The Development of Reading in Early Bilingualism: Evidence from Turkish-Child L2 Learners of English

Feride Özdemir, Belma Haznedar and Nalan Babür

Abstract

This study investigated the role of phonological awareness in the reading acquisition of Turkish-English successive bilingual children. Cross-language transfer, the relationship between phonological awareness and phonological memory and the effect of grade level on phonological awareness were also explored. The results confirmed the previous research which demonstrated that there is a strong relationship between phonological awareness and reading in monolingual children. Bilingual data, on the other hand, did not present a significant relationship between phonological awareness and reading. Error analyses of nonword reading task revealed that Turkish-English bilingual children transfer phonological awareness skills from Turkish in order to decode English pseudowords, which was evident from their use of Turkish grapheme-phoneme correspondences and Turkish phonological rules. Compatible with the previous research, the present study indicated a significant relationship between phonological awareness and phonological memory of monolingual children. However, bilingual phonological memory did not appear to explain phonological awareness. The results also pointed out that neither bilingual nor monolingual phonological awareness significantly differ across grades.

Key words: Bilingual reading acquisition, Phonological awareness, L1 influence

Introduction

Reading has long been an area of interest for researchers. Numerous studies have been conducted in order to enlighten the acquisition of reading and the processes it encompasses. Although, in basic terms, it could be described as the process of matching visual codes to sound units so as to comprehend the ideas and information through written material, research has shown that reading is actually a complex process which comprises of various skills and knowledge (Ziegler & Goswami, 2005). Related to these skills, phonological awareness appears to be central for reading (Gillon, 2007).

Phonological awareness could be described as the explicit awareness of the sound structure of a spoken word including the ability to recognize, identify, or manipulate the phonological units within words, such as phonemes, rimes and syllables (Gillon, 2006; Ziegler & Goswami, 2005). Literacy research has long addressed the role of phonological awareness in reading acquisition. Apparent from the numerous studies conducted, there is a strong relationship between literacy development and phonological awareness; and phonological awareness appears to be the best predictor of reading

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performance and spelling acquisition across languages (Bradley & Bryant, 1983; Bryant, MacLean, Bradley, & Crossland, 1990; Hoien, Lundberg, Stanovich, & Bjaalid, 1995; Lundberg, Frost, & Petersen, 1988; Schneider, Kuspert, Roth, Vise & Marx, 1997). Child literacy research demonstrated that while children who have strong phonological awareness skills are likely to succeed in reading and spelling, children who have poor awareness of phonology have difficulty in moving from speaking to reading (Gillon, 2006; Adams, 1990; Brady & Shankweiler, 1991; Goswami & Bryant, 1990; Wagner & Torgesen, 1987).

The nature of the relationship between phonological awareness and reading acquisition has been addressed in many studies across many alphabetical languages both in monolingual and bilingual contexts. Research on monolingual data (Bradley & Bryant, 1983; Wimmer, Landerl, Linortner, & Hummer, 1991; Durgunoğlu & Öney, 1999; Frost, 2001) and bilingual data (D'Anguilli, Siegel, & Serra, 2001; Lafrance & Gottardo, 2005; Verhoeven, 2007) demonstrated that phonological awareness correlated highly with reading.

Previous research has also indicated that the relationship between the phonological awareness and reading development of a language may be affected by the characteristics of the orthography and the relationship between the orthography and the phonological system of that specific language (Wimmer & Goswami, 1994; Goswami, Gombert, & De Barrera, 1998; Durgunoğlu & Öney, 1999; Defior, Martos, & Cary, 2002). Orthography is the set of rules for using a script in a particular language such as symbol-sound correspondences, punctuation, capitalization etc. (Cook & Bassetti, 2005, p. 3) and languages differing in their orthographic characteristics and phonological structures create variations in the development of phonological awareness across languages (Durgunoğlu & Öney, 1999). Transparency which is referred to as the regularity of the correspondences between the phonological (i.e. phonemes) and written forms (i.e. graphemes) appears to be a significant factor in reading development (Cook & Bassetti, 2005). Studies across transparent and opaque languages (e.g.. Turkish vs. English) indicated that readers of transparent orthographies are faster and experience less difficulty in reading than readers of opaque languages (Wimmer & Goswami, 1994; Goswami, Gombert, & De Barrera, 1998; Defior, Martos, & Cary, 2002).

In this article, the relationship between phonological awareness and reading is investigated in Turkish-English successive bilingual children. The tasks in the study tested the word reading performance and the phonological awareness levels of Turkish-English successive bilingual children and English monolingual children in English. Some studies explored the relationship between phonological awareness and reading in Turkish monolingual children (Durgunoğlu & Öney, 1999) and Turkish-Dutch bilingual children (Verhoeven, 2007). However, no previous work has documented the role of phonological awareness in reading acquisition of Turkish-English bilinguals. As a transparent language, grapheme-phoneme correspondences are highly regular in Turkish. Unlike Turkish, English is an opaque language in which the correspondences between graphemes and phonemes are not as regular and consistent. Furthermore,

phonological characteristics of the two languages, such as syllable structure and phonotactic constraints, differ to a great extent.

The organization of the article is as follows. Section II provides a review of previous research on phonological awareness and phonological memory. Section III describes the design of the study, participants and the materials used. Section IV reports on the results of the tests and finally Section V presents a discussion of the findings.

Background

The Relationship between Reading Acquisition and Phonological Awareness

It has been demonstrated in a number of studies on reading development that phonological awareness is a critical skill for alphabetic literacy acquisition, as well as one of the strongest predictors of subsequent reading ability (Bradley & Bryant, 1983; Durgunoğlu & Öney, 1999). Data from both monolingual and bilingual studies support this strong relationship.

