DECODING AND READING COMPREHENSION IN TURKISH: A COMPARISON OF TURKISH MONOLINGUAL AND KURDISH-TURKISH BILINGUAL CHILDREN

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DECLARATION OF ORIGINALITY

I, Serhat Kurt, certify that

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ABSTRACT

Decoding and Reading Comprehension in Turkish: A Comparison of Turkish Monolingual and Kurdish-Turkish Bilingual Children

This study investigated the longitudinal contributions of phonological awareness (PA), rapid automatized naming (RAN), phonological memory (PM), listening comprehension (LC) and vocabulary to Turkish decoding and reading comprehension among Turkish monolinguals (N=46) and Kurdish-Turkish bilinguals (N=50). In addition, it explored whether there was any performance difference between monolinguals and bilinguals in the development of these cognitive and linguistic components from kindergarten to Grade 1. The participants were individually tested at three times: at the beginning, at the end of the kindergarten, and at the end of Grade 1. The findings revealed a developmental pattern in PA, RAN, PM, LC and vocabulary performances across the groups from kindergarten to Grade 1. Separate mixed ANOVAs were conducted for each component to observe any performance differences among monolingual and bilingual children across the times. The monolinguals outperformed the bilinguals in all tests except for PA tests. That is, the bilingual children scored better on PA tests than their monolingual counterparts at the beginning of the kindergarten. However, this performance difference was faded in the later times, especially at Grade 1. On the other hand, monolinguals statistically did better than bilinguals especially in LC and vocabulary tests. The resuls of hierarchical regression analyses revealed that PA and RAN were significant predictors of decoding. As to reading comprehension, LC and vocabulary appeared to be the best predictors of reading comprehension. Similarly, decoding significantly contributed to reading comprehension.

ÖZET

Türkçede Kelime Kodlama ve Okuduğunu Anlama: Tekdilli Türk ve İkidilli Kürt-Türk Öğrencilerin Bir Karşılaştırması

Bu çalışmada, Türkçe tekdilli (N = 46) ve Kürtçe-Türkçe ikidilli (N = 50) çocukların fonolojik farkındalık (FF), hızlı otomatik isimlendirme (HOTİ), fonolojik hafıza (FH), dinlediğini anlama ve kelime bilgisi becerilerinin Türkçe kelime kodlama ve okuduğu anlamaya yönelik katkıları boylamsal olarak incelenmiştir. Ayrıca, bu çalışma, anaokulundan birinci sınıfa kadar söz konusu bilişsel ve dilsel bileşenlerin gelişiminde tekdilli ve ikidillilerde farkın olup olmadığını araştırmıştır. Katılımcılar bireysel olarak anaokulunun başında, sonunda ve birinci sınıfın sonunda olmak üzere üç defa test almışlardır. Bulgular, her iki grubun da FF, HOTİ, HF, dinlediğini anlama ve kelime bilgisi performanslarında gelişimsel bir örüntü ortaya çıkarmıştır. Tekdilli ve ikidilli çocuklar arasında farklı zamanlardaki performans farklarını gözlemlemek için her değişken için karma desenli ANOVA testi yapılmıştır. Tekdilliler, ikidillilerin lehine olan FF testi hariç, diğer testlerin hepsinde ikidillerden daha iyi performans göstermişlerdir. İkidilliler, FF testlerinde anaokulunun başında tekdilli akranlarından daha iyi puan almış, ancak bu performans farkı daha sonraki zamanlarda, özellikle birinci sınıfta azalmıştır. Öte yandan, tekdilliler, özellikle dinlediğini anlama ve kelime bilgisi testlerinde istatistiksel olarak ikidillilerden daha iyi performans göstermiştir. Sıralı regresyon analizinin sonuçları, FF ve HOTİ' nin kelime kodlamanın önemli yordayıcıları olduğunu ortaya koyarken, dinlediğini anlama ve kelime bilgisinin, okuduğunu anlamanın en iyi yordayıcıları oldukları görülmüştür. Ayrıca, kelime kodlama becerisi, okuduğunu anlamaya önemli ölçüde katkıda bulunmuştur.

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“To live in hearts we leave behind is not to die.”

Thomas Campbell

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ABBREVIATIONS

D: Decoding

L1: First Language

L2: Second Language

LC: Listening Comprehension

MA: Morphological Awareness

MoNE: Ministry of National Education (MEB: Milli Eğitim Bakanlığı)

OK: Orthographic Knowledge

PA: Phonological Awareness

PM: Phonological Memory

PS: Processing Speed

RAN: Rapid Automatized Naming (HOTI: Hızlı Otomatik İsimlendirme)

RC: Reading Comprehension

SES: Socio-Economic Status

SM: Sentence Method

SBSM: Sound-Based Sentence Method

SVR: Simple View of Reading

SBSM: Sound Based Sentence Method

VOCAB: Vocabulary

Wread: Word Reading

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Reading is a complex skill that involves many linguistic, cognitive and socio-economic components. By acquiring this complex skill, the individual is able to perform many interrelated tasks such as understanding a text, making sense of the written material, and expressing their feelings and thoughts (Gillon, 2007). Reading is affected by many factors such as emergent cognitive and linguistic components, home and family environment and the socio-economic situation in which the child lives. To this end, any deficiency in this skill will have a life-long impact on one's academic achievement as well as general life standards. From this point of view, reading, as an important dimension of social and academic life, directly affects the school success of the child, and early diagnosis of problems in reading acquisition is also important in terms of individual and social well being (August & Shannan, 2008; Oller & Jarmulowic, 2007). A substantial body of research has provided evidence about the contribution of some cognitive and linguistic components in the development of reading (e.g., Adams, 1990; Ziegler & Goswami, 2005). Among these components that directly affect reading skills, phonological awareness, rapid automatic naming, phonological memory, listening comprehension and vocabulary are well established components in the literature, and they are explored within the scope of the current study.

The ultimate goal of reading is comprehension, which is one of the few common grounds reading researchers agree upon. However, before comprehension, there are some important processes a reader should go over in the very beginning of

the reading journey. More specifically, prior to read to learn, it is important to learn to read (Chall, 1983). A great number of researchers have aimed to explain the following question: How do children learn to read? Unlike natural processes such as speaking, reading requires explicit instruction, which makes it an unnatural process (Gillon, 2007). In other words, there is not any biologically innate system specially dedicated to reading (Norton & Wolf, 2012), but even so, children are expected to have grasped this skill by age 7. Although it is taken for granted, reading involves complex cognitive and linguistic processes. Indeed, a successful reader must accurately coordinate a large circuit of brain areas and related processes such as visual and orthographic processing, working memory, attention, and also comprehension within a limited period of time. Language with its components (e.g., phonology, morphology, syntax, and semantics) is in the very center of this circuit (Norton & Wolf, 2012).

Among reading skills, word reading has been proven to be central to reading development, especially in early reading[1] and for a successful reading, namely comprehension, it is important to read single words accurately and fluently (Adams, 1990; Ehri, 2005). Similarly, Perfetti (1986) argues that skilled word reading is a pivotal constituent of reading at the very beginning of reading. He continues that automatization in word reading will lead to proper comprehension by allocating more cognitive resources for higher-level skills such as comprehension, or else any deficit in word reading at the onset of learning to read will lead to problems in later reading development. To this end, it becomes crucial to identify the components that may affect word reading.

[1] In the current study, decoding, word reading and word recognition refer to word reading fluency and they have been used interchangeably.

A considerable amount of research has provided some important cognitive and linguistic components of reading. One of these critical components is phonological awareness (PA), which is defined as the ability to perceive, discriminate and manipulate the sounds of a spoken language (Anthony & Francis, 2005; Wagner & Torgesen, 1987). A number of studies across languages have proven a powerful relationship between PA and reading development (e.g., English: Wagner, Torgesen, & Rashotte, 1994; Shankweiler & Fowler, 2004; Kirby, Parrila, & Pfeiffer, 2003; Turkish: Öney & Durgunoğlu, 1997; Babayiğit & Stainthorp, 2007; Dutch: de Jong & van der Leij, 2002; Finnish: Müller & Brady, 2001; French: Demont & Gombert, 1996; German: Wimmer & Mayringer, 2002).

Along with phonological awareness (PA), rapid automatized naming (RAN), the ability to name a number of similar visual stimuli as quickly and correctly as possible, has been found to be a strong predictor of later literacy development in a vast number of orthographies (English: 2001; Kirby et al., 2003; Kirby, et al., 2010; Parrila, Kirby, & McQuarrie, 2004; German: Moll, Fussenegger, Willburger, & Landerl, 2009; Greek: Georgiou, Parrila, & Papadopoulos, 2016; Spanish: González-Valenzuela, Díaz-Giráldez, & López-Montiel, 2016; Turkish: Babayiğit & Stainthorp, 2010, 2011; Bektaş, 2017; Sönmez, 2015).

Another widely studied construct related to literacy development is phonological memory (PM) skill. It refers to the ability to keep phonological representations in short-term memory (Georgiou, Parrila, & Kirby, 2006). It is accepted to be a significant component for novice readers during word reading and reading comprehension (Wagner et al., 1994). However, in spite of the crucial number of studies, the findings are still inconclusive about the direct role of PM in reading (e.g., Dufva, Niemi, & Voeten, 2001; Georgiou, Das, & Hayward, 2008).

While some studies have shown the indirect role of PM in reading (e.g., Dufva et al., 2001), other studies have treated it as a control variable (e.g., Babayiğit & Stainthorp, 2007; Bektaş, 2017).

Likewise, listening comprehension (LC) is a significant contributor to reading comprehension (e.g., Kershaw & Schatschneider, 2012; Verhoeven & van Leeuwe, 2008). In broader terms, LC is the understanding of the spoken language at the word, sentence, and text level. Previous studies have revealed a strong relationship between early listening skill and later reading comprehension (e.g., Dufva et al., 2001; Müller & Brady, 2001; Verhoeven & van Leeuwe, 2008). Together with LC, vocabulary is another correlate of reading comprehension. Numerous studies have showed the strong relationship between vocabulary and reading comprehension (e.g., Lesaux, Koda, Siegel, & Shanahan, 2006; Muter, Hulme, Snowling, & Stevenson, 2004; Oulette, 2006; Verhoeven, 2000).

All the cognitive and linguistic components discussed above are either directly or indirectly related to word reading and reading comprehension. In fact, considering these factors and the complex nature of reading, it is difficult to come up with a single model of reading ability, and similarly, it is almost impossible to cover all these factors in a single model. To this end, depending on their approach to reading and the specific reading components they include, various reading frameworks have been proposed in the literature.

To begin with, Simple View of Reading (SVR, Gough & Tunmer, 1986) is a well-documented framework for specifying the skills and processes associated with reading comprehension (e.g., Catts, 2018; Florit & Cain, 2011; Kendeou, Papadopoulos, & Kotzapoulou, 2013). The SVR simply proposes that both decoding (i.e., word reading) and listening comprehension (i.e., language comprehension) are

the essential components of reading comprehension (Hoover & Gough, 1990). While decoding (D) is defined as the ability to translate written words to speech by matching letters to sounds, listening comprehension (LC) is being able to draw meaning out of oral language (Kershaw & Schatschneider, 2012). A large body of research has presented evidence for the contribution of decoding and LC to reading, which is in line with the SVR (e.g., Babayiğit & Stainthorp, 2011).

Another influential reading framework is Lexical Quality Hypothesis (Perfetti & Hart, 2002; Perfetti, 2007). This theory assumes that vocabulary knowledge consists of phonological, orthographic and semantic representations together, and they are proxy of reading comprehension. In a similar vein, in their Automaticity Theory, LaBerge and Samuels (1974) emphasize the significant role of word reading fluency in reading comprehension. According to them, reading is a complex skill including the coordination of different processes in a very short time. Accordingly, mastering in one of the low-level skills (e.g., decoding), will certainly allocate more cognitive capacity for high-level skills (e.g., comprehension).

As one of the main purposes of the present study is to understand the reading development of bilinguals apart from monolinguals, it is important to approach the issue of reading by considering the experiences of bilinguals with the languages. Regarding the multifaceted components of reading, its acquisition can be even more complex for bilinguals who are exposed to more than one language system. Today, due to migrations between countries, changing language policies, mutual cultural and economic exchanges between societies, and the structure of the society in which they live, many children grow up in bilingual environments from an early age, and in general, two or more languages are spoken daily in the world (Bhatia & Ritchie,

2013; Grosjean, 2008; Rothman, González- Alonso, & Puig-Mayenco, 2019). From this point of view, bilingualism is a very common phenomenon in the world.

Contrary to the prevalence of bilingualism, the medium of literacy instruction is restricted to one language in a number of countries. Millions of children throughout the world have formal reading instruction in a language which differs from the language they speak at home (Jared, Levy, Cormier, & Wade-Woolley 2011). Such an education in a second language is not free of any problem for bilinguals. On the one hand, the previous research on bilinguals report that monolinguals and bilinguals have similar basic language acquisition processes (e.g., Verhoeven, 2007). On the other hand, since bilingual children deal with distinguishing two sources of input, the processes that the bilingual goes through might be more challenging compared to monolinguals (Haznedar, 2020a, 2020b; Verhoeven, van Leeuwe, & Vermeer, 2011). That's, a bilingual child might show some differences in reading acquisition. The sources of these differences in bilinguals have been the subject of an extensive body of research for a long time. However, it is far from conclusive whether reading development of bilinguals with a different home language is similar to that of monolinguals.

Some research evidence suggests that L2 learners perform similar or even better than monolinguals on phonological tasks, and that the transfer of PA skills from one language to another is possible (e.g., Durgunoğlu, Nagy, & Hancin-Bhatt, 1993). Further, the previous studies investigating RAN skills of L2 learners yielded similar performance between monolinguals and bilinguals (e.g., Chiappe & Siegel, 1999; Chiappe, Siegel, & Wade-Woolley, 2002). In a similar vein, the performances of monolinguals and bilinguals were reported to be similar in PM skills (e.g., Dufva & Voeten, 1999).

With regard to word reading, a meta-analysis by August and Shanan (2008) reported similar performance for monolinguals and bilinguals. However, regarding reading comprehension, some other studies have revealed that monolinguals performed better than bilinguals in reading comprehension (e.g., Bonifacci, Lombardo, Pedrinazzi, Terracina, & Palladino, 2020; Lervåg and Aukrust, 2012; Aarts & Verhoeven, 1999; Verhoeven, 2000). The potential source of this lag in reading comprehension of bilinguals has been attributed to weaker vocabulary knowledge and listening comprehension (e.g., Dufva & Voeten, 1999).

However, it is still an issue whether these differences stem from low level of proficiency in the L2[2] or any impairment in the fundamental processes of learning to read, or both (Durgunoğlu, 2002). More empirical evidence is needed to identify the difficulties bilinguals might experience even before introduction to formal education since reading is crucial for success in later academic and social life (Jared et al., 2011).

1.2 The purpose of the study

Reading is a relatively new area of scientific research in Turkey and there is a lack of longitudinal research studies on Turkish reading acquisition among monolinguals and bilinguals. Compared to the studies related to word reading level, higher-level reading skills such as comprehension have received less attention. The primary goal of this study is to fill this gap by examining how well Turkish monolinguals' and Kurdish-Turkish bilinguals' longitudinal and concurrent PA, RAN, PM, LC and vocabulary skills measured in Turkish predict their first grade word reading and reading comprehension in Turkish. In addition, the current study aims to explore any

[2] In the present study, L1 refers to monolingual speakers, while L2 refers to bilinguals speakers.

differences between monolinguals and bilinguals in the development of these cognitive and linguistic components from kindergarten to Grade 1. The present study has the following objectives:

I. To shed more light on the development of reading in Turkish among Turkish monolinguals and Kurdish-Turkish bilinguals

II. To investigate the amount of longitudinal and concurrent variance that the cognitive and linguistic components (i.e., PA, RAN, PM, LC and vocabulary) explain in Grade 1 word reading and reading comprehension among monolinguals and bilinguals

III. To follow the development of these cognitive and linguistic components (i.e., PA, RAN, PM, LC and vocabulary) from kindergarten to Grade 1 in monolinguals and bilinguals as well as any performance differences for these components between two groups

1.3 The significance of the study

It is now well known that evidence from different writing systems expand our understanding of reading and its association with language and cognition (Joshi & Aaron, 2000). However, an enormous body of reading research has been carried out in English and the findings from these studies have been treated as a standard even for other alphabetic languages with different orthographic depth, which is determined by the level of the consistency in sound-letter correspondence[3]. Considering the fact

[3] Alphabetic languages may differ in terms of their orthographic transparency. The proportion of transparency in grapheme-phoneme (or alternatively letter-sounds) correspondence determines whether orthography is transparent or opaque. A language like English in which there are inconsistencies in grapheme-phoneme correspondences is acknowledged to have an opaque orthography (Seymour, Aro, & Erskine, 2003). Stated differently, letter-to-sound correspondences can be uncertain in such languages. In languages with transparent orthographies, such as Turkish or Italian, however, there is a consistency between letters and sounds of the languages. That is, written and spoken forms of these languages do not differ.

that research on orthographically transparent orthographies (i.e., high consistency) as Turkish and opaque languages (i.e., low consistency) as English has reported more differences than similarities in terms of reading and its involving processes (e.g., Öney & Durgunoğlu, 1997; Verhoeven et al. 2011), it is of great importance to investigate literacy development in languages with different ortographies like Turkish.

Turkish with its reading and spelling transparency is one of exceptional orthographies (Babayiğit & Stainthorp, 2011). The number of studies dealing with the relationship between early reading components (e.g., PA, RAN, word reading, vocabulary, LC) and reading comprehension in Turkish (e.g., Babayiğit & Stainthorp, 2013) are limited, and to the best of my knowledge, no previous longitudinal research has explored the development of reading comprehension in bilinguals whose first language is different from Turkish. Further, most of the bilingual studies are cross-sectional in nature (e.g., İlerten, 2021; Öz, 2019). Moreover, considering the previous studies, a great percent of work in the field of reading acquisition focuses on word reading skills, whereas studies on higher-level skills such as reading comprehension are limited. The current study aims to examine the reading acquisition processes in Turkish comparatively in both monolingual and bilingual children. More specifically, the reading development of a number of Turkish monolinguals and Kurdish-Turkish bilinguals has been observed from kindergarten to Grade 1. To this end, the role of preschool cognitive and linguistic variables in later reading development could be observed.

The multicultural and multilingual nature of Turkey also necessitates further exploration of how the speakers of other languages master reading skills in Turkish as the language of formal instruction. For example, according to the latest PISA

results (2015), Turkey ranks the 50th out of 70 countries in reading comprehension, and the scores of students living in the East and Southeast of Turkey, where the bilingual population is high, are the lowest. Thus, understanding the reading acquisition processes in Turkish might help the early identification of the reasons for the lower reading comprehension performances of both monolingual and bilingual students in Turkey. As Kendeou et al. (2013) argue, "successful reading comprehension is the confluence of elemental skills, each of which has its own developmental trajectory" (p. 775). Hence, an early identification of the factors affecting reading comprehension and observation of their developmental path might enable educators to detect the source(s) of difficulties and develop of early intervention programs in the school system.

1.4 Definitions of terms

Bilingualism: The regular use of two languages in daily life (Bhatia & Ritchie, 2013).

Decoding: the ability to translate print to speech by matching graphemes to phonemes (Gough & Tunmer, 1986).

Grapheme: The smallest unit of a writing system (Gillon, 2007).

Phoneme: The smallest unit of sound (Gillon, 2007).

Phonics: A method of teaching children to read by linking phonemes and the symbols that represents them (graphemes, or letter groups) (Goswami, 2005).

Phonological Awareness: Being able to reflect on and manipulate the sound structures of a language (Anthony and Francis, 2005).

Phonological Memory: The temporary storage of information encoded in a sound-based representation (Anthony & Francis, 2005).

Rapid Automatized Naming (RAN): The ability to name a number of highly similar visuals such as letters, digits, objects or colors given on a page as fast and accurately as possible (Wolf & Bowers, 1999).

Reading Comprehension: The ability to derive meaning from the written text (Gillon, 2007).

Simultaneous Bilingual: The exposure to two languages from birth or before age of 3 (Haznedar, 2020a).

Word Reading: The ability to read words quickly and accurately (Adams, 1990).

Vocabulary Knowledge: The understanding and expressing the meaning of a word (National Reading Panel, 2002).

Listening Comprehension: The ability the extract meaning from the spoken language Tunmer & Chapman, 2012).

1.5 Summary

Any deficiency in reading acquisition will have longlife consequences for an individual. In this sense, the identification of the factors influencing reading gains importance. A large body of research has provided evidence related to the significant contributions of the cognitive and linguistic components (i.e., PA, RAN, PM, LC and vocabulary) to reading development across different languages. Much evidence related to the impact of these factors on reading comes from English-like languages and more importantly, this research has been confined to monolingual contexts. More research is required in other language contexts with a primary focus on the reading acquisition of bilinguals.

This chapter has introduced reading and its components along with the aim and significance of the current study. The next chapter will introduce the definition

of reading, reading in bilingualism, theories of word reading and reading comprehension toghether with a detailed review of previous monolingual and bilingual studies. Chapter 3 will present the characteristics of Turkish and Kurdish languages and information about literacy instruction in Turkey. Chapter 4 will provide the methodology of the current study including information about participants, setting, instruments, research questions, hypotheses and statistical analysis. Chapter 5 will present the descriptive and inferential statistics given in line with the research questions. Chapter 6 will provide a discussion on the main findings of the study and a conlusion, which is followed by the implications, limitations and suggestion for further research.

CHAPTER 2

LITERATURE REVIEW

This chapter begins by defining reading, as well as the concept of bilingualism, which is the particular interest of the current study, as the data examined in this study comes from Turkish monolingual and Kurdish- Turkish bilingual children. Following this, word reading and reading comprehension are discussed in line with some well-established theories. Then, the key processes and skills in word reading and reading comprehension such as vocabulary, LC, PA, RAN and PM, which form the variables investigated in this dissertation, are introduced with reference to the related previous studies in L1 and L2.

2.1 What is reading?

Ziegler and Goswami (2005) broadly define reading as the process of matching distinctive visual symbols to sound units. According to Gillon (2007), on the other hand, reading is the construction of meaning from a printed text, and in simple terms, the main goal of reading is ultimately comprehension of information and ideas presented via a written medium. Alternatively, Gough and Tunmer (1986) simply define reading as "the product of decoding and comprehension" (p. 7). Considering the given definitions, word reading and comprehension are the most addressed components in reading, which are also the main focus of the present study. Before going into the details of these principal components, it will be informative to address to bilingualism and its relationship with reading as the current study explores reading development in bilinguals as well as monolinguals.

2.2 Bilingualism and reading development

Bilingualism, the regular use of two or more languages, is widespread around the world, deriving from the estimation that majority of the world's population has the ability to function in at least two languages (Grosjean, 2008; Haznedar, 2020a, 2021). According to Grosjean (2010), bilingualism is practiced in all parts of the world, at all levels of society and for all age groups. He further claims that the number of bilinguals is noteworthy high even in contexts where many monolinguals live, which makes bilingualism "a rule and not the exception" (Bialystok, Craik, Green, & Gollan, 2009, p. 89). The number of bilinguals/multilinguals is continuously increasing. As Edwards (2006) says, "everyone is bilingual. That is, there is no one in the world (no adult, anyway) who does not know at least a few words in languages other than maternal variety" (p. 7). Even if the degree of bilingualism changes from person to person, millions of people on the world are at least bilingual. To this end, depending on the condition the languages are used or age onset in the language acquisition, the type of bilingualism may change. Of particular interest, the current study will mainly focus on simultaneous bilingualism.

Despite widely discussion on the age onset of language acquisition in bilinguals, simultaneous bilingualism is accepted as the acquisition of the both languages concurrently (De Houwer, 2021; Haznedar, 2013, 2020a, 2021). De Houwer (2021) defines simultaneous bilingualism as the exposure of two languages from birth. For Paradis, Genesee and Crago (2011), a child can be accepted to be simultaneous bilingual if the acquisition of both languages is from infancy or at least before age of 3. Regarding the context of the current study, the bilingual group is Kurdish-Turkish simultaneous bilinguals who have been exposed to Kurdish and Turkish from birth. Turkey is a multilingual country where a number of other

languages are daily spoken by people in addition to the official language Turkish (ERG, 2009; Coşkun, Derince, & Uçarlar, 2010). Of these languages, Kurdish is one of the most spoken one, which is widely spoken in the East and Southeast regions of Turkey. That's why, a large number of Kurdish children living in these regions are able to learn, or at least exposed to it to a certain extent (Derince, 2010).

Given the extreme prevalence of bilingualism, it has inevitably become a research interest to understand the contact of two or more languages within the same person. Till the mid-1970s, the main view about bilingual students was that the first language (L1) was a burden in the acquisition of the second language (L2) and bilingualism was seen as a cause of mental confusion (Cummins, 1979). Perhaps, the most coherent theoretical view in that time was Macnamara's (as cited in Cummins, 1979) balance effect hypothesis, which assumed that a bilingual child paid for his L2 skills by a decrease in L1 skills. In other words, the child learns a second language with a cost at his/her first language. However, this idea has been strictly opposed with strong evidence in the following years. A vast body of research has documented bilingual advantages over monolinguals (e.g., Bialystok, 2001, 2015; Cummins, 1978).

One of the most documented bilingual advantages is metalinguistic awareness (e.g., word awareness, phonological awareness, syntactic awareness). In broad terms, metalinguistic awareness is being able to think on and manipulate the structures of the language. According to Bialystok (2001), dealing with two language systems at the same time might make language structures more noticeable, and direct a bilingual child's attention to the structures of the language. Of particular relevance of the current study, phonological awareness (PA) is the ability to reflect and manipulate the sounds of the language (Gillon, 2007). Numerous studies have revealed an

advantage of bilinguals in PA (e.g., Bialystok, Majumder, & Martin, 2003; Özata, Babür, & Haznedar, 2016). In addition, bilingual advantage has been documented in other cognitive areas. These are developed metacognitive skills (e.g., Duncan, 2005); enhanced cognitive flexibility (e.g., Hakuta, 1990; Bialystok, 2015); creative and divergent thinking (e.g., Ricciardelli, 1992); selective attention and inhibition (e.g., Bialystok, 2001). Taken together, a vast body of research has indicated that bilingualism significantly influences cognitive functioning (Bialystok, 1999; Bialystok & Martin, 2004), and these bilingual benefits have been found to be available for individuals even in later periods of life (e.g., Bialystok et al., 2003; DeLuca, Rothman, & Pliatsikas, 2019; Gallo, Novitskiy, Myachykov, & Shtyrov, 2021).

Another widely addressed issue in bilingualism is cross-linguistic influence (Haznedar, 2020a). That is, there could be transfer from one language to the other in some aspects of language such as syntax, morphology, and phonology. As for reading, cross-linguistic influence might be salient in some of reading skills such as PA, word reading, and spelling. The development of these skills in L1 might have a facilitating effect on L2 reading development. Accordingly, consistent evidence has indicated the influence L1 PA skills on L2 PA skills, word reading and spelling (e.g., Durgunoğlu & Öney, 1999; Geva & Siegel, 2000; Özata et. al, 2016).

Besides the cognitive and linguistic advantages of bilingualism, the contact of two languages in the same mind has also some consequences for a bilingual child. In several studies, low vocabulary knowledge has been reported as a lag among bilinguals despite not being serious (Haznedar, 2020a). Evidence for low vocabulary comes from translation equivalent studies (e.g. Nicoladis & Secco, 2000; Paradis et al., 2011). The bilingual child develops a translation equivalent for a single concept

in each of the language such as *elma* in Turkish and *apple* in English. However, the bilingual child may not always have the translation equivalent of each word in the other language since they do not have the same experiences in both languages. Indeed, Pearson et al. (1995) point out to the fact that the development of translation equivalents might be a bit slow, but the "total vocabulary" of child could be similar to or better than that of the monolingual of the one of the languages (p. 352). This is the vocabulary that the bilingual child knows in one language and/ or other language. Parallel to these ideas, some studies have revealed the late development of translation equivalents among bilinguals. Following the acquisition of translation equivalents in Spanish-English bilinguals, Pearson et al. (1995) reported that the proportion of translation equivalents in Grade 1 was 50%, and even at college level, it was not 100%. This means that bilingual child develops more translation equivalents as the language develops with experience, yet s/he may never reach the point where s/he has got 100% translation equivalents (Paradis et al., 2011).

It is a well-established finding that a bilingual child may not have the same amount of vocabulary in each language as the monolingual peers, and it might not be fair to compare their vocabulary to monolingual norms. However, bilingual children will encounter difficulties if the restricted vocabulary is in their language of instruction, namely L2 (Uccelli & Paez, 2007). Therefore, the study of bilingual vocabulary in the language of literacy instruction may give us hints about vocabulary development among bilinguals.

Given the definition of reading and bilingualism, the next section discusses word reading and reading comprehension with reference to their predictors.

2.3 Word reading

Word reading is the ability to extract a representation from the printed word accurately and quickly. Accurate and fluent word reading is the key to literacy development. As Perfetti (1986) points out, word reading/recognition is a proxy of reading because the automaticity in word reading will allocate more capacity for higher cognitive processes of reading comprehension. The more automatic the reader's word reading is, the more time s/he can allocate for making meaning from the text. Thus, a good reader does not only read a word accurately, but also s/he reads it fluently. According to Kuhn and Stahl (2003), a reader has at least two interdependent tasks during reading: recognizing the words in the text and constructing meaning from the text simultanously. The less attention on decoding, the more is expended on comprehension. Furthermore, word reading has been recognized as a prerequisite of reading system, and for a successful reading, word reading should operate properly in the system (Adams, 1990). Here, the main question is how word reading becomes automatic. Regarding the stages/phases that a child goes through while learning how to read words, several influential theories of word reading have been proposed. These theories are presented in the following part.

2.3.1 Stage and phase models

One of the influential developmental reading models is Frith's (1985) stage theory of reading. In this model, Frith came up with a three-stage reading model: logographic, alphabetic and ortographic. During the logographic stage, children do not have any knowledge of individual letter or grapheme-phoneme mapping. Rather, they rely on salient visual or contextual cues such as their name, shops or common signs (i.e., *P* for *Pepsi*) while processing words. On the other hand, children develop knowledge

of grapheme-phoneme mapping in the *alphabetic stage,* and learn how to use this knowledge while reading unfamiliar words. Alphabetic and phonological knowledge play an important role in this stage. In the last stage, the *orthographic stage*, children automatically recognize a great number of words and easily retrieve them from the internal lexicon that they have developed from previous stages. With recurring exposure, children build up an orthographic lexicon that store orthographic units that are larger than individual letters and sounds. Thus, children can use these orthographic units in recombination of numerous words. According to Frith (1985), the stages are prerequisites of each other, and this is a "strict sequential order" for a successful master in reading (p. 307).

In her phase model, Ehri (1995, 2005) suggests a four-phase model to explain how sight word reading develops. According to this model, the type of connections between the printed word, its pronunciation, and how its meaning is represented in memory might differ based on the alphabetic knowledge and development. To this end, Ehri's model proposes a four-phase model: pre-alphabetic, partial alphabetic, full alphabetic and consolidated alphabetic.

