Volume: 1 Issue: 2 Year: 2019, 70-87 Cilt: 1 Sayı: 2 Yıl: 2019, 70-87

International Journal of Educational Spectrum

Uluslararası Eğitim Spektrumu Dergisi

ACQUISITION OF SIGN LANGUAGE AND LITERACY SKILLS

İŞARET DİLİ VE OKUMA YAZMA ÖĞRENİMİ

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Abstract

The term sign language is used to refer to the language of deaf people, parallel to the spoken language of hearing people. Deaf children who are not exposed to a sign language are also observed to develop their own sign system, which is called home signing, that they share with their parents. When such children attend school they are taught lip reading along with sign language and also taught how to read and write. How deaf children go through this process is an area which has scarcely been studied. The first aim of this study is to investigate whether there are individual differences between the signs that were produced by children and whether the signs are affected by peer interaction. For that reason, six deaf participants are selected from Deaf School in Adana, Turkey and divided into two age groups: 8 years old group (n=3) and 13 years old group (n=3). The second aim is to investigate how deaf children grasp the meaning of words through written forms and pictures. For this purpose, first, ten flash cards which illustrate ten Turkish words and then the pictures of these words were used to ask the participants to supply the sign for each picture. The results revealed that for 13 years of old group both written form of Turkish words and also their pictures were understandable. But for 8 years of old group only pictures were understandable and they couldn't recognize written forms of Turkish words and also their meanings.

Key Words: Sign language, literacy skills, deaf children.

Özet

İşaret dili işitme engelli bireylerin kullandığı, konuşma diline koşut bir dildir. Konuşma dilinde sesler için öngörülen sesletim yeri, biçimi ve ötümlülük gibi unsurların yerine işaret dilleri ellerin hareketi ve baş ve gövdeye göre olan konumuna göre tanımlanır. İşaret dillerinin de konuşma dili gibi kendine özgü bir dilbilgisi vardır ve sağır dilsiz bireylerin yaşadığı toplumun kullandığı sözlü dilden ayrı dildirler. Anne babaları işitme engelli olmayan ve dolayısıyla doğuştan bir işaret dili ile karşı karşıya kalmayan çocuklar da ev ortamında kullandıkları bir işaret dili geliştirirler. Çocukların bu becerilerinin her çocuğun doğuştan sahip olduğu ileri sürülen dil edinim becerisinin bir işareti ve sonucu olduğu düşünülmektedir. Sağır dilsiz çocuklar özel eğitim veren okullarda genellikle hem dudaktan okuma ve sesletim, hem işaret dili ve bir sure sonra da okuma yazma öğretimi ile yüz yüze kalmaktadırlar. Bu süreç ve yöntemler konusunda çeşitli çalışmalar yer almakla birlikte çocukların bu süreçten nasıl geçtikleri çok fazla betimlenmemiş bir konudur. Bu çalışmanın amacı çocukların evde geliştirdikleri işaret dilinin sınırlı sayıda sözcük bağlamında karşılaştırılması ve bu sözcükleri okumayı ve yazı, anlam ve resimleri nasıl eşleştirdiklerinin bir sınıf ortamında örneklenmesidir. Bu amaçla, Adana işitme engelliler okulunda eğitim gören 8 yaş grubundan üç ve 13 yaş grubundan 3 öğrenciye seçilmiş 10 temel sözcüğün resim ve yazı ile öğretilmesi sırasında video kayıtları yapılmıştır. Sonuçlar 13 yaşındaki çocukların sözcüğün hem yazılı biçimi hem de nesnenin resmini gördüklerinde işaret ve sesletim yoluyla sözcüğü ürettikleri, 8 yaşındakilerin ise sadece resimlere işaretle doğru yanıt verebildiklerini göstermektedir.

Anahtar Kelimeler: İşaret dili, okuma yazma becerileri, işitme engelli çocuklar.

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1. Introduction

The term sign language is used to refer to the language of deaf people, similar to the spoken language of hearing people. There are several sign languages as American Sign Language (ASL), British Sign Language (BSL), Indian Sign Language (ISL), and so on. The sign language developed for deaf people is based on the hands and the eyes rather than vocal tract and the ear. The lexical item of the sign language is a sign which is equivalent of a word in spoken language.