Wimmer et al. (1991) conducted a study to investigate the relationship between phonemic awareness and reading acquisition in monolingual children. Three different groups of L1 German first-graders were tested through *vowel substitution*, *word reading*, *nonword reading*, *syllable/phoneme counting*, *pseudoword repetition*, and *alphabetic spelling* tasks. Children were first tested one month after they started school and then retested at the end of the first grade. The scores of children in those two tests were compared later. The results of all three experiments indicated that children's phonemic awareness ability and their word reading were highly correlated. Phonemic awareness differences between children at the beginning of school predicted alphabetic reading and spelling accuracy at the end of grade one. These results suggest that there is a significant relationship between phonemic awareness and reading acquisition. In addition to presenting support for the relationship between reading acquisition and phonological awareness, the study also indicated that reading instruction facilitates phonological awareness. At the beginning of the first grade, children either failed in the vowel substitution task or found it very difficult to do. However, after being exposed to reading instruction, children experienced no difficulty in the vowel substitution task in the second testing. The same pattern was observed for the phoneme counting task. Considering that the children were taught reading via a phonics approach, for Wimmer et al. (1991), the effects of reading instruction should be taken into account.

Another study supporting the relationship between phonological awareness and reading was conducted by Frost (2001). Testing 44 monolingual Dutch speakers, he explored the relationship between preschool phoneme awareness and initial reading development. Preschool children were tested through several measures of reading including *phoneme counting*, *syllable counting*, *word-length detecting*, *rhyming*, *initial sound-picture matching* and a general *language comprehension* test. Based on their scores on these tests, they were divided into two groups: high phonemic awareness (HPA) and low phonemic awareness (LPA). Based on the analysis of longitudinal data,

Dutch monolingual children were tested from the beginning of the first grade to the end of the second grade. During those two years, children were administered phonemic awareness (including phoneme identification, phoneme deletion, phoneme analysis and phoneme synthesis), word reading (including regular, irregular and nonword reading), letter naming and word production tasks. The results of the study clearly indicated that HPA and LPA groups differed significantly during their reading development in 1st and 2nd grades. This result suggests that children with a high entry level of phonemic awareness on entry into grade 1 (implicit phonemic awareness) develop better reading ability at the end of grades 1 and 2 than children with low level of phonemic awareness.

Verhoeven (2007) conducted a study to investigate the relationship between early bilingualism and phonological awareness in Turkish-Dutch bilingual kindergarten children. 75 children participated in the study. Several language proficiency and phonological awareness tasks including *rhyming*, *word objectification*, *phoneme segmentation* and *word blending* were administered to the children. On all of the tests administered, the predominance of Turkish was observed. Although bilingual children perform like native speakers of Dutch, they still show dependence on their L1 at times. The significance of the findings in this study was that the scores on the language proficiency tasks and the scores on the phonological awareness tasks were positively correlated. Children who scored high in language proficiency tasks also scored high in phonological awareness tasks.

In another study investigating the role of phonological awareness in bilingual reading, Lafrance and Gottardo (2005) tested 40 French-English bilingual children. Children were administered L1 and L2 word reading, phonological awareness and nonverbal reasoning tasks. In an examination of the relationship between word reading and phonological awareness tasks, the results of the study revealed that L1 and L2 phonological awareness in Grade 1 were predictive of both L1 and L2 reading.

Another study presenting strong results on the relationship between phonological awareness and bilingual reading was conducted by D'Anguilli, Siegel and Serra (2001). In addition to phonological awareness skills, 81 English-Italian bilingual children were also tested on syntactic and working memory skills and their relationship with reading acquisition. Bilingual children and their English-speaking monolingual and Italian-speaking monolingual controls were divided into skilled and less-skilled groups based on their language abilities. These groups were also divided into 9-11 and 11-13 age groups in order to see the developmental pattern in their reading acquisition. Participants were administered parallel tasks in English and Italian including *word reading*, *nonword reading*, *spelling*, *oral cloze* and *working memory* tests. The results of the study showed that in the bilingual group and the monolingual groups, phonological awareness tasks and reading were significantly related, indicating that phonological awareness constitutes an essential component in reading development. Unlike phonological awareness, syntactic skills appeared to have a less significant relationship with reading. Furthermore, working memory did not correlate with reading at all. In addition to supporting the literature on the significant relationship between reading and phonological awareness, the study also showed that the bilingual group performed better

than English monolingual group on all English tasks. Taking the different linguistic structures of Italian and English into consideration, these results were interpreted to present positive influence of Italian on English reading development of bilingual children. Reading experience in the transparent language, Italian, which has consistent grapheme-phoneme relationships, may have benefited reading ability of bilingual children in the opaque language, English.

Studies across alphabetical orthographies demonstrated that languages other than English also have strong relationships between phonological awareness and reading. The relationship between the phonological awareness and reading development of a language may be affected by the characteristics of the orthography and the relationship between the orthography and the phonological system of that specific language. Languages differ in their orthographic characteristics and phonological structures and these differences result in variations in the development of phonological awareness across languages (Durgunoğlu & Öney, 1999). Studies conducted on different languages present clear examples of the effects of language characteristics on phonological awareness.

In order to investigate the effects of different phonological structures on reading development and phonological awareness, Durgunoğlu and Öney worked with Turkish children. In their 1999 study, they administered several tests including *syllable tapping*, *phoneme tapping* and *phoneme deletion* to Turkish and English monolingual kindergartners and 1st graders. Results of the syllable tapping task revealed that Turkish monolingual children manipulate syllables more accurately than English monolingual children. Considering that the syllable structure of Turkish is more consistently defined and has less possible syllable types compared to English syllable structure, it is not surprising that Turkish monolinguals did not experience difficulty in the syllable tapping task. Another difference between Turkish and English derives from the inflection system; as an agglutinative language, Turkish has inflections attached to the ends of the words. In parallel to this characteristic of Turkish, English monolinguals presented no difference in their performance in initial and final phoneme deletion tasks. However, Turkish monolinguals performed significantly better in final phoneme deletion tasks than in initial phoneme deletion task. Thus, the study appeared to be supporting the argument that different phonological structures have an impact on phonological awareness and the development of reading.