In the pre-alphabetic phase, the earliest phase of sight word reading, children read words based on contextual, visual cues, rather than forming sound-letter connections as their alphabetic system has not developed enough yet. For example, they might remember environmental print signs such as *McDonald's* not because of the initial M sound but the golden arches behind it. The tail at the end of *dog* or the two round eyes in *look* might help children remember the words. During the partial-alphabetic phase, on the other hand, children begin to make partial connections between letter-sounds besides visual cues since they have little knowledge of the alphabet and sounds. However, this knowledge is mostly limited to the initial and

final letter/sounds of words due to their salient features. In the full alphabetic phase, children can read full words. In other words, they can make full connections between graphemes in written forms and their sound representations, and so there appears a full grapheme-phoneme correspondence. Thus, children begin to read unfamiliar words, and the word reading accuracy is high among full alphabetic phase readers. For example, children begin to learn how a 5-letter word, *spoon*, corresponds to 4 sounds. In the last phase, the *consolidated alphabetic phase*, with the familiarity in letter patterns repeating in different words, there emerges a consolidation in letter-sounds connections in these words, and this results in larger units such as rimes, morphemes, syllables. Similarly, the knowledge of chunks is crucial to remember how to read multisyllabic words, which decreases memory load used for storing sight words. For example, the *–ing* becomes a consolidated chunk after repeating encounters in words, *ring*, *king*, *sing*. Thus, the task of a consolidated alphabetic phase reader becomes easier when learning a new word like *wing* as a sight word, which is only to connect two units, *w-* and *-ing*.

Overall, the common ground in these models is the emphasis on the stages taking the child to successful word reading, which is acknowledged as a crucial component of reading comprehension. In the following section, the cognitive and linguistic predictors of reading will be discussed with specific reference to previous studies in L1 and L2.

2.4 Predictors of word reading

The word reading development has been the focus of a substantial body of research in various languages. Specifically, the impact of cognitive and linguistic components on the development of word reading has been widely examined in monolingual and

bilingual studies. Tremendous evidence from reading literature has indicated the crucial role of PA, RAN, PM and vocabulary in word reading (see Robinson, 2013 for a review). In the following subsections, the role of these variables in word reading development of monolinguals and bilinguals is presented separately.

2.4.1 Word reading studies in L1

The following subsections will introduce the definitions of the cognitive and linguistic components, and their contributions to word reading investigated in L1 studies.

2.4.1.1 PA and word reading in L1

Phonological awareness (PA) is vastly treated as a powerful predictor of reading ability across orthographies (see Gillon, 2007, for a detailed review). Anthony and Francis (2005) define PA as "the ability to recognize, discriminate, and manipulate the sounds in one's language, regardless of the size of the word unit" (p. 256). Put it differently, it is being aware of the sound structure of a spoken word that can be divided into smaller units, and these smaller units can be blended together.

In line with the hierarchical theories of syllable structure (Treiman, 1993), Gillon (2007) defines PA as a multilevel construct including syllable awareness, onset-rime awareness and phoneme awareness. Syllable awareness refers to the ability to detect the syllables in a word. In other words, it is knowing that words are formed by dividable syllables (*number* has two syllables, nʌm-bər. The awareness that a syllable consists of onset and rime (e.g., *team*, *t*-onset, *i:m*-rime) is onset-rime awareness. While onset refers to the first consonant or consonant clusters of syllable, rime is the vowel that can be followed by any consonant. Phoneme awareness, as the

smallest unit, is the knowledge that words and syllables can be divided into individual sounds (e.g., *free* has three phonemes, */f/r/i*). Phoneme awareness, the smallest unit, has shown to be the most difficult unit of three. This awareness, to a great extent, begins with formal education. Further, phoneme awareness is the most powerful associate of early reading (Anthony & Francis, 2005; Gillon, 2007).

A normally developing individual is expected to divide and then recombine these units in order to correctly pronounce words. That's why, individuals with weak PA skills tend to have difficulties in literacy development, especially during the initial stages of reading (Holland, McIntosh, & Huffman, 2004). Moreover, a substantial body of corroborating evidence has shown that PA follows a developmental route (Cossu, Gugliotta, & Marshall, 1995; Gillon, 2007), from large units of sounds (e.g., syllables) to smaller units (onsets, rimes, phonemes). It is developmental and predictable since children go through from larger units to smaller ones as they grow up. As Anthony and Francis (2002) point out, the rate of development in PA skills and the proficiency level for individuals may show differences from one language to another considering orthography and language-specific features. A large body of research has acknowledged PA as a significant component and a powerful predictor of later literacy development in opaque orthographies (e.g., English: Kirby et al., 2003; Torgesen, Wagner, Rashotte, Burgess, & Hecht, 1997; Wagner et al., 1994; French: Nithart et al., 2011) as well as transparent orthographies (e.g., Dutch: Dufva et al., 2001; Verhoeven & van Leeuwe, 2008; Finnish: Müller & Brady, 2001; Turkish: Babayiğit & Stainthorp, 2007, 2011; Bektaş, 2017; Özata, 2018; Öney & Durgunoğlu, 1997).

A strong association between PA skills and reading ability has been detected in a great number of studies in opaque orthographies such as English (e.g., Adams,

1990; Bradley & Bryant, 1983; Wagner et al. 1994, 1997). To begin with, in one of earliest longitudinal studies, Bradley and Bryant (1983) explored the impact of PA (onset-rime awareness) in later reading ability among L1 English speakers (N=403) who were followed from kindergarten to Grade 2. In this study, kindergarten onset-rime awareness has shown to be a significant predictor of later reading and spelling. In another seminal study in English, Wagner et al. (1994) investigated the role of preschool reading precursors (PA, PM and RAN) in word reading in Grades 1 and 2. Different from Bradley and Bryant's 1983 study, Wagner et al. included two phoneme awareness tasks (i.e., phoneme recognition and phoneme blending) in their study. The results revealed a significant contribution of preschool PA in later word reading. However, RAN and PM could not explain any significant variance in later word reading.

A study by Kirby et al. (2003), also reviewed in the RAN subsection below, confirmed well-established role of PA in later reading. Specifically, PA and RAN were documented to be strong predictors of word reading among English speakers whose reading skills were assessed annualy in a five-year period. The annual test results showed a significant but decreasing impact of PA on word reading at each level. However, the impact of RAN on word reading increased in later grades.

Likewise, the impact of PA on reading ability has found evidence from other opaque orthographies like French. Demont and Gombert (1996), for instance, administered a longitudinal study with French speakers followed from Grade 1 to Grade 3. The goal was to examine the role of early PA and syntactic awareness in later word reading and reading comprehension after controlling intelligence and vocabulary variables. The findings revealed that early PA significantly predicted later accurate and fluent reading, but not reading comprehension. However, syntactic

awareness was the only predictor of reading comprehension. Again, the role of PA remained at word level as detected in other studies.

On the other hand, evidence from transparent orthographies with more consistent grapheme-phoneme correspondences is relatively more inconclusive and contradictory. Some research findings from transparent orthographies overlap with research in opaque orthographies (e.g., Dutch: Dufva et al., 2001; Finnish: Müller & Brady, 2001), whereas some other studies have pointed out to the limited or redundant role of PA in later reading success in transparent orthographies (Dutch: Verhoeven & van Leeuwe, 2008; Turkish: Babayiğit & Stainthorp, 2007, 2011; Öney & Durgunoğlu, 1997).

In one of the earliest studies in Turkish, Öney and Durgunoğlu (1997) explored the development of PA, real/pseudo-word reading, spelling, and listening comprehension (LC) in Grade 1. A sample of 30 Turkish speakers was assessed three times (with four month intervals) in a year. The findings presented a significant contribution of PA in the early stages of word reading. However, PA's impact on reading faded away towards the end of Grade 1 due to the ceiling effect in PA skills. In a similar vein, Babayiğit and Stainthorp (2007, 2011) pointed out the limited impact of PA in Turkish, a highly transparent orthography. In their longitudinal study, 56 Turkish speakers were followed in order to detect the role of kindergarten PA skills in Grade 2 word reading (real/pseudo-word reading fluency, reading speed) and spelling. Again, PA appeared to have a small effect in word reading skills. In a follow-up study Babayiğit and Stainthorp (2011) again reported the fading effect of PA in later reading. In that study, two different cohorts of the students were tested in Grade 2 and Grade 4, and then tested 9 months later in Grade 3 and Grade 5, respectively. The results showed that RAN was a strong predictor of word reading

fluency, while PA was a strong predictor of spelling. This finding was supported by a very recent study in Turkish (Candan, Babür, Haznedar, & Erçetin, 2020). Candan et al. (2020) examined the impact of RAN and phonological encoding (tested by a non-word spelling test) on Turkish reading and spelling of 3 and 4 graders. The authors documented that RAN was the most powerful predictor of word reading fluency in Grades 3 and 4.

In contrast to the studies that have revealed the fading effect of PA skills in later reading (e.g., Öney & Durgunoğlu, 1997), there are some studies that have proven the continuing role of PA skills in later reading skills even in transparent orthographies. In such a study, Müller and Brady (2001) explored the relationship between PA, decoding, listening and reading comprehension in two groups of students in Finnish: Grade 1 and Grade 4. As for Grade 1, PA skills were significantly associated with decoding and reading comprehension. With regard to Grade 4, although there was no correlation with decoding fluency and reading comprehension anymore, it had a significant correlation with decoding accuracy.

To sum up, PA has been found to be one of the reliable correlates of word reading in different languages. Together with PA, RAN is another important construct that has drawn much attention in reading literature. Thus, in what follows, the definition of RAN is given along with a review of RAN studies in L1.

2.4.1.2 RAN and word reading in L1

Rapid automatized naming (RAN) is another important ability that correlates with later literacy development (e.g., Bowers & Wolf, 1993). In simple terms, RAN refers to the ability to name a series of similar items such as objects, letters, digits or colors given on a page as fast and accurately as possible (Wolf & Bowers, 1999). With the

contributions of the influential studies by Denckla and Rudel (1974, 1976), RAN has been considered to be one of the well-established cognitive processes underlying reading. However, there has not been a consensus on the extent or the position of the relationship between RAN and reading since the introduction by Denckla and Rudel. Here, two prominent theoretical accounts can be identified.

In one of these theoretical accounts, Torgesen et al. (1997) account for RAN, along with PA and PM as a subcomponent of phonological processing in working memory. Wagner et al. (1997) define RAN as "the rapid retrieval of phonological codes from permanent memory" (p.469). According to Kirby et al. (2010) RAN functions as a measure of "the rate of access to and retrieval of stored phonological information in long-term memory" (p. 343). To this end, RAN is associated with reading through phonological processing, a more general construct (Torgesen et al., 1994). On the other hand, some studies have indicated the unique contribution of RAN in reading (e.g., Wolf & Bowers, 1999). Based on their studies with children having reading difficulties, Wolf and Bowers (1999) quite convincingly argue in their double deficit hypothesis that RAN and PA are unique constructs that determine reading difficulties separately.

Despite the differences in theoretical approaches to RAN, the predicting power of RAN in reading development has long been confirmed across different languages (Torgesen et al. 1994; Wagner et al., 1997; Wolf & Bowers, 1999). Compared to PA, the research line of RAN ranges from alphabetic languages (e.g.: Dutch, Verhagen, Aarnoutse & van Leeuwe, 2008) to non-alphabetic languages (e.g., Chinese: McBride-Chang et al., 2006), from opaque languages (e.g., English: Wagner et al., 1997) to transparent orthographies (e.g., Turkish: Özata & Haznedar, 2018) and other languages (e.g., Arabic: Asadi, Khateb, Ibrahim, & Taha, 2017). The general tendency in word reading precursor studies is that while PA is a strong

predictor of accuracy in word reading, RAN plays a significant role in predicting reading fluency (see Norton & Wolf, 2012, for a review). While the studies in opaque orthographies revealed PA as the most significant predictor of reading accuracy skills among beginning readers (Wagner et al., 1997), RAN has been found to be a more reliable variable of reading fluency in transparent orthographies (Norton & Wolf, 2012). Reading accuracy mastered at the end of first grade in transparent orthographies does not leave much place for PA's predictive role for later reading development; however, RAN is employed as an index of future reading skills. Even in opaque languages like English or French, after mastering 90% accuracy in word reading, RAN becomes a more powerful predictor for later reading development (Georgio et al., 2008). The relationship between PA and reading in opaque orthographies as well as the association between RAN and reading in transparent orthographies is mostly related to the time required to set up letter-sound recoding processes in different orthographies (Ziegler & Goswami et al., 2005).

Besides the rate of the transparency of orthographies, the task type may impact the association between RAN and reading. There are generally two types of tests used to assess RAN; alphanumeric (i.e., digits-letters) and non- alphanumeric (i.e., objects-colors). Non-alphanumeric tests are primarily preferred for kindergarteners or pre-readers who could not read yet, while alphanumeric tests are conducted with children in Grade 1 and above. The correlations between alphanumeric RAN tests and reading have been detected to be higher, and these RAN tests have been found to be a more powerful predictor of reading than non-alphanumeric tests (e.g., Araújo, Reis, Petersson, & Faisca, 2015; Bowey, McGuigan, & Ruschena, 2005; Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004). According to Kirby et al. (2010), the strong association between alphanumeric tests and reading results

from the nature of the sets where the stimuli come; “letters and digits come from closed sets with small numbers of distinct members, whereas colors and objects come from much larger open sets of less distinct members with multiple names” (p. 342). Also, Cutting and Denckla (2001) discuss that since non-alphanumeric tests do not include orthography, there may not be a causal association between these tests and reading ability. In the current study, since the children did not have the knowledge of letters and numbers in the preschool, non-alhpanumeric tests were preferred in kindergarten. In Grade 1, on the other hand, alphanumeric (i.e., letters and digits) tests were administered as they were found to be more powerful predictor of reading (Araújo et al., 2015).

An extensive body of research has proven RAN as a powerful predictor of reading in different languages (e.g., Chinese: McBride-Chang et al., 2006; Dutch: Verhagen et al., 2008; Greek: Georgiou et al., 2016; English: Kirby et al., 2003; Turkish: Babayiğit & Stainthorp, 2010) and in different age groups (e.g., Kirby et al., 2010; Norton & Wolf, 2012). In one of these studies, Kirby et al. (2003) investigated the impact of kindergarten PA and RAN in subsequent reading ability in English. The findings revealed a high correlation between PA and RAN; however, they separately contributed to later reading (i.e., real word and pseudo-word reading accuracy). The further results showed that while PA was a strong predictor of early reading skills, its effect faded in later grades. On the other hand, RAN’s role in reading increased with time.

In a recent study in a transparent orthography, Georgiou et al. (2016) explored the relationship between RAN, PA and reading among Grade 4 Greek students. The findings indicated a significant role of RAN in reading fluency while PA failed to contribute to reading fluency. Similar results were reported in a study by

Papadopoulos et al. (2016). In their longitudinal design, Papadopoulos et al. followed a number of Greek students from Grades 1 to 2. The concurrent and longitudinal analysis of RAN revealed a direct role of RAN in real/pseudo-word reading fluency.

In another study of a transparent orthography, Dutch, Verhagen et al. (2008) examined the role of RAN and PA on accuracy and fluency of word recognition in a sample of Dutch speakers in a longitudinal study (from Grades 1 to 2). The results showed that PA measured at the beginning of Grade 1 was only the predictor of word recognition accuracy at the end of Grade 1. On the other hand, RAN at the beginning and end of Grade 1 successfully contributed to both word recognition accuracy and fluency at the end of Grade 1 and Grade 2. Similar findings were provided in a cross-linguistic study by Furnes and Samuelsson (2011) who assessed the impact of PA and RAN in predicting sight word reading, phonological decoding and spelling in English (opaque), Norwegian (transparent) and Swedish (transparent) languages. The results of this longitudinal study indicated that the role of RAN continued as a powerful predictor of later reading, while the predictive role of PA diminished over time, especially in transparent orthographies.

As for Turkish, Babayiğit and Stainthorp (2010) investigated the role of PA and RAN in word level fluency (i.e., real/pseudo-word reading fluency and agglutinated word reading fluency) and spelling in a sample of Turkish speakers from Grades 1 to 2. RAN was proven to be a consistent and longitudinal contributor to word reading fluency after controlling PA, grammatical awareness and short-term memory. In a further study, Babayiğit and Stainthorp (2011) explored the role of PA and RAN in reading fluency and spelling. Two different cohorts of the students from the second and fourth grades were tested, and then tested 9 months later in the third

and fifth grades, respectively. The findings indicated that RAN was a strong predictor of word reading fluency while PA was a strong predictor of spelling.

With regard to the strong association between RAN and word reading, more evidence comes from recent Turkish studies, as well. In one of these studies, Sönmez (2015) reported the impact of RAN in Grade 3 and Grade 4 word reading fluency, and the diminishing effect of phonological skills after Grade 3. Similarly, Bektaş (2017) examined the role of PA, RAN, PM and MA in real word and non-word reading fluency in Turkish speakers from Grade 2 and Grade 4. Congruent with Sönmez's (2015) results, RAN was reported to be the most powerful contributor to word reading fluency across grades while PA's impact diminished among Grade 4 students. The study by Özata and Haznedar (2018), also reviewed in reading comprehension subsection, provided extra support for the powerful relationship between RAN and word reading in Grades 2 and 4 in Turkish. The researchers examined the role of the cognitive and linguistic components in word reading fluency as well as reading comprehension. Considering RAN, the results showed a predictive power of RAN in word reading fluency in both grades.

Given the strong relationship between RAN and word reading across various languages, it will be useful to examine another important component of reading, PM in the next part.

2.4.1.3 PM and word reading in L1

Phonological memory (PM) refers to phonological coding in working memory. Anthony and Francis (2005) define PM as "coding information in a sound-based representation system for temporary storage" (p. 255), and it is necessary to store individual sounds temporarily before blending them into words (Baddeley, 1982;

Wagner et al., 1994; Wagner et al., 1997). Thus, a beginning reader requires an efficient phonological coding of information in order to have an accurate representation of the codes (sounds/phonemes) related to letters or parts of words; thus, s/he could allocate much more cognitive resources for word reading and reading comprehension (Wagner et al., 1997). As the reading skills develop, the functioning of PM becomes automated. With the automatization in PM, much more capacity in the working memory is spared for extracting the meanings of words and text.

With regard to the measurement, a great deal of research has conducted non-word repetition or digit span tests (forward or backward, or composite scores of both) to assess PM skills especially among children (e.g., Dufva et al., 2001; Wagner et al., 1997).

As a relatively less-studied reading component, there are few studies directly assessing the effect of PM in the development of reading. In one of these studies, Babayiğit and Stainthorp (2007) examined the role of kindergarten PA and PM in early reading skills (i.e., real word and non-word reading fluency, reading speed). A group of kindergarten Turkish students was followed into Grade 2. The results revealed significant and consistent contributions of PA skills in Grade 1 and Grade 2 spelling, while PM was the strongest predictor of reading speed.

In a longitudinal study, Nithart et al. (2011) examined the function of the longitudinal and concurrent PM and PA skills in later reading ability in a sample of French speakers who were followed from kindergarten to Grade 1. The findings revealed that while kindergarten PA was a better predictor of Grade 1 word reading accuracy and fluency, Grade 1 PM appeared to be a better contributor to Grade 1 word reading accuracy and fluency. However, in another longitudinal study, Dufva et

al. (2001) could not find a direct impact of PM on reading of Finnish children followed from kindergarten to Grade 2. Unlike the findings of Nithart et al. (2011), Dufva et al. reported a direct effect of PA on later word reading, while PM had an indirect role in word reading, which was through PA.

In a similar vein, Wagner et al. (1994) investigated the contribution of PA and PM measured in kindergarten to English word reading in the second grader. Again, PM failed to correlate with subsequent word reading. On the other hand, PA successfully correlated with word reading.

Studies handling the association between PM and word reading have presented inconsistent results. Some studies showed a direct relationship between PM and word reading, while some yielded weak or no relation. Despite inconsistent results about its predictive role in reading development, studies mostly employed PM as a control variable (de Jong & van der Leij, 2002; Dufva et al., 2001; Georgiou et al., 2008; Kirby et al., 2003) and the findings displayed an indirect effect of PM in later reading especially through PA (Dufva et al., 2001; Babayiğit & Stainthorp, 2007).

2.4.1.2 Vocabulary and word reading in L1

According to National Reading Panel (2002), vocabulary is the understanding and expressing the meaning of a word. It can be categorized as receptive vocabulary and productive vocabulary. While the first one refers to the vocabulary knowledge that we have while listening or reading, the latter one is about the vocabulary knowledge we have while speaking or writing.

Vocabulary knowledge involves an individual's orthographic, phonological and semantic representations together, and according to Perfetti and Hart (2002),

skilled reading builds on high-quality word representations consisting of integrated constituents (i.e., orthography, phonology and semantics). In the early stages of reading, vocabulary might behave as a mediator between word reading and reading comprehension; however, in later grades, vocabulary has a direct effect on reading comprehension. That's why, in their meta-analysis, Stahl and Fairbank (1986) point out the causal role of vocabulary in reading comprehension. Further, the correlation between vocabulary and reading comprehension has been turned out to be high, ranging from .66 to .75 (Carver, 1994). According to Carver (1994), in order to properly understand a text, the number of unknown words should not be more than 3%, while Nagy and Scott (2000) propose that the reader should know 90-95% of the vocabulary in a text to fully understand it.

To this end, extensive research has documented that vocabulary knowledge significantly correlates with students' later reading comprehension and readers having low vocabulary size may have difficulties in reading comprehension (Babayiğit & Stainthorp, 2013; Swanson, Rosston, Gerber, & Solari, 2008; Torgesen et al., 1997; Verhoeven, 2000; de Jong & van der Leij, 2002). Besides the critical role of vocabulary in reading comprehension, some researchers point out the bidirectional relationship between vocabulary and reading comprehension (Verhoeven et al., 2011; Verhoeven & Perfetti, 2021). That's, reading might enhance vocabulary knowledge, and in turn enhanced vocabulary knowledge might lead to better reading comprehension.

An underexplored dimension about vocabulary is about the categorization of vocabulary. According to Ouellette (2006), many vocabulary studies neglected the difference between vocabulary breadth and vocabulary depth. While the former is defined as the number of words available in the lexicon, the latter is about the

knowledge of word meaning. In particular, vocabulary breadth refers to the number of lexical entries in the lexicon, and the depth of vocabulary refers to knowledge of what a specific word means. The limited research on this distinction has also provided evidence on the task type tapping these skills separately. Receptive vocabulary tasks have been preferred to evaluate vocabulary breadth, and expressive vocabulary tasks for the depth of vocabulary knowledge (Ouellette, 2006; Proctor, Silverman, Harrring, & Montecillo, 2012). However, in the long run, the depth of vocabulary has been identified as a significant contributor to reading comprehension (e.g., Ouellette, 2006).

Despite its crucial role in reading, it has not drawn enough attention as much as other components of reading (Swart et al., 2017). The reason for this might be the fact that vocabulary has not been treated as a single component, but rather has been constructed as part of other skills such as LC or oral language (Braze, Tabor, Shankweiler, & Mencl, 2007; Oullette & Beers, 2010). However, vocabulary has shown to be a powerful predictor of reading ability over years (e.g., Cunningham & Stanovich, 1997; Muter et al., 2004; Oulette, 2006; Sénéchal et al., 2006).

Despite a vast body of researh on the association between vocabulary and reading comprehension, there is limited number of studies focusing on the role of vocabulary knowledge in word reading. In one of these studies, Ricketts, Nation and Bishop (2007) assessed the predictive power of productive vocabulary in regular word reading, irregular/exception word reading (i.e., words with inconsistent letter-sound correspondences), and reading comprehension. The findings indicated that vocabulary knowledge is a significant contributor to reading comprehension and irregular word reading, but not regular word reading. Rickets et al. (2007) concluded

that vocabulary could contribute to some word reading skills as well as reading comprehension.

More support for the association between vocabulary and word reading as well as reading comprehension is offered by a study carried out by Nation and Snowling (2004). The researchers followed a group of English speaking children from the age of 8.5 to 13, by testing their vocabulary, phonological skills and reading skills (i.e., reading comprehension, real/pseudo-word reading and irregular word reading). Of particular interest, concurrent vocabulary accounted for a small but important variance in word reading. Similarly, vocabulary longitudinally contributed to word reading with a small but unique proportion. Nation and Snowling (2004) commented that as an important oral language skill, vocabulary could be added to the early reading measures since it concurrently and longitudinally predicted later reading skills, including word reading. Furthermore, in another study, Nation and Snowling (1998) argued the strong relationship between vocabulary, word reading and reading comprehension. They found that poor comprehenders had weaker vocabulary and word readings skills than good comprehenders.

Further support related to the relationship between word reading and vocabulary is provided by a longitudinal study in Dutch. Verhoeven et al. (2011), also reviewed in the reading comprehension section, attempted to investigate the development of reading ability among Dutch speakers followed from Grades 1 to 6. The results revealed a consistent development all reading skills (i.e., vocabulary, word reading, reading comprehension) from one grade to another. Also, early (basic) vocabulary size significantly predicted later word reading. Compared to that of reading comprehension, the relationship between vocabulary and word reading was

weaker, though. Verhoeven et al. (2011) concluded that the orthographical transparency in Dutch might make vocabulary less decisive in word reading.

Having reviewed research on the cognitive and linguistic components related to word reading in L1, it is important to see the association between these components and word reading in L2 studies. The next section will introduce the review of L2 studies in word reading.

2.4.2 Word reading studies in L2

As the definitions of reading predictors were given in the previous sections, they will not be mentioned in the following sections. Rather, parallel to L1 studies, this section will review L2 studies examining the relationship between the cognitive and linguistic components and word reading.

2.4.2.1 PA and word reading in L2

Despite the scarcity of studies in L2 reading acquisition, especially in transparent orthographies, studies dealing with the role of PA skills in reading in L2 have focused on the predictive function of PA in reading as well as the transfer (i.e., cross-language influence) of this skill (Durgunoğlu et al., 1993; Verhoeven, 2007).

In a study from an immersion context in Canada, Jared et al. (2011) explored the role of kindergarten English skills in later French and English reading abilities as well as the interaction of the two languages with each other in a 4-year longitudinal study. First, the participants were tested in some English cognitive and linguistic tests (i.e., nonverbal intelligence, working memory, vocabulary, PA, RAN, letter knowledge) at the end of kindergarten, and then they were annually assessed in word identification, word reading fluency and reading comprehension both in French and

English from Grades 1 to 3. The results revealed the predictor power of some kindergarten English cognitive/linguistic tasks (PA, RAN, letter knowledge) in later word reading fluency and reading comprehension in both French and English. Further, the study showed that skills such as PA, letter knowledge might be transferred.

Regarding the influence of L1 PA skills in L2 reading, more evidence was provided in English. In one of these studies, Durgunoğlu et al. (1993) specifically assessed the relationship between L1 Spanish PA skill and L2 English word recognition along with L1 Spanish word recognition, LC, language production and vocabulary skills. The participants were Spanish-English bilinguals (Spanish-dominant) attending Grade 1. The overall findings showed the facilitator role of PA skills both in Spanish word recognition and English word recognition. Durgunoğlu et al. (1993) concluded that high PA performance might have within and cross-language effect in reading ability. Similar results were reported by Gottardo (2002). This study attempted to investigate the relationship between L1 Spanish and L2 English reading skills (i.e., PA, RAN, vocabulary, word reading). Considering PA skills, the results of the study indicated a strong assocaciation between Spanish and English PA skills and word reading in L2. In congruent with Durgunoğlu's study, this result shows us the cross-linguistic influence between languages.

In another study, Özata et al. (2016) evaluated PA and word reading skills of monolingual English (N = 15) and Turkish-English successive bilingual (N = 50) primary school students. The results showed PA impact on word reading within languages. Namely, Turkish PA skills contributed to Turkish word reading, while English PA skills did so in English word reading. When reading non-words or unfamiliar words in English, bilinguals used their L1 phonology skills. That is,

although bilinguals' PA skills in Turkish were better than their L2 English PA skills, their word reading performance in both languages were at similar rates. Özata et al (2016) argued that the bilingual children transferred their L1 PA skills to L2 reading.

L2 studies reviewed so far examined the role of PA in word reading. There were also some studies investigating cross-linguistic influence between the languages as well as comparing PA skills of monolinguals and bilinguals. Verhoeven (2007) examined the relationship between early bilingualism and PA in 75 Turkish-Dutch bilinguals in kindergarten. The students were given a battery of tests at the beginning and at the end of the kindergarten in both Turkish and Dutch. The findings revealed that although there was a development in both languages from age 5 to age 6, Turkish appeared to be dominant through kindergarten. In addition, a relation between L1 and L2 was found, which means there was a transfer from L1 to L2. The findings showed that the students with high levels of proficiency in both languages did better in PA tasks.

In a more recent study of Dutch, Janssen, Bosman and Leseman (2013) compared 15 Dutch monolinguals and 62 bilinguals with different L1 backgrounds (15 of them Turkish-Dutch bilinguals) in their Grade 1 performance of phoneme awareness, vocabulary and word reading in Dutch. The Turkish-Dutch bilinguals were also assessed separately in Turkish phoneme awareness and Turkish vocabulary tasks. The results indicated a higher performance of Dutch monolinguals in vocabulary tasks compared to all bilinguals. However, monolinguals and bilinguals performed similarly in phoneme awareness tasks. As for the phoneme awareness performance of Turkish-Dutch bilinguals in Turkish and Dutch, a different pattern was observed. Turkish-Dutch bilinguals did better in Dutch phoneme awareness than in Turkish phoneme awareness.

In a recent study, Soleimani and Arabloo (2018) examined phonological performances of Persian monolingual and Kurdish-Persian bilingual children in kindergarten. The findings revealed that of the 10 subtests of PA, the Kurdish-Persian bilinguals outperformed their monolingual counterparts in alliteration recognition and phoneme combination subtests. However, the authors could not explain the reasons for this performance difference compared to similar performance in other subtests.

Regardless of language status (i.e., L1 or L2), the review of the PA skills has shown that the transparency of the orthography is a significant dimension in determining the role of PA in reading ability. While PA has appeared to be a significant predictor of early reading as well as later reading development in opaque orthographies, its effect has almost faded away towards the end of the first grade after mastering decoding in transparent orthographies. Similarly, PA has been found to be a strong correlate of word reading accuracy rather than fluency even in opaque orthographies.

2.4.2.2 RAN and word reading in L2

Research in L1 has provided extensive evidence on the role of RAN in reading, specifically in word reading fluency. Despite the limited number of studies in L2, some researchers have investigated the role of RAN in word reading (e.g., Gholamain & Geva, 1999; Manis, Lindsey, & Bailey, 2004; Özata et al., 2016).

In one of these studies, Gholamain and Geva (1999) investigated the parallel development of cognitive and linguistic components (RAN, PM, oral language) in English and Persian in a sample of English-Persian bilinguals from Grades 1 to 5. Similarly, the researchers explored the role of these skills in real and non-word

reading in both languages. The results showed that RAN and PM explained significant variance in L1 and L2 basic reading skills despite differences in the level of language proficiency and orthographies. Also, L1 RAN and L2 RAN significantly contributed to real and non-word reading within as well as between languages.

In another study, reviewed also in the PA subsection, Özata et al. (2016) examined the precursors (i.e., RAN, PA) of word reading in Turkish and English among English monolinguals and Turkish-English bilinguals in elementary school levels. The results showed that PA and RAN were significant predictors of word reading in Turkish and English.

In another study, reviewed also in reading comprehension section, Manis et al. (2004) examined the predictive power of kindergarten Spanish linguistic skills (i.e., PA, RAN, print knowledge and expressive vocabulary) in Spanish and English reading skills of the children in Grades 1 and 2. With regard to word reading, the results showed that kindergarten RAN significantly correlated with Spanish and English word reading. Similarly, RAN independently predicted word reading in English as well as in Spanish. This shows the cross-language association between languages.

In a recent study, Wood, Bustamante, Fitton, Brown and Petscher (2017) aimed to explore the association between RAN and other reading assessments in Spanish-English dual language learners attending kindergarten and Grade 1. One of the findings revealed that bilinguals' RAN performance was similar to national norms. Another finding was that RAN significantly correlated with English and Spanish receptive vocabularies and word reading.

Overall, as can be seen in our discussion up to now, previous research in monolinguals and bilinguals has indicated that RAN is an independent and

significant contributor to word reading across various languages. In the following part, the relationship between PM and word reading will be discussed with a specific reference to L2 studies.