Richards and Schmidt (2002) defined sign language as a language used by many hearing-impaired people and by some who communicate with hearing impaired people, which makes use of movements of the hands, arms, body, face, eyes, and mouth to communicate meanings. Researchers (Klima & Bellugi, 1979; Sandler & Lillo-Martin, 2006) have explained that sign languages are organized similarly to spoken languages; i.e. they have semantic, syntactic, morphological, and phonological systems. There is an interesting report given by Bonvillian (1999, as cited in Barrett, 2001) that sign language acquisition has appeared as one of the most exciting areas of investigation in child language research. Three decades ago, sign language was viewed as consisting of pantomimic gestures with little evidence of grammatical structure. Stokoe (1960) in his investigations of ASL showed that ASL signs had distinct linguistic structure. Studies (Klima & Bellugi, 1979; Wilbur, 1987) following Stoke's discoveries, indicated that sign languages had a large lexicon and operated according to rule-governed phonological, morphological, and syntactical processes. So the scholars became convinced that sign language is full, genuine language. It differs from other languages in one major aspect in that it has no spoken word. Also, the core lexicon of sign languages is smaller than the lexicon of spoken languages (Sutton-Spence & Woll, 1998), and there are few signs for items below the basic level. For example, there are signs for basic level items such as flower, dog, car, and so forth but not signs for particular types of flowers, dogs, or cars (Courtin, 1997).

Even though Turkish Sign Language (TSL) has a long history, dating back to Ottoman period, there are no scientific or educational materials, grammar books, or dictionaries published on Turkish Sign Language. The only printed material on the subject is a manual published by ministry of Education and even that is hard to be obtained. Furthermore, there is no sign language education at deaf schools in Turkey and in this aspect Turkey is almost 50 years behind many countries.

2. Literature Review

2.1. Similarities between Sign and Spoken Language Acquisition

A particular sign language is a language and is acquired as the same way as spoken languages (Lillo-Martin, 1999; Newport & Meier, 1985). One clear example is the research done by Petitto (2000). In her research, she claims that deaf children exposed to signed languages from birth acquiring these languages on an identical maturational time course as hearing children acquire spoken languages. Objectives claimed by Petitto are identical in signing and speaking children include babbling (7-12 months of age); the first word stage (11-14 months); and the first two-word stage (16-22 months). Furthermore, Petitto (2000) says that "social and conversational patterns of language use ..., as well as the types of things that they

'talk' about, have demonstrated unequivocally that their language acquisition follows the identical path seen in age-matched hearing children acquiring spoken language".

2.2. Differences between Sign and Spoken Language Acquisition

By considering the role of modality in explaining differences between sign language and spoken language development, it is better to look at the appearance of first signs versus spoken words. It is noteworthy to say that, a major difference between signs and words is that a substantial number of signs look like the concepts they denote whereas words rarely do so. That is, certain signs are iconic or pantomimic in that they resemble the actions objects, or properties for which they stand. Numerous authors (Bonvillian, Orlansky, & Novak, 1983; Schlesinger & Meadow, 1972) have claimed that first signs emerge before first words by as much as six months. Meier and Newport (1990), in a study came to some significant general conclusions about the similarities and differences. First, the advantage for signs seems to be about 1.5 to 2.5 months (roughly age 8.5 months for first signs versus age 10-11 months for first words), and this difference is seen only with the earliest context-bound signs, not purely symbolic ones. Second, they argued that the sign advantage exists only for first words, not for first word combinations. Finally, they offered a possible explanation for the sign advantage in terms of peripheral mechanisms that are used in the production and perception of signs versus words. They say that, it takes longer for speaking children to develop adequate articulatory control to produce utterances which can be recognized as words than for signing children to develop comparable control. Thus, the difference boils down to a disadvantage for spoken language at the earliest stages of lexical development.

Another body of research which examines effects of modality on sign language acquisition concerns early sign phonology. Researchers (Conlin, Mirus, Mauk, & Meier, 2000; Marentette & Mayberry, 2000) have studied which components of signs children are more or less accurate with, and found that in many cases children's development can be explained by appealing to the development of motor and perceptual mechanisms. Both of these explanations put emphasis on the role that modality plays in sign language acquisition.

Researchers have also noticed that children's earliest signing often includes movement repetition (Meier, 2006). This can be directly related to repeated movements in motoric development such as the stereotypes of repeated kicking or arm waving. Meier (2006) also says that children's early non-target forms in two-handed signs may be explainable by reference to a phenomenon known as 'sympathy', whereby children have difficulty inhibiting the action of one hand when the other is active.