As well as phonological structures, orthographic characteristics of languages are argued to present significant impacts on the development of reading and phonological awareness. Among others, transparency appears to be a key factor in reading development. Transparency refers to the regularity of the correspondences between the phonological and written forms (Cook & Bassetti, 2005). This correspondence between grapheme and phoneme differs across languages, even across the languages which share the same script. As the same graphemes are used in the limits of different phonological structures of different orthographies, their levels of transparency vary. According to the orthographic depth hypothesis (Katz & Frost, 1992), characteristics of the orthography determine the reading processing strategies

that readers adapt to. Readers of *shallow orthographies* such as Turkish use a phonological pathway to read, as the letter-sound correspondences are consistent and regular in these languages. In contrast, readers of *deep orthographies* such as English are not encouraged to use the phonological pathway while reading, as graphemes do not map onto sounds consistently in these languages. With the stimulation of these arguments, numerous studies have explored the effect of orthographic depth on reading development and phonological awareness.

In their 1994 study, Wimmer and Goswami investigated the effects of orthographic consistency by comparing English and German. They administered three reading tasks to groups of 7, 8 and 9-year-old children who were learning to read in English and German: *a numeral reading task, a number word reading task* and *a nonsense word reading* task. It was assumed that German children should not have difficulty in reading nonsense words, as grapheme-phoneme correspondences are consistent in German. In contrast to children learning German, English children were assumed to have more difficulty in nonsense word reading due to the opaque nature of English. Results of the study confirmed these assumptions. The most noticeable difference between the two languages appeared in nonsense word reading. German reading learners outperformed English learners in all three age groups. In addition to the scores obtained on the tests, error analyses provide important information about the strategies that children use to read the words. German readers, for instance, never refused to read nonsense words, while English readers have 37 refusals in total. This suggests that German children read the nonsense words by assembling pronunciations. English children, on the other hand, depend on direct access strategies which make them read the word lists in longer times and have difficulty in reading nonsense words.

Phonological Memory

Phonological memory could be defined as a temporary storage in which information is coded in a sound-based representation system (Baddeley, 1982). This phonological coding of information allows the beginning reader to maintain an accurate representation of the phonemes associated with letters or word parts. In addition, it enables the maximum devotion of cognitive resources to ongoing decoding and comprehension processes (Wagner Torgesen, & Rashotte, 1994).

Being one of the phonological processing skills, the nature of phonological memory and its relationship with reading and phonological awareness was investigated in various studies (Wagner, Torgesen, & Rashotte, 1994; Wagner, Torgesen, Rashotte, Hecht, Barker, Burgess, Donahue, & Garon, 1997; Kroese, Hynd, Knight, Hiemenz, & Hall, 2000; Dufva, Niemi, & Voeten, 2001). Various results were obtained as a result of these studies, some of which demonstrated the relationship between reading, phonological awareness and phonological memory, while some others failed to support the relationship.

In their well-known study, Wagner, Torgesen and Rashotte (1994) explored the role of various phonological skills including phonological synthesis and analysis,

phonological memory, isolated and serial naming in word recognition. They followed English monolingual children from preschool to second grade. The results showed that phonological memory failed to predict word recognition in preschool and the first grade. It was only the phonological awareness which directly affected word recognition in the first grade.

In another study conducted by Dufva et al. (2001), the relationship among phonological awareness, reading and phonological memory was investigated through a longitudinal study. 222 Finnish preschoolers were followed through second grade. Several skills including verbal abilities, listening and reading comprehension, word recognition, phonological awareness and phonological memory were assessed. The results of the study indicated that phonological awareness was the most significant predictor of word recognition. Phonological memory, on the other hand, had a weak effect on phonological awareness at preschool, while having weak effect on grade one and grade two word recognition. Furthermore, phonological memory did not have a direct effect on reading comprehension.

In addition to normally developing children, children with reading disabilities have also provided significant findings in the exploration of the relationship between phonological memory, reading and phonological awareness. In one of these attempts, Kroese et al. (2000) investigated the relationship between phonological memory, reading, phonemic awareness and spelling. Thirty-four children with reading disability, thirty-one children with Attention-Deficit-Hyperactivity-Disorder and thirteen normal, control children aged between 8 and 12 participated in the study. The participants were administered a battery of tests including cognitive, linguistic, academic, phonemic awareness, and memory tests. The main purpose of the study was to assess the effect of phonemic awareness and phonological memory on spelling skills. The results met the expectations of the study and phonological memory appeared to be significantly correlated with reading recognition and spelling skills.

This study was designed to investigate the role of phonological awareness and phonological memory on the reading development of successive Turkish-English bilingual children. The study explored (a) the role of phonological awareness in reading acquisition of Turkish-English successive bilingual children and English monolingual children, (b) whether Turkish-English successive bilingual children transfer phonological awareness skills from Turkish to English, (c) whether there is a relationship between phonological memory and phonological awareness of Turkish-English successive bilingual children and (d) whether reading acquisition of Turkish-English bilingual children follows a developmental pattern across the second, the third and the fourth grade.

Method

Participants

A total of 18 children participated in the study, 9 in each of two groups. The groups comprised a group of Turkish-English bilingual children and a control group of English monolingual children. Participants were selected from two private schools in Istanbul. The study did not include state schools but private schools, as the study examines early reading performance in English by English-speaking monolingual and English-Turkish bilingual children. In the Turkish educational system, English language education starts in the fourth grade in state schools. In private schools, on the other hand, English language education starts in kindergarten or in the first grade.

9 Turkish-English bilingual children from second, third and fourth grades participated in the study. Each grade group consisted of three children. The mean age of the participants was 8.4. All bilingual children that participated in the study started learning English in kindergarten. It is the speaking skill which is focused on in kindergarten. Starting from the first grade, they were taught to read in English and Turkish simultaneously.