2.4.2.3 PM and word reading in L2

As stated previously, the results of the studies investigating the relationship between PM and reading in monolinguals have been inconclusive and inconsistent. This has been the case in PM studies in bilinguals, as well. In addition, there are few studies specifically dealing with the role of PM in the early development of reading in bilinguals.

In one of these studies, Swanson, Sáez, Gerber and Leafstedt (2004) specifically explored the predictive power of PM and working memory in L2 English acquisition and L2 reading development. Three cohorts of Grade 1 students participated in the study: English monolinguals, Spanish monolinguals and Spanish-English bilinguals, who were assessed in their PM skills (i.e., non-word repetition and digit span task), RAN, working memory tests along with vocabulary and reading tasks. The results showed a pivotal role of PM in L2 acquisition and English reading development, especially in vocabulary and word reading. Also, working memory uniquely contributed to English vocabulary and word reading. More evidence came from the study conducted with Persian-English bilinguals by Gholamain and Geva (1999). The results of this study, also reviewed in RAN subsection, showed that PM was a more consistent predictor of English word reading and non-word reading.

In another study, Geva and Siegel (2000) investigated real/pseudo-word reading in a sample of English- Hebrew bilinguals who were learning to read concurrently in both languages. The aim was to detect the nature of reading

acquisition in line with different orthographies (English vs. Hebrew) as well as common cognitive processes (PM, non-verbal intelligence) in the students in kindergarten to Grade 5. The results revealed that regardless of orthographic differences, L1 and L2 PM accounted for a limited but significant variance of basic reading skills. On the contrary, Özata (2013) could not find any role of PM in word reading. In her study, Özata (2013) assessed the role of PM as well as RAN and PA in word reading of English monolinguals and Turkish-English bilinguals. Considering PM performance, the results showed that PM did not contribute to Turkish word reading, while it significantly predicted English word reading. According to the researcher, the bilinguals relied on more their PM skills in English because of the inconsistent grapheme-phoneme correspondences compared to Turkish.

Findings reported in both L1 and L2 studies of PM have presented inconclusive results about the relationship between PM and word reading. While some showed direct effect of PM on reading, other yielded indirect or no relationship with it. The following part presents L2 studies focusing on the relationship between vocabulary and word reading.

2.4.2.4 Vocabulary and word reading in L2

Some L2 studies have examined the role of vocabulary in word reading in L2. For instance, in her study, also reviewed in PA subsection, Gottardo (2002) followed 85 Spanish-English speakers in order to explore the relationship between L1 and L2 reading skills in the first grade. The students' reading skills were assessed via the measures of word reading, RAN, PA, vocabulary and syntactic knowledge in Grade 1. Regarding vocabulary, the findings revealed that L2 vocabulary significantly

contributed to English word reading. Gottardo (2002) concluded that for beginning readers, familiarity with the oral form of English vocabulary might help them decode words more easily.

In another Spanish-English bilingual context, Swanson et al. (2008) investigated the effect of PA and oral language skills (i.e., expressive vocabulary, receptive vocabulary and syntax) on reading of Spanish-English speakers in Grade 3. The aim was to assess the best predictors of word attack, word identification and reading comprehension skills in both Spanish and English. The hierarchical regression models indicated that L2 oral language skills (vocabulary and syntax) explained a significant amount of variance in L2 reading skills compared to PA, which reached its ceiling effect in Grade 3.

The aim of the study by Howard et al. (2014) was to investigate the role of home and school language and literacy practices, SES and vocabulary in predicting bilingual children's English reading accuracy and reading comprehension in different ages and in different settings: kindergarten, grade 3 and grade 5. The children in kindergarten were coming from mostly Spanish speaking contexts but having English instruction; the third and the fifth graders were in bilingual instruction. The results of several hierarchical regression revealed that oral vocabulary was the only predictor of word reading and reading comprehension in all groups once the other factors were considered.

In French immersion context, Lee and Chen (2018) explored role of word reading fluency and vocabulary in predicting reading comprehension. There were two groups of students in this study: English L1 speakers acquiring French as a second language and L2 English learners with different L1 backgrounds acquiring French as a third language. The students were tested in Grades 2 and 3 via measures

of PA, RAN, word reading accuracy, word reading fluency, vocabulary, and reading comprehension in English and French. The findings showed that, after controlling other variables, word reading fluency and vocabulary independently predicted reading comprehension in both languages in Grade 2. On the other hand, an interaction between word reading fluency and vocabulary was found in Grade 3. This interaction also contributed to reading comprehension. The researchers attributed this interaction to the development of word reading and also to the demands of reading comprehension (e.g., simple vocabulary, less complex reading texts). That is, in Grade 2, word reading was not fully automatic and it might not be a good predictor of reading comprehension. However, in Grade 3, skilled word reading with high vocabulary could contribute to reading comprehension.

Taken together, the studies reviewed in the previous sections explored the role of cognitive and linguistic components in word reading performances of monolinguals and bilinguals. The following section will first focus on a higher-level dimension of reading, namely reading comprehension, in line with some well-established reading frameworks. Then, a detailed review will be presented regarding L1 and L2 research examining the contributions of the cognitive and linguistic components to reading comprehension.

2.5 Reading comprehension

The ultimate goal in literacy education is comprehension, which is closely related to the individual's success in academic and social life. Despite various approaches to reading comprehension, the general agreement is that reading comprehension is "the construction of a coherent mental representation of the text" (Kendeou, van den Broek, White, & Lynch, 2009, p. 766), in which the text and the reader's background

knowledge play a crucial role. Comprehension is not a one-way skill, but a multifaceted family involving lower-level skills (e.g., lexical access, syntactic parsing), higher-level skills (e.g., inferencing, background knowledge), strategy use, executive functions, and working memory (Cain & Oakhil, 2007; Grabe & Stoller, 2011). Moreover, according to Perfetti and Stafura (2014), even comprehending a simple sentence requires the processing of the target words through which the reader needs to identify the orthographic, phonological and semantic structure of the target words, and then, s/he is expected to link these words by operating syntactic rules to make sense of the sentence. Thus, it is quite difficult to come up with a theoretical model covering all these processes in reading, and hence, reading researchers commonly tend to deal with some sub-component of reading comprehension processes in their reading comprehension models (Perfetti, Landi, & Oakhill, 2005). The current study primarily bases its discussion on the Simple View of Reading by Gough and Tunmer (1986). Therefore, studies on this framework will be reviewed in detail. Additionaly, the other reading frameworks associated with the Simple View of Reading will be discussed briefly.

2.5.1 Simple view of reading

Simple View of Reading (SVR, Gough & Tunmer, 1986; Hoover & Gough, 1990) has been one of the most studied reading models (see Catts, 2018 for a review). Gough and Tunmer (1986) suggest that reading is the multification of decoding (i.e., word reading/recognition) and comprehension, both of which are interrelated, but independent and of equal importance for reading comprehension. The formula is simple: R (reading comprehension) = D (decoding) x LC (language comprehension/listening comprehension). While word decoding is the ability to read

isolated words as quickly and accurately as possible, LC is "the ability to take lexical information (i.e., semantic information at the word level) and derive sentence and discourse interpretations" (Hoover & Gough, 1990, p. 131). Stated differently, LC simply refers to the process of deriving meaning from the spoken language, and this process involves vocabulary, syntax, inferencing, and discourse-level knowledge.

Tunmer and Gough (1990) argue that decoding and listening comprehension (LC) are two basic tenets of reading and lack of one skill will impede the successful comprehension (for example, in the lack of decoding, D (not present) = 0; 0 x LC = 0). The proportion of effect of these components will change with grade levels and reading proficiency. A large body of previous research has reported the significant role of decoding during the early stages of reading development (e.g, Tunmer & Chapman, 2012). After mastering word reading level and the development of word recognition skills, the influence of decoding on reading comprehension decreases. Here, other processes such as LC become powerful predictors of later reading comprehension. Numerous studies have reported the predictive power of the SVR in both opaque and transparent orthographies. Of particular relevance, studies in transparent orthographies (e.g., Turkish and Dutch) with simpler and more consistent letter-sound relationship have revealed a longitudinal role of LC in reading comprehension while word reading reaches a certain threshold in the first year of formal education (e.g., Babayiğit & Stainthorp, 2011; de Jong & van der Leij, 2002). On the other hand, in opaque orthographies (e.g., English), the role of decoding in reading comprehension might continue even in later grades due to the slow development of word reading acquisition (Florit & Cain, 2011). This is mostly because of the inconsistency between grapheme-phoneme correspondences in these opaque orthographies.

This highly influential reading comprehension framework has presented mounting evidence coming from both cross-sectional (e.g., Bonifacci et al., 2020; Braze et al., 2016; Chiappe, Glaeser, & Ferko, 2007; Fernandes, Querido, Verhaeghe, Marques, & Araujo 2017; Geva & Farnia, 2012; Gottardo, Mirza, Koh, Ferreria, & Javier, 2018; LARC, 2015; Tunmer & Chapman, 2012) and longitudinal studies (e.g., Catts, Herrera, Nielsen, & Bridges, 2015; Hjetland et al., 2019; LARC, 2017; Lonigan, Burgess, & Schatschneider, 2018; Massonnie et al., 2019; Ouellette & Beers, 2010). Likewise, this parsimonious framework has presented a big amount of evidence in orthographically different languages (i.e., opaque/shallow vs. transparent), and language groups (i.e., monolingual vs. bilingual). In the following sections, the SVR studies in L1 and L2 will be presented.

2.5.1.1 Simple view of reading in L1 English

Simple View of Reading (SVR) has been a well-documented frameworks in English. To this end, a substantial body of research has provided support for the SVR in English. To begin with, in a longitudinal study, Catts et al. (2015) investigated the role of kindergarten word precursors (i.e., letter knowledge, PA, RAN) and oral language in predicting Grade 3 reading comprehension in L1 English in line with the framework of the SVR. Also, word reading assessed in Grade 2 functioned as a mediator. The results demonstrated that the SVR components (kindergarten LC and Grade 2 word reading) accounted for 90% of the variance in Grade 3 reading comprehension. On the other hand, letter knowledge and PA indirectly affected reading comprehension (mostly through word reading).

In another study, Lonigan et al. (2018) explored the impact of decoding and LC on reading comprehension in English in Grade 3 through Grade 5. The findings

displayed that both decoding and LC accounted for significant amount of variance in reading comprehension across grades. However, the variance explained by decoding and LC differed across grades. The power of decoding decreased in later grades while the role of LC increased, which was compatible with the findings of Ouellette and Beers's (2010) study. In that study, Oullette and Beers investigated the essence of the relationships between decoding, irregular word recognition, oral vocabulary, LC and reading comprehension in Grade 1 and Grade 6. The regression analysis revealed that vocabulary accounted for significant variance in reading comprehension in Grade 6, but not in Grade 1 when other variables were controlled. The results showed that the role of vocabulary in reading comprehension increased from Grade 1 to Grade 6, while the role of decoding decreased, as observed in previous studies.

In a similar vein, Language and Reading Research Consortium (LARC-2015) tested the SVR in a cross-sectional study of Grade 1, 2 and 3 in English. The results of multiple reading measures showed that the influence of decoding decreased, while the role of LC increased in later grades. Similarly, while word accuracy significantly predicted early word recognition, later word recognition was mostly predicted by word fluency. As for vocabulary, it had an indirect effect in reading comprehension via word recognition and LC. In a follow-up study, LARC (2017) examined whether LC and oral language (vocabulary, grammar) were the same construct or different constructs in preschool through Grade 3 in English-speaking students. The results showed that LC and oral language appeared to operate as a single construct, sharing high correlation.

Regarding the role of vocabulary in the model, Braze et al. (2016) replicated the study by Tunmer and Chapman (2012), with an aim to examine the role of

vocabulary in the SVR. Recruiting 286 young adult English speakers, Braze et al. investigated the role of vocabulary in reading comprehension beyond LC and decoding. The hierarchical regression analysis revealed a significant role of vocabulary in reading comprehension after controlling LC and decoding. However, the further analysis revealed that vocabulary was a part of general oral language skills and that it could not be treated as a different factor. In other words, vocabulary was a part of listening comprehension skill.

2.5.1.2 Simple view of reading studies in other languages as L1

Simple View of Reading (SVR) has gained the attention in other languages, though not as much as in English. In such a study, Massonnie, Bianco, Lima, & Bressoux's study (2019) attemted to follow the development of reading skills (i.e., decoding, oral language) in line with reading comprehension. They followed a number of Grade 1 French students whose reading skills were measured at the beginning and end of the academic year. Oral language, one of the components of the SVR, was divided into two dimensions: lower language skills (vocabulary, syntax) and discourse-level skills (oral text comprehension). The results showed that lower language skills strongly predicted later reading comprehension while discourse-level skills did marginally. Similarly, decoding precursors (letter knowledge, RAN, PA) predicted reading comprehension beyond decoding skills (pseudo-wordword, word reading) as well as through them.

In another study, Tobia and Bonifacci (2015) investigated the SVR in a highly transparent orthography, Italian. 1895 students from Grade 1 to Grade 5 were tested in word and non-word reading, passage reading, LC and reading comprehension. Separate confirmatory factor analysis for each grade indicated that

LC was the best predictor of reading comprehension in each grade. On the other hand, reading speed could not explain a significant variance in reading comprehension, while reading accuracy explained a small but significant variance in reading comprehension.

In the testing of the SVR in another transparent language, Norwegian, Hjetland et al. (2019) followed Norwegian students from age 4 to 9. The students were tested yearly through a number of oral language skills (LC, grammar, vocabulary, verbal working memory), and code-related tests (letter knowledge, phoneme awareness, RAN). The aim was to understand the relationships between these constructs and how they were related to later reading comprehension and decoding. After controlling for latent variables, the findings demonstrated that those early oral language skills significantly predicted later reading comprehension. On the other hand, the role of decoding in reading comprehension changed over time. With more automatization in word reading, decoding's role in reading comprehension decreased in later grades. To this end, it was clear that the oral language skills relationship was more stable with reading comprehension compared to decoding skills.

Kendeou et al. (2013) investigated the emergence of the SVR in kindergartens in Greek. Specifically, the aim of the study was to examine the relationship between the SVR components (i.e., decoding and LC), and reading comprehension. The results of exploratory factor analysis indicated that decoding and comprehension-related measures were weakly correlated. To put it differently, decoding and comprehension skills appeared to be distinct factors even before formal instruction.

In another study, Dolean, Lervåg, Visu-Petra and Melby-Lervåg (2021) explored the role of executive functions in reading comprehension beyond decoding and LC skills in Romanian students in Grade 2. In this short-term longitudinal study, the students were tested at the beginning and at the end of Grade 2 through LC, decoding, grammar and executive functions tests. The findings revealed that despite strong association with reading comprehension, executive functions did not directly affect reading comprehension beyond decoding and LC. Also, while decoding and LC together explained significant variance of reading comprehension at the beginning of Grade 2, the role of decoding faded towards the end of the second term. To put it differently, after mastering fluency, LC was the only predictor of later reading comprehension.

2.5.1.3 Simple view of reading studies in L2

As for the studies in L2, there are few studies investigating the SVR, especially in transparent orthographies (e.g. Florit & Cain, 2011; Catts, 2018). In one of these studies, Bonifacci and Tobia (2017) investigated the predicting role of decoding and LC in L2 reading comprehension in Italian. A battery of decoding tests (reading accuracy, reading speed), LC and reading comprehension was run in a sample of bilingual minority children from the first to fifth grades. Irrespective of grade level, LC was the highest predictor of reading comprehension, while reading accuracy was a significant predictor of reading comprehension for younger students.

In a similar vein, in their longitudinal study, Verhoeven and van Leeuwe (2008) followed a large sample of L1 and L2 Dutch speakers throughout the elementary school. The researchers detected the increasing effect of LC in reading comprehension in later grades while the impact of word reading in reading

comprehension decreased with grade levels among L1 Dutch speakers as well as L2 Dutch learners.

In a recent study, Beattie (2018) explored the association between LC, decoding, oral language fluency and reading comprehension in English in the groups of L1 English speakers and Spanish L2 learners of English in Grade 3. The findings revealed a strong relationship between LC and reading comprehension for both groups. Further, oral language fluency positively contributed to reading comprehension. Proctor, Carlo, August and Snow (2005) also reached similar results to that of Beattie (2018) in their study in which LC significantly contributed to reading comprehension in a sample of L2 English learners in Grade 4.

The results of the L1 and L2 studies reviewed above have proven that the SVR is a simple but well-established framework that proposes some critical factors influencing reading comprehension. Undoubtedly, this widely studied framework could not be free of limitations. Catts (2018) argues quite convincingly that reading comprehension is a "multidimensional cognitive activity" affected by reader, text and context (p. 320). Likewise, in addition to decoding and LC, some researchers discuss the possible role of other cognitive and linguistics skills in reading comprehension such as RAN (Joshi & Aaron, 2000), vocabulary (Ouellette & Beers, 2010), morphological awareness (Kirby et al., 2012), general language ability (Cain & Oakhill, 2006) and working memory (Gathercole & Baddeley, 1990; Cain, Oakhill, & Bryant, 2004). Similarly, it has been criticized for being too reductionist while framing a complex skill like reading (Kirby and Savage, 2008). Still, despite some flaws in the model, Kendeou et al. (2009) argue that the SVR is somewhat transparent, and contributes to the understanding of such a complex phenomenon.

To sum up, with a great number of studies ranging from transparent to opaque orthographies and from monolingual to bilingual contexts, the SVR has

provided evidence for the understanding of reading comprehension processes. Because of the complex nature of reading, however, other cognitive and linguistic variables should be considered. The following parts briefly discuss other reading hypotheses related to the SVR.

2.5.2 Other reading comprehension theories

The Automaticity Theory by LaBerge and Samuels (1974) highlights the significance of reading fluency in reading comprehension. Specifically, LaBerge and Samuels emphasize the role of word reading automaticity in reading comprehension. As stated before, reading comprehension is a complex skill involving low and high-level skills. The coordination of these skills requires cognitive resources (i.e., working memory) for the completion of the task (i.e., comprehension) in a very limited time. In order to allocate more capacity for high-level skills (e.g., inferencing), automaticity in low-level skills is crucial. Therefore, automaticity in word reading will preserve attention resources for high-level skills, resulting in better comprehension.

In a very recent study in Turkish, Candan (2021) investigated the relationships between the cognitive and linguistic components of reading, and their predictive power in reading fluency and comprehension among Grade 4 Turkish students. In that study, Candan provided strong evidence for the role of text reading fluency in reading comprehension, which is in line with the Automaticity Theory. Similarly, Özata and Haznedar (2018) provided evidence for this theory in Turkish. In their study, the researchers examined the association among some cognitive and linguistic components (i.e., PA, RAN, MA, OK, PS) and word reading fluency and reading comprehension in the children attending Grades 2 and 4. The results showed that word reading fluency significantly predicted reading comprehension in both

grade levels. The findings of these studies again proved that with automatic word reading, more cognitive resource could be reserved for reading comprehension.

Another reading comprehension model is the Lexical Quality Hypothesis by Perfetti and Hart (2002). According to Perfetti and Hart (2002), lexical quality involves "the well-integrated constituents of orthography, phonology and semantics" (p. 191). Any variation in one of these constituents results in individual differences, and ultimately differences in comprehension.

High quality in the knowledge of words is a prerequisite for successful reading comprehension. This quality includes phonological, orthographic and semantic (meaning) representations of words. To put it differently, for smooth reading comprehension, lexical representations of words should be retrieved rapidly without much cognitive effort, and the activation of one representation (orthography/spelling) should trigger the activation of other representations (phonological/pronunciation and meaning) for the same word, since these representations are bound together. However, readers with poor lexical representations might have difficulties while retrieving lexical information during reading, and thus might result in too much cognitive load for working memory at the word level, leaving not much place for higher-level processes for reading comprehension (Perfetti, 2007). While these representations operate synchronously at retrieval level in high quality readers, they might be asynchronous in low quality readers. To this end, Perfetti (2007) argues that reading comprehension relies on word reading, which includes orthographic, phonological and semantic knowledge of a given word, and differences among readers may result from differences at word level processes.

With the aim of testing the SVR and lexical quality hypothesis, Verhoeven and van Leeuwe (2008) followed a sample of Dutch speakers in a longitudinal design during the primary school years. They investigated the role of word reading, vocabulary and LC in reading comprehension. The results showed that word reading was an important predictor of early reading comprehension along with LC and vocabulary. However, LC and vocabulary remained as significant contributors to reading comprehension in later grades. The Turkish studies by Özata and Haznedar (2018) and Candan (2021) also provided support for the theory. In that, Özata and Haznedar (2018) reported a significant role of vocabulary in reading comprehension performances of both the second and fourth graders. In a similar vein, Candan (2021) revealed the significant role of vocabulary in reading comprehension in Grade 4 children.

To sum up, despite some conceptual differences, both Automaticity Theory and Lexical Quality Hypothesis define word reading and vocabulary as important determinants of reading comprehension. In the following part, the predictors of reading comprehension are discussed in a review of monolingual and bilingual studies.

2.6 Predictors of reading comprehension

Multi-componential nature of reading comprehension has been a well-established finding, which makes it a complex process. To this end, the previous research has identified several components that play important roles in reading comprehension. The next section will present the relationship between these components and reading comprehension in L1 and L2 separately.

2.6.1 Predictors of reading comprehension in L1

The following subsections will provide some L1 research conducted in order to investigate the predictive power of reading components in reading comprerehension.

2.6.1.1 PA and reading comprehension in L1

PA has been acknowledged as a significant associate of word reading in various languages (see Gilllon, 2007, for detail). When it comes to its contribution to reading comprehension, the results of PA studies are inconclusive as they present a direct, indirect or no relationship. In one of these studies, French, Demont and Gombert (1996), also reviewed in PA subsection, investigated the role of early PA and syntactic awareness to later word reading and reading comprehension. The results showed that syntactic awareness was shown to be a facilitator of reading comprehension, whereas PA skills only correlated with word reading. In a longitudinal study, also reviewed in the SVR subsection in detail, Catts et al. (2015) reported an indirect of role of kindergarten PA in reading comprehension, which was mostly through word reading.

In another study from English, Georgiou et al. (2008) explored the impact of PA, RAN and working memory on word reading and reading comprehension in a sample of Canadian students in Grades 3 and 4. In this study, PA and RAN explained significant variance in word reading, which was beyond and over the factors of age and working memory. However, PA failed to accont for any significant variance in reading comprehension.

Of particular interest of this study, Güldenoğlu, Kargın and Ergül (2016) examined the role of PA in word reading accuracy/fluency and reading comprehension in Turkish in 85 participants (45 students with high PA skills vs. 40

students with low PA skills). The participants' PA skills were assessed in kindergarten, and their word reading and reading comprehension skills were tested in Grade 1. The findings showed that both groups performed similarly in reading accuracy tests. However, the participants who had high phonological skills scored better in reading fluency and reading comprehension tests. The researchers concluded that enhanced PA skills might enable children to apply phonological and synthesis skills quicker and recognize words faster. In turn, these skills yield in better reading comprehension.

In a more recent study in Turkish, Ergül et al. (2021) provided more evidence for the longitudinal effect of preschool reading skills in later reading ability in Turkish. The researchers specifically explored the role of kindergarten (at the beginning and end of the kindergarten) PA, RAN and PM in word reading and reading comprehension in Grade 1. The results indicated that early kindergarten PA skills indirectly predicted word reading and reading comprehension via RAN and PM. However, with developed PA skills towards the end of the kindergarten, PA skills significantly contributed to reading comprehension. Better predictive power of PA at the end of kindergarten was attributed to kindergarten trainining in PA.

Taken together, a substantial body of empirical evidence from different languages has proven the significance of PA skills in the development of reading in L1 and L2. In fact, the degree of the relationship between PA and reading skills may be affected by the orthographic transparency of languages and level of reading development. The next part will review L1 studies dealing with the role of RAN in reading comprehension.

2.6.1.2 RAN and reading comprehension in L1

A comprehensive study in English was conducted by Kirby et al. (2003) having followed a sample of L1 English speakers tested at the end of each year from kindergarten till Grade 5. The study aimed to explore the impact of early PA and RAN skills in later reading skills (real/pseudo-word reading and reading comprehension). The annual test results showed that both RAN and PA uniquely contributed to real/pseudo-word reading and reading comprehension. Nevertheless, the proportion of variance accounted by RAN and PA changed over years. That said, while PA was initially determined to be a more powerfull contributor in early grades, a decline began in PA's predictive power in later grades. On the contrary, RAN gained more significance in later grades.

In their study, also reviewed above, Catts et al. (2015) examined the predictive power of preschool cognitive and linguistic components in Grade 3 reading comprehension. The findings indicated longitudinal role of RAN in reading comprehension in addition to listening comprehension. Bishop (2003) provided more support for the contribution of early reading factors to reading achievement. Bishop examined the role of kindergarten PA, RAN, PM and letter identification in the first grade word reading, reading comprehension and oral fluency. The combination of PA, RAN and letter identification scores appeared to the best predictor of early reading skills. With these results, the researcher emphasized the importance of conducting standardized tests that shed light on reading process.

Additional evidence with regard to the signicance of RAN in reading development comes from a study in French, another opaque language. In their study, Plaza and Cohen (2003) assessed the influence of RAN, PA and syntactic awareness in reading (i.e., real/pseudo-word reading and reading comprehension) and spelling.

The results showed that all of these components significantly predicted reading and spelling in Grade 1.

The RAN studies reviewed till now were conducted in languages, i.e., English and French, which are orthographically opaque languages. The common findings of these studies indicated the predictive power of RAN in reading comprehension along with word reading. Accordingly, it might be useful to see the role of RAN in reading development of the languages with consistent orthographies. Here, it is important to note that, to our knowledge, there are very few studies dealing with the relationship between RAN and reading comprehension as most of the RAN studies in transparent orthographies investigated the role of RAN in word reading.

In such a study, Abolafya (2008) examined the function of RAN (digits, letters) in reading skills (real/pseudo-word reading, reading comprehension, oral reading fluency, letter knowledge) among Grade 2 students with different levels of reading (poor and good readers) in Turkish. As to poor readers, high correlations were reported between RAN and word reading and oral reading fluency. Likewise, RAN letters significantly associated with reading comprehension in poor readers. However, in good readers, there was no significant relationship between RAN and other variables except for word reading. These findings demonstrated that good readers who had significantly higher RAN scores than poor readers had automatized reading and performed better in reading comprehension. However, poor readers with signifantly lower RAN scores spent their cognitive resources for decoding words, but not for comprehension. Thus, this research implies that RAN might be a significant associate of reading comprehension especially in poor readers.

A recent study in Chinese, a non-alphabetic language, also provided support for the role of RAN in reading comprehension. In their study, Zhao, Cheng and Wu

(2019) explored the longitudinal contribution of RAN as well as morphological awareness to reading comprehension. Of particular relevance, Grade 1 RAN had a small but significant impact on reading comprehension measured in Grade 3.

Overall, the previous literature has demostrated that RAN is mostly a significant correlate of reading comprehension, either direct or indirect. Having reviewed some important L1 studies focusing on the relationship between RAN and reading comprehension, it is important to see the relationship between PM and reading comprehension in L1. The next part will present some L1 research on the role of PM in reading comperehension.

2.6.1.3 PM and reading comprehension in L1

Despite the number of the studies that has examined the predictive role of PA and RAN in reading comprehension, there are few studies that have directly explored the role of PM in reading comprehension (e.g., Bishop, 2003; Dufva et al., 2001; Näslund and Schneider, 1991). Indeed, these studies have treated PM either as control variable as a part of working memory or as an indirect contributor (via word reading) to reading comprehension. In one of these studies, also reviewed above, Bishop (2003) tested the role of PA, RAN, PM and letter identification in reading comprehension. The results of various multiple regression anayses revealed that the combination of PA, RAN and letter identification was the best contributor to reading comprehension. This means that PM failed to contribute to reading comprehension.

Following a sample of Finnish children from kindergarten to Grade 2, Dufva et al. (2001) attempted to investigate the relationships among PM, PA and reading skills. In line with previous studies, PA was found to be the most significant predictor of early word reading. While the impact of PM on word reading was either

moderate or indirect, there was no direct role of PM in reading comprehension. However, PM significantly correlated with listening comprehension that explained significant variance in later reading comprehension.

In a similar vein, Näslund and Schneider (1991) investigated the longitudinal role of PM, PA and verbal capacity in subsequent word reading and reading comprehension. The findings showed no significant impact of preschool PM on Grade 2 reading comprehension. In fact, PM indirectly predicted later word reading through its powerfull relationship with PA skills.

In their longitudinal study, Parrila, Kirby and McQuarrie (2004) examined the predictive power of PM, RAN, PA, and articulation rate measured in kindergarten and Grade 1 in English word reading and reading comprehension which were measured in Grades 1, 2 and 3. The results revealed that PM did not explain any significant variance in reading comprehension when entered into the regression model after other variables. In fact, PM appeared to share the variance with other variables (i.e., RAN, PA).

To sum up, as in the relationship between PM and word reading, the results of the studies are inconsistent with regard to the relationship between PM and reading comprehension. Together with PA and RAN, however, it is still an important component of early reading development. In the following part, L1 research on the relationship between vocabulary and reading comprehension will be reviewed.

2.6.1.4 Vocabulary and reading comprehension in L1

Either in line with other components of reading or as a single component, a wealth of findings in different languages has revealed vocabulary to be an important predictor of reading ability over time (e.g., Sénéchal et al., 2006; Verhoeven et al., 2011).

Specifically, research in L1 has displayed a significant relationship between reading comprehension, word reading and vocabulary. In one of these studies, Verhoeven and van Leeuwe (2008) explored the role of word reading, LC, and vocabulary in reading comprehension among 2143 Dutch speakers in a longitudinal design. The students who were followed from Grade 1 to Grade 6 were tested at each grade. The results indicated a developmental pattern of all skills across grades. Similarly, the individual differences detected at the very beginning of the study continued across grades. Word reading, vocabulary and LC were found to be crucial predictors of reading comprehension. However, the effect of word reading in reading comprehension decreased in later grades. While vocabulary stayed as an important predictor of reading comprehension, there was a reciprocal relationship between LC and reading comprehension.

In a similar vein, Babayiğit and Stainthorp (2013) tested the effect of preschool vocabulary, LC, verbal short-term memory (VSTM) and grammar on later reading comprehension in Turkish. The results showed a moderate variance of kindergarten skills in Grade 1 and Grade 2 reading comprehension (44% and 33% respectively). Vocabulary, on the other hand, emerged to be a unique predictor of Grade 2 reading comprehension. In fact, in another study in Turkish, Babayiğit and Stainthorp (2011) could not find a direct role of vocabulary in reading comprehension in Turkish. Vocabulary indirectly predicted reading comprehension, which was through LC.

In another longitudinal study, Verhoeven et al. (2011) explored the development of vocabulary (basic vocabulary and advanced vocabulary), word decoding and reading comprehension in Dutch speakers followed from Grade 1 to 6. The results of the study indicated that there was a stable development in all reading

skills. Further, early vocabulary size significantly contributed to later word decoding and reading comprehension. However, the association between vocabulary and reading comprehension was stronger compared to the relationship between vocabulary and word decoding. This finding is in line with studies in transparent orthographies (e.g., Babayiğit & Stainthorp, 2013). Also, a reciprocal relationship between vocabulary and reading comprehension was detected.

A sample of Greek students from Grade 2, 3 and 4 was recruited in a study by Protopapas, Sideridis, Mouzaki and Simos (2007), examining the relationship between vocabulary, word reading and reading comprehension. The findings revealed that the significant contributions of word reading to reading comprehension disappeared when vocabulary was added to the regression model. The authors concluded that vocabulary might function as a mediator between word reading and reading comprehension.