2.3. The Development of Sign Language

As social creatures, human beings have an essential need to communicate with each other. Childhood deafness often seriously hinders or prevents children's acquisition of their parents' spoken language, because the large majority of deaf children, more than 90%, have hearing parents (Meadow, 1980, Schein & Delk, 1974). Therefore, many parents do not know sign language prior to their child's birth and cannot provide fluent sign language input to their children. When the only language that parents use in their interaction with their deaf children is a spoken one, these children frequently is left with a need to communicate but they are without a useful language model. Goldin-Meadow (1977) in a research focused on the children capacity in the lack of effective language input to see how they construct their own gestural communication system. At the end of her investigation, she identified three different types or groups of gestures made by the children (Goldin-Meadow & Feldman, 1997; Goldin-Meadow & Mylander, 1984, 1990). One group, deictic gestures, was used by the children to indicate specific objects, persons, and locations. This was done mostly by pointing. The second group

of gestures consisted of stylized pantomimes known as characterizing gestures. These gestures resembled the objects or actions to which the children were referring. The third category of gestures, called markers, clearly resembled many of the hand and facial gestures used by most members of American society. Goldin-Meadow also found that children combine gestures. Many of the children's gestural combinations were of one particular form: a point, to indicate a specific object, was combined with a characterizing gesture, to designate an action or attitude. Analysis of the children's gestural combinations revealed that the children used them to express a range of semantic relations. Furthermore, the semantic relations expressed in the children's gestural combinations closely resembled those that typically appear in hearing children's two-word utterances. Also it is found that the combination of gestures were in a distinct order. From these findings, Goldin-Meadow and her colleagues concluded that young children, without linguistic input, have the capacity to form their own basic lexicons, to express a range of semantic relations, and to generate basic rules for gestural combinations.

2.4. The Critical Period for Sign Language Acquisition

The period during which a child can acquire language easily, rapidly, perfectly, and without instruction is known as critical period (Richards & Schmidt, 2002). This hypothesis was advanced most forcefully by Eric Lenneberg. According to Lenneberg (1967), this critical period extends from early childhood to puberty because after that the plasticity of the brain begins to gradually decrease. A child who has not acquired a language by that time runs the risk of not acquiring native-like fluency in any language (Lenneberg, 1967; Pakaluk & Neville, 2010).As a result, the child becomes linguistically deprived. Linguistic deprivation occurs rarely among hearing children, and only in the most unusual circumstances, such as in children who have grown up without being surrounded by human language (Krashen, 1973), or in children who have been denied language as an act of abuse.

In order to investigate the critical period for learning sign language, scholars in a series of studies (Mayberry & Fischer, 1989; Mayberry & Eichen, 1991), have examined the relationship between the ages at which deaf individual began learning to sign and their sign language processing abilities as adults. Mayberry and Fischer (1989) found that performance on sign language tasks declined linearly with decreasing sign experience. Analysis of the learners' errors further revealed that there were differences by age of acquisition in the types of errors the learners made. Those who were younger when they began acquiring sign language tended to make more semantic errors than phonological ones. In another study, Mayberry and Eichen (1991) investigated whether age at which individuals began learning to sign was related to ultimate levels of signing skills and they found that age at sign acquisition is tied to eventual signing skills even among deaf persons who have had lengthy signing experience.

In conclusion, studies of sign language acquisition provide strong support for the existence of a critical period for language acquisition. Moreover, sign language acquisition data show that a critical period for language, functions independently of language modality. One basis for this claim is the finding that younger sign learners consistently show greater sign language facility than later learners. A second source is that early success in acquiring spoken language skills positively influences later signing skills. Finally, it should be noted that, the later sign language learners differed from the younger learners across the whole spectrum of sign language skills (Bonvillian, as cited in Barrett, 2001).

2.5. Benefits of Sign Language Learning

Vicki Fong (2001) says that, teaching signing beginning at an early age is beneficial, and teaching signing to deaf children is a necessity. The global benefit of learning sign language (ASL) as a first language is that it creates a standard bilingual situation in which teachers and learners take advantage of one language to assist in acquiring the other and in

the transfer of general knowledge (Wilbur, 1990). Results of the study by Acredolo and Goodwyn (2000), revealed that signing with hearing babies:

- Reduces frustration, biting and other aggressive behaviors.
- Helps parents and teachers be more observant and responsive.
- Builds trust between babies and their parents and caregivers.
- Allows babies to share their worlds revealing just how smart babies really are.
- Promotes positive emotional development.
- Boosts babies' self-confidence and builds self-esteem. (p.5)

Sign language lets deaf people communicate quickly and effectively with others who sign. Most deaf people use the combination of sign language, lip-reading and written communication to go about their daily lives.