A total of 9 monolingual children from second, third and fourth grades (3 in each grade) participated in the study. The mean age of the participants was 8.2. All the monolingual participants started to learn reading English in kindergarten. They have not received reading instruction in Turkish. They attend an international British school in Istanbul, where they are exposed to English throughout the day. Besides, all of the nine participants have L1 English parents, which means that they are exposed to English at home, as well.

Materials

Two standardized English reading tests, The Test of Word Reading Efficiency (TOWRE) and The Comprehensive Test of Phonological Processing (CTOPP), were administered to the participants.

Two subtests of TOWRE (Torgesen,Wagner & Rashotte,1999) were employed in the study:

Sight Word Efficiency

In this test, children were presented a list of 104 printed words and instructed to read the words in the list as fast as possible in 45 seconds. The test comprises of isolated, real words which increased in difficulty and the number of phonemes they include.

Phonemic Decoding Efficiency

63 pronounceable, printed non-words were administered to children and they were instructed to read as many non-words as possible in 45 seconds. From the first item to the last item, the test increases in difficulty and the number of phonemes that the items include.

Six subtests of CTOPP (Wagner, Torgesen & Rashotte,1999) were administered in the study:

Elision

In this test, the children were required to say the given words without specific sounds. For example, the examinees were instructed "Say *tan* without saying /τ/". They were expected to say *an* /εν/. The examinees were instructed to remove sounds in word-initial, word-final and mid-word positions.

Blending Words

After hearing recorded sounds, children were asked to form a whole word from the sounds they heard. For example, children were asked, "What words do these sounds make /τ/ /oI/?". The correct answer was "*toy*". From the first item to the last, the words increased in the number of phonemes or syllables.

Blending Nonwords

In parallel to the previous task, children were asked to form a whole nonword from the sounds they heard. For instance, examinees were instructed, "What made-up word do these sounds make? /β/ /{/ /σ/ /π/?" The correct response was *basp*.

Segmenting Words

This task required the children to repeat a word first, then to say it one sound at a time. For example, they were told, "Say *eat*. Now say *eat* one sound at a time." The expected answer was /ι:/ /τ/. As in the other subtests, the test items varied in length and difficulty.

Segmenting Nonwords

In this task, children were asked to segment nonwords this time. For instance, they were instructed "Say *dra*. Now say *dra* one sound at a time". The correct response is /δ/ /≤/ /εI/.

Memory for Digits

In this test, the examiner played the series of numbers on the computer and asked the examinee to repeat the numbers in the order that they hear them. The length of the number series increased from the first to the last item. For instance, the first item *1 6* included two digits; while the last item *4 9 6 7 3 1 6 5* included eight digits.

Procedure

The tests were administered to the participants in one session. All participants were tested individually in a separate, quiet room. All the conversation between the participants and researcher was recorded. The order of the subtests was changed for each participant to prevent the effect of the fatigue on the answers.

Results

Relationship Between Phonological Awareness and Reading

Word reading and phonological awareness scores of Turkish-English bilingual children and English monolingual children were correlated in order to see the relationship between phonological awareness and reading.

Table 1 shows the correlation among the scores obtained by bilingual children on word reading and phonological awareness tasks[1]. No significant correlations were found between phonological awareness and reading performance of bilingual children.

Table 1. Correlations between phonological awareness and word reading of bilingual children

	Word Reading Efficiency	**Sight Word Reading**	**Phonemic Decoding Efficiency**
Phonological Awareness	.28	-.24	.51
Alternative Phonological Awareness	-.08	.06	.11

* $p < .05$

In contrast to bilingual children, the scores of monolingual English children presented a significant relationship between phonological awareness and reading.

[1] Two different phonological awareness scores were calculated as phonological awareness and alternative phonological awareness scores. Wagner, Torgesen and Rashotte (1999) defined alternative phonological awareness as a score which is available for examiners who desire to assess phonological awareness exclusively with pseudowords. While phonological awareness scores mainly focused on real words, alternative phonological awareness scores mainly presented the awareness of phonology in pseudowords.

According to Table 2, alternative phonological awareness highly correlated with word reading efficiency (r = .75, p< .05). Phonological awareness scores of monolingual English children, on the other hand, did not significantly correlate with word reading efficiency scores (r = .53, p< .05).

Table 2. Correlations between phonological awareness and word reading of monolingual children

	Word Reading Efficiency	**Sight Word Reading**	**Phonemic Decoding Efficiency**
Phonological Awareness	.53	.36	.55
Alternative Phonological Awareness	.75*	.78*	.75*

* p <.05

Transfer of Phonological Awareness Skills from Turkish to English

So as to investigate transfer effects, first, word reading, pseudoword reading and phonological awareness scores of Turkish-English successive bilingual children and English monolingual children were compared.

According to the results, Turkish-English bilingual children (Mdn = 118) and English monolingual children (Mdn = 114) did not significantly differ in the extent to which they read real words, U = 38.5, r = .04. As in real words, Turkish-English bilinguals (Mdn = 123) and English monolinguals (Mdn = 120) did not significantly differ in pseudoword reading either U= 33.5, r = .14.

In line with word reading, phonological awareness of Turkish-English successive bilinguals (Mdn = 109) and English monolinguals (Mdn = 115) did not significantly differ, U = 28, r = .26. Although the results represent no significance, there is still a low effect of .26, which indicates a slight difference between bilinguals and monolinguals on phonological awareness. However, the results show that alternative phonological awareness presents a different behavior than phonological awareness. Turkish-English bilinguals (Mdn = 115) and English monolinguals (Mdn = 115) differed significantly in alternative phonological awareness, U = 10.5, r = .63. The effect size indicates a large effect of language on alternative phonological awareness. Both results on phonological awareness and alternative phonological awareness showed that monolinguals outperformed bilinguals on phonological awareness of English.

