b> Kız <b>kulaklık</b> takıyor. The girl is wearing <b>earphone</b> .	<b>Answer.</b> Çocuk <b>kulaklık</b> alıyor. The child is buying <b>earphone</b> .

Seven criteria were determined in identifying contents and during the development of the tasks. These were as follows:

1. All of the words which are used in the sentences of the tasks are simple words which appear in the vocabulary of (i.e., familiar words) the deaf students.
2. All of the sentences consist of 3 words (subject-object-verb).
3. All of the subjects are limited to “the man, the child, the woman, and the girl.”
4. All of the verbs in the sentences are conjugated in present continuous tense.
5. The inflectional suffixes, such as “-den, -dan” in Turkish (meaning –from), which indicate leaving the source are used. The derivational suffixes, (“-lik, -lık” in Turkish which mostly means holder or a case of something such as pencil case or a book case when added to the end of the word), which derive noun from a noun are used.
6. In the 6 of the sentences derivational suffixes, in the other 6 sentences inflectional suffixes are used. During the implementation of the tasks 12 sentences in which inflectional and derivational sentences are presented to the students in a mixed order.
7. Firstly the sentences are formed for the pictorial task and then by changing either the subject or the verb or changing both the subject and the verb the sentences in the nonpictorial task are formed.

During the implementation of the tasks, in order to control for the transference effect of cues in the pictorial task to the non-pictorial task, the order of the presentation of pictorial and non-pictorial tasks in every assessment task were changed. In one of them first the pictorial then the non-pictorial task, in another first the non-pictorial then pictorial task was implemented.

For the tasks, the validity and reliability studies could be conducted. For the validity studies content validity could be examined and for the reliability KR20 value could be calculated. For the content validity of the tasks in this study, the tasks were sent to a deaf Turkish teacher, and to two faculty members who were conducting research on Turkish and reading, and necessary reorganizations were made according to expert opinions. When the reorganizations were made, the tasks were identified to have content validity. Subsequently, having implemented the reorganized tasks KR20 coefficients were calculated and the tasks were identified to be reliable (for pictorial task KR20=.96; for non-pictorial task KR20=.97).

### Procedure

The implementation of the tasks were carried out in a predetermined place in students’ schools during one-to-one sessions and lasted about 10 to 15 minutes in average. Before each implementation the students were reminded to stay calm since that was not a test, and with the consent of the participant saying “I’m ready” the session was started. During all of the sessions conducted with deaf students, necessary explanations and instructions were prerecorded prior to the implementation by a translator who had a good command of sign language, and all of the instructions related to the tasks were presented to the students via videos. In case the students did not understood the videos, a certified sign language expert was present in all of the sessions.

The implementation of the tasks were completed in two stages. The first one was “the explanation stage” in which the implementer modeled the participant in the tasks, the second was “the test stage” in which the participant independently carried out the tasks. In the explanation stage, firstly the videos in which explanations of how to implement the tasks were shown to the participants for them to understand the tasks, secondly two sample items which did not take place in the actual implementation were carried out by the implementer to generate a model for the participant. Having completed the sample implementation, the students were asked whether or not they understood what was expected of them, and when the student affirmed that they understood how to do the task test stage was initiated. In the test stage, the students were asked to independently answer the questions in the tasks as quickly as possible. Moreover in the beginning of all tasks, the students were told that, had they thought they might have done a mistake, they would have continued until the end of the questions without pausing, after then the test stage was initiated.

### 3. Results

In order to compare morphological awareness skills of deaf and hearing students, a MANOVA was conducted in which between subjects factor was student groups (deaf and hearing controls), and within subjects factor was the effect of the processing level (performance difference between pictorial and non-pictorial tasks). In the analysis average number of students’ errors in the pictorial and non-pictorial tasks were calculated and they are given in Table 3.

**Table 3. Performance of deaf and hearing students in pictorial and non-pictorial tasks**

ANOVA Results			
	F	p	$\eta^2$
LoP	2,51	.11	.02
Group	486,11	.00	.81
LoP*Group	1,27	.26	.01
Pictorial Task			
Groups	Mean	sd	N
Hearing	11,76	1,56	59
Deaf	2,24	3,01	53
Total	7,25	5,32	112
Non-pictorial Task			
Groups	Mean	sd	N
Hearing	11,81	1,43	59
Deaf	2,54	2,95	53
Total	7,42	5,17	112

*LoP: Level of Processing*

Firstly, average errors of all students in the study group for pictorial and non-pictorial tasks were examined and in terms of processing level there was not a statistically significant difference in the students’ average number of errors ( $F(1,110)=2,51, p>.05, \eta^2=.02$ ). As it can be seen in the Table 3 when all the students are taken together, the students showed a similar performance in both of the task levels.