2.6. Related Empirical Studies

The study of sign languages and deaf communities can provide information about language development under extreme situations. This is a unique contribution to our understanding of the nature of language and the mechanisms which make language acquisition possible. Researchers (e.g. Mayberry, Lock, & Kazmi, 2002; Meier, 1982; Morford and Mayberry, 2000; Newport, 1990) studying such circumstances have a very particular role in developing scientific knowledge. Their studies tell us about the variety of possible languages, the path and properties of language emergence, resilient properties of language, critical period effects in language acquisition, how the learners modify the input they receive, and etc.

Morford and Mayberry (2000) investigated the effects of delayed input on first language acquisition. This research has been conducted with adults whose exposure to sign language began at different times. By studying adults, researchers investigated the outcome of the language development process, after years of experience have made the use of sign language a well-practiced, familiar skill. This research with adults whose age of first exposure to ASL was approximately 4 to 16 years, as compared to native signers (those with exposure from birth), have consistently reported differences in both production and comprehension tests.

Newport (1990) found that later learners (those with exposure after age 12) scored lower than early learners (those with exposure between 4 and 6), who in turn scored lower than native signers, on tests of ASL morphology production and comprehension. Mayberry, Lock, and Kazmi (2002), compared late first language learners of ASL with late second language learners of ASL, that is, late deafened adults whose exposure to sign language began in the same period as the late first language learners. They found that the effects of late exposure were strongest for late first language learners; late second language learners performed close to natives. These results reveal that early exposure to language is critical for its normal acquisition.

In another research, Morford and Mayberry (2000) examined the differences in phonological processing skills for native or early learners versus late learners, and said that what is missing for late learners is what is learned by those with native exposure in the first year of life. They continued that a great deal of phonological development takes place during this period, and their studies show infants' sensitivities to phonological information from a very early age. That is, the development of the phonological system is prior to the development of the lexical-semantic and morpho-syntactic systems.

Meier (1982) examined the acquisition of verb agreement in ASL in comparison to the acquisition of verbal morphology in spoken languages. He wanted to know whether agreement would be acquired differently in the two modalities, since the sign language agreement can be considered iconic. He argued that sign language agreement is acquired in a similar fashion as is complex, unstressed verb agreement in some spoken languages. In particular, he found that

agreement is mastered only around age 3 (not early due to apparent iconicity). This mastery is defined as correct use in obligatory contexts, an important consideration since not all verbs take agreement.

The purpose of this study is to contribute to the field and education of TSL in Turkey. In this study, I focus on whether there are individual differences between the signs that were produced by children and whether the signs are affected by peer interaction. Furthermore, I want to investigate how deaf children grasp the meaning of words through written forms and pictures, specifically in Turkish Sign Language.

3. Methodology

3.1. Participants

Six deaf participants were selected from Deaf School in Adana, Turkey. The subjects were divided into two age groups, group one was 8 years of old and group two was 13 years of old. All participants had a hearing loss and all of them were from deaf families.

Table 1

Participant Characteristics

Participants	Age	Gender	Parental hearing status	School
1	13	F	Deaf	Deaf School
2	13	F	Deaf	Deaf School
3	13	F	Deaf	Deaf School
4	8	F	Deaf	Deaf School
5	8	M	Deaf	Deaf School
6	8	F	Deaf	Deaf School

3.2. Instrumentation

The following three sections provide the detailed explanations of instruments.

3.2.1. Flash cards. Ten flash cards were used to show ten Turkish words to all the participants in two groups. The participants were asked to produce the sign for each word. These words were listed in Table 2.

Table 2

Turkish Words Shown to the Participants

Number	Word
1	Ev
2	Anne
3	Ağaç
4	Güneş
5	Su
6	Köpek
7	Kuş
8	Çocuk
9	Araba
10	Gözlük

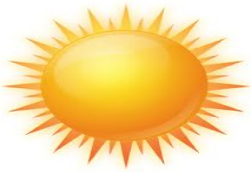
3.2.2. Pictures

The pictures of the above-mentioned Turkish words were supplied to be shown to the participants. They were shown pictures and were asked to produce the sign of each picture. Table 3 provides pictures of these ten words respectively.