As the second set of analyses to address cross-language transfer, the errors made by bilingual and monolingual children in pseudoword reading task were classified and compared. The errors were classified according to the error classification that Durgunoglu, Nagy and Hancin-Bhatt (1993) used in their cross-language transfer study. According to this study, errors were classified into six groups: incomplete decoding,

guessing, English replacement, Turkish replacement, unclear and no response. Incomplete decoding errors included mistakes when only one or two phonemes of the target pseudoword were pronounced (e.g. /βρε/ for bremick). Guessing errors included mistakes that were unrelated to the target pseudoword (e.g. /ονο/ for *strone*). In the *English replacement* category, errors reflected the participant's replacement of an English word or pseudoword for the presented nonword (e.g. /ναΙπ/ for *knap*). *Turkish replacement errors*, on the other hand, reflected the participant's Turkish word or pseudoword replacement for the presented nonword (e.g. /ϖΥμ/ for *wum*). In the last category, *unclear errors* included mistakes which could be interpreted as either Turkish or English replacement or were not clearly audible (e.g. /γΥδι/ for *guddy*). This classification was taken into consideration while bilingual errors were examined. As monolingual children would not make Turkish replacement for English words, their errors were classified into five categories excluding the *Turkish replacement error* type.

A qualitative analysis of errors indicated that the biggest proportion of bilingual errors is comprised of *Turkish replacement errors* (TR) 53.3% (79 errors). *English replacement errors* (ER) 22.1% (33 errors) and unclear errors 14.8% (22 errors) followed *Turkish replacement errors* in terms of proportion. In contrast, *English replacement err*ors of English monolingual children covered 63.4% (26 errors) errors in total, while *unclear errors* (U) (19.5%) followed this category. For both bilinguals and monolinguals, *incomplete decoding* (ID), *guessing* (G) and *no response* (NR) types of errors remained in low levels. The numbers and the distributions of errors are illustrated in Figure 1 and Figure 2.

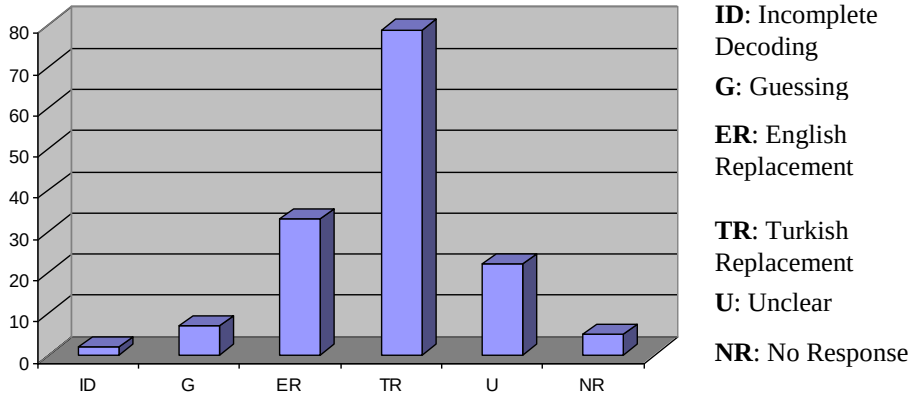
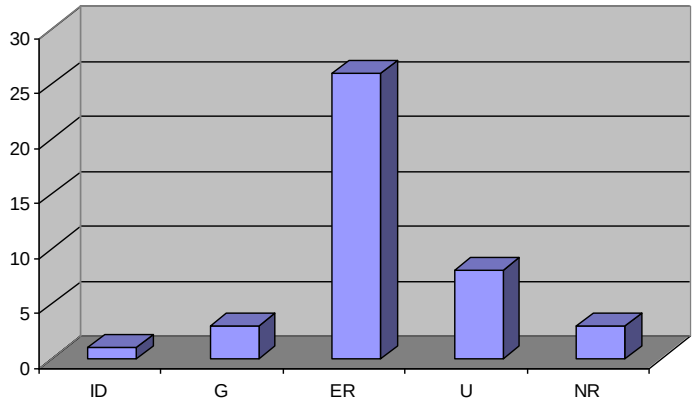


Figure 1. Numbers of errors in pseudoword reading task by bilingual children



ID: Incomplete Decoding

G: Guessing

ER: English Replacement

U: Unclear

NR: No Response

Figure 2. Numbers of errors in pseudoword reading task by monolingual children

Relationship Between Phonological Awareness and Phonological Memory

To examine the relationship between phonological awareness and phonological memory of Turkish-English bilingual children and English monolingual children, phonological awareness and phonological memory scores of bilingual and monolingual children were correlated. The results of the Mann-Whitney U test indicated that there is a significant difference between monolingual and bilingual groups in terms of phonological memory, $U = 6$, $r = -.72$. As the effect size shows ($r = -.72$), language has a very large effect on phonological memory and the monolingual children outperformed the bilinguals on phonological memory.

Table 3 shows the correlation between phonological awareness and phonological memory scores of bilingual children.

Table 3. Correlations between phonological awareness and phonological memory of bilingual children

	Phonological Awareness	**Alternative Phonological Awareness**
Phonological Memory	.22	.03

* $p < .05$

Bilingual data presented no significant correlation between phonological awareness and phonological memory ($r = .22$, $p < .05$). Parallel with this finding, alternative phonological awareness did not significantly correlate with phonological memory, either ($r = .03$, $p < .05$).

Table 4. Correlations between phonological awareness and phonological memory of monolingual children

	Phonological Awareness	**Alternative Phonological Awareness**
Phonological Memory	.68*	.47

* $p<.05$

In contrast to bilingual children, there is a significant relationship between phonological awareness and phonological memory of monolingual English children (r = .68, p <.05) as can be seen in Table 4. However, no significant correlation was found between phonological memory and alternative phonological awareness (r = .47, p <.05).

Developmental Pattern of Reading Acquisition in Turkish-English Bilingual Children

Grade 2, Grade 3 and Grade 4 students of Turkish-English and monolingual English children were compared based on the scores they obtained in word reading and phonological awareness tasks in order to see whether there is a developmental pattern they go through. As the analysis included more than two groups, the Kruskal-Wallis one way analysis of variance was used to compare the differences between these groups. Separate analyses were conducted for bilingual and monolingual children. As for post hoc tests, Mann-Whitney U analyses were conducted.

