

Factors in Preschool Period Affecting Reading and Writing Achievements of Turkish Children in the First Grade

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Abstract

This study's aim was to determine the factors affecting Turkish children's reading- writing achievements in the first grade in the preschool period. The prediction level of attention, visual perception (VP), rapid automatic naming (RAN), writing development (WD), and phonological awareness (PA) of the children in the preschool on their success in reading, reading comprehension (RC), and writing in the first grade was investigated longitudinally. In the preschool, 269 kindergarden students participated in the research, 187 out of those who proceeded to the first grade participated the second year of the study. The study was carried out in the screening design. As the result of research, it has been established that VP, PA, RAN, and WD predict the reading rate in the first grade, and that PA and RAN predict the reading accuracy. It has been found out that PA predicts RC and that VP, WD, and PA predict writing.

Keywords: Attention, Visual Perception, Phonological Awareness, Rapid Automatic Naming, Writing Development

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INTRODUCTION

The transition from preschool to elementary school is a critical step in which children acquire basic knowledge and skills. Reading and writing, which are the most important basic skills in this step, are acquired in a developmental process and comprise of a versatile and complicated structure in terms of physical, mental, social, and emotional conditions they require (Gillon, 2004). There is a vast array of knowledge and skills that need to simultaneously come together for reading and writing. Early childhood years are seen as critical years for reading and writing skills, which have multiple interconnected sub-components (Scarborough, 2001; Wang, Yin & McBride, 2015). Being among the interconnected components of reading and writing and the determinant of the potential of being a competent literate, early literacy skills take their roots from the early years of life (Justice & Sofka, 2014).

If the acquisition process of reading and writing skills is to be compared to a pyramid, reading and writing would be located at the top, while early literacy skills would be at the base. Early literacy skills, which constitute the building blocks of reading and writing starting from the early years of life, refer to the prior knowledge, skills, attitudes, and behaviors of individuals pertaining to reading and writing in their preschool period (Gupta, 2009; Sulzby & Teale, 1991; Whitehurst & Lonigan, 1998). These skills are among the strong predictors of individuals' future reading, RC, and writing achievements along with their overall academic success. (Lonigan, Burgess & Anthony, 2000; McCardle, Scarborough and Catts, 2001; National Early Literacy Panel, 2008; Nelson, 2005; Skibbe, Montroy, Bowles & Morrison, 2019; Spira, Bracken & Fischel, 2005; Stevenson & Newman, 1986; Vellutino, Scanlon & Reid, 2003; Whitehurst and Lonigan, 2001).

In longitudinal studies on literacy skills of children at an early age and reading and writing achievements in later years, it is stated that children, who do not have the basic skills required for literacy, face reading and writing difficulties (Cabell, Justice, Konolda and McGinty, 2011; Goodman, Libenson and Wade-Woolley, 2010; Missall, Reschly, Betts, McConneil, Heistad, Pickart, Sheran & Marston, 2007). It is also indicated that deficiencies in these skills have an effect on children's literacy motivation and are determinant in exhibiting problematic behaviors (Spira, Bracken and Fischel, 2005).

According to Whitehurst and Lonigan (2001), early literacy skills are built on two interrelated fields: "inside-out" and "outside-in". While letter-sound relation, phonological awareness (PA), and writing skills constitute the inside-out field; the outside-in field consists of contextual and semantic units. The outside-in skills are skills that have effect upon comprehension after learning reading and writing (Lonigan, 2004). In the learning process of reading and writing, the letter-sound relation, PA, and writing skills constituting the inside-out field are at the forefront. In this process, children decipher the coding system that creates writing and notice that every letter has its own sound. In this context, it can be stated that the inside-out skills take on a great duty in the process of reading and writing acquisition.