3.3. Procedure

In this study, each participant was tested individually by his/her teachers, who were hearing and fluent signers with more than 5 years of experience in teaching deaf children in Deaf School. The test was presented to each child individually in a quiet room at the participant's school, using a camera to take videos of their signing. First, ten flash cards which were showing ten Turkish words (Table 2) were used to test the vocabulary knowledge of 13 years of old participants. Each flash card was shown by the teacher and each participant produced the sign for each word. After showing the written form of words and producing the signs of them, the teacher showed them ten pictures (Table 3) one by one that were showing the pictures of above-mentioned Turkish words. Again, the participants were asked to supply the sign for each picture and the videos of their signing were taken. Second, the flash cards were exploited to test the vocabulary knowledge of 8 years of old participants. The written forms of words were shown by the teacher and participants were asked to produce the sign for each word. Then, the pictures were shown to the participants and again they were asked to produce the sign of each word. The videos of these processes were taken to be analyzed.

Table 3
Pictures for Ten Turkish Words

	Picture		Picture
1		6	
2		7	
3		8	
4		9	
5		10	

4. Data Analysis and Results

The aim of this study was to investigate how deaf children grasp the meanings of words through written form and real image. Also, it was investigated whether there were differences between the signs that were produced by children for every word/picture or not.

As mentioned in Table 1, six deaf participants were chosen from Deaf School and were divided into two groups according to their age.

Firstly, 13 years of old participants were tested by their teacher one by one in a room in their school. They were shown ten flash cards each containing one Turkish word (Table 2) and asked to sign by seeing each word. All the participants in this group signed and the videos of their signing were taken and analyzed (Table 4 & Table 5).

Table 4

Types of Signs to 10 Turkish Words by 13 Years of Old Participants

Participants	Ev	Anne	Ağaç	Güneş	Su	Köpek	Kuş	Çocuk	Araba	Gözlük
1	1	1	3	2	1	3	1	3	1	1
2	1	3	2	2	1	3	2	3	1	1
3	1	1	3	2	1	3	2	1	1	1

1 = True Sign, 2 = False Sign, 3 = True Sign but Different from Standard Turkish Sign Language

Table 5

Frequency and Percentage of Signs for the Turkish Words by 13 Years of Old Participants

Word	Frequency (True)	Frequency (False)	Frequency (*)	Percent (True)	Percent (False)	Percent (*)
Ev	3	0	0	100.0	00.0	00.0
Anne	2	0	1	66.7	00.0	33.7
Ağaç	0	1	2	00.0	33.3	66.7
Güneş	0	3	0	00.0	100.0	00.0
Su	3	0	0	100.0	00.0	00.0
Köpek	0	0	3	00.0	00.0	100.0
Kuş	1	2	0	33.3	66.7	00.0
Çocuk	1	0	2	66.7	00.0	33.3
Araba	3	0	0	100.0	00.0	00.0
Gözlük	3	0	0	100.0	00.0	00.0
Total	17	6	7	-	-	-

* True Sign but Different from Standard Turkish Sign Language

As it was shown in Table 4 and Table 5, all the participants of 13 years old age signed correctly to words "Ev, Su, Araba, and Gözlük ". Also, all of the participants of this group signed incorrectly to the word "Güneş". One participant signed incorrectly to the word "Ağaç" and two participants signed incorrectly to the word "Kuş". From these participants one person signed differently to the word "Anne", two people signed differently to the words "Ağaç and Çocuk" but all of them signed differently to the word "Köpek".

Secondly, 13 years of old group was tested by pictures. Their teacher showed them pictures of 10 Turkish words one by one and asked each participant to sign. The data of this test are summarized in Table 6 and Table 7 below.

Table 6

Types of Signs to 10 Pictures by 13 Years of Old Participants

Participants	Ev	Anne	Ağaç	Güneş	Su	Köpek	Kuş	Çocuk	Araba	Gözlük
1	1	1	3	2	1	3	1	3	1	1
2	1	3	3	2	1	3	3	3	1	1
3	1	1	3	2	1	3	3	1	1	1

1 = True Sign, 2 = False Sign, 3 = True Sign but Different from Standard Turkish Sign Language

Table 7

Frequency and Percentage of Signs for 10 Pictures by 13 Years of Old Participants