Secondly, average errors of groups of deaf and hearing students in terms of morphological awareness skills were compared and it was found that there was a statistically significant difference between the number of average errors of two groups ( $F(1,110)=486,11, p<.05, \eta^2=.81$ ). According to the Table 3, in terms of total morphological awareness scores, hearing students had highest scores on both of the tasks and they had higher performance on both of the tasks than deaf students.

It was examined whether there was an interaction between the level of processing and student groups. Results suggested that there was not a statistically significant interaction in terms of students’ average number of errors ( $F(1,110)=1.27, p>.05, \eta^2=.01$ ). Thus, this showed that performance difference in the pictorial and non-pictorial tasks of students in both of the groups were similar.

### 4. Discussion

The purpose of this study was to comparatively examine the morphological awareness skills of Turkish deaf and hearing readers. For this purpose, two fill in the blank tasks (pictorial and non-pictorial) were used in this study. In both of the tasks, the students were asked to fill-in the blanks by adding the appropriate suffixes to the target words. The only difference between the two tasks is that there is a picture on top of the sentences in the pictorial task that depict the sentence and present cues for the suffixes to be added (See Table 1).

For the first hypothesis of the study, it was expected that deaf students would perform lower than their hearing counterparts at both of the task levels. Analyses showed that this hypothesis was confirmed. When the results are interpreted in terms of hearing students, it can be suggested that the tasks which are organized for deaf students was easy to hearing students who were attending high school and therefore they had higher scores than their deaf peers at both of the tasks. Since the sentences in the tasks were regular and they were especially simple in terms of grammar, the nominative and derivative cases of the target words were simple and had simple morphemes, and the target words were familiar words for all students, there might have been this difference between the deaf and hearing groups.

When this difference is interpreted in terms of deaf students it could be thought that two main factors might have affected the results. The first one is that deaf students have limited grammar and language knowledge and experience than their hearing counterparts. It is suggested in the literature that depending on the type and degree of hearing loss deaf students have serious limitations on reading skills compared to their hearing peers and this case generally affects their language development and communication and specifically affects vocabulary, syntax, and morphological awareness significantly (Breadmore, 2007; Gaustad 2000; Gaustad et al., 2002; Gaustad & Kelly, 2004; Kelly & Gaustad, 2007; Makaroğlu, 2012; Makaroğlu & Ergenç, 2016; Walker, Munto, & Richards, 1998). From this point of view, even though they were competent in sign language the fact that they had poor language skills in spoken and written Turkish might have led them to have lower scores on the tasks which were organized in spoken Turkish. Regarding this, one of the significant matters which might have been effective on scores is thought to be that they prefer to communicate in Turkish Sign Language (TİD) on a daily basis however in reading they encounter spoken Turkish. As it is well known, general syntax and morphology of the spoken Turkish has a very different structure. This difference in which deaf individuals use TİD in communication however they use grammatical structure of the spoken Turkish during reading might lead to critical limitations in reading and reading comprehension. About the morphological and syntactic differences among languages Zeshan (2002) indicated that in TİD there are different structures in terms of inflectional suffixes compared to the spoken Turkish. In TİD the sign for insanlar (humans) insan + bütün/çok (human + whole/a lot of) signs are used consecutively or in the sign language the sentence of “Savaşta insanlar ölür” (“People die in war”) is put into grammatical case as “savaş+içinde insan+çok ölmek+var” (“in+war +human+a lot of die+exists.”).

When this case is considered in terms of derivational suffixes, even though competence in TİD for deaf students positively contributes to making sense of derivate nouns (i.e., vocabulary), it is obvious that these contributions do not positively affect morphological performances as might be expected. For example, even though “kalem” (pencil) and “kalemlik” (pencil case) are related in terms of morphology and these simple words exist in the vocabulary of most of the deaf students, their equivalences corresponding to two different words in TİD makes it difficult for deaf students to understand that these are derived from only one word. This finding makes us think that even though deaf students have a good command of TİD, TİD does not contribute to developing morphological awareness in spoken or written Turkish for deaf students and positive interaction in terms of morphology between spoken Turkish and TİD cannot exist. Similarly, Makaroğlu and Ergenç (2016) also suggested that because of the negative transfer of the morpho-syntactic structure of TİD, the deaf students have difficulties in understanding the morpho-syntactic relations of Turkish.