As stated previously, one of the less-explored dimensions of vocabulary was about vocabulary task types and their role in tapping the related skills. In one of these pioneering studies, Ouellette (2006) examined the relationship between vocabulary (vocabulary depth and breadth), decoding, word recognition and reading comprehension in a sample of English speakers (N=60). Here, Ouellette made an important distinction between vocabulary breadth and depth in task administrations. Single-answer tasks (receptive and expressive) were conducted as a test of vocabulary breadth whereas oral-definition tasks (expressive) as the test of vocabulary depth. The findings showed a relationship between receptive vocabulary breadth and decoding whereas expressive vocabulary breadth uniquely contributed to word recognition. On the other hand, the depth of vocabulary affected word recognition via its relationship with expressive vocabulary breadth, but directly

contributed to reading comprehension. This finding highlights the fact that rather than vocabulary depth, vocabulary breadth can be a better predictor of reading comprehension, and the results of a study may be affected by the vocabulary task type.

To sum up, a growing body of research evidence has revealed the powerful association between vocabulary and reading comprehension. Likewise, it is well-known that any individual differences in vocabulary knowledge will have impact on reading comprehension. Similarly, the reciprocal relationship between vocabulary and reading comprehension has been proven in the literature. The following part will present the relationship between listening comprehension and reading comprehension with reference to previous studies in L1.

2.6.1.5 Listening compehension and reading comprehension in L1

Listening comprehension (LC) is one of the complex skills that have been difficult to categorize, especially regarding its relationship with vocabulary (Tunmer & Chapman, 2012). While some researchers (e.g., Ehri, 2005) define LC and vocabulary under a broader reading skill, others handle them as separate constructs (e.g., Kendeou et al., 2009). In this study, LC has been evaluated as a separate construct.

Whether as a single construct or as a part of a broader skill, it is widely argued that LC significantly correlates with the comprehension of reading (e.g., Verhoeven & van Leeuwe, 2008; Kershaw & Schatschneider, 2012). LC shares some sub-skills with reading comprehension. That is, the processes that LC includes are "parsing of sentences into their constituent components; the drawing of inferences to make the relations within and between sentences sufficiently explicit and thereby

facilitating the integration of information" (Verhoeven & van Leeuwe, 2008, p. 409). Along with decoding, LC is also categorized as a crucial component of the widely accepted reading framework, the SVR discussed above. In this framework, Gough and Tunmer (1986) define LC as the ability to understand oral language mainly at the level of words as well as sentences and text-level.

As to the association between listening and reading comprehension, just like the relationship between vocabulary and reading comprehension, one can argue for a reciprocal relationship between listening and reading comprehension that feeds each other. Further, according to Hoover and Gough (1990), LC and reading comprehension include similar sub-skills (e.g., syntax, vocabulary, discourse, background knowledge) except for modality type. While LC occurs aurally, reading comprehension requires visual material.

A vast body of research has explored the relationship between LC and reading comprehension in cross-sectional and longitudinal studies among young readers (e.g., Cain & Oakhill, 1996; Dufva et al., 2001). Some studies revealed that poor readers had difficulties in these processes during LC (e.g., Cain & Oakhill, 1996; Hutchinson, Whiteley, Smith, & Connors, 2003; Yuill & Oakhill, 1991). Likewise, some longitudinal studies have shown a strong relationship between LC and reading comprehension, even in younger readers (Catts et al., 2015; Dufva et al., 2001; Müller & Brady, 2001; Verhoeven & van Leeuwe, 2008).

Some studies in monolinguals revealed a significant correlation between LC and reading comprehension in highly transparent orthographies like Dutch, Finnish and Turkish (e.g., Babayiğit & Stainthorp, 2013; Dufva et al., 2001). In one of these studies, also reviewed above, Babayiğit and Stainthorp (2013) investigated the role of kindergarten vocabulary, grammatical skills, LC skills and verbal short-term

memory (VSTM) in later reading comprehension performance in Turkish (Grade 1 and 2). To this end, 56 students were followed from kindergarten to Grade 2 in Northern Cyprus. The findings revealed that LC was the highest correlate of reading comprehension across all levels. The hierarchical regression results showed that while kindergarten LC, grammatical skills and VSTM were significant predictors of Grade 1 reading comprehension, kindergarten vocabulary was the only predictor of reading comprehension in Grade 2. On the other hand, the analysis of word reading accuracy and LC assessed in Grade 1 indicated that LC was a significant predictor of Grade 2 reading comprehension.

As reviewed above, Verhoeven and van Leeuwe (2008) tested the SVR and Lexical Quality Hypothesis among Dutch speakers during primary school years. The results indicated the contributions of word reading, vocabulary and LC to early grades reading comprehension. In the following years, while word reading lost its predictive power in reading comprehension, vocabulary and LC continued to facilitate reading comprehension. This result was compatible with a study in Turkish, also reviewed in PA subsection above, by Öney and Durgunoğlu (1997). In their study, LC explained significant variance in reading comprehension above and beyond word recognition.

In another study in Turkish, Babayiğit and Stainthorp (2011) investigated the role of RAN, vocabulary, LC and working memory in word reading, reading comprehension and writing. The results showed a significant contribution of LC to subsequent reading comprehension. In a similar vein, some studies in Finnish indicated significant predictive power of LC in early reading comprehension (e.g., Müller & Brady, 2001).

In a recent study in Norwegian, Lervåg, Hulme and Melby-Lervåg (2018) explored the relationship between LC and reading comprehension alongside the role of other language related skills (i.e., vocabulary, memory, inference and grammar). 93 Norweigan second graders were recruited for this study. These students were followed for 5 years. The findings showed that the shared effect of other language-related skills had a significant variation in LC and reading comprehension. Similarly, decoding and LC were significant predictors of early reading comprehension. On the other hand, LC had a significant variance in both early and later reading comprehension skills.

Taken together, LC is accepted as a proxy of reading comprehension. Indeed, despite the modality type (i.e., aural vs. visual), there are a number of common subskills (e.g., syntax, discourse, background knowledge) shared by vocabulary and reading comprehension. For this reason, a number of L1 studies have revealed the powerful role of early LC skills in later reading comprehension.

2.6.2 Predictors of reading comprehension in L2

Given the relationship between the cognitive and linguistic components and reading comprehension by reviewing L1 studies above, the following sections will introduce the relationship between these components and reading comprehension in L2 studies.

2.6.2.1 PA and reading comprehension in L2

There are few studies focusing on the relationship between PA and reading comprehension in L2. In one of these studies, İlerten (2021) investigated the role of cognitive and linguistic components in reading comprehension among Turkish monolinguals and Arabic-Turkish simultaneous bilinguals in Grade 2. The separate

analyses of the results indicated that only morphosyntactic awareness predicted reading comprehension in monolinguals while vocabulary, word reading, and PM significantly predicted reading comprehension in bilinguals. However, the study did not find any predictive power of PA in reading comprehension either in monolinguals or bilinguals. The researcher argued that due to ceiling effect in PA skills in Turkish, PA could not explain any variance in reading comprehension.

In another study, reviewed also in word reading section, Jared et al. (2011) examined the relationship between early English cognitive and linguistic components skills, and later French and English reading skills. Regarding PA skills, the findings showed that kindergarten PA uniquely predicted Grade 3 reading comprehension not only in English but also in French. However, the variance explained by PA in French reading comprehension was smaller than that of English. The researchers concluded that due to more consistent sound-letters correspondences in French, PA was more related to English with less consistent orthography.

As in PA studies in L1, the reviewed studies above showed that the role of PA in reading comprehension in L2 varied based on the orthographical transparency of the languages. In the following subsection, a review of RAN studies focusing on the relationship between RAN and reading comprehension in L2 will be presented.

2.6.2.2 RAN and reading comprehension in L2

In a study of L2 English, Yaghoub-Zadeh, Farnia and Geva (2010) attempted to expand Simple View of Reading (SVR) by including RAN and PA in the framework. That is, in addition to the SVR components, decoding and listening, the researchers used PA and RAN measures while assessing reading comprehension performances of L2 English learners with different L1 backgrounds. Besides reading comprehension,

text-reading fluency was also added to the model as an outcome. The results showed that RAN significantly predicted word reading that functioned as mediator between RAN and reading comprehension. In a similar vein, RAN uniquely contributed to text-reading fluency.

In a comprehensive study, also reviewed in the vocabulary section below in detail, Schaars, Segers and Verhoeven (2019) explored the kindergarten contributors to Grade 2 word reading and reading comprehension in L1 and L2 Dutch speakers. Of particular relevance, RAN did not contribute to later reading comprehension, while it significantly predicted word reading. However, as reviewed above, a recent study by İlerten (2021) did not report any predictive power of RAN in reading comprehension in both monolingual and bilingual groups, while it significantly contributed to their word reading. This result is compatible with other L1 (e.g., Bektaş, 2007; Özata et al., 2016) and L2 Turkish studies (e.g., Öz, 2019), which identified a strong impact of RAN on word reading.

Manis et al. (2004) investigated the predicting power of preschool Spanish linguistic skills (i.e., PA, RAN, print knowledge and expressive vocabulary) in Grades 1 and 2 reading development in both Spanish and English in an early immersion context. With regard to word reading and reading comprehension in English, the results indicated that bilinguals performed similar to the national norms of English monolinguals. However, English oral language was behind national norms. As to RAN, kindergarten RAN failed to predict reading comprehension in later grades. Further, a cross-language correlation was detected for PA, RAN and print knowledge from Spanish to English, while oral language stayed as a within language predictor.

Overall, the limited RAN studies in L2 have showed an indirect contribution of RAN to reading comprehension, whereas RAN significantly predicted word reading fluency across languages. The following part will present the relationship between PM and reading comprehension in light of L2 research.

2.6.2.3 PM and reading comprehension in L2

In a study by Swanson et al. (2011), the aim was to explore the contribution of PM, RAN, PA, working memory and vocabulary to L2 reading development. A group of students from Grades 1, 2 and 3 were assessed via a battery of measures both in L1 Spanish and L2 English. One of the findings of the study was that there was no cross-linguistic influence between languages when all measures were analyzed in the same regression model. That is, Spanish measures best predicted Spanish reading comprehension, while English measures predicted English reading comprehension. The other finding was that PM only contributed to word reading.

In another study, Dufva and Voeten (1999) explored the relationship between PM and L2 English reading skills by including L1 Finnish reading skills. With this in mind, the researhers followed a number of L1 Finnish speakers from Grade 1 to Grade 3. The first grade tests were L1 listening comprehension and word reading; the second grade tests were L1 word reading, reading comprehension and PM. With L2 English instruction, English tests were included into Grade 3, which were vocabulary, listening comprehension and communicative skills. The main finding was that both PM and other L1 skills positively affected L2 reading skills. Here, the researchers emphasized the significant role of L1 proficiency in L2 reading development.

Parallel to PM studies in L1, PM studies in L2 yielded inconclusive findings related to the role of PM in reading comprehension. In the following part, the predictive power of vocabulary in reading comprehension will be given with reference to some important L2 studies.

2.6.2.4 Vocabulary and reading comprehension in L2

A vast body of research has displayed that the degree of success in reading is highly affected by vocabulary knowledge, and it is even a more convincing indicator of individual differences in reading comprehension among bilinguals (e.g., Mancilla-Martinez & Lesaux, 2011; Proctor et al. 2012; Verhoeven et al., 2011). In one of these studies, Mancilla-Martinez and Lesaux (2011) focused on Spanish-English speakers' word reading and oral language developments in both languages from ages 4.5 to 11. By using the scores from the standardized tests, a development model was designed for the participants' scores in word reading, expressive vocabulary, LC and verbal short-term memory. The participants' performance and development in word reading were similar to national norms. Together with word reading and LC, vocabulary appeared to be a powerful predictor of reading comperehension. However, their vocabulary skills lagged behind national norms and the development was behind age-appropriate levels. Also, the participants' word reading, LC and vocabulary in Spanish were behind their English levels and this gap deepened in years. Regarding vocabulary delays, Ucelli and Paez (2007) also reported that despite a developmental pattern in vocabulary and narrative skills from kindergarten to Grade 1, vocabulary performance of bilinguals lagged behind national norms.

As in L1 studies, some argue that rather than vocabulary breadth, vocabulary depth is a powerful contributor to reading comprehension. In such a study, Proctor et

al. (2012) examined the influence of vocabulary depth on reading comprehension among English monolingual and Spanish-English bilingual children in grade 2-4 in the USA. 294 children joined in this study. Here, vocabulary depth was defined as a kind of metalinguistic awareness including morphological, semantic and syntactic awareness. Besides English tests, bilingual children were also tested in the Spanish equivalent of the tests. The results revealed that vocabulary depth predicted significant variance in the initial status of reading comprehension controlling for vocabulary breadth and word identification, but not any change in the later reading comprehension. Also, no relationship was found between Spanish language measures and English reading comprehension of bilingual group.

In another study, Lervåg and Aukrust (2010) examined the critical role of vocabulary knowledge and decoding in reading comprehension of L1 Norwegian speakers and L1 Urdu speaker-L2 Norwegian learners. The participants were followed during elementary years of schooling. The findings indicated that L1 speakers had better reading comprehension performances at the beginning and the growth in this skill was faster compared to L2 learners. Vocabulary and decoding were good predictors of initial reading comprehension, but the former was a better predictor of growth in reading comprehension in both groups. While there were no initial differences between both groups' decoding skills, there were initial differences in vocabulary skills of both groups.

In a longitudinal study, Schaars et al. (2019) investigated the predictors of early word decoding and reading comprehension from kindergarten to Grade 3 in L1 and L2 learners of Dutch in the Netherlands. A great number of cognitive and linguistic tasks were administered to test first and second language reading development. The findings revealed that L1 learners scored better than L2 learners in

reading comprehension, kindergarten RAN, vocabulary, and phoneme segmentation. On the other hand, the performance of both groups was similar in kindergarten grapheme knowledge, phoneme isolation, short-term memory, and word decoding across grades. Also, it appeared that word reading and vocabulary were significant predictors of reading comprehension in both groups. Similarly, RAN, short-term memory and grapheme knowledge predicted word reading in both groups.

More evidence related to the crucial role of vocabulary in reading development of bilinguals comes Dutch. Verhoeven (2000) investigated the development of vocabulary, decoding, spelling and reading comprehension in L1 Dutch speakers and L2 Dutch learners with different L1 backgrounds from Grade 1 and Grade 2. The results indicated that while bilinguals kept up with Dutch monolinguals on word decoding, the bilinguals lagged behind monolinguals in spelling and reading comprehension. A further analysis showed that L2 vocabulary knowledge was the main reason for this delay in reading comprehension of bilinguals. Verhoeven's findings were supported by a recent study conducted with Dutch monolinguals and Dutch bilinguals (Janssen et al., 2013) which revealed a higher performance of monolinguals in reading compehension.

To sum up, L2 studies reviewed here have provided valuable evidence about the impact of vocabulary on reading comprehension. Vocabulary is a proxy of reading comprehension, and its impact on reading can be both concurrent and longitudinal. In the following part, the review will continue with another crucial predictor of reading, listening comprehension, which has been also examined in the present study.

2.6.2.5 Listening comprehension and reading comprehension in L2

As in L1 studies, listening comprehension (LC) has also been reported to be a significant predictor of reading comprehension in L2. In one of these studies, Proctor et al. (2005) tested the role of decoding, LC and vocabulary in reading comprehension in a group of L1 Spanish speakers of L2 English learners in Grade 4. LC appeared to be the best precursor of reading comprehension. Likewise, vocabulary was a significant correlate of reading comprehension.

In a longitudinal study of L2 English, also reviewed in vocabulary section, Mancilla-Martinez and Lesaux (2011) examined the relationship between LC, vocabulary, word reading and reading comprehension in L2 English learners tested at four times between Grade 4 and 7. Considering LC skills, the results showed that LC significantly predicted reading comprehension.

Additionally, some L2 studies in transparent orthographies provided more support for the association between LC and reading comprehension. In such a study, reviewed in the SVR subsection, Bonifacci and Tobia (2017) investigated the contribution of decoding and LC to reading comprehension in Italian among L2 Italian learners from elementary school levels. The results showed that LC was the most powerful predictor of reading comprehension in all grades, whereas reading accuracy contributed to reading comprehension in early grade levels. Likewise, the results of a study in Dutch reported strong evidence for the contributions of LC to reading comprehension. In that study, Verhoeven and van Leeuwe (2008) assessed the influence of LC as well as word reading in reading comprehension performance of L1 and L2 Dutch speakers. LC was found to be the most significant predictor of reading comprehension.

2.7 Summary

Overall, in this chapter, reading and its components have been introduced with a special focus on the studies examining the relationship between these components (i.e., PA, RAN, PM, LC and vocabulary) and reading development in monolinguals and bilinguals. Tremendous evidence from these studies indicated that the relationship between these components and reading mostly based on the transparency of orthographies as well as the levels of reading acquisition. To be more specific, the predictive power of PA and RAN in reading differs depending on the orthographical transparency of the languages. While the role of PA in predicting reading decreased in later grades in transparent orthographies (e.g., Turkish), RAN continued to be significant contributor to word reading. Conversely, some studies revealed longitudinal effects of PA in reading in opaque languages (e.g., English). As for PM in L1 and L2, the results were still far from a conclusion in the identification of the role of PM in reading. On the contrary, both vocabulary and LC were found to be significant predictors of reading. It also appeared that they were the most evident components in which monolingual and bilingual students showed performance differences. However, further research is required to identify how these components work in predicting reading development of monolinguals and bilinguals of orthographically transparent orthographies.

The following chapter will first introduce the characteristics of Turkish and Kurdish languages. Then, it will provide some information about literacy instruction in Turkey.

CHAPTER 3

CHARACTERISTICS OF TURKISH AND KURDISH

This chapter begins with general information about Turkish language. Then, the characteristics of Turkish phonology are presented. Following this, the characteristics of Kurdish phonology are introduced. The chapter ends with the literacy instruction in Turkey.

3.1 Turkish language

Turkish is an Altaic language that is spoken by over 80 million people around world including the Balkans, the Middle East, and Europe. With more than 70 million speakers, it is principally spoken in the Republic of Turkey (Durgunoğlu, 2017). With the foundation of the modern Republic of Turkey, the Latin alphabet was accepted in 1928 as a part of the country's modernization. The new alphabet includes 29 letters; 21 consonants and 8 vowels.

The letter-sound correspondence is highly transparent in Turkish. That is, there is consistency between the written and spoken form of the language in terms of one-to-one correspondence. This consistency is in two ways: from spelling to sounds and from sounds to spelling. It is a well-documented finding that the tranparency in mapping one grapheme to one phoneme in Turkish enables a normal developing child to master decoding skill towards the end Grade 1 (e.g., Öney & Durgunoğlu, 1997; Babayiğit & Stainthorp, 2007). Öney and Durgunoğlu (1997), for instance, reported that by the end of the first grade, a beginner reader reached ceiling levels of decoding and accuracy in Turkish.

With regard to the canonical word order, the order is highly tranparent in Turkish. Despite the most common word order, namely subject-object-verb (SOV), there are other word order permutations, SVO, OSV, OVS and VSO in Turkish (Kornfilt, 1997). Pro-drop characteristics of Turkish contributes to the word order flexibility, and in turn, leads to the frequent subject drop, especially in adult conversation (Durgunoğlu, 2017).

3.2 Turkish phonology

Turkish has a transparent orthography in which there is a mainly grapheme-phoneme mapping. The number of phonemes for the consonants are twenty-four and these consonants can be categorized as bilabial, laiodental, dental, alveolar, alveo-palatal-velar and glottal based on their *place of articulation*. In addition, Turkish consonants can also be defined with their *manner of articulation* as being plosives, affricates, fricatives, nasals, tap, lateral and glide; and with *voicing* feature as being voiced or voiceless (Erguvanlı-Taylan, 2015). Turkish consonant sounds are displayed in Table (XX) with their distinctive features.

Table 1. Turkish Consonants

	Bilabial	Labio-dental	Dental	Alveolar	Alveo-palatal	Palatal	Velar	Glottal
Plosives	*p*		*t*			*c*	*k*	
	b		*d*			*ɟ*	*g*	
Affricates					*tʃ*			
					dʒ			
Fricatives		*f*	*s*		*ʃ*		*ɣ*	*h*
		v	*z*		*ʒ*			
Nasals	*m*		*n*					
Tap (Flap)				*ɾ*				
Lateral			*ɬ*		*l*			
Glide						*j*		

Source: Erguvanlı-Taylan (2015, p.11).

The reason why there are three more phonemes in Turkish compared to the number of graphemes is some letters can be pronounced with two distinct phonemes

depending on the phonological environment they stand. Accordingly, /k/ and /c/ are phonemes used to represent the letter “k”; /g/ and /ɟ/ are for the letter “g” and lastly /l/ and /ɬ/ for the letter “l”.

As for the vowels of Turkish, there are eight vowels and they can be categorized based on their backness (front or back), heigh (low, mid and high) and rounding (round or non-round) features (Erguvanlı-Taylan, 2015). The categorization of Turkish vowels is displayed in Table 2.

Table 2. Turkish Vowels

	Front		Back	
	Non-round	Round	Non-round	Round
High	*i*	*y (ü)*	*ɯ (ı)*	*u*
Mid	*e*	*œ (ö)*		*o*
Low	*ɛ*		*a*	

Source: Erguvanlı-Taylan (2015, p. 17).

The co-occurrence of vowels in a Turkish word is constrained with a very fundamental rule called *vowel harmony*. Accordingly, the rule applies from left to right, so the initial vowel in each word can be any of the vowels available in Turkish. The following vowels, though, should be in harmony with the preceding vowel in terms of its backness and rounding features (Durgunoğlu & Öney, 1999). The rule also applies for suffixes and determines which allophone of a morpheme such as /-dı/ or /-dü/ should be inflected.

Considering the syllable structure, Turkish syllables include one vowel along with one or more consonants, and the most (ninety eight percent) syllables have the V, VC, CV, and CVC forms where CV is the most common one (Durgunoğlu, 2017). The syllables in Turkish also have high saliency, so when a word is divided into syllables, regardless of its morphological structure (e.g., ev-e), its syllabic structure is

taken into consideration (e.g., e-ve). The limited number of possible syllable structure in Turkish and their saliency may make it easier for Turkish-speaking children to get syllable awareness faster compared to those speaking English with more complex syllable forms (Durgunoğlu & Öney, 1999).

3.3 Kurdish phonology

Kurdish belongs to the North-West Iranian branch of the Indo-European Language Family (Bedirxan & Lescot, 2009). Kurdish consists of four dialects: Kurmanji, Dımilki (Zazaki), Sorani and Gorani. It is an inflecting language and the word order in Kurdish is in the form of subject – object – verb (SOV) (1). However, it may differ in transitive verbs (2).

(1)	Min	du nan	kir-în
	S	O	V
	I	two bread	buy-PAST. 1SG

"I bought two loaves of bread."

(2)	Ew	çûn	mal - ê.
	S	V	O
	They	go – PAST. 3PL	home-DAT.

"They went home."

The Latin alphabet is used in Kurdish. Also, Kurdish can be accepted as a transparent language since it has a predictable grapheme-phoneme correspondence (Öz, 2019). The alphabet has thirty-one letters: twenty-three consonants and eight vowels.

Table 3. Kurdish Consonants

	bilab	lab.-dent.	dent.	alveol	post-alv.	pal.	vel.	uvul.	pharyn.	glott.
Plosives	p^h p b		t^h t d				k^h k g	q		ʔ
Fricatives		v f	ʃ ʒ				x ɣ	ʁ	ħ ʕ[9]	h
Affricates			ʧ^h ʧ ʤ							
Nasals	m		n				ŋ			
Trill			r							
Flap			ɾ							
Approx.	w					j				
Lateral			l (dialectally also ɬ)							

Source: Haig & Öpengin (2015, p. 14)

As seen in Table 3, some stops and affricates have three-way constrast. For example, a bilabial plosive consonant can be voiceless-aspirated as /p^h/, voiceless-unaspirated as /p/ or voiced /b/. However, in the standard Kurdish ortogpraphy, no distinction between aspirated and aspirated sounds is made, so both /p/ and /p^h/ sounds, for instance, are written as the “p” letter. In addition, when the “r” letter is word-initial, it is certain that it is trilled as /r/; however, without having a predictable distribution, it can be trilled /r/ or flap /ɾ/ in other environments.

Table 4. Kurdish Vowels

	Long/Full		Short/Weak	
	Front	Back	Front	Back
High	î= /i/	û = /u/		i = /ɨ/ u = /ʊ/
Mid	ê = /e/		e = /æ/	
Low		a = /a/ o = /o/		

Source: Bedirxan & Lescot (2009, p. 19)

There are five full (long) and three weak (short) vowels in the Kurdish basic vowel system. The full vowels are /i/, /e/, /a/, /u/, and /o/, and these letters are pronounced phonetically long especially when they are in an open syllable environment. In the southestern dialects of Kırmanji the long /u:/ sometimes go through de-rounding and pronounced as /i:/. The vowels /ʊ/ and /æ/ are more centralized, less lengthened compared to the full vowels and they can be used at the end of words. Lastly, although the letter "i" corresponds to the sound /ɨ/, this sound has two varieties which are the lexical central vowel and epenthetic central vowel occurring different environments (see Haig & Öpengin, 2015).

3.4 Literacy instruction in Turkey

In Turkey, the official language of instruction is Turkish. With a centralized education policy, each school follows a common program and textbooks developed by Ministry of National Education (MoNE) (Durgunoğlu, 2017). For a long time, Sentence-Method (SM) was implemented in the primary schools in Turkey. As a top-down skill based model, the literacy instruction proceeded from the largest unit (i.e., sentence) to the smallest one (i.e., phoneme) in this method. Since the 2005-2006 academic year, sound-based sentence method (SBSM) has been utilized in Turkish primary school program. In SBSM method, it is essential to teach sounds (i.e., phonemes) at the initial step of early reading and writing. Then, syllables are made from phonemes, words from syllables and sentences from words (Akıncı, Bektaş, Gülle, Kurt, & Kurt, 2016).

The reading and writing steps in the SBSM are as follows: readiness for literacy; recognizing and distinguishing sounds; forming syllables from sounds, words from syllables, sentences from words, and finally creating text from sentences.

With this bottom-up approach, it is believed that learning progresses from the smallest items to the difficult ones, and as a result, there will be an increase in the effectiveness of literacy (Turan, 2007).

There are 5 groups of sounds/letters to be followed in literacy teaching, which are determined depending on the frequency of use and the possibility of producing words by combining these letters (MEB, 2019):

Group 1: Ee-Ll-Aa-Kk-İi-Nn

Group 2: Oo-Mm-Uu-Tt-Üü-Yy

Group 3: Öö-Rr-Iı-Dd-Ss-Bb

Group 4: Zz-Çç-Gg-Şş-Cc-Pp

Group 5: Hh-Vv- Ğğ-Jj-Ff

The general idea behind the SBSM method is the belief in its facilitative role in decoding in transparent orthographies. Considering its consistent letter-sound mapping, Turkish is accepted as an ideal language for implementation of this method (Baydık & Bahap-Kudret, 2012). However, the studies that have been conducted on the effectiveness of SBSM have yielded controversry findings. As an instance, Beyazıt (2007) conducted a comprehensive study with some stakeholders (i.e., teachers, administers, parents) with the aim of exploring the effectiveness of the SBSM, a relative new approach in literacy, compared to SM. The findings indicated that the SM was found to be more effective in reading accuracy and fluency, and comprehension. Similar results came from a study by Bilir (2005). In that study, Bilir took attention to the fact that children might get lost during comprehension with too much focus on the sounds. In a recent study, Polat (2017) argued that the SM could be a more suitable method for literacy instruction because of syllable saliency in Turkish.

On the other hand, Güneş (2006) points out to the facilitative role of the SBSM in making children active and productive during learning to read. In another study, Bay (2010) followed a sample of the first graders for eight months to see the impact of the SBSM on the children's literacy development. The study revealed some important findings. One was that in a short time, the children made significant progress in literacy skills. Likewise, SBSM appeared to facilitate reading of visual materials and oral language in children that had learning difficulties. Despite the ongoing discussion on the efficiency of the SBSM, there is a consensus that this method is effective in the teaching of bottom-up skills, and it is appropriate for the orthographic features of Turkish. However, as Akıncı et al. (2016) argue, for a language like Turkish, instead of choosing one method and unconditionally accepting it to be the best, mix methods may be conducted depending on the needs and development of students.

In this chapter, language features of Turkish and Kurdish were introduced. Also, some information about literacy instruction in Turkey was given. The next chapter will introduce the methodology of the present study.

CHAPTER 4

METHODOLOGY

This chapter reports the methodology of the current study that covers research design, participants and setting, data collection instruments, procedure, research questions and hypotheses, and the statistical analysis.

4.1 Research design

This is a longitudinal study in which the reading development of Turkish monolinguals and Kurdish-Turkish bilinguals were followed from kindergarten to Grade 1. A number of tests (i.e., vocabulary, LC, PA, RAN and PM) were conductedin three time intervals:(i) at the beginning (Time 1) and –(ii) end of kindergarten (Time 2), and (iii) Grade 1 (Time 3) in order to see their relationship with Grade 1 word reading and reading comprehension performance. Given the longitudinal nature of the research design and the variety of the tests, the researcher was able to follow Turkish reading development in monolinguals and bilinguals.

4.2 Participants and setting

At the beginning of the kindergarten, the data collection began with 123 participants attending four state kindergartens in İpekyolu, a district of Van, which is a convenient city to reach Turkish monolingual and Kurdish-Turkish bilingual children. However, three of the participants could not complete all the test batteries because of various reasons and they were excluded from the data analysis. 59 students were Kurdish-Turkish bilinguals (mean age of 63.2 months) and 61 students were Turkish monolinguals (mean age of 64.1). Between the first data collection at

beginning of kindergarten and the third data collection in Grade 1, some of the participants could not complete all the data collection process. 12 of the participants moved to another district or city; six of them did not want to participate in the study anymore, and three of them could not complete all the tests. Similarly, three students were identified as outliers due to their low scores in the first data collection, and they were excluded from the data analysis. As seen in Table 5, 46 Turkish monolinguals (22 males, 24 females; means of age 73.5 months) and 50 Kurdish-Turkish bilinguals (25 males, 25 females; means of age 74.2 months) participated in Grade 1 data collection. The schools were selected by means of convenience sampling based on the availability and willingness of the school administration. Likewise, all the participants were randomly selected. The participants were normally-developing children with no learning difficulties.

Table 5. Participants' Demographics (Grade 1)

Group	Gender	*N*	Age (Months) $\bar{x}$	*SD*
Monolingual	Male	22 (47.8%)	73.5	.35
	Female	24 (52.2%)		
	Total	46		
Bilingual	Male	25 (50%)	74.2	.38
	Female	25 (50%)		
	Total	50		

At the very beginning of the study, a meeting was held with the parents about the aim and design of the study. The parents were given a consent form and a questionnaire involving questions about their educational backgrounds, jobs, incomes. In order to have an index of their socio-economic status (SES), mothers' and fathers' educational backgrounds were taken into consideration (Özata & Haznedar, 2018; Şirin, 2005).

Table 6. Parents Educational Level

	Monolingual (%)		Bilingual (%)	
	Mother	Father	Mother	Father
	N = 23	*N* = 22	N = 50	*N* = 50
Literate	0	0	8.5	6.20
Primary School	25.6	24.12	28.33	25.43
Secondary School	23.4	25.7	22.24	24.54
High School	22.1	20.43	20.12	17.9
University	27.9	29.75	20.81	24.93

Table 6 summarizes the educational backgroundof the parents. Regardless of the groups, the fathers had better high education levels compared to the mothers. As for group differences, the parents of monolinguals had better educational backgrounds than bilinguals' parents. While the lowest education level was primary school among monolinguals' parents, there were bilingual parents who did not have formal education, but somewhat literate.

The formal language of education was Turkish; however, the bilingual group also used Kurdish at home or in their daily routines. To this end, an adaptation of the questionnaire developed by Derince (2010) was administered with the parents of bilinguals to have a general idea about their children's language proficiency, and language choice during daily routines, and while interacting with others (see Tables 7, 8, and 9).