Word	Frequency (True)	Frequency (False)	Frequency (*)	Percent (True)	Percent (False)	Percent (*)
Ev	3	0	0	100.0	00.0	00.0
Anne	2	0	1	66.7	00.0	33.3
Ağaç	0	0	3	00.0	00.0	100.0
Güneş	0	3	0	00.0	100.0	00.0
Su	3	0	0	100.0	00.0	00.0
Köpek	0	0	3	00.0	00.0	100.0
Kuş	1	0	2	33.3	00.0	66.7
Çocuk	1	0	2	33.3	00.0	66.7
Araba	3	0	0	100.0	00.0	00.0
Gözlük	3	0	0	100.0	00.0	00.0
Total	16	3	11	-	-	-

* True Sign but Different from Standard Turkish Sign Language

Regarding Table 6 and Table 7, all the participants in this group again signed correctly to the words "Ev, Su, Araba, and Gözlük" and signed incorrectly to the word "Güneş" but all of them signed differently to the words "Ağaç and Köpek". The word "Anne" was signed differently only by one person and the words "Kuş and Çocuk" were signed differently by two people.

In order to see whether the participants in 8 years of old group grasp meaning through written form or picture, they were tested by their teacher one by one.

Firstly, each participant was shown 10 flash cards which every flash card contained one word in Turkish language (Table 2) and they were asked to sign by seeing every word. The data of this test was summarized in Table 8.

Table 8

Types of Signs to 10 Turkish Words by 8 Years of Old Participants

Participants	Ev	Anne	Ağaç	Güneş	Su	Köpek	Kuş	Çocuk	Araba	Gözlük
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0

0 = Doesn't know the response, that is, he/she doesn't understand the written form of the Turkish word

Table 8 indicates that all the participants of the 8 years of old group didn't know the sign of the written words. In other words, it can be said that no one understood the written form of these words.

Secondly, these participants were shown pictures of 10 Turkish words and again were asked to show the sign of each word. The results obtained from this test were presented in Table 9 and Table 10 below.

Table 9

Types of Signs to 10 Pictures by 8 Years of Old Participants

Name	Ev	Anne	Ağaç	Güneş	Su	Köpek	Kuş	Çocuk	Araba	Gözlük
4	1	3	3	2	1	3	1	1	1	1
5	1	1	3	2	1	3	2	1	1	1
6	3	0	3	3	1	3	3	0	1	1

0 = Doesn't know the response, that is, he/she doesn't understand the picture and doesn't know the sign for that picture, 1 = True Sign, 2 = False Sign, 3 = True Sign but Different from Standard Turkish Sign Language

Table 10

Frequency and Percentage of Signs for 10 Pictures by 8 Years of Old Participants

Word	Frequency (True)	Frequency (False)	Frequency (*)	Frequency (**)	Percent (True)	Percent (False)	Percent (*)	Percent (**)
Ev	2	0	1	0	66.7	00.0	33.3	00.0
Anne	1	0	1	1	33.3	00.0	33.3	33.3
Ağaç	0	0	3	0	00.0	00.0	100.0	00.0
Güneş	0	2	1	0	00.0	66.7	33.3	00.0
Su	3	0	0	0	100.0	00.0	00.0	00.0
Köpek	0	0	3	0	100.0	00.0	100.0	00.0
Kuş	1	1	1	0	33.3	33.3	33.3	00.0
Çocuk	2	0	0	0	66.7	00.0	00.0	00.0
Araba	3	0	0	0	100.0	00.0	00.0	00.0
Gözlük	3	0	0	0	100.0	00.0	00.0	00.0

* True Sign but Different from Standard Turkish Sign Language, ** Doesn't know the response, that is, he/she doesn't understand the picture and doesn't know the sign for that picture

According to Table 9 and Table 10, it can be concluded that the words "Su, Araba, and Gözlük" were signed correctly by all the participants of the 8 years of old group. Also, the word "Güneş" was signed incorrectly by two people and the word "Kuş" by only one person. The words "Ağaç and Köpek" were signed differently by all the participants, but the words "Ev, Anne, Güneş, and Kuş" were signed differently only by one person.

5. Discussion

The research questions of this study were organized as “How deaf children grasp the meaning of words through written forms and real images?" and "Are there differences between the signs that were produced by children for every word/picture or not?”. Based on the results of this study, it was revealed that written form of Turkish words and pictures were recognized and understood by 13 years of old participants and appropriate signs were produced by them. On the other hand, the written form of Turkish words had no meaning for 8 years of old participants, that is, they couldn't recognize or understand them to produce signs. For this group of participants only pictures were understandable and they produced signs only for pictures.

Sign language is a common way for the deaf to communicate with other people. Factors causing sign data variation come from many sources, like geographical or social reasons, language backgrounds, age of the signers, their families' social class, being from deaf family, and etc.