There are multiple skills within the scope of early reading and writing skills, which form the basis of literacy starting from the preschool period. It can be indicated that visual and auditory perception, PA, knowledge of letter and alphabet, writing development, word and print awareness, attention, vocabulary, verbal language skills and rapid automatic naming (RAN) are among those skills (Adams, 1990; Akyol, 2018; Eurydice, 2009; National Early Literacy Panel, 2008; National Reading Panel, 2000; Oktay, 2010; Palmer and Bayley, 2008; Rakhlin, Cardoso-Martins & Grigorenko, 2014; Ryan, 2003; Scarborough, 2001). Among those, PA is defined as the recognizing and distinguishing the sounds in words, also as the ability to add and remove sounds for the words (Justice, 2006); while visual perception (VP) is defined as recognizing and distinguishing visual stimuli and interpreting those by associating them with foreknowledge (Frostig, 1964); RAN is defined as the fast and correct vocalization of the objects, colors, numbers, and letters given in a mixed way from left to right (Norton and Wolf, 2012). While A is a nervous system function among stimulants that enables orientation to what is appropriate for requests and needs (Kolb and Winshaw,

1996) writing development (WD) is defined as all the writing-oriented developmental characteristics of the child during the process in which s/he scribbles while starting to discover writing, creates letter-like shapes, draws lines, and writes down letters that make up her/his name (Griffith, Beach, Ruan and Dunn, 2008).

Studies on children's early PA (Levesque, Kieffer & Deacon, 2018; Wang, Yin & McBride, 2015), VP (Kenneth, 1982; Kaiser, Albaret & Doudin, 2009; Wang, Yin and McBride, 2005), RAN (Norton and Wolf, 2012; Wolf and Denckla, 2005), and WD (Matera, 2008; Pierce, 2003) show that these skills are related to future reading, RC, and writing skills.

McBride-Chang, Chung, and Tong (2011) investigated the relationship between the copying skills of Chinese children (3rd and 4th grade) with and without dyslexia in Korean, Vietnamese, and Hebrew words and their skills for reading and writing of Chinese word, rapid naming, morphological awareness, and orthographic processing. As a result of the study, they concluded that three copying skills were related to reading and writing of Chinese word, rapid naming, morphological awareness, and orthographic processing skills. In addition to this, they also found out that reading and writing of Chinese words and rapid naming differentiated between the groups. Wang, Yin, and McBride (2015) examined the predictors of word reading and writing skills in a study they conducted with 73 Chinese kindergarten students (age= 4;9-6,2). As a result of the study, they pointed out the presence of a relation between word reading skills and RAN, between semantic awareness and vocabulary, and between writing words down and visual orthographic copying. They determined that among these skills, semantic awareness is a predictor of word reading and writing.

In their longitudinal study, Inoue, Georgiou, Parrila, and Kirby (2018) examined the developmental relation between home literacy, early literacy, and reading skills (reading fluency and accuracy) through the model they created. As a result of the study, they established that parent teaching predicts the early vocabulary and PA of children, and the interactive book reading practices predict the rapid naming skills of the children. Additionally, they stated that parent teaching and interactive reading have an effect on the reading fluency and accuracy in the first grade while home literacy has impact on the RC in the second and third grades.

In the studies carried out in Turkey on the skills of the children have at their early ages and on the reading and writing achievements in the following years, although it was expressed that reading and writing are affected by some skills, there are limitations in studies in which their effect sizes and relationships are addressed in a holistic framework. Therefore, it is acknowledged that the sub-skills, which lay the groundwork for the literacy processes of Turkish children and that play a role in the flow of this process, should be determined and that having children acquired these skills would prepare them for literacy at an early age. This would not only enable Turkish children to reach the reading and writing maturity but also help them to start first grade with a fast and prepared state of mind. It is assumed that this study would also carry preschool education a further point through alternative teaching practices offered to those in the early childhood education programs.

Turkish, which is the mother tongue of Turkish children, besides many other languages of the world, is an agglutinating language in which the sound-letter relation can be easily established. In Turkish language, every letter is represented with a sound, and every sound is represented with only one letter. Not only does this situation accelerate the letter-sound pairing that brain performs during the word recognition process, but it also facilitates the initial reading and writing teaching process carried out in the first grades in Turkey. According to Dehaene (2007), who studies the neurology of reading, our brain first examines the letters of words and then converts these letters into sounds. Next, it creates syllables and words by combining the created sounds. When the functioning process of reading in the brain and the language features of Turkish are examined, it can be claimed that this process corresponds to the characteristics of Turkish language and is facilitated by the unique structure of the language. In this context, it could be asserted that, this study which has been carried out with Turkish native children is distinctive and particularly important since it takes the characteristics of

Turkish into account and differs from other studies conducted in languages with different structure and letter-sound relation.