For Turkish-English bilingual children, the results indicated that grade did not significantly affect the word reading performance of the children (H (2) =4.23, p<.05). In order to see if real word reading and pseudoword reading differed in terms of grade effect, separate analyses were conducted for sight word reading and phonemic decoding efficiency tasks. The results showed that neither real word reading (H (2) =4.66, p<.05) nor pseudoword reading (H (2) = 4.86, p<.05) were significantly affected by the grades of children.

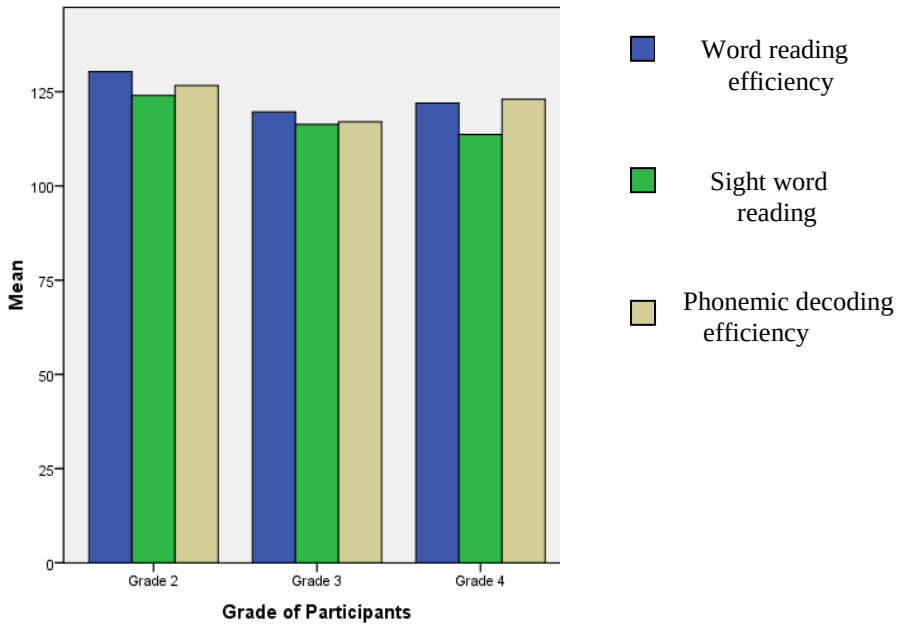


Figure 3. Word reading performances of bilingual children across grades

For English monolingual children, the results indicated that word reading of English monolingual children was not significantly affected by grade (H (2) = 2.4, p <.05), either. Again, in order to differentiate real word reading and pseudoword reading, separate Kruskal-Wallis tests were conducted for sight word reading and phonemic decoding efficiency tasks. As in bilingual children, neither real word reading (H (2) =3.006, p <.05), nor pseudoword reading (H (2) = 2.4, p <.05) appeared to be affected significantly by grade.

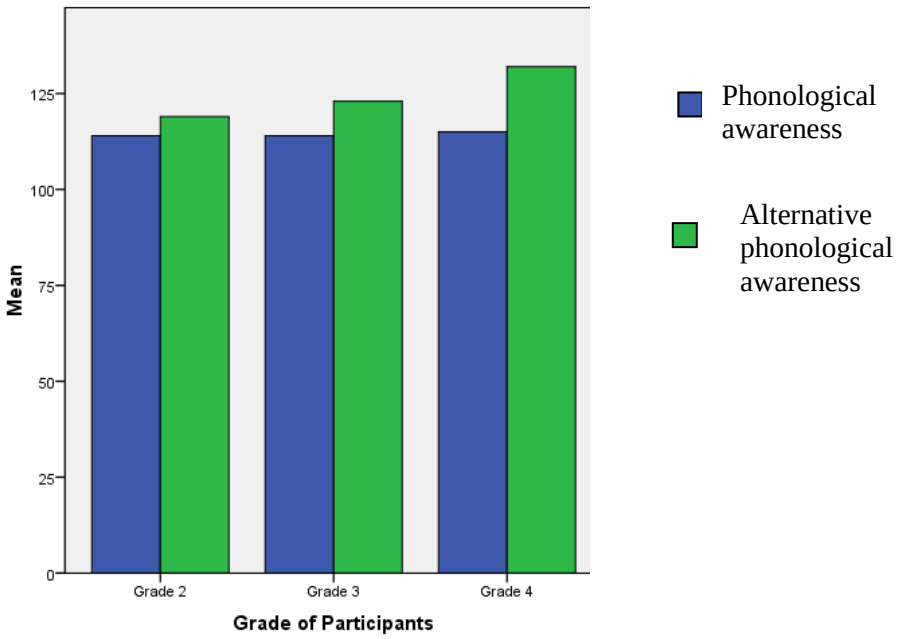


Figure 4. Phonological awareness performances of monolingual children across grades

Discussion

Findings of the present study confirm previous research that monolingual English speakers' phonological awareness skills and word reading performance strongly correlate (Bradley & Bryant, 1983; Wimmer, Landerl, Linortner, & Hummer, 1991; Durgunoğlu & Öney, 1999; Frost, 2001). Without the knowledge of grapheme-phoneme correspondences and the ability to manipulate the phonological units within words, it does not seem to be possible to read words. This is evident from the real word and pseudoword reading performances of monolingual English children.

In contrast, Turkish-English successive bilingual children did not demonstrate a significant relationship between their phonological awareness skills and word reading performance. Two reasons could be identified regarding this finding: transfer of phonological awareness skills from Turkish and the small sample size of the present study.