Tablo 7. Bilinguals' Language Use with Other People (%)

	Father	Mother	Elder Siblings	Younger Siblings	Relatives	School Friends	Friends Outside School	Teachers	Best Friend	Play-ground Friends
Always Kurdish	17.4	28.9	10.9	5.8	14.4	0	1.8	0	10.5	3.5
More in Kurdish	22.3	27.7	11.3	10.5	18.6	5.5	14.9	0	11.8	10.08
Kurdish/ Turkish Equally	21.6	20.26	13.83	11.6	23.23	22.1	23.15	4.5	22.15	26.42
More in Turkish	19.8	12.06	30.7	12.98	21.45	30.22	26.85	31.7	22.6	28.27
Always Turkish	18.9	11.08	33.27	59.12	22.32	42.18	33.3	63.8	32.95	31.73

Table 7 reports the language choice of bilingual children while interacting with people. Considering family members and relatives, a balance in the use of Kurdish and Turkish was observed except for the younger siblings with whom bilingual children used Turkish to a great extent. While interacting with others, there was a high preference of Turkish among bilingual children.

Tablo 8. Bilinguals' Language Use in Various Occasions (%)

	Watching TV/Videos	Reading Comics/Books	Listening to Music	Shopping	Playing Sport/Game
Always Kurdish	1.8	0	2	2.2	3.34
More in Kurdish	12.26	0	5.25	5.36	8.52
Kurdish/ Turkish Equally	24.2	0	15.42	10.66	14.54
More in Turkish	22.26	3	24.8	29.15	33.37
Always Turkish	39.48	97	52.53	50.63	40.23

In Table 8, the results of bilinguals' language-use during daily routines revealed that they preferred Turkish over Kurdish during in various occasions. More specifically, the language of reading was only Turkish almost. Similarly, the children used Turkish to a great extent while listening to music and shopping. As for watching TV

and playing sport/games, despite high use of Turkish, there was a preference of Kurdish, as well.

Tablo 9. Language Proficiency of Bilinguals

	Mean (%)					
	Reading	Writing	Speaking	Vocabulary	Grammar	General Language
Kurdish	1.43	0	3.7	2.96	2.1	3.23
Turkish	4.08	3.86	4.56	2.43	3.25	4.12

Note: Means of the responses by the parents of bilinguals based on the likert scale (i.e., 1 = too bad, 5 = very good)

With regard to the language proficiency of the bilingual children, based on the parents' responses to a questionarrie, Table 9 showed a better competence of Turkish compared to Kurdish. The bilinguals could hardly read or write in Kurdish. Likewise, their other skills (i.e., speaking, grammar and general language ability) were better in Turkish than their Kurdish. Kurdish vocabulary was the only skill, which was higher than their Turkish vocabulary. This might be because of the fact that the bilinguals had not yet developed the translation equivalents in Turkish.

4.3 Data collection instruments

Considering the longitudinal design of the study, a battery of tests were employed with the aim of having an extensive perspective on the development of word reading and reading comprehension in monolingual and bilingual Turkish speakers from kindergarten to Grade 1 (see Figure 1). The list of the tests was as follows:

- Phonological Awareness Skills Screener (FFFT: Fonolojik Farkındalık Tarama Testi, Babür, Haznedar, & Erçetin, 2009)
- Turkish Test of Rapid Automatized Naming (HOTI: Hızlı Otomatik İsimlendirme Testi, Bakır & Babür, 2009, 2018)

- Turkish Test of Word Reading Efficiency (KOBIT: Kelime Okuma Bilgisi Testi, Babür, Haznedar, Erçetin, Özerman, & Erdat-Çekerek, 2011)
- Wechsler Intelligence Scale for Children -WISC-R Turkish (Savaşır & Şahin, 1995)
- The Turkish version of Woodcock Johnson Picture Vocabulary Subtest (Erçetin et al. 2014),
- The Turkish version of Woodcock Johnson Listening Comprehension Subtest (Erçetin et al. 2014), and Test of Text Listening developed by researcher
- Turkish version of Woodcock Johnson Reading Comprehension Subtest - Boğaziçi Test of Reading Comprehension (Erçetin, Babür, & Haznedar, 2014) and Text Comprehension (adapted by the researcher).

4.3.1 Phonological awareness skills screener (FFTT)

FFTT (Fonolojik Farkındalık Tarama Testi) is the Turkish version of the English Test of Phonological Awareness (PASS, Mather & Goldstein, 2001). This test includes ten subtests: word identification, rhyme recognition, rhyme production, phoneme blending, phoneme segmentation, phoneme recognition, phoneme deletion, syllable segmentation, syllable blending and syllable deletion.

Word Identification: In word identification task, participant is expected to listen to a pair of words (silgi-sokak [eraser-street] or inci-inci [pearl-pearl]) from the tape and to decide whether both words are same or different. The Cronbach's alpha coefficient was .76 (N = 96) for this test in the current study.

Rhyme Recognition: In rhyme recognition, participants listen to three different words (i.e., *tuz-buz-çan* [salt-ice-bell]) from the tape and they are required to decide which ones end with the same sounds. The expected answer is *tuz-buz*. The aim of this

subtest is to assess participants' rhyme recognition abilities. For this test, The Cronbach's alpha coefficient was .78 (*N* = 96)

Rhyme Production: In this task, participants are expected to produce a word rhyming with the target word. Participants are asked to name the object in the picture, and asked to produce a word that has the same ending as the word in the picture. For example, participant is shown an elephant's picture and asked to say its name (i.e., *fil*) and then say another word ending with similar sounds (e.g., *bil* [*know*]). The Cronbach's alpha coefficient was .81 (*N* = 96)

Syllable Segmentation: In syllable segmentation task, the aim of this task is to divide words into syllables. For instance, the participant is requested to repeat the target word (e.g., kalem [*pencil*]), and then to segment the word into syllables (ka-lem). The Cronbach's alpha coefficient was .80 (*N* = 96).

Syllable Deletion: In syllable deletion task, participants are required to delete either the first or the last syllable of a word. The researcher first says a word, and wants the participant to repeat the word back. Then, participants are asked to delete the initial or final syllable of the word. For example, participants are instructed to ''say *fincan* (cup), and now say it again without saying *fin–*'' The expected answer is *–can*. There are two-syllable and three-syllable words in this task. The Cronbach's alpha coefficient was .75 (*N* = 96).

Syllable Blending: In syllable blending task, the participant listens to a syllabized word (e.g., ma-sa) from the tape, and then s/he is expected to blend syllables and form the exact word (masa [*table*]). The Cronbach's alpha coefficient was .78 (*N* = 96).

Phoneme Recognition: In phoneme recognition task, the aim is to test the participant's skill in detecting initial sounds of a spoken word, and then generating another word beginning with the same sound. As an example, the participant is given the word *at* (horse), and then supposed to produce another word starting with the same sound. The response can be *araba* (car). The Cronbach's alpha coefficient was .75 (N = 96).

Phoneme Deletion: Phoneme deletion task is conducted to measure participants' ability to delete the target phonemes (i.e., initial or final) within word. The participant is asked to repeat the word after the researcher, and then again asked to repeat the word but without saying the target phoneme. The participant is, for instance, instructed to ''Say *çok* [*much*] and now say it again without *ç–*. The expected answer is *–ok*. The Cronbach's alpha coefficient was .72 (N = 96).

Phoneme Segmentation: The aim of this 10-item task is to test the ability to segment words into individual sounds. For example, the participant is requested to repeat the word *bak* (look) after the researcher, and then to segment the word into sounds (b-a-k). The Cronbach's alpha coefficient was .71 (N = 96).

Phoneme Blending: In this task, the participant listens to individual sounds from the tape and s/he is supposed to blend these sounds into a whole word (e.g., *b/a/k* becomes bak [*look*]). The Cronbach's alpha coefficient was .72 (N = 96).

Based on the instruction of the subtest, three to five practice sessions were administered before each subtest to ensure that the participants understood what was expected from them. After three consecutive errors by the participant, the subtest was terminated. There were 10 items in each FFTT subtest except for phoneme blending which contained 16 items. Each correct response was scored 1 point, and the total number of correct responses was counted as the score of each subtest.

4.3.2 Rapid automatized naming (HOTI)

Rapid Automatized Naming (RAN) originally developed by Denckla (1972), and Denckla and Rudel (1974, 1976) was employed to assess individuals' speed of naming aloud visual stimuli such as objects, pictures, colors or symbols (letters or digits). HOTI (Hızlı Otomatik İsimlendirme Testi), as Turkish version of the RAN, was developed by Bakır and Babür (2009, 2018). Non-alphanumeric stimuli (i.e., colors and objects) were used for kindergartners as they did not have sufficient knowledge of digits and letters at this level. On the other hand, alphanumeric stimuli (i.e., letters and digits) were used for Grade 1 since they were more frequently preferred with older students who were literate.

RAN-picture: This test consists of five high frequent pictures (i.e., *table, pencil, dog, flower, hand*) that are randomly situated as 5 rows of 10 items each. Participants are asked to name aloud all the 50 items from left to right as rapidly as possible without any mistakes.

RAN-color: In RAN-color test, participants are expected to name aloud five frequent colors (i.e., black, red, yellow, green, blue) in an array of 5 rows of 10 items each as rapidly as possible without any mistake.

RAN-letter: In RAN-letter, participants are expected to name aloud five high frequent letters (i.e., b, k, s, m, t) in an array of 5 rows of 10 items each as rapidly as possible without any mistake.

RAN-digit: In this task, participants are prompted to name aloud five numbers (i.e., 2, 4, 6, 7 and 9) in an array of 5 rows of 10 items each as rapidly as possible without any mistake.

Prior to each test administration, there was a practice session for the participant in order to ascertain familiarity with test items. If the participant failed to name all five items in a RAN test, that test was not administered to him/her. The administrator recorded the amount of the time spent on the task, and the number of corrections and incorrect answers. The score of the participant was the amount of time s/he had spent to accomplish the task.

4.3.3 Turkish test of word reading efficiency (KOBIT)

KOBIT (Kelime Okuma Bilgisi Testi) is conducted to assess word reading ability of elementary school students (Babür et al., 2011). In the current study, Sight-Word Efficiency subtest of KOBİT, a reliable and valid measurement of reading efficiency in Turkish, was administered to evaluate the accuracy and fluency performance of the first graders while reading printed words.

Sight-Word Efficiency: This test included 104 real words that are arranged according to the number of their syllables, difficulties and frequency. It begins with a monosyllabic word, *bir* (one) and ends with a multisyllabic word, *gerçekleştirilmemiş* (unrealized). Before the test administration, a practice session is employed to ascertain participant's familiarity with the task. Participants are provided the list of the words and they are supposed to read aloud as many words as possible within 60 seconds. It is important for participants to follow the sequence of the words in the list. The total score for this test is the number of the words read within 60 seconds. For this test, the Cronbach's alpha coefficient was .82.

4.3.4 Phonological memory (PM) tests

In this study, the forward and backward digit span subtests from the Turkish adaptation of WISC-R by Savaşır and Şahin (1995), and non-word repetition task were administered to determine children's PM abilities.

Forward-backward digits tests: There are 8 rows with two sets of digits in each row (i.e., 16 items in total) in the backward and forward subtests. The first row includes three digits (e.g., 5, 8, 4). The number of digits increases one by one in each following row. In the forward test, the participant is supposed to repeat the series of digits forward after hearing them. For instance, the participant is given a series of digits (e.g., 5, 8, 4), and required to repeat back them in the same order. In the backward test, after hearing the digits, the participant is expected to repeat them in reversed order. After two trials, the test begins. If the participant misses two sets of digits in the same row, the test is finished. The Cronbach's alpha coefficients were is .85 and .80 respectively (N = 96).

Non-word repetition tests: Non-word repetition test measures participants' abilities to repeat non-words that are congruous with the orthographic and phonological features of Turkish. The test includes 18 items, which starts with a one-syllable word, *kun* and ends with a multi-syllable word, *luşkofçanaçmur*. The participant is required to repeat the word after hearing from the tape. After three consecutive errors, the test is stopped. Each item is 1 point and the number of the participant's correct repetitions is the total score. The Cronbach's alpha coefficient was .79 (N = 96).

4.3.5 Listening comprehension

The Turkish version of Woodcock-Johnson III Listening Comprehension Test: The aim of this test (English version, Woodcock, McGrew, & Mather, 2001) adapted by Erçetin et al. (2014) is to assess participants' listening comprehension (LC) skills. In this test, the participant listens to a sentence in which the last word is missing from the tape, and s/he is expected to complete the speaker's sentence with the missing word. The participants should understand each sentence and complete it with a word. Some items have more alternative responses than one word. There are enough pauses between the items. Prior to test administration, there are four practice sessions, two of which are presented orally by the experimenter while the others are presented from the tape. This task has 38 items in total and the total score is calculated from the number of correct responses to the items. The Cronbach's alpha coefficient was .78 (N = 96).

Text Listening: The aim of this test is to measure participants' LC skills at text level. One narrative and one expository reading comprehension tests and their questions have been adapted as LC test by the researcher. In this task, participant listens to a text from the tape. Then, the written form of the questions is presented to the participant. There are 4 questions for each test, and the total score is the number of correct answers to the items. The Cronbach's alpha coefficient was .67 (N = 96).

4.3.6 Vocabulary

The Turkish version of Woodcock Johnson Picture Vocabulary Test and the vocabulary subtest of WISC-R Turkish were administered in this study.

The Turkish version of Woodcock Johnson Picture Vocabulary: In this version adapted by Ercetin et al. (2014) the vocabulary skills of participants are measured via

visuals of objects presented on a card. The participant is required to name each object respectively. This test consists of 44 items ordered from familiar to less familiar objects. The visual of each object is shown to the participant, and asked, ‘‘*What's this?*’’. Prior to test administration, one trial is conducted. When the participant fails to name six test items consecutively, the test is stopped. The Cronbach's alpha coefficient was .77 (N = 96).

The Vocabulary Subtest of WISC-R Turkish: Participant's expressive vocabulary skills are assessed with the Vocabulary Subtest of WISC-R Turkish developed by Savaşır and Şahin (1995). In this test, participants are expected to verbally define words uttered by the researcher [‘‘*kalem ne demek*?’’ (what does pencil mean?)]. The answers are evaluated according to a standardized answer key in which the score for each word varied from 0 to 2 in line with the quality of the definition. The participant's answers are recorded. There are 34 words in this test and the highest score is 68. When the participant fails to define five consecutive test items, the test is terminated. The Cronbach's alpha coefficient was .80 (N = 96).

4.3.7 Reading comprehension

Two reading comprehension tests were administered at the end of Grade 1: The Turkish version of Woodcock Johnson Reading Comprehension developed by Ercetin et al. (2014), and a text comprehension test adapted by the researcher.

The Turkish Version of Woodcock Johnson Reading Comprehension: The participants are expected to read some sentences in which the length and difficulty increase in the following items. After reading each text silently, the participant is supposed to answer the following comprehension question. Each item is 1 point, and the highest score a participant can get is 35. There is no time limitation for this test.

The Cronbach's alpha coefficient was .76 (N = 96).

Reading Comprehension Texts: This task includes three narratives and two expository tests each of which is followed by five comprehension questions. Participants are required to read the texts and answer the following open-ended questions. Each question is 1 point and the highest score is 25. The Cronbach's alpha coefficient was .69 (N = 96) for this test.

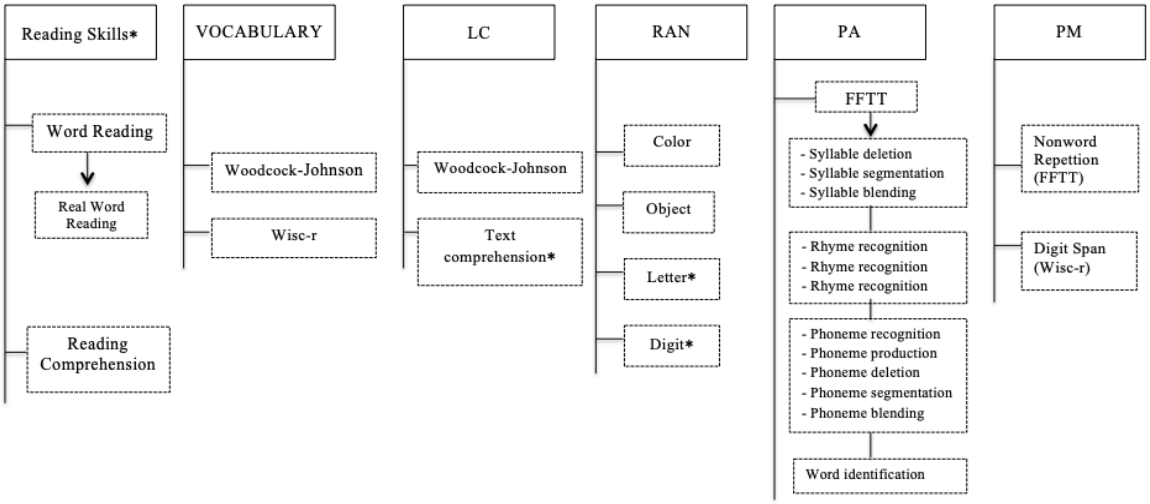

Figure 1 Measures of the study
Note: *Tests were conducted in Grade 1 while the other tests were used in Kindergarten and Grade 1.

4.4 Procedure

The researcher applied for the official permission from the district directorate of national education in 2017, informing them about the longitudinal design of the study (see Appendix A). After getting the permission, the researcher visited the list of the schools available, and met the school administrations and teachers to inform them about the study. Depending on their availability and socio-economic situations (SES), four state kindergartens were chosen. The researcher requested the teachers to inform the students' parents about the study and to arrange a meeting with them in order to inform them about the design of the study. In the meeting, the researcher

gave the consents forms to the parents who accepted their children's participation in the study (see Appendix C).

Table 10. Timetable of Data Collection

Time 1	**Time 2**	**Time 3**
Kindergarten November 2017	Kindergarten May 2018	Grade 1 May 2019

The first data collection was conducted at the beginning of the kindergarten in 2017 November, followed by Time 2 data collection at the end of the kindergarten in 2018 May. Time 3 data collection was carried out at the end of Grade 1 in 2019 May. Since all tasks should be run individually, each participant was tested in a quiet room/library in his/her schools by the researcher. As given in Figure 1, all participants were administered a battery of tests at the beginning (i.e., Time 1) and at the end of the kindergarten (i.e., Time 2), and they were also tested at the end of first grade (i.e., Time 3). Each data time had two testing sessions. As the number of tests and participants' ages differed from Time 1 to Time 3, the duration of each session varied from 30 minutes to 45 minutes. Before the data collection, the teachers introduced the researcher to their class for familiarity, and thus making the students comfortable with the researcher. Then, each participant was taken from the classroom to the quiet room. In the very first meeting with the participant, the researcher made an informal introduction in order to create a friendly environment for the participant. The researcher followed the same instruction for all the participants so as to keep the test same for all. The same order of testing was followed for each participant.

4.5 Research questions and hypotheses

This study attempts to find answers for the following research questions:

1. Which of the cognitive and linguistic components (i.e., PA, RAN, PM, vocabulary knowledge) are the best predictors of word reading in Turkish in Grade 1?
2. Which of the cognitive and linguistic components (i.e., PA, RAN, PM, vocabulary knowledge, LC) are the best predictors of reading comprehension in Turkish in Grade 1?
3. Do the development of cognitive skills and linguistic components in Turkish differ between Turkish monolinguals and Kurdish-Turkish bilinguals across grade levels (i.e., beginning of kindergarten, end of kindergarten, Grade 1)?
4. Do word reading performance and reading comprehension performance differ between Turkish monolinguals and Kurdish-Turkish bilinguals in Grade 1?

Based on the research questions above, the following hypotheses are assumed:

1. It is predicted that both kindergarten PA and RAN will be strongly associated with the participants' word reading performance in Grade 1 (Babayiğit & Stainthorp, 2007; Öney & Durgunoğlu, 1997). On the other hand, it is predicted that RAN rather than PA will be a more reliable predictor of word reading, especially fluency (de Jong & van der Leij, 2002; Babayiğit & Stainthorp, 2011). Regarding vocabulary, there will a weaker relationship between vocabulary and word reading compared to those of PA and RAN, and this will in turn affect its predictive power in word reading (e.g., Ricketts et al., 2007).
2. In line with the previous research, it is predicted that LC will be a significant contributor to reading comprehension in Grade 1 (Verhoeven & van Leeuwe,

2008; Babayiğit & Stainthorp, 2011). LC is expected to be the most significant predictor of later reading comprehension, which is in line with the predictions of the simple view of reading (SVR). Another component of the SVR, word reading will also predict reading comprehension. Similarly, vocabulary knowledge will independently contribute to later reading comprehension beyond LC and word reading (Braze et al., 2007; Oullette & Beers, 2010).

3. It is expected that all the cognitive and linguistic variables will show a developmental pattern from Times 1 to 3 in both monolinguals and bilinguals. As to PA performance, bilinguals will outperform monolinguals, especially at Times 1 and 2 (Adesope, Lavin, Thompson, & Ungerleider, 2010; Bialystok, 2001; Durgunoğlu, 2002) because of developed metalinguistic awareness skill in bilinguals. With formal instruction, however, it is expected that monolinguals will keep up with bilinguals because of early mastering in PA skills (Dufva et al., 2001). There will be no performance difference between the groups in RAN and PM tests. On the other hand, monolinguals will perform better than bilinguals in LC and vocabulary tests (Proctor et al., 2005; Verhoeven et al., 2011.
4. Considering the last research question, it is hypothesized that the bilingual group will perform similar to the monolingual group in word reading (Crosson & Lesaux, 2010; Geva & Farnia, 2012). However, bilinguals will lag behind monolinguals in reading comprehension due to limited vocabulary capacity and underdeveloped LC skills (Bonifacci et al., 2020; Janssen et al., 2013).

4.6 Statistical analysis

SPSS (Statistical Package for Social Sciences) for Windows 25.0 was utilized to analyze the role of PA, RAN, PM, LC and vocabulary in the development of reading ability. Prior to conducting any statistical analysis, data set was checked for some preliminary assumptions.

The assumption of normality revealed that PA, PM, LC and vocabulary were normally distributed while RAN tests were negatively skewed. However, skewness and kurtosis values were within acceptable limits, i.e., -2 and +2 (Bachman, 2004). In addition, the correlations between the variables were ranging from moderate to strong, still there was no violation of collinearity assumption (i.e., Tolerance and VIF). In order to conduct multiple analyses, other assumptions, namely univariate and multivariate outliers, linearity, homoscedasticity, and homogeneity of variance-covariance matrices were checked for any violation (Huck, 2012; Tabachnick & Fidell, 2007). They were all within acceptable limits.

Separate Pearson-product moment correlations were carried out in monolinguals and bilinguals to identify the relationship among the reading components. In the following step, a 2x3 mixed ANOVAs was administered for each variable, the group (i.e., monolingual and bilingual) as between-group, and time (e.g., kindergarten 1 PA, kindergarten 2 PA, Grade 1 PA) as within-group variables. In that, the developmental pattern of each skill could be identified, and the performance difference, if any, between monolinguals and bilingual could be seen.

Next, in order to see the role of cognitive and linguistic variables in word reading and reading comprehension, separate hierarchical regression analyses were carried out for each data collection time instruments as independent variables, and word reading or reading comprehension as dependent variable. Stated differently,

depending on their relationship with the dependent variable and theory, the predictor variables (e.g., Time 1 LC, vocabulary, PA, RAN and PM) were entered into the regression as independent variables, and reading comprehension or word reading as dependent variables. Further, simultaneous regression analysis was carried out with the variables still contributing to the dependent variable even in the last model (step) of the hierarchical regression. Thus, the role of these variables was identified.

In order to compare the performances of monolinguals and bilinguals in word reading and reading comprehension, a one-way MANOVA was conducted in which group (i.e., monolingual and bilingual) was treated as independent variable, and word reading and reading comprehension as dependent variables.

To sum, the chapter has presented information regarding the methodology of the current study and the statistical analyses conducted to examine data. The next chapter will provide the results of the study in light of the research questions and hypotheses.

CHAPTER 5

RESULTS

This chapter reports the findings of the data analyses with respect to the research questions and hypotheses.

5.1 Descriptive statistics

Descriptive statistics of monolinguals' and bilinguals' performances in three times (kindergarten 1, kindergarten 2 and Grade 1) are separately presented below to have a general idea about the performance of monolinguals and bilinguals in the tasks.

Table 11. Descriptive Statistics at Time 1, Time 2 and Time 3

		Monolingual (*N* = 46)				Bilingual (*N* = 50)				
	Variables	*M*	*SD*	*Min*	*Max*	*M*	*SD*	*Min*	*Max*	Max Possible Score
Time 1	PA_T1	31.41	8.86	16	53	33.94	9.34	12	58	100
	RAN_T1	138.57	23.05	90	195	145.10	25.43	96	203	-
	PM_T1	5.17	1.40	3	8	4.98	1.23	3	9	32
	VOCAB_T1	25.93	4.80	16	36	21.00	6.00	7	33	66
	LC_T1	5.24	2.05	2	10	4.04	1.85	1	8	38
Time 2	PA_T2	40.35	13.33	18	78	41.18	11.83	17	66	100
	RAN_T2	126.58	23.47	82	179	134.03	23.64	87	192	-
	PM_T2	6.00	1.70	3	10	6.02	1.47	4	10	32
	VOCAB_T2	29.50	4.97	20	38	24.64	6.85	9	37	66
	LC_T2	6.35	2.49	2	11	5.10	2.45	1	10	38
Time 3	PA_T3	58.41	14.82	28	84	62.44	14.05	35	88	100
	RAN_ T3	64.52	10.76	39	85	67.94	11.37	47	96	-
	PM_ T3	7.65	1.66	4	12	7.28	1.31	4	10	32
	VOC_ T3	41.46	6.07	28	54	35.66	7.59	18	53	66
	LC_ T3	9.50	2.82	3	15	7.58	2.28	2	13	46
	Wread_ T3	37.78	7.93	21	52	34.57	7.94	19	51	104
	RC_ T3	22.74	5.55	13	34	18.87	6.37	3	31	51

Note: T = Time, PA = Phonological Awareness (composite of ten subtests), RAN = Rapid Automatized Naming (composite of objects and colors), PM = Phonological Memory, VOCAB = Vocabulary, LC = Listening Comprehension, Wread = Word Reading, RC = Reading Comprehension.

Both at Time 1 and Time 2, monolinguals outperformed bilinguals in vocabulary and LC tasks. Similarly, monolinguals appeared to be faster than bilinguals in terms of

RAN performance. On the other hand, bilinguals were better than monolinguals in relation to PA tasks. Both groups performed similarly concerning their PM performance.

Regarding Time 3, as in previous times, monolinguals lagged behind bilinguals in PA tasks. However, the performances of monolinguals were higher in vocabulary and LC tasks than those of the bilinguals. Concerning RAN performance, bilinguals were still slower in naming the stimulus. On the other hand, both groups performed similar in PM tasks. In addition to kindergarten tasks, word reading and reading comprehension tasks were administered in Grade 1. Monolinguals outperformed bilinguals in word reading tasks. Likewise, monolinguals did better than bilinguals in reading comprehension tasks.

In order to explore the relationship between the cognitive and linguistic variables (i.e., PA, RAN, PM, LC, and vocabulary), and word reading and reading comprehension, separate Pearson product-moment correlations for monolinguals and bilinguals were obtained (see Tables 12, 13, and 14).

Table 12. Intercorrelations among Time 1 Measures and Time 3 Wread and RC

Variables	1	2	3	4	5	6	7
1. PA_T1	--	-.448**	.513**	.583**	.560**	.317*	.596**
2. RAN_T1	-.336*	--	-.457**	-.412**	-.402**	-.322*	-.286*
3. PM_T1	.389**	-.171	--	.495**	.499**	.260	.440**
4. VOCAB_T1	.452**	.389**	.395**	--	.754**	.025	.569
5. LC_T1	.402**	.452**	.355**	.642**	--	-.020	.304*
6. Wread_ T3	.552**	.450*	.370**	.448**	.425**	--	.496**
7. RC_T3	.541**	-.176	.503**	.670**	.661**	.620**	--

Note: Monolingual results are below diagonal; Bilingual results are above the diagonal.
T = Time, PA = Phonological Awareness (composite of ten subtests), RAN = Rapid Automatized Naming (composite of objects and colors), PM = Phonological Memory, VOCAB = Vocabulary, LC = Listening Comprehension, Wread = Word Reading, RC = Reading Comprehension.
*p < .05, ** p < .01

Intercorrelations of cognitive and linguistic components at Time 1 with word reading and reading comprehension at Time 3 for monolinguals and bilinguals are given in Table 9. As to monolinguals, reading comprehension correlated with all variables

except for RAN. The highest correlations were between vocabulary and reading comprehension, (r =.670, p < .01), and between LC and reading comprehension (r = .661, p < .01), respectively. On the other hand, word reading had significant correlations with all measures. PA had the highest correlation with word reading (r = .552, p < .01), which was followed by RAN (r = .450, p < .01), VOCAB (r = .448, p < .01), LC (r = .425, p < .01) and PM (r = .370, p < .01).

With respect to bilinguals, when the relationship between Time 1 tasks (kindergarten 1) and Grade 1 reading comprehension was examined, it showed that compared to monolinguals, the intercorrelations between the cognitive and linguistic components and reading were moderate although most of these components had moderate to high correlations with each other. To begin with reading comprehension, there were significant correlations between these components and reading comprehension and of all, PA had the highest correlation with reading comprehension, (r = .59, p < .01), which was followed by VOCAB (r = .56, p < .01) and PM (r = .44, p < .01). Unlike monolinguals, PM had higher association with reading comprehension in bilinguals. As for word reading, it had a significant correlation with PA and RAN, (r = .31, p < .01; r = .32, p < .01, respectively).

Table 13. Intercorrelations among Time 2 Measures and Time 3 Wread and RC

Variables	1	2	3	4	5	6	7
1. PA_T2	--	-.398**	.453**	.556**	.573**	.412**	.467**
2. RAN_T2	-.364**	--	-.413**	-.478**	-.345**	-.432**	-.368*
3. PM_T2	.367**	-.125	--	.514**	.535**	.215	.487**
4. VOCAB_T2	.534**	-.376**	.456**	--	.703**	.237	.486**
5. LC_T2	.427**	-.203	.407**	.607**	--	-.068	.32*
6. Wread_T3	.658**	-.466**	.285	.445**	.445**	--	.496**
7. RC_T3	.644**	-.303*	.527**	.686**	.738**	.620**	--

Note: Monolingual results are below diagonal; Bilingual results are above the diagonal.
T = Time, PA = Phonological Awareness (composite of ten subtests), RAN = Rapid Automatized Naming (composite of objects and colors), PM = Phonological Memory, VOCAB = Vocabulary, LC = Listening Comprehension, Wread = Word Reading, RC = Reading Comprehension.
*p < .05, ** p < .01

Intercorrelations between Time 2 measures (i.e., PA, RAN, PM, VOCAB, LC), and word reading and reading comprehension in monolinguals and bilinguals were given separately in Table 10. The intercorrelations results for monolinguals showed that reading comprehension had the highest correlation with LC (r = .73, p < .05), which was followed by VOCAB (r = .68, p < .05). PA was also strongly correlated with reading comprehension (r = .64, p < .05). Similarly, PM was significantly correlated with reading comprehension (r = .52, p < .05), and lastly, RAN was correlated with reading comprehension (r = .30, p < .05). Again, the highest correlations were between VOCAB and reading comprehension, and LC and reading comprehension. On the other hand, PA was the highest correlated variable with word reading.