Within the framework of these purposes, the relation between *attention*, *VP*, *WD*, *PA*, and *RAN* of children during preschool period and *reading*, *RC*, and *writing achievements* in the first grade was examined. Furthermore, the prediction levels of awareness, *VP*, *WD*, *PA*, and *RAN* in the preschool period on the reading, *RC*, and writing achievements in the first grade were identified. Thus, the following sub-problems have been identified within the scope of the study.

(1) What is the predictive attention, *VP*, *WD*, *PA*, and *RAN* in the preschool period on the fluent reading (rate and accuracy) achievements in the first grade?

(2) What is the predictive attention, *VP*, *WD*, *PA*, and *RAN* in the preschool period on the level of *RC* in the first grade?

(3) What is the predictive attention, *VP*, *WD*, *PA*, and *RAN* in the preschool period on the writing achievement in the first grade?

METHOD

The study was carried out in the screening design. The correlation between children's preschool skills and reading and writing achievements in the first grade was investigated longitudinally. To examine the relation between children's preschool skills and their reading and writing achievement in the first grade, a linear correlation analysis was conducted (as it provides normality assumption regarding the variables). To determine the prediction level of preschool skills on reading and writing, multiple regression analysis was carried out.

Participants

The research was conducted in 5 elementary schools at lower and middle socioeconomic levels in Istanbul province of Turkey between 2018-2020. The research started with 269 Turkish kindergarten students, 160 girls and 109 boys (5;0-6;0 age range), in the spring semester of the 2018-2019 academic year. Among these students who started their first year in the 2019-2020 academic year, some students had to be excluded from the study as they transferred to different schools. The study was completed with 187 students, 83 boys and 104 girls, in the spring semester of the first year.

Procedure

Before the research was conducted, the necessary permissions were obtained from the relevant institutions and the necessary permission forms were obtained from the parents for their children to participate in the research. All applications were made individually in schools. The applications were carried out in two stages. The first phase was completed by measuring children's attention, *VP*, *WD*, *PA* and *RAN* skills in the spring semester of kindergarten. Measurements of attention, *VP*, *WD*, *PA* and *RAN* skills were completed within three months in the spring semester of the kindergarten periods. The second phase resulted in the determination of the students' reading, *RC* and writing achievements while they were first year students. The measurement of reading, writing and reading comprehension achievements of first-year students was carried out in the independent literacy phase of the first literacy teaching process. These measurements were completed within one month.

Measurements

Attention

Children's attention skills were measured by the "Frankfurter Adaptive Concentration Test" (Raatz and Möhlig, 1971). Children were asked to find and mark as many *pears* as they can among the

apple and pear pictures (*apple* = 126; *pear* = 42) given to them mixed within 90 seconds. The number of pears marked at the end of 90 seconds constituted the attention raw score of the child. Since age and gender would affect the result, the calendar age on the day the child took the test was calculated from the corrected score table, and the correction score corresponding to this age was determined. By adding the correction score to the raw score, the attention score that allowed the attention level of the child to be compared with her/his peers was obtained.

Visual perception

The visual perception skills of the children were measured by the "Visual Perception Scale" (Kalkan and Arslan, 2015). The scale consisted of 3 sub-dimensions, namely "Pattern Discrimination", "Figure-Ground Perception", and "Matching", and 20 items in total. The highest score that could be obtained from the scale was 20. The test with 0.84 Cronbach's alpha reliability coefficient took an average of 15 minutes for each student to complete.

Writing development

The "Pre-Writing Skills Test" was used to determine the WD of children (Karaman, 2013). The reliability value of the "Pre-Writing Skills Subtests" test was $KR-20 = 0.77$. The duration of the test with each student took an average of 10 minutes. Children were asked to cut a circle with scissors, write to a friend within a designated area, complete the dashes until the end of the line, remember the text shown and rewrite it, and write her/his name down.

Phonological awareness

Phonological Awareness Scale was used to measure PA of the children (Yangın, Yangın and Erdoğan, 2010). The reliability level of the scale was $KR=0.74$, and the highest score that could be obtained was 35. The subdimensions of the scale were "Recognizing that sentences are made up of words", "Recognizing that words are made up of syllables", "Recognizing that words can be rhymed", "Recognizing that words can start with same vowel", and "Recognizing that words can end with same vowel". The completion of the scale took 20 minutes on average.