As mentioned in the results section, analyses revealed no significant difference between monolingual and bilingual children in the extent they read words. However,

the results of phonological awareness scores indicated that monolingual children outperformed bilingual children. As the previous studies on literacy development highlighted repeatedly, there is a positive relationship between reading and phonological awareness and children who have low phonological awareness level experience difficulty in reading (Bradley & Bryant, 1983; Wagner & Torgesen, 1987; Lundberg, Frost, & Petersen, 1988; Bryant, MacLean, Bradley, & Crossland, 1990; Adams, 1990; Goswami & Bryant, 1990; Brady & Shankweiler, 1991; Hoien, Lundberg, Stanovich, & Bjaalid, 1995; Schneider, Kuspert, Roth, Vise, & Marx, 1997, D'Angiulli, Siegel, & Serra, 2001; Gillon, 2006). It is seen that there was a mismatch between phonological awareness and word reading of bilingual children. This mismatch raises the question of how Turkish-English bilingual children could read as much as - even more than- monolingual children did although they have lower phonological awareness. In order to compensate for this gap, they must have made use of an additional mechanism. At this point, one can argue that Turkish-English bilinguals might not have undergone reading difficulties as a result of low phonological awareness because their phonological awareness in Turkish helped them to decode words in English. Phonological awareness is argued not to develop specific to a particular language and children can build on the strengths that they already have in their L1 (Durgunoğlu, Nagy & Hancin-Bhatt, 1993). Turkish and English are alphabetic languages and they both require manipulation the phonological subcomponents of words and to comprehend the mapping of orthographic symbols on these phonological subcomponents. Consequently, although having low phonological awareness in English, Turkish-English bilingual children could perform in word reading as well as monolinguals, thanks to their phonological knowledge in Turkish.

These results also confirm previous work which demonstrated that bilingual children often transfer decoding skills across languages in the early phases of literacy acquisition (Geva & Siegel, 2000).

In addition to quantitative analyses, error analyses highlighted that *Turkish replacement error*s constitute an overwhelming proportion of bilingual children's errors with a percentage of 53.3. *Turkish replacement error*s reflected the participant's Turkish word or pseudoword replacement for the presented nonword. For instance, when children were given the pseudoword *knap* to read, they were expected to pronounce the word as [nˈæp] conforming to grapheme-phoneme correspondences of English. However, some bilingual children read the pseudoword as [knʌçp] applying grapheme-phoneme correspondences of Turkish. In another example, children were asked to read the pseudoword *smuncrit.* While the expected answer was [smʌnkrɪt], some bilingual children pronounced the word as [sMmYnðZMrit]. Inserting the vowel /M/ into consonant clusters, voicing the grapheme *c* as /ðZ/ instead of /k/ or /s/, conform to Turkish phonological rules, while contradicting English phonology. This finding clearly demonstrates transfer of phonological awareness from Turkish to English. Resulting from the fact that bilingual children in the present study gained their phonological awareness primarily through their L1 Turkish in which they had both speaking and reading experience more intensively than in English, the first hand source

for them when they encounter an unknown word to apply is Turkish phonology. Turkish grapheme-phoneme correspondences and Turkish phonological units appeared to be helping bilingual children when decoding unknown words.

The result of error analysis of pseudoword reading task demonstrated that Turkish bilinguals made *Turkish replacement error*s (53.3%) and *English replacement error*s (22.2%) the most, and monolinguals, not surprisingly, made *English replacement error*s the most. However, *no response* (3.3% for bilinguals; 7.3% for monolinguals) and *guessing* (4.7% for bilinguals; 7.3% for monolinguals) errors remained in low proportions for both groups.

Examples of errors that Turkish-English bilinguals made in pseudoword reading tasks illustrate better that bilingual children employed grapheme-phoneme correspondences and phonological units of Turkish more than English while reading. The analyses indicated that bilinguals committed basically three types of transfer errors: *diphthong errors*, *syllable error*s and *initial cluster errors*.

Diphthongs are vowels that change quality within a single syllable (Ashby & Maidment, 2005) and this is a salient feature of English. In Turkish, on the other hand, there is no diphthong sound. Each vowel represents one phoneme and two unified vowels cannot constitute a single phoneme in Turkish (Kornfilt, 1997; Topbaş & Yavaş, 2007). These phonological features of Turkish and English explain the endeavor of bilingual children to divide the diphthongs they were presented into two separate phonemes. For instance, all of the monolingual children segmented the word *pie* into its individual phonemes as /π/ /αI/. However Turkish bilingual children, with the influence of Turkish, segmented the word as /π/ /α/ /φ/ by dividing the diphthong into two.

Another type of error that bilingual children committed in pseudoword reading task was *syllable error* in which children failed to segment the word into phonemes, but produced syllables, as in the example /μ{γ/ /νI/ /φαI/. Considering that syllable boundaries are always clear in Turkish unlike English (Yavaş, 2006), bilingual children's relying on syllables rather than phonemes appear to be reasonable. The children seem to transfer their knowledge of phonological units from Turkish to English, which lead them to err in English. This finding is also compatible with the findings of Durgunoğlu and Öney (1999) that Turkish children are very comfortable in manipulating syllables compared to L1 English children, resulting from the consistent syllable structure of Turkish.

Initial cluster error is the last type of error which could be asserted as evidence for transfer. *Initial cluster error*s included adding an extra vowel between the two consonants of word initial consonant clusters. This error was observed both in reading tasks such as reading the nonword *knap* [ν{π] as [κΜνςπ] or in segmenting task such as segmenting the word *ground* as /γ/ /Μ/ /ρ/ /α/ /υ/ /ν/ /δ/. English allows more complex cluster types in syllables than Turkish does. Two or three consonants both in onsets and codas are possible clusters in English (Yavaş, 2006). However, Turkish does not allow

onset clusters and as Turkish does not allow consonant clusters in the syllable initial position, an epenthetic high vowel is inserted between the initial consonant clusters in those borrowed words as in the example *krem* [κ□M4Eμ]. These phonological characteristics of Turkish and English confirm that the extra vowels that bilingual children inserted between the consonants of word initial clusters are transferred from Turkish to English.