For bilinguals, VOCAB appeared to have the highest correlation with reading comprehension (r = .48, p < .01), followed by PA (r = .46, p < .01). On the other hand, RAN and PA were the only reading variables which significantly correlated with word reading, (r = .43, p < .01; r =.41, p < .01, respectively).

Table 14. Intercorrelations among Time 3 Measures and Time 3 Wread and RC

Variables	1	2	3	4	5	6	7
1. PA_T3	--	-.452**	.471**	.510**	.362**	563**	502**
2. RAN_ T3	-.424**	--	-.395**	-.272	-.328*	-.693**	-.418**
3. PM_ T3	.556**	-.116	--	.546**	.380**	.255	.482**
4. VOCAB_ T3	.504**	-.453**	.356**	--	.573**	.194	.518**
5. LC_ T3	.537**	-.387**	.343**	.708**	--	.123	.467**
6. Wread_ T3	.565**	-.562**	.295	.465**	.493**	--	.496**
7. RC_ T3	.617**	-.447**	.497**	.744**	.716**	.620**	--

Note: Monolingual results are below diagonal; Bilingual results are above the diagonal.
T = Time, PA = Phonological Awareness (composite of ten subtests), RAN = Rapid Automatized Naming (composite of objects and colors), PM = Phonological Memory, VOCAB = Vocabulary, LC = Listening Comprehension, Wread = Word Reading, RC = Reading Comprehension.
*p < .05, ** p < .01

Table 11 displayed the intercorrelations between Grade 1 cognitive and linguistic variables, and word reading and reading comprehension in monolinguals and bilinguals. Considering monolinguals, except for the relationship between RAN and PM, (r = .03, p > 05), there were significantly correlations between other variables.

As for the reading comprehension, the highest correlations were with VOCAB (r = .74, p < 01), and LC (r = .71, p < .05), respectively. In addition, word reading had the highest correlation with

PA (r = .56, p < 01) and RAN (r = .56, p < 01).

As for intercorrelations between Time 3 variables (grade 1) and reading comprehension in bilinguals, the strongest relationship was between VOCAB and reading comprehension, (r = .51, p < .01), which was followed by PA (r = .50, p < .01). However, the highest correlation was found to be between RAN and word reading, (r = .69, p < .01). Likewise, PA was the second highest variables correlated with word reading, (r = .56, p < .01).

Taken together, there were moderate to strong relationships between reading components (i.e., word reading and reading comprehension), and reading related cognitive and linguistic components (i.e., PA, RAN, PM, VOCAB and LC) at all times. The following part will document the development of these skills in monolinguals and bilinguals across times as well as performance differences between these groups.

5.2 Inferential statistics

The results of regression analyses, ANOVAs, and one-way MANOVA were presented in light of the research questions.

5.2.1 The cognitive and linguistic predictors of Turkish word reading

One of the goals of this study is to explore the concurrent and longitudinal predictive power of cognitive and linguistic components, (i.e., PA, RAN, PM, LC, and vocabulary) in word reading measured in the first grade. To this end, a number of

regression analyses were administered across grades. In these regression analyses, based on the literature and research hypothesis, socio-economic status (SES) was entered as control variable. Otherwise, it would be a confounding variable. Similarly, considering its relationship with other variables (e.g., PA) and previous studies, PM was treated as a control variable in order to minimize its shared effects with other variables in the later steps. In a similar vein, categorical group variable (i.e., monolingual vs. bilingual) was treated as a control variable. In order to determine any interaction between group and other variables, group by variable (e.g., group X vocabulary) was entered into the regression model in the last step as a moderator variable. In that, it was aimed to identify whether the relationship between reading comprehension and other skills differed depending on the group variable. To this end, in the last step of hierarchical regression, the interaction between group and other variables were entered into the model.

Before conducting any hierarchical regression analysis, the relevant regression assumptions were checked. The correlational analysis revealed significant intercorrelations between some of the independent variables such as vocabulary and LC. Yet, the assumption of no multicollinearity was met (i.e., Tolerance and VIF). Similarly, the assumptions of homogeneity and linearity were satisfied by residuals and scatter plots. As for the assumption of independent errors, the Durbin-Watson value was within accepted limits.

Keeping all this in mind, several hierarchical regression analyses were run to see the unique role of cognitive and linguistic variables measured at different times in Grade 1 word reading.

5.2.1.1 The predictor power of Time 1 reading skills in word reading at Time 3

A hierarchical regression analysis was conducted to see contributions of Time 1 reading skills (kindergarten 1 PA, RAN, LC, VOC and PM) to Grade 1 word reading.

Table 15. Longitudinal Predictors (TIME 1) of Word Reading (N = 96)

Step 1			.454	.223	.22	10.29***
SES	.163	1.638				
GROUP	-4.169	-2.171*				
PM _T1	1.095	3.195**				
Step 2			.523	.278	.06	7.34**
SES	.120	1.234				
GROUP	-.181	-2.189				
PM_T1	.277	3.410*				
RAN_T1	-.246	-2.720**				
Step 3			.578	.341	.05	5.44*
SES	.072	.830				
GROUP	-.226	1.972*				
PM_T1	.182	-2.691				
RAN_T1	-.204	-2.209*				
PA_T1	.228	2.356*				
Step 4			.645	.391	.04	2.21
SES	.043	.488				
GROUP	.465	1.515				
PM_T1	-4.557	-.459				
RAN_T1	-.103	-1.598*				
PA_T1	.282	2.721*				
Group x RAN_T1	.002	.027				
Group x PA_T1	.314	.324				

Note. T = Time, SES = Socio-Economic Situation, PM = Phonological Memory, RAN = Rapid Automatized Naming, PA = Phonological Awareness, B = Standardized Beta, ΔR2 = R Squared Change, *p < .05, **p < .01, ***p < .001.

Table 22 summarized the four-step regression model for word reading. Again, SES, PM and group were treated as control variables with regard to literature. When entered in step 2, RAN uniquely explained 6% of variance in word reading. Similarly, PA added 5% of variance to the model in the next step. However, neither of the interactions in the last step signifantly contributed to the regression model. This model accounted for 64% of a total variance in word reading in total.

5.2.1.2 The predictor power of Time 2 reading skills in word reading at Time 3

A hierarchical regression was conducted to explore the predictive role of Time 2 (kindergarten 2) reading related skills in Time 3 (Grade 1) word reading. The same entry was followed for Time 2 variables: SES, PM and Group as control variables in step 1, followed by RAN and PA respectively in the latter steps. In the last step, the interactions between group and other variables were entered into the model.

Table 16. Longitudinal Predictors (TIME 2) of Word Reading (N = 96)

Indepenendent Variable	*B*	*t*	*R*	*R2*	*ΔR2*	*F*
Step 1			.446	.199	.19	9.49***
SES	.180	1.791				
GROUP	-.214	-2.298*				
PM_T2	.272	2.876**				
Step 2			.488	.268	.07	6.72*
SES	.137	1.382				
GROUP	-.187	-1.986*				
PM_T2	.242	2.482*				
RAN_T2	-.252	-2.593**				
Step 3			.639	.353	.07	9.39**
SES	.072	.773				
GROUP	-.215	-2.354*				
PM_T2	.120	1.163				
RAN_T2	-.196	-2.106*				
PA_T2	.299	2.811**				
Step 4			.651	.393	.04	2.10
SES	.035	.363				
GROUP	-.205	-2.121				
PM_T2	.120	1.160				
RAN_T2	-.244	-2.550*				
PA_T2	.278	2.872*				
Group x RAN_T2	-.003	-.047				
Group x PA_T2	-.060	-.061				

Note. T = Time, SES = Socio-Economic Situation, PM = Phonological Memory, RAN = Rapid Automatized Naming, PA = Phonological Awareness, B = Standardized Beta, ΔR2 = R Squared Change, *p < .05, **p < .01, ***p < .001.

Table 23 summarized the regression model for word reading. The model explained a total of 65% change in word reading. Following the control variables in Step 1, RAN was entered in the model in Step 2. RAN added 7% of independent variance in word reading. Likewise, when added to model in step 3, PA significantly contributed to

word reading with 7% change. In the last step, however, neither of the interactions did significantly added to the model predicting Grade 1 word reading.

5.2.1.3 The predictor power of Time 3 reading skills in word reading at Time 3

Lastly, a hierarchical regression was administered to test the predictive role of Grade 1 reading related skills (i.e., PA, RAN, LC, VOC and PM) in Grade 1 word reading. SEM, PM and group were treated as the control variables in the first step. These were followed by RAN, followed by PA in the second step. In the last step, the interactions between group and other variables were entered into the model.

Table 17. Concurrent Predictors (TIME 3) of Word Reading (N = 96)

Indepenendent Variable	*B*	*t*	*R*	*R2*	*ΔR2*	*F*
Step 1			.449	.201	.20	8.59***
SES	.183	1.834				
GROUP	-1.96	-2.056*				
PM_T3	.277	2.811**				
Step 2			.715	.519	.31	56.33***
SES	.159	2.024*				
GROUP	-.117	-1.546				
PM_T3	.164	2.083*				
RAN_ T3	-.577	-7.544***				
Step 3			.763	.602	.08	17.69***
SES	.086	1.187				
GROUP	-.187	-1.346				
PM_ T3	.010	.121				
RAN_ T3	-.499	-6.714***				
PA_ T3	.364	3.986***				
Step 4			.785	.643	.04	2.42
SES	.066	.813				
GROUP	-.191	-1.789				
PM_ T3	.047	.194				
RAN_ T3	-.310	-2.968**				
PA_ T3	.317	3.233**				
Group x RAN_ T3	-.118	-.963				
Group x PA_ T3	.901	1.141				

Note. T = Time, SES = Socio-Economic Situation, PM = Phonological Memory, RAN = Rapid Automatized Naming, PA = Phonological Awareness, B = Standardized Beta, ΔR2 = R Squared Change, *p < .05, **p < .01, ***p < .001.

The four-step regression model accounted for nearly 79% of total variance in word reading. After entering SEM, PM and group as control variables in Step 1, RAN appeared to explain 31% of variance in word reading in Step 2. In Step 3, another important word reading predictor, PA explained 8% of unique variance in word reading. However, the interactions between group and other variables failed to contribute to word reading.

Having reported the predictive power of the cognitive and linguistic components in word reading, we will give the results of regression analyses indicating the role of these components in another dependent variable, reading comprehension.

5.2.2 The cognitive and linguistic predictors of Turkish reading comprehension

One of the main aims of this study was to investigate the role of cognitive and linguistic components (i.e., PA, RAN, PM, VOCAB and LC) tested at the beginning and end of kindergarten, and in Grade 1 in reading comprehension measured in Grade 1. To this end, a number of regression analyses were administered across grades. Prior to conducting any analysis, the regression assumptions (i.e., normality, linearity, homoscedasticity and collinearity) were checked. Since they were all within accepted limits (Field, 2009), several hierarchical regression analyses were generated.

5.2.2.1 The predictor power of Time 1 skills in reading comprehension at Time 3

A five-step hierarchical regression was administered with Time 3 (Grade 1) reading comprehension as dependent variable and Time 1 (kindergarten PM, PA, VOC, LC) as independent variables in Table 19. The entry of the variables into the model was

ordered in line with the theories, correlations between the variables and the previous studies. As stated above, SES, PM and group variables were entered into the regression in Step 1 as control variables.

Table 18. Longitudinal Predictors (TIME 1) of Reading Comprehension (N = 96)

Indepenendent Variable	*B*	*t*	*R*	*R2*	*ΔR2*	*F*
Step 1			.525	.276	.27	14.15***
SES	.278	2,895**				
GROUP	-.222	-2,407**				
PM_T1	.281	2,959**				
Step 2			.633	.401	.13	18.21***
SES	.153	1.653				
GROUP	-.121	-1.390				
PM_ T1	.171	1.894				
LC_T1	.420	4.275***				
Step 3			.715	.511	.11	19.32***
SES	.139	1.652				
GROUP	.006	.066				
PM_T1	.107	1.282				
LC_T1	.101	.879				
VOCAB_T1	.525	4.396***				
Step 4			.749	.560	.05	9.51**
SES	.093	1.136				
GROUP	-.102	-1.158				
PM_T1	.014	.165				
LC_T1	.058	.527				
VOCAB_T1	.427	3.604**				
PA_T1	.303	3.084**				
Step 5			.775	.601	.04	2.80*
SES	.101	1.273				
GROUP	-.117	-1.370				
PM_T1	.012	.144				
LC_T1	-.061	-.526				
VOCAB_T1	.477	4.031***				
PA_T1	.333	3.431**				
groupxVOCAB_T1	.086	.799				
groupxLC_T1	-.291	-2.712**				
groupxPA_T1	.116	1.342				

Note. T = Time, SES = Socio-Economic Situation, PM = Phonological Memory, LC = Listening Comprehension, VOCAB = Vocabulary, PA = Phonological Awareness, B = Standardized Beta, ΔR2 = R Squared Change, *p < .05, **p < .01, ***p < .001.

Table 19 displayed that this five-step model explained about 78% of a total variance in reading comprehension performance. When SES, PM and group were entered in the first step as control variables, they explained 27% of variance in reading

comprehension. After controlling for effect of SES, PM and group as control variables, the result of step two revealed that LC explained 13% of unique variance in reading comprehension. In the following step, VOCAB added extra 11% of variance into the model. Next, PA was entered into the model, and it accounted for 5% of independent variance in the model. As to the last model, the interaction between group and other variables (group by LC, group by VOCAB, group by PA) accounted for a total of 4% variance in the model. Of these interactions, however, group by LC interaction had a significant predictive power in reading comprehension (β = -.29; p < .01).

In the last model of the regression analysis, Time 1 VOCAB, PA and group by LC were the significant predictors of Time 3 reading comprehension. A simultaneous regression analysis was run to explore the independent impacts of these variables on reading comprehension. Again, the results revealed significant roles VOCAB (β = .56; p < .01), PA (β = .29; p < .01) and group by LC (β = -.18; p < .01) in reading comprehension.

5.2.2.2 The predictor power of Time 2 skills in reading comprehension at Time 3

Similarly, a five-step hierarchical regression was generated to test if Time 2 tasks measured at the end of kindergarten (PA, PM, VOC, LC) predicted Grade 1 reading comprehension. As in Time 1, SES, PM and group variables were treated as control variables in Time 2.

Table 19. Longitudinal Predictors (TIME 2) of Reading Comprehension (N = 96)

Indepenendent Variable	*B*	*t*	*R*	*R2*	*ΔR2*	*F*
Step 1			.536	.287	.28	11.80***
SES	.275	2.893**				
GROUP	-.233	-2.543*				
PM_T2	.301	3.211**				
Step 2			.664	.441	.15	23.96***
SES	.111	1.220				
GROUP	-.140	-1.675				
PM_T2	.160	1.806				
LC k2	.477	4.895***				
Step 3			.732	.536	.10	17.60**
SES	.088	1.048				
GROUP	-.031	-.382				
PM_T2	.107	1.303				
LC_T2	.229	2.138*				
VOCAB_T2	.450	4.196***				
Step 4			.761	.580	.04	8.83**
SES	.056	.696				
GROUP	-.085	-1.072				
PM_T2	.022	.263				
LC_T2	.167	1.600				
VOCAB_T2	.376	3.556**				
PA_T2	.280	2.973**				
Step 5			.781	.604	.02	1.68
SES	.042	.520				
GROUP	-.090	-1.120				
PM_T2	.013	.160				
LC_T2	.126	1.194				
VOCAB_T2	.403	3.666***				
PA_T2	.299	3.165**				
modVOC_T2	.074	.728				
modLC_T2	-.215	-2.180*				
modPA_T2	.050	.565				

Note. T = Time, SES = Socio-Economic Situation, PM = Phonological Memory, LC = Listening Comprehension, VOCAB = Vocabulary, PA = Phonological Awareness, B = Standardized Beta, ΔR2 = R Squared Change *p < .05, **p < .01, ***p < .001.

Prior to running any analysis, the data were checked for the assumptions of normality, multicollinearity, homogeneity and linearity. As control variables, SES, PM and group accounted for 28% of total variance in the first step. LC was entered in the second step, which added 15% of more variance in reading comprehension. Similarly, VOC accounted for 10% significant variance in the third step. Next, PA accounted for 4% of significant variance in reading comprehension. In the last step,

the interaction between group and other variables (group by LC, group by VOC, group by PA) accounted for a total of 2% of variance in the model, but only group by LC interaction had significant predictive power in reading comprehension (β = -.21; $p < .05$). In the last model of regression, VOCAB, PA and group by LC appeared to significantly contribute to reading comprehension. The further simultaneous regression analysis also proved the contributions of VOCAB (β = .56; $p < .01$), PA (β = .30; $p < .01$) and group by LC (β = -.18; $p < .01$) in reading comprehension.

5.2.2.3 The predictor power of Time 3 skills in reading comprehension at Time 3

A hierarchical regression analysis was conducted with Grade 1 the cognitive and linguistics components as independent variables, and reading comprehension as dependent variables. At Time 3, in addition to the cognitive and linguistic components (i.e., LC, VOCAB, PM, PA, RAN), Grade 1 word reading was added to the regression model as a possible contributor to reading comprehension. Before running any statistical analysis, assumptions of regression were checked, and they were all within acceptable limits.

Table 20. Concurrent Predictors (Time 3) of Reading Comprehension (N = 96)

Indepenendent Variable	*B*	*t*	*R*	*R2*	*ΔR2*	*F*
Step 1			.542	.291	.29	12.58***
SES	.265	2.827**				
GROUP	-.244	-2.722**				
PM_T3	.286	3.090**				
Step 2			.663	.444	.14	22.62***
SES	.188	2.190*				
GROUP	-.161	-1.958				
PM_ T3	.169	1.952				
Wread_ T3	.422	4.759***				
Step 3			.751	.558	.13	26.56***
SES	.067	.829				
GROUP	-.055	-.715				
PM_ T3	.068	.848				
Wread_ T3	.390	4.917***				
LC_T3	.422	4.912***				
Step 4			.779	.607	.06	10.29*
SES	.047	.612				
GROUP	-.003	-.036				
PM_ T3	.011	.137				
Wread_ T3	.365	4.799***				
LC_T3	.270	2.828**				
VOCAB_ T3	.307	3.101**				
Step 5			.781	.609	.00	.74
SES	.041	.529				
GROUP	-.036	-.427				
PM_ T3	-.015	-.181				
Wread_ T3	.333	3.922***				
LC_T3	.257	2.652**				
VOCAB_ T3	.292	2.909**				
PA_T3	.087	.865				

Note. T = Time, SES = Socio-Economic Situation, PM = Phonological Memory, LC = Listening Comprehension, VOCAB = Vocabulary, PA = Phonological Awareness, WREAD = Word Reading, B = Standardized Beta, ΔR2 = R Squared Change
*p < .05, **p < .01, ***p < .001.

Regarding Time 3, the five-step regression model accounted for 78% of total variance in Grade 1 reading comprehension performance. Again, as control variables, SES, PM and group accounted for 29% of variance in the model. As a significant component of the SVR, word reading was entered in the second step of the model (Catts, et al., 2015). When added to the model in step 2, word reading uniquely explained 14% of unique variance in reading compehension. Furthermore, in Step 3, LC added 13% of variance to the model, and VOC in Step 4 significantly

contributed to reading comprehension with 6% independent variance. However, PA could not lead to any significant change in reading comprehension in step 5 (β = .08; p > .05). When the role of interactions between group and other variables (i.e., group by WREAD, group by VOCAB, group by LC, and group by PA) in reading comprehension was checked in the model, it was clear that there was no significant role of any of these interactions in reading comprehension. To put it differently, the predictive power of reading skills stayed similar for both monolinguals and bilinguals.

Having reported the role of the cognitive and linguistic components in reading, it is important to identify the developments of these components across grades. The following parts will document the development of these skills from kindergarten to Grade 1.

5.2.3 The development of the cognitive and linguistic components among monolinguals and bilinguals

One of the goals of this study was to investigate the development of PA, RAN, PM, LC and vocabulary in monolinguals and bilinguals as well as any performance differences between these groups across grades. With this in mind, separate 2x3 mixed ANOVAs were carried for each variable.

In this analysis, the repeating tasks were treated as within group variables (e.g., PA_T1, PA_T2, PA_T3), and group (i.e., monolingual vs bilingual) was defined as between group variable. Prior to conducting any inferential statistical analysis, preliminary statistical analyses were conducted to check for ANOVA assumptions (i.e., normality, homogeneity and shpericity). There was not any

violation noted. Since there were multiple statistical analyses, Bonferoni adjustment was conducted (alpha level of .01).

5.2.3.1 The development of PA skills

A 2x3 mixed ANOVA was conducted on PA tasks with group (monolingual and bilingual) as between-group and time (PA_T1, PA_T2, PA_T3) as within-group variables. The normality and homogeneity assumptions of ANOVA were sustained. However, the sphericity assumption was violated. Thus, Greenhouse-Geisser-corrected degrees of freedom (df) were used in all F-tests of repeated measures (Huck, 2012). There was no significant main effect of groups, $F(1, 94) = 1.21$, $p > .27$, and no significant interaction of group and time. It tells us that the two groups did not significantly differ in their PA performances and the pattern of their performance differences did not significantly change over time. However, a significant main effect of time was found on task performance, $F(2, 93) = 424.71$, $p < .001$, partial $eta^2 = .81$. This indicates that the task performance changed over time irrespective of group membership. Following this, pairwise comparisons showed that both monolinguals and bilinguals performed better in PA tasks at Time 2 ($M = 40.35$, $M = 41.18$, respectively) compared to Time 1 ($M = 31.41$, $M = 33.94$, respectively), and similarly did better at Time 3 ($M = 58.41$, $M = 62.44$, respectively) than Time 2.

5.2.3.2 The development of RAN skills

Concerning RAN, a 2x3 mixed ANOVA was administered with time (RAN_T1, RAN_T2, RAN_T3) as within-group, and group (monolingual and bilingual) as between-group variables. Before running any analysis, normality, homogeneity and sphericity assumptions of ANOVA were checked. While the assumptions of

normality and homogeneity were met, the sphericity was violated. To address this violation, Greenhouse-Geisser-corrected degrees of freedom (df) were used in all F-tests of repeated measures. The results indicated that there was no significant main effect of groups, $F(1, 94) = 2.26$, $p = .11$, and a non-significant interaction was found between time and group, $F(1.14, 188) = .65$. However, there was a main effect of time on RAN performance, $F(1.14, 188) = 976.12$, $p < .001$, partial $eta^2 = .91$. Pairwise comparisons revealed that monolinguals and bilinguals scored better at Time 2 ($M = 126.58$, $M = 134.03$, respectively) than Time 1 ($M = 138.57$, $M = 145.10$, respectively), and similarly they did better at Time 3 ($M = 64.52$, $M = 67.94$, respectively) than Time 2.

5.2.3.3 The development of phonological memory (PM) skills

A 2x3 mixed ANOVA was conducted on PM tasks with time (PM_T1, PM_T2, PM_T1) as within-group and group (monolingual and bilingual) as between-group variables. The normality and homogeneity assumptions were sustained, but since the sphericity assumption was violated, Greenhouse-Geisser-corrected degrees of freedom (df) were employed in all F-tests of repeated measures. The results yielded a nonsignificant main effect of groups, $F(1, 94) = .42$, $p = .51$, and also there was no significant interaction between time and groups, $F(1.79, 168.77) = 2.26$, $p = .12$. However, a main effect of time was detected for PM tasks, $F(1.79, 168.77) = 320.41$, $p < .001$, partial $eta^2 = .77$. The pairwise tests showed a better performance of the participants at Time 2 ($M = 6.00$, $M = 6.02$, monolinguals and bilinguals respectively) compared to Time 1 ($M = 5.17$, $M = 4.98$, monolinguals and bilinguals respectively), and also scored better at Time 3 ($M = 7.65$, $M = 7.28$, monolinguals and bilinguals respectively) compared to Time 2 PM performance.

5.2.3.4 The development of vocabulary skills

A 2x3 mixed ANOVA was conducted on VOCAB tasks with time (VOCAB_T1, VOCAB_T2, VOCAB_T3) as within-group and group (monolingual and bilingual) as between-group variables. The assumptions of normality and homogeneity were sustained. However, since the sphericity assumption was violated, Greenhouse-Geisser correction was used for *F*-ratios. The results indicated that there was not any significant interaction between time and group, $F(1.14, 107.26) = .78$, $p = .39$. On the other hand, there was a significant main effect of time on task performance, $F(1.14, 107.26) = 721.01$, $p < .001$, partial $eta^2 = .88$. Pairwise comparisons revealed that both monolinguals and bilinguals participants did better at Time 2 ($M = 29.50$, $M = 24.64$, respectively) than Time 1 ($M = 25.93$, $M = 21.00$, respectively), and they also performed better at Time 3 (M = 41.46, $M = 35.66$, respectively) than Time 2. Further, a significant main effect of groups was found, $F(1, 94) = 19.94$, $p < .001$, partial $eta^2 = .17$. Pairwise comparisons showed that monolinguals ($M = 25.93$, $M = 29.50$, $M = 41.46$, respectively) outperformed bilinguals ($M = 21.00$, $M = 24.64$, $M = 35.66$, respectively) in VOCAB tasks at Times 1, 2, and 3.

5.2.3.5 The development of listening comprehension (LC) skills

A 2x3 mixed ANOVA was conducted on LC with time (LC_T1, LC_T2, LC_T3) as within-group and group (monolingual and bilingual) as between-group variables. The assumptions of normality and homogeneity were met, but the sphericity assumption was violated. That's why, Greenhouse-Geisser correction was used for *F*-ratios of repeated measures. The results displayed that there was no significant interaction of time and group, $F(1.37, 129.50) = 2.43$, $p = .11$. On the other hand, there was a significant main effect of time on LC performance, $F(1.37, 129.50) = 243.15$, $p <$

.001, partial eta^2 = .721. Pairwise comparisons for time effect showed that the performance of both groups got better in each succeeding time compared to the previous one (*M* = 5.24, *M* = 4.04 for Time 1; *M* = 6.35, *M* = 5.10 for Time 2; *M* = 9.50, *M* = 7.58 for Time 3, in monolingual and bilinguals, respectively). In a similar vein, there was a significant main effect of group, $F(1, 94) = 11.46$, $p < .001$, partial eta^2 = .11. The pairwise tests of the groups yielded a higher performance by monolinguals (*M* = 5.24, *M* = 6.35, *M* = 9.50, respectively) compared to bilinguals (*M* = 4.04, *M* = 5.10, *M* = 7.58, respectively) across times.

Overall, with respect to cognitive and linguistic components, the results of separate ANOVAs showed a developmental pattern for both monolinguals and bilinguals from Time 1 to Time 3. Similarly, bilinguals performed similar to monolinguals in some skills (i.e., PA, RAN and PM). However, they showed some delays in vocabulary and LC skills compared to their monolingual peers.

5.2.4 Comparison of performances of monolinguals and bilinguals in reading comprehension and word reading

Another aim of the study was to investigate whether monolinguals and bilinguals performed similar in the tests of reading comprehension and word reading. To this end, a one-way MANOVA was carried out to see any performance difference between the groups. In this analysis, reading comprehension and word reading were treated as the dependent variables and groups (monolingual-bilingual) as the independent variable. Prior to running this test, normality, univariate and multivariate outliers, linearity, multicollinearity and homogeneity of variance-covariance matrices were checked for any violation (Tabachnick & Fidell, 2007). All the related assumptions were met.

The results of one-way MANOVA revealed a significant difference of the group with regard to DVs, reading comprehension and word reading, Wilk's $\lambda = .88$, $F(1, 93) = 4.22$, $p < .05$, partial $\eta^2 = .086$, observed power = .727. It appears that approximately 9% of multivariate variance of is related to the group factor. When the results of the dependent variables were considered separately, the findings yielded significant differences between reading comprehension performance of bilinguals and monolinguals, $F(1, 94) = 7.97$, $p < .05$, whereas there was no significant differences between the groups in word reading $F(1, 94) = 3.79$, $p > .05$. To put it differently, monolinguals and bilinguals performed at similar rates in word reading; however, bilinguals lagged behind monolinguals in reading comprehension tasks.

This chapter has reported the results of the current study in light of the research questions and hypotheses. The next chapter will provide a comprehensive discussion on the research findings in light of some reading theories of reading. It will end up with the implications, limitations and recommendations for future studies.

CHAPTER 6

DISCUSSION AND CONCLUSION

The current study has primarily focused on the role of kindergarten and Grade 1 phonological awareness (PA), rapid automatized naming (RAN), phonological memory (PM), listening comprehension (LC) and vocabulary in Grade 1 Turkish word reading and reading comprehension among Turkish monolinguals and Kurdish-Turkish bilinguals. Likewise, the development of these cognitive and linguistic components from kindergarten to Grade 1 was observed. Accordingly, this chapter will first present the development of these predictors in monolinguals and bilinguals. Next, the longitudinal and concurrent predictive power of these components in word reading and reading comprehension will be discussed. The conclusion part will end with some implications for the literacy instruction in Turkish, and limitations of the study.

6.1 The development of cognitive and linguistic components in monolinguals and bilinguals

Regardless of the groups, a developmental pattern has been observed in the cognitive and linguistic components of reading from kindergarten to Grade 1. The following part provides discussion regarding this developmental pattern. Also, any similarities or differecences between monolinguals' and bilinguals' performances in these components will be discussed.

6.1.1 The development of phonological awareness (PA) in monolinguals and bilinguals

With respect to the developmental pattern in PA skill, the results of this study replicated the previous literature both in L1 (e.g., Adams, 1990; Özata, 2013) and L2 (e.g., Verhoeven, 2000, 2007). One of the prominent findings in these studies is that children first detect or reflect on the syllables in a word. Then, identification of onset-rimes in word comes, which is followed by phoneme awareness, the smallest unit in a word. Similarly, the current study demonstrated that both Turkish monolinguals and Kurdish-Turkish bilinguals followed a developmental pattern in PA from Time 1 to Time 3.

When looking at the performance of monolinguals at Time 1 (at the beginning of kindergarten), they did better in the PA sub-tests which tapped syllable awareness (M = 16.71) than their PA sub-tests tapping onset-rime awareness (M = 6.9). Similarly, their performance of onset-rime tests was better than their phoneme awareness tests (M = 1.11) at Time 1. The similar pattern continued at Time 2 (syllable awareness: M = 20.05; onset-rime awareness: M = 10.65; phoneme awareness: M = 3.08) and Time 3 (syllable awareness: M = 28.10; onset-rime awareness: M = 26.20; phoneme awareness: M = 23.40). Here, performance of phoneme awareness tasks at Time 3 (Grade 1) deserves a special mention. Despite the improvements in all sub-tests of PA across three times, this was the time when monolinguals performed the best in phoneme awareness tasks. This finding has proved the idea that phoneme awareness requires formal instruction. In line with other studies, phoneme awareness typically developed after exposure to formal reading instruction (e.g., Weaver & Riccio, 2000). Similar performance was detected in the bilingual group, as well. The performance in PA sub-tests tapping syllable

awareness was greater than onset-rime and phoneme awareness at Time 1 (syllable awareness: *M* = 17.76; onset-rime awareness: *M* = 6.43; phoneme awareness: *M* = 1.23). The similar pattern was followed at Time 2 (syllable awareness: *M* = 20.58; onset-rime awareness: *M* = 9.77; phoneme awareness: *M* = 3.32) and Time 3 (syllable awareness: *M* = 28.90; onset-rime awareness: *M* = 25.87; phoneme awareness: *M* = 24.52). Again, phoneme awareness performance at Time 3 reached its highest of all times in the bilingual group. Overall, the separate data from monolinguals and bilinguals showed a developmental pattern in PA from kindergarten to Grade 1. This result is compatible with studies both in L1 (e.g., Cossu et al., 1995; Durgunoğlu et al., 1993; Özata et al. 2016) and L2 (e.g., Chiappe & Siegel, 1999; Verhoeven, 2007). Of particular relevance, the current findings were in line with Durgunoğlu and Öney's (1997) study that showed a better performance of children in PA skills in Grade 1 compared to their kindergarten performance.