The second variable which could be effective on limited performance of deaf students might be their limited reading and reading comprehension skills. It is emphasized in the literature that increasing frequency and efficiency of reading and comprehension activities which enable for concretely observing the effects of especially vocabulary development and morphemes added to the words also increase morphological performance of the readers (Deacon & Kirby, 2004; Mahony et al., 2000; Nunes & Bryant, 2006). Moreover, studies have shown that there is a positive correlation between reading comprehension and morphological awareness skills and that an increase or decrease in the performance in either pair will lead to the same effect on the other (Bown, 1984; Clark et al., 2011; Cooper, 1967; Gaustad, 2000; Gaustad et al., 2002; Gaustad & Kelly, 2004; Hanson, 1993; Izzo, 2002; Hoogmoed et al., 2011; Kemps et al., 2005; Norbury et al., 2001; McGuckian & Henry, 2007; Makaroğlu, 2012; Makaroğlu & Ergenç, 2016). In the previous studies, it is indicated that it is critical to correctly understand the words in the first hand and then the sentences in which this word is used in order for the similar words derived with different suffixes (e.g., watch, watcher, and watchable, etc.) to become meaningful (Cooper, 1967). However, when reading and comprehension knowledge and experience of deaf students in this study are taken into account, even though they had the basic reading skills which was the participation criterion for this study, it can be suggested that they did not have basic knowledge and experience to transform reading into an interactive learning activity. It was seen that the teachers frequently indicated during the study that students only made efforts to decode the words presented to them during reading and they did not pay attention either to the semantic or the structural characteristics of the words. In this study, in order to make more precise measurements for the students’ morphological awareness skills, in other words in order to minimize the effects of the limited reading and reading comprehension skills on the morphological awareness to be assessed, the tasks developed were formed in two different levels as pictorial and non-pictorial and for later hypotheses performance of deaf students on these tasks were compared.

The results of the analyses showed that deaf students had similar performance on both of the task levels. In the planning of this study it was thought that the pictorial cue which would be presented in the pictorial task would be a critical facilitator in

making especially the deaf students who had limited reading comprehension performance add appropriate suffixes to the target words. Thus, even though they had limited reading comprehension skills, they would be able to make sense of the sentences by looking at the pictures and if they had the sufficient morphological awareness skills, they were expected to have added the appropriate suffix to the target word. However, the results of the analyses showed that this organization did not yield the expected significant effect, though low processing level showed that deaf students had similar difficulties in both of the tasks. At least in the pictorial task which does not require higher level reading comprehension skills, when they were required to use derivational suffixes, even though they knew the target word and the derived case of it represented on the picture, they still failed to fill-in the blanks and this supports the idea that they did not have the knowledge, role, and function of morphemes added to the words. This finding was also supported some other research which examine the effect of morphological processing skills on reading and reading comprehension performance of deaf readers (Makaroğlu, 2012; Makaroğlu & Ergenç, 2016).

As a conclusion when all of the aforementioned information is taken together, the outcomes of this study make a significant contribution to research in this area. The results are deemed important that they describe the case for deaf students in morphological skills which are one of the basic skills for reading and comprehension and that the results show that these students could not even achieve very basic morphological structures that they were expected to achieve on a more fundamental level. When the results are considered in terms of Turkish, these disadvantages that the deaf students have constitute a much bigger risk for their academic performances. In language likewise Turkish which is agglutinative and in which a word can have an unlimited number of suffixes, having limited knowledge and experience related to morphology would definitely cause serious limitations in reading and comprehension at first and later in writing which are basic academic skills. From a wider perspective, even though they have a good command of TID the fact that all the written materials which they encounter in their daily lives are prepared in accordance with the spoken Turkish requires them to learn basic grammar rules peculiar to the spoken language. Otherwise when they cannot learn the basic grammar structures peculiar to the language it is thought that both their academic performance and their quality of life would decrease.

The results of this study should be reviewed within the scope of its limitations. Firstly, this study is limited to a total number of 112 students. Therefore, in future studies the sample size might be increased and the study might be repeated with students with different characteristics who are attending different grade levels in order to increase the generalizability of the results of this study. Secondly, the results of this study are limited to the suffixes examined and assessment tools used in this study. Therefore, assessing the use of morphological structures of the students with different tools to be developed in the future studies could provide more detailed information related to this topic and significantly contribute to the related literature.

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