In addition to attesting transfer, all these findings of error analyses above confirm previous work on literacy across languages that the relationship between the phonological awareness and reading development of a language may be affected by the characteristics of the orthography and the relationship between the orthography and the phonological system of that specific language (Wimmer and Goswami, 1994; Goswami, Gombert, & De Barrera, 1998; Durgunoğlu & Öney, 1999; Defior, Martos, & Cary, 2002; Cook & Bassetti, 2005). Analyses also show that phonological awareness of Turkish-English bilingual children is shaped around the phonological characteristics of Turkish. Their sensitivity to syllables, confronting the rules of syllable structure of Turkish, identification of phonemes according to Turkish vowel inventory provide evidence that phonological characteristics of Turkish influenced both their word reading and phonological awareness. Besides, having a shallow orthography, Turkish caused bilingual children to use consistent grapheme-phoneme correspondences even when reading in English, which is evident from their Turkish replacement errors in English pseudoword reading task.

In terms of the relationship between phonological awareness and phonological memory, the findings of monolingual English children confirm previous research which indicated that phonological memory has an effect on phonological awareness (Wagner, Torgesen, & Rashotte, 1994; Wagner et al.1997; Dufva et al. 2001). As Wagner et al. (1994) defined; phonological memory is a temporary storage in which information is coded in a sound-based representation system. And, the tasks which measure phonological awareness require retention of sounds or words in this temporary storage system during completion of the task (Dufva et al., 2001). Considering the tasks employed in the present study, this relationship between phonological memory and phonological awareness could easily be comprehended. For instance, in order to complete a word segmenting task, the child needs to keep the word in the phonological memory, and then segment it into its individual phonemes. Or, during a word blending task, the child needs to keep the phonemes heard in phonological memory in order to blend them into a meaningful word.

The findings that bilingual children represented no significant relationship between phonological memory and phonological awareness, on the other hand, is compatible with the findings reported by D'Angiulli et al. (2001) and Wagner et al. (1994). Although finding a strong relationship between reading and phonological awareness both in monolingual and bilingual groups, these studies failed to provide support for the relationship between phonological memory and phonological awareness. The lack of a significant relationship between bilingual phonological awareness and phonological memory in the present study appears to result from the type of the memory

measure used. As explained in the methodology section, only a digit repetition task was employed to measure phonological memory. Another memory task such as nonword repetition, which is a widely used phonological memory task- could have been included in the study. Dufva et al. (2001) argue that span tasks tend to have small variances, which was observed in the Wagner et al. (1997) study, as well. Using different tasks could produce larger variances and stronger influence of phonological memory on phonological awareness.

Findings of the present study failed to present an effect of grade on reading performance of bilingual and monolingual children. The reasons for the lack of a developmental pattern that bilingual and monolingual children go through during their reading development could be various. What appears to be the strongest factor that prevented a developmental pattern from showing up in the present study is the small sample size. If Kruskal Wallis analyses are examined in detailed terms, it is seen that there are differences between the means of grades both in the monolingual and the bilingual groups. However, due to the small sample- there were three children in each grade level-, these differences cannot be reported as statistically significant. In addition, even the smallest individual differences between the children are probable to affect the total outcome in large amounts, as there are few participants in the study.

Conclusion

The present study, which investigated the role of phonological awareness in reading acquisition of Turkish-English bilingual children, replicated the previous findings that there is a strong relationship between phonological awareness and word reading in monolingual children. Bilingual children, on the other hand, did not represent any significant relationship between phonological awareness and word reading, although they performed as well as monolinguals in word reading tasks. In relation to this, Turkish-English bilingual children provided evidence for transfer of phonological skills. As a result of their longer exposure to Turkish, and knowledge of the orthographic transparency of Turkish, bilingual children employed consistent Turkish grapheme-phoneme correspondences and the knowledge of phonological units in Turkish when decoding unknown words in English. In terms of phonological memory, bilingual and monolingual groups differed. Monolingual children presented a strong correlation between phonological memory and phonological awareness, whereas bilingual children showed no significant effect of phonological memory on phonological awareness. Lastly, grade levels of neither bilingual nor monolingual children appeared to be effective on their word reading performance or phonological awareness, which indicates the lack of a developmental pattern that children go through in the reading acquisition process.

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Erken İkidillilikte Okuma Becerisinin Gelişimi: İkinci Dil Olarak İngilizce Öğrenen Türk Çocuklarının İncelenmesi

Özet

Bu çalışma, Türkçe ve İngilizce'yi ardışık olarak edinen ikidilli çocukların okuma edinimininde ses farkındalığını olgusunu incelemektedir. Çalışma kapsamında ayrıca diller arası etkileşim, ses farkındalığı ile fonolojik bellek arasındaki ilişki ile sınıf düzeyinin ses farkındalığına etkisi araştırılmıştır. Elde edilen bulgular, tek dilli çocuklarda alanyazında sıkça tartışılan ses farkındalığı ile okuma arasındaki yakın ilişkiyi desteklemektedir. İki dilli çocuklarda ise, söz konusu iki değişken arasında anlamlı istatistiksel ilişki görülmemiştir. Anlamsız sözcük okumada yapılan hata analizi, Türkçe ve İngilizce konuşan iki dilli çocukların İngilizce anlamsız sözcükleri okurken anadillerinde gelişen ses farkındalığı becerilerindne yararlandıklarını göstermektedir. Alanyazında tartışılan bir başka olguda ise –ses farkındalığı ile fonolojik bellek arasında tek dilli çocuklarda anlamlı istatistiksel ilişki saptanırken, iki dilli çocuklarda her iki değişken arasında istatistiksel olarak anlamlı bir ilişki görülmemiştir. Son olarak, bu çalışma kapsamında ses farkındalığının tek dilli çocuklarda ve iki dilli çocuklarda sınıf düzeyine gore anlamlı bir değişimi görülmemiştir.

Anahtar sözcükler: İkidillilikte okuma edinimi, Fonolojik farkındalık, Anadilin etkisi