With respect to the comparison of group performance in PA, we expected significant differences between monolinguals and bilinguals in PA skills that would be in favor of the latter group across all times due the extensive evidence that revealed the development of metalinguistic awareness, explicit awareness of language and its structures, in bilinguals (Adesope et al., 2010) compared to monolinguals in both transparent orthographies (e.g., İlerten, 2021) and opaque orthographies (e.g., Bialystok, 2001). As a part of metalinguistic awareness, bilinguals' developed PA skill might help them consciously notice and manipulate sounds structure of the language (Gillon, 2007). In line with this expectation, bilinguals group outperformed their monolingual peers especially in PA tasks at Time 1. However, this performance difference narrowed in later times. More specifically, the monolinguals kept up with bilinguals especially at Time 3 when the

formal education began. This finding is consistent with some other studies in transparent orthographies (e.g., Verhoeven, 2007).

However, further analysis revealed no performance differences between the groups when PA scores from all times were entered into analysis at same time. The results of the 2x3 mixed ANOVA revealed no significant differences between monolinguals and bilinguals performance when Times 1, 2 and 3 were considered together. This result supports the findings of studies in opaque (e.g., French: Comeau et al., 1999; English: Chiappe & Siegel, 1999) and transparent orthographies (Dutch: Janssen et al., 2013). For instance, Comeau et al. (1999) found comparable PA skills in L1 and L2 French speakers. Chiappe and Siegel (1999) reported similar results for L1 and L2 English speakers. However, these PA results of the current study are partly incongruent with a very recent study conducted with the second grade Arabic-Turkish simultaneous bilinguals (İlerten, 2021). In that cross-sectional study, İlerten reported a better PA performance of Arabic-Turkish bilinguals than that of Turkish monolinguals. According to the researcher, the fact that bilinguals deal with two phonological systems at the same time may improve their metalinguistic awareness. The current study also revealed higher PA skills in Kurdish-Turkish bilinguals at the early times (i.e., kindergarten). However, unlike İlerten (2021) who found a PA difference between monolinguals and bilinguals even in Grade 2, the bilingual advantage in the present study slightly diminished towards the end of first grade after the onset of formal instruction. This difference between two studies can be attributed to variables such as language status, orthographies of the languages and SES. Overall, regarding the results of the current study, it might be acceptable for monolinguals to keep up with bilinguals in PA ability after the introduction of formal literacy instruction in Turkish with a transparent orthography. Likewise, a substantial

body of research in transparent orthographies has provided evidence for ceiling effect of PA skills towards the end of the first grade (e.g., Dutch: Verhoeven, 2007; Janssen et al., 2013; Turkish: Babayiğit & Stainthorp, 2007; Öney & Durgunoğlu, 1999). That might be the reason for monolinguals and bilinguals having shown similar performance at the end of Grade 1.

6.1.2 The development of rapid automatized naming (RAN) in monolinguals and bilinguals

As children were not fully familiar with letters and digits in the kindergarten, non-alphanumeric RAN tests (i.e., objects and colours) were conducted at Time 1 and Time 2. In Grade, alphanumeric RAN tests (i.e., letters and digits) tests were administered. The analysis of RAN tests indicated improvement in the RAN performance of Turkish monolinguals and Kurdish-Turkish bilinguals from Time 1 to Time 3.

Regarding the performance differences in RAN, there was not any significant differences between monolinguals and bilinguals across times. This result was not congruent with the results of Fleury and Avila (2015) who found a better performance of bilingual children in RAN, reading accuracy and PM than their monolingual peers. In that study, the students were assessed both their L1 (Brazilian Portuguese) and L2 (English), and according to Fleury and Avila, there might be a facilitating role of L2 acquisition in the naming speed performance. However, in the present study, there was not any L1 Kurdish tests avaliable for bilinguals to compare their performances of RAN in both languages. On the other hand, Manis et al. (2004) detected similar performance of RAN in monolinguals and bilinguals along with similar performance in PA and print knowledge performance. Similarities in the

performance of monolinguals and bilinguals across different studies may point to the domain general structure of RAN (Kail & Hall, 1994). Regardless of language backgrounds, children develop similar RAN skills.

6.1.3 The development of phonological memory (PM) in monolinguals and bilinguals

In simple terms, PM is the skill to keep verbal information in short-term memory for a temporary time. Accordingly, digit-span (i.e., forward and backward) and non-word repetitions tests were conducted in this study to assess this capacity of temporary storage. Regardless of the groups, from Times 1 to 3, a developmental pattern was expected in PM skill. Regarding PM skill, no performance difference between monolinguals and bilinguals was expected.

Compatible with research hypothesis, the results of analyses revealed a development in the PM skills of both groups. Monolinguals and bilinguals developed their PM skills from Time 1 to Time 3. As to group differences in PM performance, we could not detect any differences between monolinguals and bilinguals. These results were consistent with the previous studies (e.g., İlerten, 2021; Yoo & Kaushanskaya, 2012). In a recent study, İlerten (2021) reported non-significant difference in PM skills of Turkish monolinguals and Arabic-Turkish bilinguals in Grade 2. However, the findings of the current study were at odds with previous research having found performance differences between monolinguals and bilinguals specifically in nonword repetition tests (Messer, Leseman, Boom, & Mayo, 2010). Regarding the results of the present study, one explanation might be that non-word repetition tests were so challenging for both monolinguals and bilinguals that the

group difference was equalized. Therefore, monolinguals and bilinguals did not differ in their PM performance.

6.1.4 The development of listening comprehension (LC) in monolinguals and bilinguals

With regard to the development of LC, the results were compatible with the expectations. That's, a time effect was observed in Turkish monolinguals and Kurdish-Turkish bilinguals separately. More specifically, both monolinguals and bilinguals improved their LC skills across times. As for any difference in group performance, the monolingual group performed better in LC than the bilingual group. This finding was also in line with the very few studies in L2 LC (e.g., Babayiğit, 2012; Droop & Verhoeven, 2003). To my knowledge, there was not any study dealing with a comparative development of LC in monolinguals and bilinguals in a highly transparent orthography such as Turkish.

The reason of low LC performance among bilinguals is likely to be due to low vocabulary knowledge of them (Hutchinson et al., 2003). In this study, Kurdish-Turkish bilinguals lagged behind their Turkish monolingual peers in LC skills at three times despite annually progress of this skill in both groups. LC and vocabulary were significantly correlated at three times. This result is closely in line with a longitudinal study carried out among L1 and L2 English speakers by Hutchinson et al. (2003). Hutchinson et al. (2003) found a lower performance of L2 English speakers in LC, vocabulary and reading comprehension than L1 English speakers. More evidence comes from other studies, which showed that smaller vocabulary together with weak LC ability in bilinguals impeded their reading comprehension performance (e.g., Bonifacci & Tobia, 2017; Melby-Lervåg & Lervåg, 2014). To this

end, the current study has added to the growing evidence that has revealed low listening skills of bilinguals in the beginning of reading acquisition compared to those of monolinguals.

6.1.5 The development of vocabulary in monolinguals and bilinguals

Vocabulary is a pivotal component of both monolingual and bilingual reading skills. However, the vocabulary development in bilinguals might not be on the same rate with monolinguals. According to Bialystok (2002), being raised a bilingual may yield disadvantages alongside advantages. Smaller vocabularies in each of their languages might put bilinguals at a disadvantage position compared with monolinguals (Scheele, Leseman, & Mayo, 2010). Likewise, considerable research has revealed that a major determinant of poor comprehension among bilinguals is low vocabulary (see August & Shannan, 2006 for a review). To this end, in this study, it was hypothesized that although there would be an improvement in the vocabulary size of both monolinguals and bilinguals, in line with literature, Kurdish-Turkish bilinguals would lag behind Turkish monolinguals across all times.

Within results of the ANOVA analysis revealed a time effect in the development of vocabulary knowledge in both monolinguals and bilinguals. From Time 1 to Time 3, we can see an enhancement of vocabulary size in both groups. However, further analysis indicated a faster growth of vocabulary size in monolinguals compared to bilinguals. This result is in line with the previous literature (e.g., Lervåg and Aukrust, 2010; Mancilla-Martinez & Lesaux, 2011; Schaars et al., 2019; Uccelli & Paez, 2007; Verhoeven, 2000). The rate of vocabulary development in both groups showed difference between monolinguals and bilinguals despite within-group enhancement of vocabulary. More specifically, despite

improvements in their vocabulary, Kurdish-Turkish bilinguals went on performing below Turkish monolinguals. This is also compatible with the studies conducted in bilingual contexts (e.g., Tabors, Paez, & Lopez, 2003; Uccelli & Paez, 2007; Verhoeven, 2000). For example, Tabors, et al. (2003) detected a delay in bilinguals' vocabulary depth and breadth compared to monolinguals in kindergarten levels. Similarly, in Verhoeven's (2000) study, vocabulary appeared to be a greater determiner in the variance in L2 reading comprehension compared to L1's. Verhoeven argues quite convincingly that the smaller vocabulary in bilinguals might impede their L2 reading at both word level and text level comprehension. In line with Verhoeven's (2000) and Tabors et al.'s (2003) studies, the results of the current study have showed that restricted vocabulary in bilinguals constrained their reading comprehension performance. According to Carver (1994), a very small number of unknown words in a text might be tolerated by a skilled reader who could even extract the meanings of those words from the context of the text. Carver continues that a novice reader should be familiar with almost all of the words in a text for a proper comprehension, and the reader who is not familiar with at least 97% of the vocabulary in a text might experience difficulties in understanding. Similarly, with a more liberal percentage, for Nagy and Scott (2000), 90-95% of the words in a text should be known for a proper understanding. If not, the high percentage of unknown words will indefinitely disrupt comprehension process. Indeed, the source of enhanced or low vocabulary might date back to preschool years. Specifically, home literacy environment and activities related to print awareness, also discussed in the implications of the current study, will certainly have impact on later reading.

Actually, vocabulary size matters, as vocabulary will affect later reading acquisition, especially reading comprehension. Regarding age-norms for vocabulary,

the estimation shows that bilinguals might require between two and five years to catch their monolinguals (Bialystok, 2002). According to Bialystok (2002), vocabulary might be depressed for bilingual, and then this affects reading ability. Concurrent with this idea, Verhoeven (2000) points out to the fact that with a limited L2 lexicon, L2 learners may face difficulties while building an L2 vocabulary for reading. Further, failure in comprehension will lead to less reading, and this will disrupt the process of learning new words (Stanovich, 1986). To put it differently, the reciprocal relationship between vocabulary and reading comprehension will be hindered by limited vocabulary size. Parallel to this, Anderson and Freebody (1983) propose that huge vocabulary makes reading comprehension easier, while more reading brings about larger vocabulary sizes.

However, discussion on bilinguals' vocabulary size is a very sensitive topic. To some researchers, it is not fair to compare vocabulary sizes of bilinguals to the monolingual norms (e.g., Oller, 2005; Pearson et al., 1995). Instead, the total vocabulary of the bilingual child should be considered (Pearson et al., 1995). Lack of vocabulary in one language is not a handicap. Because of the "the distributed characteristics of bilingual knowledge", translation equivalents of some words may not be available in the other language (Oller & Pearson, 2002, p. 10). Similarly, Bialystok et al. (2009) assert that bilingual child's fewer words in each language are not surprise. That said, one word available in language might not be in another language. However, it is crucial to gain more insights in bilinguals' vocabulary knowledge, especially in the language that will be the formal language of education as in this study's case. As Uccelli and Paez (2007) argue, although the vocabulary of bilinguals assessed in one language will not equal to that of a monolingual, when bilinguals have very low vocabulary knowledge in the language of instruction, they

will certainly face difficulties. Likewise, weaker vocabulary of bilinguals compared to monolinguals' in the language of literacy (i.e., schooling) may have impact on the success of bilinguals in the assessments (Bialystok et al., 2009).

6.2 Word reading and reading comprehension in monolinguals and bilinguals

One of the aims of this study was to compare word reading and reading comprehension performances of Turkish monolinguals and Kurdish-Turkish bilinguals in Grade 1. Studies related to word reading performance in L1 and L2 have displayed conflicting results. On the one hand, a large amount of research has showed similar performance of word reading in monolinguals and bilinguals even at the early onset of reading (e.g., Lervåg & Aukrust, 2010). On the other hand, some studies have indicated better performance of monolinguals in word reading compared to their bilingual peers (e.g., Droop & Verhoeven, 2003). Considering these contradictory findings from various languages, in this study, it was hypothesized that bilinguals would perform neither better nor worse than monolinguals in Turkish word reading assessed at the end of the first grade. With regard to reading comprehension, there are inconsistent results, as well. While some studies have reported a better performance of reading comprehension in L2 speakers (e.g., Chiappe et al., 2007; Lesaux et al., 2006), other studies have revealed a lagged reading comprehension in L2 speakers compared to L1 peers (e.g., Bonifacci et al., 2020; Lervåg & Aukrust, 2010). Regarding their limited vocabulary sizes and less-developed listening skills in L2, a lower performance was expected from the bilingual group in reading comprehension.

As to word reading, the results of one-way MANOVA revealed similar performance of monolinguals and bilinguals in Turkish word reading. Kurdish-

Turkish bilinguals read words as fluent and accurate as Turkish monolinguals. The results of this study converged with the previous studies having revealed that while reading words, bilinguals can perform at similar rates with monolinguals (e.g., Bonifacci et al., 2020; Lervåg & Aukrust, 2010; Mancilla-Martinez & Lesaux, 2011). Bonifacci et al. (2020) reported similar results in a very recent study in which minority L2 learners showed no delay in Italian word reading compared to their monolingual counterparts. The authors argue that there will be no delay in reading fluency of bilinguals while learning to read in a transparent language like Italian. In terms of transparent orthographies, this assumption has found credence from our study at least at word-level fluency in Grade 1, and also from a study conducted with L1 and L2 Dutch speakers (Lervåg & Aukrust, 2010). However, there might be some discrepancies between performance of monolinguals and bilinguals at text-level fluency in later grades (Crosson & Lesaux, 2010; Geva & Farnia, 2012), which is out of scope of this study.

With respect to reading comprehension performance, bilingual lagged behind monolinguals in the tasks of reading comprehension performance, though. Follow-up analyses revealed performance differences in reading comprehension between both groups, which was in favor of monolinguals. This finding validated the research hypothesis. Parallel to the findings related to the performance differences between monolinguals and bilinguals in vocabulary and LC, two pivotal predictors of reading comprehension, the success of monolinguals in reading comprehension was not a surprise. One reason for the delay in reading comprehension performance of bilinguals might be that if the number of unknown words is too high, the comprehension will not fully happen. That said, for a proper comprehension, 95 % of the words in a text should be known (Hu & Nation, 2000). Further, according to

Carver (1994), 97% of the words in a text should be known for reading comprehension. The results of this study were also compatible with the previous studies having reported a delay in the bilingual reading comprehension in early grades (e.g., Droop & Verhoeven; Lervåg & Aukrust, 2010; Melby-Lervåg & Lervåg, 2014; Nakamoto, Lindsey, & Manis, 2008; Proctor et al., 2005). Lervåg and Aukrust (2010), for instance, detected that L1 Dutch speakers were better at reading comprehension at the early stages of reading, and this skill improved faster in L1 speakers than L2 Dutch speakers. According to them, these differences between monolinguals and bilinguals could be totally connected to the early differences in vocabulary knowledge.

In a similar vein, the initial differences between monolinguals and bilinguals in LC might result in a weaker reading comprehension in the bilingual group. Despite the modality type (aural vs. visual), listening and reading comprehension share common sub-skills (e.g., syntax, vocabulary, discourse, background knowledge). To this end, the delay in reading comprehension of bilinguals might be also attributed to the initial differences in LC skill. Similarly, for bilinguals, low LC was likely to stem from low vocabulary knowledge. These findings were also compatible with previous studies (e.g., Braze et al., 2007; Hutchinson et al., 2003). Parallel to the results of our study, Hutchinson et al. (2003) documented low performances of L2 English speakers in LC, vocabulary and reading comprehension compared to those of L1 English peers. Likewise, in line with the previous research, the findings of the current study have revealed the strong association between vocabulary, listening and reading comprehension.

Taken together, while reading Turkish words, Kurdish-Turkish bilinguals performed at similar rates with Turkish monolinguals. However, performance

differences appeared in reading comprehension. Here, monolinguals scored better in comprehension tasks than bilinguals. All these findings are in line with the fact that after mastering decoding (fluent word reading in this study), for bilinguals, the role vocabulary and other high order skills (e.g., listening) gain prominence. Any delay in these skills might impede later reading comprehension.

In this part, the development of the cognitive and linguistic components in monolinguals and bilinguals has been presented in details. Also, word reading and reading comprehension performances of monolinguals and bilinguals have been discussed comparatively. The following part will present the predictive role of these cognitive and linguistic variables in word reading and reading comprehension separately.

6.3 Predictors of word reading

One of the main goals of this study was to explore the longitudinal (i.e., kindergarten) and concurrent (i.e., Grade 1) predictive power of PA, RAN, PM and vocabulary in word reading. To this end, several hierarchical regression analyses were conducted to determine the unique contributions of these variables to word reading. In line with the expectations, irrespective of groups, RAN and PA appeared to be the most powerful longitudinal and concurrent predictors of word reading. In this study, instead of accuracy in word reading, word reading fluency was assessed since in transparent orthographies (e.g., Italian, Norwegian, Turkish) word reading accuracy usually reach a certain level in the earliest stages of learning to read (Seymour et al., 2003).

6.3.1 The impact of RAN on word reading

Extant evidence has demonstrated that RAN is a consistent associate of word reading in numerous languages (e.g., Candan et al., 2020; Candan, 2021; Kirby et al., 2003; Özata et al., 2016; Wagner et al., 1997; Wood et al., 2017). This strong relationship has been argued to be the result of some common processes shared by RAN and reading. In that, there is serial processing of the visual material in both RAN and reading. Similarly, the reader makes a rapid connection between orthographic (i.e., visual information) and phonological representations (Norton & Wolf, 2012). Automaticity is another process that is equally significant for reading and RAN. To this end, in the current study, it was hypothesized that RAN would be a powerful correlate of word reading in Turkish, and it would uniquely contributed to the word reading. More specifically, with different rates of impact, it was expected that RAN (objects & colors) in kindergarten and RAN (digits & letters) in Grade 1 would significantly predict word reading in Grade 1.

Overall, RAN was a powerful predictor of word reading after controlling for group, PM and SES. Separate hierarchical regression analyses related to the role of RAN in word reading revealed a significant longitudinal and concurrent impact of RAN on word reading measured in Grade 1. At Time 1 (kindergarten 1) regression model, RAN accounted for 6% variance in Grade 1 word reading. Similarly, Time 2 (kindergarten 2) RAN explained 7% variance in word reading. Lastly, RAN significantly contributed to word reading with 31% variance in Time 3 regression model (Grade 1). This result was compatible with other studies in L1 (e.g., Babayiğit & Stainthorp, 2011; Bektaş, 2017; Georgio et al. 2016; Landerl & Wimmer, 2008; Özata & Haznedar, 2018; Protopapas, Altani, & Georgiou, 2013; Sönmez, 2015) and L2 (e.g., Fleury & Avila, 2015; Özata et al. 2016; Wood et al., 2017). Considering

the increasing predictive power of RAN from Time 1 to Time 3 (6%, 5%, and 31% respectively) in word reading it can be argued here that Grade 1 alphanumeric RAN tests (i.e., digits-letters) are more powerful predictors of word reading compared to kindergarten non-alphanumeric RAN tests (objects-colors). This result is also in line with some previous studies (e.g., Asadi et al., 2017; Özata & Haznedar, 2018). In that, alphanumeric tests are more consistent and powerful predictors of word reading compared to non-alphanumeric tests (Araújo et al., 2015), and the correlations between alphanumeric RAN and word reading have been found to be higher than non-alphanumeric RAN (e.g., Bowey, McGuigan, & Ruschena, 2005; Compton, 2003). For example, Schatschneider et al. (2004) documented the correlation between RAN and word reading of .68 in Grade 1. In the current study, the correlation between RAN and word reading was .63. Further, the naming speed at Time 1 and Time 2 was rather slower than Time 3 naming speed, which indicated the progress the students made from kindergarten to Grade 1.

Broadly, the findings of this study have provided more support for the previous studies presenting the strong relationship between RAN and word reading in transparent orthographies. Compared to reading in opaque orthographies, reading accuracy in transparent orthographies improves in a very short time after the introduction of formal instruction (Babayiğit & Stainthorp, 2010; Öney & Durgunoğlu, 1999). That is, because of the ceiling levels in reading accuracy, reading fluency (speed) is accepted as an index of word reading. For this reason, PA, as a predictor of reading accuracy, had less contribution to word reading compared to RAN which was proven to be a stronger index of word reading. Of particular relevance, this result is convergent with studies in transparent orthographies. Comparing L1 English and L1 Greek children, Georgio et al. (2008) reported RAN

to be a more powerful of reading fluency in Greek than in English while PA's role in reading accuracy was greater in English. Further, Georgio et al.'s findings were supported by Babayiğit and Stainthorp (2010) who found RAN as the most longitudinal powerful predictor of reading fluency in Turkish. In a similar vein, Verhagen et al. (2008) provided evidence for RAN to be a reliable and powerful predictor of word reading in another transparent language, Dutch.

Moreover, the strong similarity between RAN and reading process might also affect the role of RAN in word reading. While reading words fluently, the process is similar to naming stimuli in RAN tasks. As in RAN tasks, during reading words, "groups of letters or entire words are processed as single units rather than as a sequence of grapheme- phoneme correspondences" (Kirby, et al., 2010, p.343). To put it differently, with automaticity in word reading (i.e., sight word reading), words are seen as single units just like the visual stimulus in RAN tasks. Hence, from all this evidence on the commonalities between word reading and RAN, it was not unexpected to identify a greater role of RAN in word reading compared to that of PA.

6.3.2 The impact of PA on word reading

PA is a critical component of reading in transparent and opaque orthographies (Anthony & Francis, 2005). Specifically, PA has been documented as a significant contributor to word reading across languages (Gillon, 2007). This contribution might vary based on the transparency of the orthography. While it has been found to be a strong correlate of reading accuracy in opaque orthographies (e.g., Kirby et al., 2003), PA skill has significantly contributed to reading fluency and spelling in transparent orthographies (e.g., Babayiğit & Stainthorp, 2010, Candan et al. 2020).

Thus, despite its decreasing effect in later reading skills, a small but significant contribution of PA to word reading was expected in this study. This hypothesis was partly based on the grade level in which word reading was measured. As is known, in this study, word reading was assessed in Grade 1 in which the students were learning to read at basic levels. Similarly, in line with previous studies in Turkish (e.g., Öney & Durgunoğlu, 1997; Babayiğit & Stainthorp, 2007), the effect of PA would fade away in later grades, but there would be small but significant effect of PA on word reading in Grade 1. Keeping this in mind, the longitudinal and concurrent contributions of PA to Grade 1 word reading were measured through several hierarchical regression analyses after accounting for the variance explained by PM and RAN variables. Time 1 regression model revealed a unique role of PA (5%) in word reading measured at Time 3. Likewise, in Time 2 regression model, PA explained 6% of significant variance in word reading. In the last regression analysis at Time 3, PA concurrently predicted word reading with 8% of unique variance. In general, the findings of this study revealed longitudinal and concurrent predictive power of PA in Grade 1 word reading in Turkish. This result is congruent with the previous studies in transparent orthographies including Turkish (e.g., Bektaş, 2017; Güldenoğlu et al., 2016; Müller & Brady, 2001; Öney & Durgunoğlu, 1997; Öz, 2019; Özata, 2013), and in opaque orthographies (e.g., Demont & Gombert, 1996; Kirby et al., 2003; Wagner et al., 1994). Likewise, the pivotal role of PA in the early years of reading acquisition in transparent orthographies is a well-established finding (e.g., Müller & Brady, 2001; Öney & Durgunoğlu, 1997). Considering this, one can argue for the critical role of PA in early reading development of a highly transparent orthography as Turkish. As Öney and Durgunoğlu (1997) point out, at the onset of reading instruction, children might still rest on phonological processing in reading

words. However, this is a time-limited effect since with the ceiling effects in PA skills, other reading related skills will be better indicators of later reading.

To become a skilled reader, there are some stages/phases that the novice reader should undergo. In her model, Ehri (1995) asserts that in full alphabetic phase, a child can read full words by making full connections between letters in written forms and their sounds in pronounciation. With a full grapheme-phoneme correspondence, the novice reader begins to read unfamiliar words. In consolidated alphabetic phase, on the other hand, there is full alphabetic knowledge through which the words are read as whole units based on phonological knowledge, rather than letter-sound conversion (Gillon, 2007). In the current study, the word reading performance of the children was in a place between Ehri's full alphabetic phase and consolidated alphabetic phase that is similar to Frith's (1985) orthographic stage. In that, as in full alphabetic phase the first graders partially relied on their PA skills while reading words; however, as discussed above, the contribution of RAN to word reading was greater than PA's. In other words, in this study, with less dependence on PA, there began a transition from full alphabetic phase to consolidated alphabetic phase in which there is much place for sight-word reading.

Further, based on the group performances, the relationship between PA and word reading did not change at any time. Stated differently, PA across all times was found to be a significant predictor of word reading irrespective groups. However, these results were incompatible with a recent study conducted in Turkish. İlerten (2021) reported a difference in the association between PA and word reading (real and non-word reading fluency) in a sample of Turkish monolinguals and Arabic-Turkish bilinguals in Grade 2. Her results revealed that in monolinguals, PA accounted for 11% of significant variance in word reading fluency while there was

no significant contribution of PA to word reading fluency in the simultaneous bilingual group. The researcher explained this situation with ceiling levels of PA performance in the bilingual group. However, in our study the students were in Grade 1 where the development of PA skill (especially phoneme awareness) still continues in both monolinguals and bilinguals, and the children might still, to some extent, rest on their PA skills in the current study. Similarly, we had only real word reading scores of the students in this study. Most importantly, one should be careful while interpreting the results of İlerten's and the current study since the other confounding variables such as SES, language status, orthographies, and task types could be interfered in.

Overall, PA and RAN significantly contributed to the first graders' word reading. In the following section, the relationship between vocabulary and word reading will discussed in light of the research findings and the previous literature.

6.3.3 The impact of vocabulary on word reading

Some studies in L2 English revealed a role of vocabulary in word reading, especially at the onset of learning to read as familiarity with oral form of vocabulary might facilitate word reading in a language like English with inconsistent letter-sounds mappings (e.g., Gottardo, 2002). In the current study, however, after the predictive power of PA and RAN, a nonsignificant role of vocabulary was expected in word reading due to the consistent letter-sounds mapping in Turkish.

There were moderate correlations between vocabulary and word reading across three times, but vocabulary failed to predict word reading. These findings were convergent with the expectations of this study since most of the students could accurately and fluently read words. Although vocabulary knowledge in the bilingual

group was rather low, both monolinguals and bilinguals performed similar in word reading.

Given the discussion of the predictors of word reading, it is important to discuss the predictors of reading. In the following part, the predictors of reading comprehension are presented.

6.4 Predictors of reading comprehension

Reading comprehension is a multi-componential phenomenon that covers lower-level (e.g., lexical access, decoding) and higher-level skills (e.g., background knowledge, inferencing) (Stanovich, 2000). Some of these skills might be significant indicators of subsequent reading comprehension performance. Accordingly, the current study explored the role of PA, RAN, PM, LC, vocabulary, and word reading in the development of reading comprehension[4]. The following part will present the longitudinal and concurrent predictors of Turkish reading comprehension measured in Grade 1.

6.4.1 The impact of word reading on reading comprehension

Skilled reading theories have underlined the significance of efficient word reading in the development of reading (Gough & Tunmer, 1986; Perfetti & Hart, 2002; Perfetti, 2007; Wagner et al., 1994). The individual differences in word reading are considered to be one of the reasons for success in reading comprehension (Lesaux, Crosson, Kieffer, & Pierce, 2010). In that, a number of studies have reported the central role of word reading in reading comprehension in various languages differing in terms of orthographical transparency and alphabets (e.g., Candan, 2021; de Jong &

[4] As known, while other components were measured three times, word reading was measured only at Time 3. In addition to other components, it was included in the analysis at Time 3.

van der Leij, 2002; Fernandes et al., 2017; İlerten, 2021; Özata, 2018; Perfetti, 2007; Protopapas et al., 2007). To this end, in this study, it was hypothesized that fluent word reading would significantly contribute to reading comprehension in Turkish.

The correlation analysis revealed a strong association between word reading and reading comprehension. This association was supported by hierarchical regression analysis, as well. Word reading accounted for 14% of unique variance in reading comprehension after accounting for the effect of PM and SES, and this contribution continued in the last model of the regression after all variables were entered (see Table 20). The results of a separate simultaneous regression revealed a significant role of word reading in reading comprehension (B = .37). The unique contribution of word reading to comprehension converges with the research hypothesis, and also the findings of previous monolingual (e.g., de Jong & van der Leij, 2002; Fernandes et al., 2017; Perfetti, 2007; Protopapas et al., 2007) and bilingual studies (e.g., Catts et al., 2015; Lervåg & Aukrust, 2010; Verhoeven, 2000) across different languages.

The results of this study have also provided support for Simple View of Reading (SVR) framework that emphasizes the crucial role of word reading (decoding) alongside LC in reading comprehension. According to the SVR, especially in younger children, word reading accounts for significant variance in reading comprehension, but when children become more facile reader over time, LC lends more support to the framework (Gough & Tunmer, 1986; Hoover & Gough, 1990).

Likewise, the current result is convergent with the assumptions of Automaticity Theory by LaBerge and Samuel (1974). The focus of this theory is to illustrate the mechanism in the association between fluent reading and reading

comprehension. During reading, with the automaticity in word reading, attention burden is lowered and more attentional resources can be allocated to text comprehension. In this study, the predictive power of word reading in reading comprehension performance showed the automaticity in word reading, and then, the readers could use more resources for extracting meaning from the text. The results of this study also provide support to the Lexical Quality Hypothesis (Perfetti & Hart, 2002; Perfetti, 2007). Parallel to the SVR and automaticity theory, the proponents of this theory highlight the significant role of fluent word reading in comprehension along with vocabulary knowledge.

6.4.2 The impact of listening comprehension on reading comprehension

Listening comprehension (LC) skill significantly correlates with reading comprehension (Tunmer & Chapman, 2012). The SVR model defines LC, along with decoding (word reading), as a critical component of reading comprehension (Gough & Tunmer, 1986).

In line with the literature, it was assumed in the current study that LC skills that were measured at kindergarten and Grade 1 would uniquely contribute to reading comprehension measured in Grade 1 after controlling for SES and PM.