The important factor in the case of deaf people in Turkey is the lack of Standard Sign Language in this country. Deaf people don't have a common sign language and only the alphabet is common. Deaf children usually create signs by themselves whenever it is needed like the words "Ağaç, Anne, Ev, Güneş, Köpek, Kuş, Çocuk" because they need to interact with others. For this reason, there are more than one sign for a word in one region. However, given that the majority of deaf children come from widely varying language backgrounds, their inquisitional pathways may be quite different. For example, home signing is common in Turkey because most of deaf children have deaf parents and they have interaction with them from their childhood. So they acquire sign language from the environment they belong to. In other words, they don't learn the signs from their teachers at schools but from their own families. However,

in the case of deaf children who have hearing parents it is different. They don't have access to deaf people to interact with and they don't learn sign language before starting the primary school. But after entering the Deaf Schools everything changes and they learn sign language from their teachers and the other deaf children.

Another factor causing some difficulty for deaf children in Turkey is that, the same books are taught in Deaf Schools as in the normal schools. There are not special books for the deaf, as it is obvious from this research the pictures are so important for deaf children because they cannot understand the written form of words in young ages. They can write alphabet and words or they can do finger spelling to show alphabet and words, but they cannot understand their meanings in early ages. Since, they are the sounds that give meaning to the written words. Therefore, specific books are necessary for deaf children at schools.

6. Conclusion

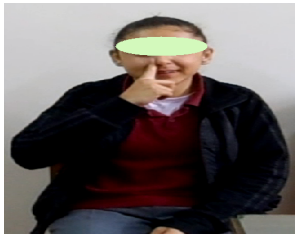
Regarding the results revealed from this study, it can be concluded that participants in 13 years of old group produced signs both for written form of Turkish words and also for pictures shown to them. Also, it was revealed that the signs which they produced for every word were of three kinds:

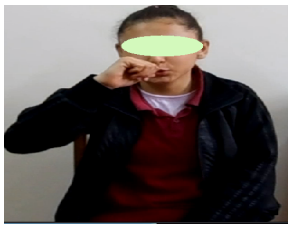
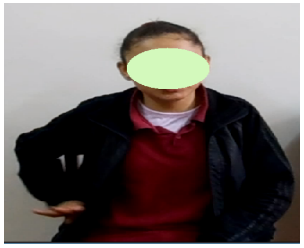
- True sign (The word/picture was recognized and true sign was produced)
- False sign (The word/picture was recognized but the false sign was produced)
- Different sign (The word/picture was recognized but different sign from the standard sign was produced).

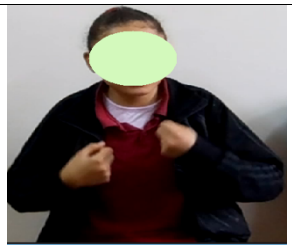
The comparisons of their signing to the written words can be seen in Table 11 below.

Table 11

Comparison of the 13 Years of Old Participants' Signing to 10 Turkish Words

Word	Participant 1	Participant 2	Participant 3
Ev	 True	 True	 True
Anne	 True	 Different	 True

Ağaç	 Different	 Different	 Different
Güneş	 False	 False	 False
Su	 True	 True	 True
Köpek	 Different	 Different	 Different
Kuş	 False	 False	 False
Çocuk	 True	 Different	 Different

Araba	 True	 True	 True
Gözlük	 True	 True	 True

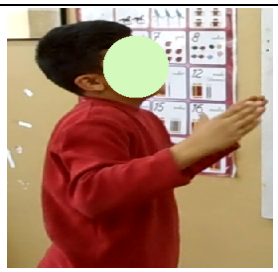
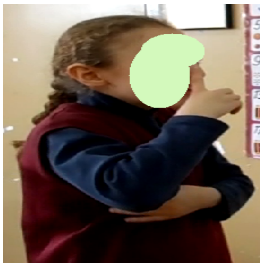
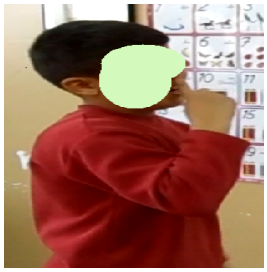
In the case of 8 years of old group, it was determined that they were only able to produce signs for pictures and not for written form of Turkish words. Because as it was said before, the written form is not meaningful for the deaf at young ages and only pictures and real objects are important. Also, the signs that they produced for every picture were of four different types:

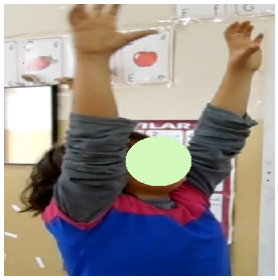
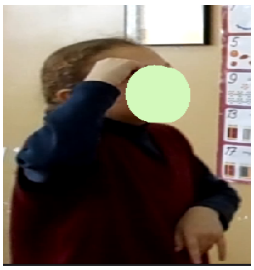
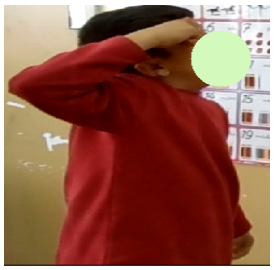
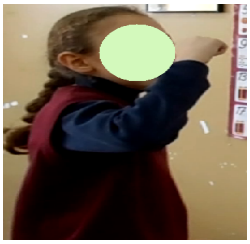
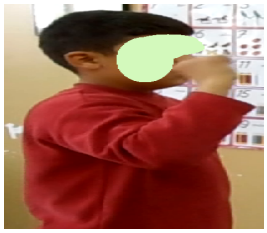
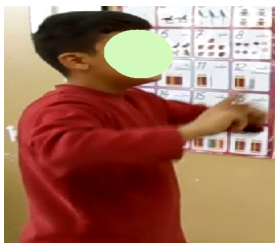
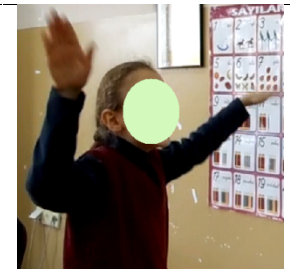
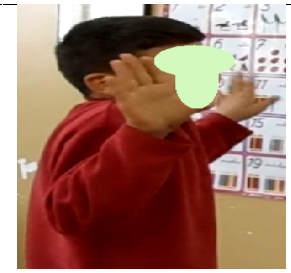
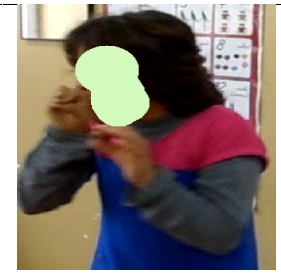
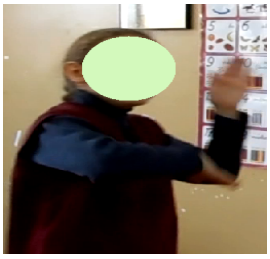
- True sign (The picture was recognized and true sign was produced)
- False sign (The picture was recognized but the false sign was produced)
- Different sign (The picture was recognized but different sign from the standard sign was produced).
- No sign (The picture wasn't recognized and no sign was produced).

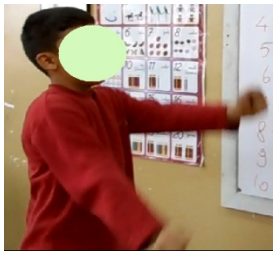
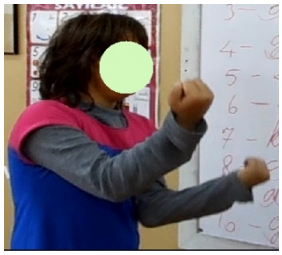
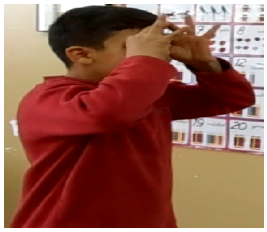
The comparison of their signing to pictures was shown in Table 12.

Table 12

Comparison of the 8 Years of Old Participants' Signing to 10 Turkish Pictures

Word	Participant 4	Participant 5	Participant 6
Ev	 True	 True	 Different
Anne	 True	 True	 Doesn't understand

Ağaç	 Different	 Different	 Different
Güneş	 False	 False	 Different
Su	 True	 True	 True
Köpek	 Different	 Different	 Different
Kuş	 False	 False	 Different
Çocuk	 False	 True	 Doesn't understand

Araba	 True	 True	 True
Gözlük	 True	 True	 True

7. Limitations of the study

In current study, only 6 participants were used to gather data about sign language and it was better to include more participants in data gathering process. Also, this study was conducted with only one male participant that was reasonable to select more males. Considering the fact that this study was limited to only 8 and 13 years of old participants, it was considered the best that participants were of different ages.

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