Broadly, the result of several hierarchical regression analyses indicated that irrespective of the groups, LC was proven to be a longitudinal (kindergarten) and concurrent (Grade 1) predictor of Grade 1 reading comprehension, which was compatible with the assumptions of the SVR. More specifically, the regression analysis showed that Time 1 listening (kindergarten 1) significantly predicted Grade 1 reading comprehension with 13% of variance after entering control variables (i.e., group, SES and PM). However, after entering all variables, the last regression model

revealed vocabulary, PA and the interaction of group and LC as significant predictors of reading comprehension. The follow-up analyses showed that this interaction significantly contributed to reading comprehension (*B* = -.20). This means that the variation in the performance of monolinguals and bilinguals affected the predictive power of listening in reading comprehension. At Time 1, bilinguals performed lower than monolinguals in the LC tests, and in turn, bilinguals' listening performances did not significantly contribute to later reading comprehension, but those of monolinguals did. In a similar vein, at Time 2 (kindergarten 2), LC continued to uniquely facilitate Grade 1 reading comprehension with 15% of variance. Again, after entering all the variables at the last step of hierarchical regression, the results showed that rather than LC itself, the interaction between group and LC predicted the subsequent reading comprehension. The interaction was in favor of the monolinguals, who did better in the LC tests. Further analysis indicated unique contributions of this interaction to Grade 1 reading comprehension (*B* = -.52). As for Time 3 (Grade 1), LC was still a strong indicator of reading comprehension success with an increasing amount of variance (13%). The predictive power of LC in reading comprehension steadily increased from Times 1 to 3. Unlike Times 1 and 2, regardless of the groups, LC skills at Time 3 continued to be a significant facilitator of reading comprehension in the further analysis (*B* = .26). This means that rather than group by LC interaction, LC itself contributed to reading comprehension. That said, LC performances of both monolinguals and bilinguals at Time 3 significantly predicted reading comprehension. In fact, it should be noted that the predictive power of group by LC interaction at Times 1 and 2 in reading comprehension could be affected by task type. The LC test used in kindergarten required vocabulary

knowledge as well as LC skill[5]. To this end, low vocabulary knowledge of bilinguals might affect the role of kindergarten LC in later reading comprehension.

Overall, these findings validated the assumptions of this study, and provided additional support for the SVR with regard to the role of listening in reading comprehension. Similarly, extensive research evidence has emphasized the significant association between LC and reading comprehension both in cross-sectional (e.g., Bonifacci & Tobia, 2017; Proctor et al., 2005), and longitudinal studies (e.g., Babayiğit & Stainthorp, 2013; Catts et al., 2015; Lervåg et al., 2018; Verhoeven & van Leeuwe, 2008). Similarly, the results of L1 (e.g., Babayiğit & Stainthorp, 2013) and L2 studies (e.g., Droop & Verhoeven, 2003; Proctor et al., 2005) have documented the unique association between listening and reading comprehension. In their comprehensive meta-analysis, Yeon and Tamashita (2014) discuss that LC could be considered both as a predictor and a companion variable of reading comprehension since both have common sub-components.

As two fundamental components of the SVR, the proportion of word reading and LC may change with time (Hoover & Gough, 1990; Verhoeven & van Leeuwe, 2008). For less transparent orthographies such as English, the extent of variance explained by word reading comprehension switches from word reading to LC around 8-9 years old (Gottardo et al., 2018). In other words, for these languages, the role of word reading in comprehension may be stronger at the early stages of reading (e.g., Catts et al., 2015). However, in this study, despite significant contributions of both components, Grade 1 LC accounted for more variance in reading comprehension compared to Grade 1 word reading. Similar results for Turkish were documented by Babayiğit and Stainthorp (2011, 2013), who found a stronger effect of listening in

[5] In addition to the Woodcock-Johnson LC Test, a test of text listening was used in Grade 1.

reading comprehension even in early grades. More evidence comes from a study by Droop and Verhoeven (2003) who explored the role of LC along with word reading and vocabulary in reading comprehension in L2 Dutch. This might stem from the highly transparent orthography of languages like Turkish and Dutch in which children reach a certain level in word reading in early grades. That is, as a result of early acquisition of decoding skills and skilled word reading, reading comprehension performances of children were more affected by their listening skills (Babayiğit & Stainthorp, 2011; Verhoeven & van Leeuwe, 2008). After a full master of word reading, the predictive role of listening in reading comprehension will be greater (Beattie, 2018). This shift of variance does not make word reading a less significant construct, though. In fact, Lervåg and Aukrust (2010) reported its contribution to comprehension until late grades in L1 and L2 Dutch speakers.

Therefore, LC and word reading have significantly accounted for a large variance in reading comprehension. In the following part, the role of vocabulary in reading comprehension will be discussed.

6.4.3 The impact of vocabulary on reading comprehension

Due to its well-established relationship with reading comprehension, vocabulary has been widely examined by researchers (e.g., Oulette, 2006; Muter et al., 2004; Sénéchal et al., 2006; Verhoeven et al., 2011) in numerous languages. The results of monolingual and bilingual studies have documented vocabulary to be a direct proxy of reading comprehension beyond word reading and LC (e.g., Geva & Farnia, 2012; Braze et al., 2007). Further, preschool vocabulary has shown to be a stable predictor of later reading comprehension (Lervåg & Aukrust, 2010). In the current study, it was hypothesized that vocabulary would play a unique role in reading

comprehension. To this end, several regression analyses were conducted to identify the longitudinal and concurrent power of vocabulary in Grade1 reading comprehension beyond LC skill.

The results of Time 1 vocabulary analyses indicated a unique contribution of vocabulary to reading comprehension at Time 3. More specifically, having been entered into the regression model after LC, SES, group and PM, vocabulary accounted for 11% of significant variance in subsequent reading comprehension. The further analysis proved unique impact of vocabulary (*B* = .47) on reading comprehension. As to Time 2 vocabulary, the regression model still revealed the significant role of vocabulary in reading comprehension with 10% of unique variance. The further analysis also showed its effect in reading comprehension (*B* = .40). Similarly, the last regression analyses at Time 3 revealed a significant role of vocabulary (6%) in Grade 1 reading comprehension. Also, the follow-up analyses displayed a unique contribution of vocabulary (*B* = .31) beyond word reading and LC.

The findings related to the unique contributions of vocabulary to reading comprehension were convergent with the previous studies in L1 (e.g., Braze et al., 2007; Candan, 2021; İlerten, 2021; Özata & Haznedar, 2018) and L2 (e.g., Lervåg & Aukrust, 2010; Schaars et al., 2019; Tabors et al., 2003; Verhoeven et al., 2011). This study added more empirical evidence to the research on the relationship between vocabulary and reading comprehension. Braze et al. (2007), for example, reported 6% extra variance by vocabulary in reading comprehension over word reading and LC. Cunningham and Stanovich (1997) also detected extra 6.5% role of vocabulary in their study. Similarly, in the current study, two tenets of the SVR, LC and word reading at Time 3 explained a total variance of 27% in reading

comprehension. When added to the model in the following step, vocabulary accounted for 6% of unique variance in reading comprehension. Of special interest, some recent cross-sectional studies in L1 Turkish have presented a direct role of vocabulary in reading comprehension at the primary levels (e.g., Candan, 2021; Özata & Haznedar, 2018). The current study has provided more support to these studies not only in L1 Turkish, but also in L2 Turkish with a longitudinal design. Taken together, regarding L1 studies and L2 studies in various languages, the results of the current study are in line with assumptions about the unique role of vocabulary in reading comprehension (Geva & Farnia, 2012).

With respect to another hypothesis, lexical quality hypothesis emphasizes the significance of high quality vocabulary knowledge in reading comprehension (Perfetti & Hart, 2002; Perfetti, 2007). This is in line with the assumption of this study that vocabulary should play a unique role in reading comprehension. The results of our study provided additional support to this hypothesis, as well. In other words, a direct contribution of vocabulary to reading comprehension was identified. Some evidence for independent effect of vocabulary over LC comes from other studies (e.g., Oullette & Beers, 2010; Verhoeven & van Leeuwe, 2008). For instance, Oullette and Beers documented unique role of vocabulary in reading comprehension among English speakers. Protopapas et al. (2013) found similar results in a longitudinal study with L1 Greek speakers. In their study, vocabulary alone stood for extra 7.8% variance in reading comprehension.

Taken together, as emergent predictors of later reading comprehension, LC and vocabulary together with early effects of word reading remain to be reliable sources individual differences in monolinguals and bilinguals. As Lervåg and Aukrust (2010) argue, initial lag in any of these skills, especially in bilinguals, may

impede the development of later reading comprehension. On the other hand, fluent word reading along with a rich vocabulary and an enhanced LC skill will certainly improve reading comprehension performance of children.

Having focused on the contribution of LC, word reading and vocabulary to reading comprehension, it is important to address to the role of othe components in reading comprehension. The role of PA and RAN in reading comprehension will be presented in the following part.

6.4.4 The impact of PA and RAN on reading comprehension

The previous studies have revealed a small or indirect role of PA and RAN in reading comprehension since these skills have been proven to explain reading comprehension through word reading (see Araújo et al., 2015 for details). In line with the literature, in the present study, it was anticipated that PA and RAN would have indirect roles in reading comprehension, most of which would be through word reading.

The results of several regression analyses showed an early role of PA in later reading comprehension, but not any significant role of RAN in reading comprehension. When entered into the model at Time 1 after LC and vocabulary, PA had a small but significant effect on reading comprehension at Time 3. PA uniquely explained 5% of variance in reading comprehension over LC and vocabulary. Even further analysis showed significant role of Time 1 PA in reading comprehension (B = .29). At Time 2, PA, but still not RAN, continued to be a contributor to Grade 1 reading comprehension with a small but independent variance (4%). However, in the following year, PA measured at Time 3 lost its unique contribution to reading comprehension (B = .09). We should keep in mind the fact that unlike Times 1 and 2,

word reading was measured at Time 3, and it was also entered into the regression analysis at that time. As discussed in the previous parts, word reading and LC at Time 3 were tested as the tenets of the SVR. However, the longitudinal (i.e., kindergarten) and unique predictive power PA in reading comprehension cannot be underestimated. The results of the study revealed an emergent role of PA in later reading comprehension (at least in Grade 1 reading comprehension in this study). Stated differently, PA emerged to be a longitudinal indicator of reading comprehension. In a similar vein, Ergül et al. (2021) point out the role of preschool PA skills in later word reading and reading comprehension in L1 Turkish speakers. That's to say, early PA skills might affect later reading ability to some extent.

The findings related to PA was partly validated the hypothesis of the study. While PA measured at Times 1 and 2 significantly predicted reading comprehension in Grade 1, PA at Time 3 did not contribute to reading comprehension. One explanation might be that PA had an indirect role in reading comprehension through word reading that was found to be a significant predictor of reading comprehension. Word reading was not measured at Times 1 and 2, and PA measured at these times significantly predicted later reading comprehension. However, with the inclusion of word reading at Time 3, PA lost its power, and it indirectly affected reading comprehension. Actually, this might be true since early PA (Times 1 and 2) has shown to be the strongest predictor of later word reading (Time 3). To this end, when entered into the regression model before PA at Time 3, word reading might explain the shared variance with PA in reading comprehension. Similarly, Özata and Haznedar (2018) found an indirect role of PA through word reading in reading comprehension performances of the fourth graders in Turkish.

With respect to RAN, longitudinal (Times 1 and 2) and concurrent (Time 3), RAN failed to predict any variance in reading comprehension measured at Time 3. RAN is widely adressed for its relationship with reading fluency (e.g., Georgio et al., 2008; Norton & Wolf, 2012). To this end, the indirect role of RAN through word reading in reading comprehension was expected at Time 3. Just like PA-word reading association at Time 3, when entered into the regression model before RAN, word reading explained shared variance with RAN in reading comprehension at Time 3. However, unlike PA skills, longitudinal (Times 1 and 2) RAN did not contribute to reading comprehension. One of the reasons for this might be that non-alphanumeric RAN tasks (i.e., objects-colors) were not good at explaining later reading as much as alphanumeric tasks (i.e., digits-letters). This assumption was also supported with the increased correlation between Time 3 RAN and reading comprehension. Another explanation for RAN's failure in reading comprehension could stem from the nature of RAN sets from where they are taken. Regarding the task sets, as Kirby et al. (2010) argue, while digit-letters come from closed sets, objects-colors come from open sets. In this respect, the predictive power of non-alphanumeric tasks might not be as reliable and strong as alphanumeric ones.

To sum up, word reading and LC appeared to be significant predictors of reading comprehension in Turkish, which is in line with the propositions of the SVR. Likewise, compatible with Lexical Quality Hypothesis, vocabulary was identified as a longitudinal and unique contributor to later reading comprehension.

The following sections will present a conclusion including the summary of this research with its main findings and some pedagogical implications that can be drawn considering the findings. In addition, some possible limitations will be highlighted, and some suggestions for further research will be proposed.

6.5 Conclusion

The present study primarily attempted to explore the role of preschool cognitive and linguistic components in later word reading and reading comprehension. To this end, several conclusions can be deduced in light of the findings presented in the current study. First of all, a significant progress was observed in each of the cognitive and linguistic components of reading from Kindergarten to Grade 1 in both Turkish monolinguals and Kurdish-Turkish Bilinguals. This finding lended credence to the argument that reading and its components follow a developmental pattern (Logan, 1997).

Regarding the group performances in the cognitive and linguistic components, some differences between monolinguals and bilinguals have been identified. At the very beginning of kindergarten, monolinguals underperformed bilinguals in PA tests. However, with formal literacy instruction, the monolingual group caught up their bilingual peers. In this sense, the present findings provided support for the previous research. That is to say, due to dealing with two separate linguistic systems in the same mind, bilinguals are aware of the sound structures of each language, and thus they can reflect and manipulate the sounds of each language better than monolinguals can (Bialystok, 2001). In other words, they can develop better metalinguistic awareness skills, namely PA in this study. In a language like Turkish with transparent orthography like Turkish, on the other hand, monolinguals can keep up with bilinguals in PA skills in a very short time (Durgunoğlu & Öney, 1999). Furthermore, monolinguals and bilinguals performed at similar rates in RAN and PM tests, while bilinguals lagged behind monolinguals in vocabulary and LC tests. These findings are also in line with previous research in vocabulary (e.g. Tabors et al. 2003; Uccelli & Paez, 2007; Verhoeven, 2000), and LC (Bonifacci & Tobia, 2017;

Hutchinson et al., 2003; Melby-Lervåg & Lervåg, 2014). It is a well-known fact that restricted vocabulary together with underdeveloped LC skills will have consequences for a bilingual child. Any deficit in these skills will have impact on later reading.

Another finding of the study is that word reading performance of bilinguals were similar to that of monolinguals. Stated differently, bilinguals read words at similar rates to the monolinguals' performance. This means that there is no lag among bilinguals while reading words in a language with a transparent orthography. Considering reading comprehension, however, the bilingual group showed some delays compared to the monolingual group. As two pivotal facilitators of reading comprehension, any lag in vocabulary and LC skills will certainly affect subsequent reading ability (Braze et al., 2007). The initial peformance differences between monolinguals and bilinguals in vocabulary and LC skills continued in Grade 1, as well. Bilinguals' low performance in these skills affected their reading comprehension.

Regardless of the groups, the longitudinal and concurrent analyses of the role of the cognitive and linguistic components revealed that both PA and RAN were significant determinants of word reading in Turkish, but their explanation powers in word reading differed. That is, in Grade 1, concurrent RAN skills emerged to be a better contributor to word reading compared to PA. This is compatible with the previous findings that with automatization in decoding at the end of the first grade, RAN becomes a better predictor of reading in transparent orthographies (e.g., Babayiğit & Stainthtop, 2007; Georgio et al., 2016).

With regard to the predictors of reading comprehension, word reading, as one of the basic components of the SVR framework, significantly contributed to reading comprehension in both groups. This means that reading fluency even in early years

of literacy acquisition can be an important predictor of reading comprehension. The significant role of word reading in reading comprehension also provides additional support to the automaticity theory. That is, with automaticity in word reading, much more cognitive resources could be allocated for higher-level reading skills, and a better performance in reading comprehension. Another component of the SVR, LC significantly predicted reading comprehension. With a high proportion of variance explained by these components in reading comprehension, this result presents strong evidence for the SVR. Likewise, vocabulary independently predicted reading comprehension beyond LC skill and word reading, which is in line with the propositions of the lexical quality hypothesis. Enhanced vocabulary leads to better performance in reading comprehension.

Despite its decreasing role in Grade 1, not preschool RAN but PA appeared to predict later reading comprehension. PA is predominantly discussed to be a determinant of lower-level skills such as word reading. However, in the current study, the predictive power of PA in reading comprehension can be explained by the fact that preschool PA skill was an early developed reading skill in Turkish, and thus, this emergent skill contributed to later reading comprehension. However, when word reading was measured in Grade 1, PA's role decreased and it indirectly contributed to reading comprehension through word reading.

Taken together, the present study was a unique attempt to identify the longitudinal predictors of reading in Turkish monolinguals and Kurdish-Turkish bilinguals. In the following subsections, some pedagogical implications and limitations of the study will be provided, and the chapter will conclude with suggestions for future studies.

6.6 Pedagogical implications

The findings of the current study provide some pedagogical implications for parents, teachers, administrators, and program and material developers. The results of the study make it clear that some preschool cognitive and linguistic components may have longitudinal impact on reading ability. Rich vocabulary knowledge and developed LC skill, for instance, significantly contribute to reading comprehension. In this study, bilinguals with low vocabulary and LC skills showed poor performances in reading comprehension. Thus, it is crucial to take attention to these skills before formal education. Stated differently, in order to reinforce these skills prior to the onset of formal literacy instruction, ample opportunities should be provided for children with weak vocabulary or LC skill at kindergarten level (Verhoeven & van Leeuwe, 2008). Similarly, considering the fact that preschool PA significantly contributes to further word reading and reading comprehension performance, children should be exposed to activities that can enhance their PA skills. This can be succeeded with a rich print environment not only at school but also at home. Emergent print awareness at home significantly contributes to the vocabulary size, PA enhancement, and thus reading ability.

In addition, due to daily use of two languages at the same time, the type or amount of input a bilingual child receives may differ from the monolingual peer. The input the bilingual child gets in L2 (i.e., language of instruction) may not be as rich as the monolingual peer of the language. In this sense, it is important to provide enough input for bilinguals, especially in L2. In a similar vein, the quality of the vocabulary used by teachers, especially in kindergarten has impact on later reading skills (Aukrust, 2007). This means that not only the number of words, but also the depth of vocabulary known by the child matter.

Moreover, active screening and assessment of emergent reading skills prior to formal education will create opportunity to detect any deficiency in these skills (Uccelli & Paez, 2007). Early intervention programs can be developed. The development of these skills can be monitored in later grades and thus their relationship with reading ability can be identified.

Although word reading is an early-developed skill in transparent orthographies, the relationship between word reading and reading comprehension is still critical. To this end, automaticity in word reading and lexical access should be also prioritized at the early school levels (Verhoeven & van Leeuwe, 2008).

6.7 Limitations

The results of the current study should be interpreted tentatively as there were some limitations related to the research design, instruments and instruction.

To begin with the research design, at the onset of the first data collection time, November 2017, the aim was to follow the reading development of the children from kindergarten to Grade 2, and thus the parents of the participants were informed about the longitudinal nature of the study. Unfortunately, due to coronavirus disease (COVID-19) pandemic that emerged towards the end of 2019, as of March 2020, the classes moved online in Turkey. For this reason, the last data collection (Time 4) which was expected to be conducted at the end of Grade 2 could not be fulfilled. The analysis of the current study included data from kindergarten and Grade 1. Data from Grade 2 might have given us a different picture of the reading development in monolinguals and bilinguals, especially in terms of word reading and reading comprehension since these two components were measured only in Grade 1.

Another notable limitation in the research design was related to the sample size of the study. The small sample size did not allow conducting more complex analysis such as structural equation model (SEM), which allows exploring the relationship between all the variables and their direct and indirect contribution to reading comprehension.

Regarding the instruments, although the tests used in this study were widely incorporated in various studies, some of the tests were in the process of standardization. The standardization will contribute to the generalizability of the tests. Also, in the current study, reading comprehension was measured via texts followed by open-ended questions. The type of reading comprehension tests could have impact on the results of the current study (Cutting & Scarborough, 2006). In addition, as known, only Turkish version of the tests were carried out in this study. With the inclusion of Kurdish version of the tests for the bilingual group, within as well as between languages relationships could have been determined. Unfortunately, there was no Kurdish version of any of the tests. The development of reading tests in Kurdish might have enabled us to examine the development of L1 and L2 reading, and the possible cross-linguistic influence between the languages. Similarly, considering Kurdish-Turkish bilingual group, the findings can not be generalized to other bilinguals living in different places of Turkey since each minority has its own linguistic and literacy backgrounds (Öz, 2019).

Another limitation of the study was lack of precise information about bilingual children's L1 Kurdish proficiency. Since there was not any L1 proficiency test available for children at that age, information regarding their L1 proficiency and daily language use was gathered via a questionnaire filled by the parents.

Lastly, there was no information about the teacher's approach to reading instruction in the classroom, which might affect the results of the current study. Concordantly, there was no comparison of the student's interaction with the monolingual teacher and that of bilingual teacher in the classroom.

6.8 Recommendations for further research

The current study investigated the predictors of reading ability in Turkish from kindergarten to Grade 1. In a further study, the development of reading skills in monolinguals and bilinguals can be monitored from kindergarten to later grades in order to determine the contribution of each predictor to reading after the master of basic skills such as word reading. Accordingly, as an important predictor of later reading comprehension, morhological awareness tests can be included in later grades since morphological awareness has been documented to be a strong associate of Turkish with rich agglutinative features (Durgunoğlu, 2017).

Likewise, longitudinal design studies can be conducted with other minorities whose language and literacy backgrounds differ. Along with Turkish tests, including L1 Kurdish tests may reveal any potential relationship between the development of reading skills in both groups, and thereby any kind of cross-linguistic influence (e.g., transfer of skills, strategies) can be determined. In this study, L1 competence of bilinguals was assessed based on the parents' responses to some questions about children's daily language use. L1 proficiency tests can be developed in order to have idea about the level of bilingualism among bilingual children. Also, with larger samples, more complex statistical analysis such as SEM can be administered in the future studies.

As for task types, reading fluency was assessed at word reading level in this study because of the grade level. In the further research, text-level reading fluency can be measured to identify its role with reading comprehension and other variables.

Lastly, parents, teachers and administrators are significant stakeholders of literacy instruction at the very beginning of reading. Therefore, their roles can be integrated into the research design. For instance, teachers may be interviewed, and the implementation of literacy instruction can be observed in the classroom. To this end, further research is needed to gain more insight into reading development.

APPENDIX A

APPROVAL OF THE DISTRICT DIRECTORATE OF NATIONAL EDUCATION

T.C.
İPEKYOLU KAYMAKAMLIĞI
İlçe Milli Eğitim Müdürlüğü

Sayı : 60529165-20-E.19494505 17/11/2017
Konu : Serhat KURT

KAYMAKAMLIK MAKAMINA

İlgi: Serhat KURT'un 13/11/2017 tarih ve 19051858 sayılı dilekçesi

İlgi dilekçede , Boğaziçi Üniversitesi Yabancı Diller Eğitim Bölümü öğretim üyesi Prof. Dr. Belma Haznedar'ın yürütücüsü olduğu " Türkçe okuma edinimini etkileyen faktörler: Tek dili ve dilli çocuklarda Türkçe okuma süreçlerinin değerlendirilmesi " başlıklı Tübitak Projesi kapsamında ilçemizdeki ana okullarına devam eden çocuklardan veri toplama amaçlı projelerini yürütmeleri , müdürlüğümüzce uygun görülmektedir.

Makamınızca da uygun görüldüğü takdirde olurlarınıza arz ederim.

Şükrullah YAVUZER
İlçe Milli Eğitim Müdürü

OLUR

.../11/2017
Cemil ÖZTÜRK
Kaymakam

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T.C.
İPEKYOLU KAYMAKAMLIĞI
İlçe Milli Eğitim Müdürlüğü

Sayı : 60529165-20-E.5630150 18/03/2019
Konu : Anket İzni
(Serhat KURT)

KAYMAKAMLIK MAKAMINA

İlgi : Serhat KURT'un 11/03/2019 tarih ve E.5131042 sayılı dilekçesi.

Boğaziçi Üniversitesi Yabancı Diller Eğitim Bölümü öğretim üyesi Prof. Dr. Belma HAZNEDAR'ın yürütücüsü olduğu "Türkçe okuma edinimini etkileyen faktörler , Tek dilli ve iki dilli çocuklarda Türkçe okuma süreçlerinin değerlendirilmesi " başlıklı Tübitak projesi kapsamında üçüncü aşamasının 06-31 Mayıs 2019 tarihleri arasında müdürlüğümüze bağlı tüm anaokul, ilkokul ve ortaokullarda anket çalışması yapılması planlanmaktadır.

Yapılması planlanan anket çalışması ; Milli Eğitim Temel Kanunu Genel amaçlarına uygun olarak yürürlükte olan tüm yasal düzenlemelerde belirtilen ilke, esas ve amaçlarına aykırılık teşkil etmeyecek şekilde, ilgili mevzuat ve milli güvenliğe aykırı olmamak kaydıyla denetimleri okul müdürleri tarafından gerçekleştirilmek üzere, derslerin aksatılmaması kaydıyla gönüllülük esasına göre ve ücretsiz olarak yapılması, müdürlüğümüzce uygun görülmektedir.

Makamınızca da uygun görüldüğü takdirde olurlarınıza arz ederim.

Eşref YILDIZ
İlçe Milli Eğitim Müdürü .V

OLUR

.../03/2019
Cemil ÖZTÜRK
Kaymakam

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APPENDIX B

CONSENT FORM FOR PARENTS

VELİ ONAY FORMU

Sayın Veli,

Bu çalışmanın amacı **anaokuluna devam eden öğrencilerin Türkçe dil becerileri ve kelime bilgilerinin daha sonra ilkokul birinci sınıfta kelime okuma ve okuduğunu anlama becerilerine etkisini incelemektir.**

Bu çalışmanın çocuklarınız üzerinde hiçbir olumsuz etkisi bulunmamaktadır. Aksine, bu çalışma, anaokuluna devam eden çocuklarınızın dil becerilerinin okul hayatları boyunca okuma becerileri üzerine olan etkilerini görmemize ve herhangi bir sorun durumunda çözümler üretmemize yardımcı olacaktır. Elde edilen veriler sadece bilimsel amaçlarla kullanılacaktır. Sizin ve çocuğunuzun bilgileri saklı tutulacak ve bu bilgiler hiçbir kurum ve kişiyle paylaşılmayacaktır.

Bu çalışmaya katıldığınız için teşekkür ederim.

"Çocuğum,.....'un *Türkçe okuma edinimini etkileyen faktörler: Tek dilli ve iki dilli çocuklarda Türkçe okuma süreçlerinin değerlendirilmesi* başlıklı Tübitak (kod:115K023) projesinde yer almasına izin veriyorum."

Veli Adı-Soyadı:
İmzası:
Tarih:

Serhat Kurt
Boğaziçi Üniversitesi
İngiliz Dili Eğitimi Anabilim Dalı
Doktora Öğrencisi

APPENDIX C

SAMPLE TEST ITEMS

PHONOLOGICAL AWARENESS

SYLLABLE DELETION

resim: -sim *(picture)*

yağmur: yağ *(rain)*

RHYME RECOGNITION

baş: taş, gel *(head: stone, come)*

melek: yelek, okul *(angel: waistcoat, school)*

PHONEME DELETION

ço(k): ok *(much → arrow)*

kar(t): kar *(card → snow)*

RAN (HOTI)

RAN DIGITS

2	6	9	4	7	6	2	9	7	4
9	4	2	7	4	2	6	7	9	6

RAN LETTERS

k s m t b s k m b t

m t s b t k s b m k

PHONOLOGICAL MEMORY:

FORWARD DIGIT

5-9

6-1-2

BACKWARD DIGIT

2-5

3-7-4

NONWORD REPETITION

kun *(nonword)*

kettle *(nonword)*

VOCABULARY

WISC-R

Kalem nedir? *(What is a pen?)*

Tavşan nedir? *(What is a rabbit?)*

LISTENING COMPREHENSION

WOODCOCK-JOHNSON LISTENING

1. Dün sana anahtarlarımı verdim. Sonra da kapıda kaldım. Nerede benim _____. (anahtarlarım)
(Yesterday, I gave you my keys. Then, I got locked out. Where are my keys?)

2. Süt kaynarken başında beklemeliyiz. Yoksa süt _____. (taşar, bozulabilir, bozulacak, bozulur, çürür, bayatlar, küflenir)
(We have to keep an eye on milk untill it boils. Otherwise, milk will spoil/rot.

TEXT LISTENING

AYILAR

Doğada birçok ayı çeşidi vardır. Ayıların, kahverengi, siyah, beyaz gibi renkleri olabilir. Ayılar çok iyi koku alırlar ve çok iyi duyarlar. Ancak gözleri küçük olduğu için iyi göremezler. Her türlü yiyeceği yerler. Birçok ayı tüm kış boyunca uyur. Bu nedenle, uyandıklarında çok aç olurlar.

Ayılar çok hızlı koşarlar. Ağaçlara tırmanabilirler. Ayılar doğada çok tehlikeli olabilirler. Onları görmek isterseniz en güvenli yer hayvanat bahçesidir.

(BEARS
There are many types of bears in nature. Bears can have colors such as brown, black, white. Bears can smell and hear very well. However, they cannot see well because their eyes are small. They eat all kinds of food. Most bears hibernate all winter. Therefore, when they wake up, they are very hungry. Bears run very fast. They can climb trees. Bears can be very dangerous in nature. If you want to see them, the safest place is the zoo.)

SORULAR (QUESTIONS)

1. Ayıların hangi duyu organları diğerlerine göre daha az gelişmiştir? *(Which sense organs of bears are less developed than others?)*
a. Göz *(eye)* b. Burun *(nose)* c. Kulak *(ear)* d. El *(hand)*

2. Ayılar neden uyandıklarında aç olurlar? (*Why are bears hungry when they wake up?)*
.....

WORD READING

bir *(one)*

ama *(but)*

bardak *(glass)*

…

gerçekleştirilmemiş *(unrealized)*

READING COMPREHENSION

WOODCOCK-JOHNSON

‘‘Keşke bir kuş olsaydım,’’ dedi Ceren. ‘‘Bulutların üstüne çıkardım.’’
Soru: Ceren neden kuş olmak istiyor?
……...

(“I wish I was a bird,” said Ceren, “I would be up in the clouds.’’
Question: Why does Ceren want to be a bird?)

TEXT COMPREHENSION

HAYVANAT BAHÇESİNDE DOĞUM GÜNÜ
Güneşli bir pazar günüydü. Yataktan heyecanla kalktım çünkü bugün benim doğum günümdü. Arkadaşlarımı eve çağırmıştım. Birazdan annem ve babamla evi süsleyecektik. Çok güzel bir parti olacaktı. Annem kahvaltıda, “Selin, sana bir sürprizim var. Ancak bunun için evdeki partiden vazgeçmemiz gerekecek.” dedi. Buna biraz üzülerek anneme, ‘‘Ama arkadaşlarım bugün partiye geleceklerdi.” dedim. Annem başka zaman yine parti yapabileceğimizi söyledi. Keyfim biraz kaçmıştı ama sürprizi de merak ediyordum. Hazırlanıp evden çıktık. Babam, “Haydi bakalım arabaya!” dedi. Yol boyunca sustum. Annem yolun sonuna doğru “Sürprize yaklaşıyoruz!” dedi. Geldiğimiz yer hayvanat bahçesiydi. Meğer annem tüm arkadaşlarımı da oraya çağırmış. Hepsi kapıda beni bekliyorlardı. O gün hayatımın en güzel doğum günü oldu.

(BIRTHDAY AT THE ZOO
It was a sunny Sunday. I got out of the bed excited because today was my birthday. to which I invited my friends. We were going to decorate the house with my mom and dad soon. It would be a beautiful party. At breakfast, "Selin, I have a surprise for you. But for that we will have to give up the party at home." my mother said. I got a bit upset and said, "But my friends were going to come to the party today." My mom said we could have party another time. I was a bit sad, but I was also curious about the surprise. We got ready and left the house. My father said, "Let's get to the car!". I was silent all the way. While we were getting close to the zoo, my mom said, ''We are getting close to the surprise!". We were at the zoo. All of my friends had beeen invited to the zoo. They were all waiting for me at the door. That day was the best birthday of my life.)

SORULAR *(QUESTIONS)*

1. Selin sabah kalktığında neden heyecanlıydı? *(Why was Selin exited when she got up in the morning?)*

.....

2. Selin hayvanat bahçesine nasıl gitti? *(How did Selin go to the zoo?)*

.....

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