Rapid automatic naming

The RAN of the children was measured through Turkish Rapid Automatized Naming Test (Babür and Bakır, 2018). The test consisted of 4 sub-dimensions: pictures, colors, numbers, and letters. In the lower dimensions of the test, children were required to name the symbols they saw quickly from left to right. At the end of the application, the evaluation was carried out by taking the time for students to complete each card and the number of symbols correctly named within that time into account. Given the fact that children do not receive a formal letter training in the kindergartens in Turkey, and hence there were children who did not recognize letters, the subdimension of the test regarding the letters were not used during implementation.

Reading and reading comprehension

In order to determine the reading achievement of students (rate and accuracy) and their RC level, two narrative texts (Little Salmon Fish and Kerem's Decision) prepared by researchers and then edited through asking experts for opinions were used at first grade level.

To determine the reading rate of the children, they were asked to read the narrative text called "Little Salmon Fish". The number of words read correctly within one minute was recorded as the reading rate. To determine the reading accuracy achievement, the number of words read correctly in one minute was proportioned to the total number of words read in one minute. The result obtained was referred as a percentage, and the reading accuracy achievements of the students were determined.

To determine the RC level of the students, they were firstly asked to read two narrative texts. Comprehension questions at simple and inferential level prepared for narrative texts were used to determine the level of comprehension of the students. After reading the texts, students were given comprehension questions in written form and asked to answer the comprehension questions as the same way. Reading Inventory developed by Ekwall and Shanker (1988) and adopted by Akyol (2012) was used to form the comprehension scores of the students. For the simple-level comprehension questions, unanswered questions were scored as "0", half answers as "1", and complete answers as "2". For the inferential-level comprehension questions, unanswered questions were scored as "0", half answers as "1", expected yet incomplete answers as "2", and complete and effective questions as "3". At the end of the implementations, total comprehension scores of the students from two different texts were created. The mean scores of the two texts were averaged, and the RC scores of the students were formed.

Writing

To evaluate the writing achievements of the students mechanically, "Writing Achievement Evaluation Form" was used. The form consisted of 8 items: "Font Size, Line Writing, Writing Style of Letters, Writing Order, Spacing Between Words, Paper Layout, Spacing Between Letters, and Writing Cleanliness". The highest score that could be obtained from the form was 8, and the lowest score was 0. In determining the mechanical writing achievement of the students, what they wrote were used to be able to answer the comprehension questions.

RESULTS

In this section, descriptive statistics, correlation, and multiple regression analysis results regarding the data are presented.

Table 1. Descriptive statistics on variables in the preschool period and first grade

N=187	\bar{X}	sd	Max. Value of the Test	Min. Value of the Test	Max. Value of the Students	Min. Value of the Students
1	32.50	6.16	48	0	44	10
2	15.01	2.62	20	0	20	8
3	5.84	1.50	9	0	9	0
4	17.34	6.65	35	0	32	0
5	69.47	22.77	-	0	169.24	0
6	29.55	12.26	113	0	70	10
7	93.14	8.04	100	0	100	57.14
8	6.23	3.29	13	0	13	0
9	4.34	2.11	8	0	8	0

1: Attention, 2: VP, 3: WD, 4: PA, 5: RAN (duration/second), 6: Reading rate, 7: Reading accuracy (%), 8: RC, 9: Writing success

Table 1 contains descriptive statistics on the variables in the preschool period and first grade. When average values on the skills of the students in the preschool period and first grade are compared with the maximum and minimum values that can be obtained from the test, it can be safe to assume that these skills of students are at a moderate level.

Table 2. The linear correlation analysis results between variables in the preschool period and first grade

N=187	1	2	3	4	5	6	7	8	9
1	1.000	-	-	-	-	-	-	-	-
2	.191**	1.000	-	-	-	-	-	-	-
3	.278**	.181*	1.000	-	-	-	-	-	-
4	.287**	.270**	.272**	1.000	-	-	-	-	-
5	-.299**	-.078	-.094	-.043	1.000	-	-	-	-
6	.305**	.334**	.326**	.361**	-.179*	1.000	-	-	-
7	.063	.198**	.135	.252**	-.109	.611**	1.000	-	-
8	.184*	.251**	.190**	.345**	-.092	.548**	.405**	1.000	-
9	.245**	.246**	.322**	.273**	-.043	.308**	.161*	.484**	1.000

1: Attention, 2: VP, 3: WD, 4: PA, 5: RAN (duration/second), 6: Reading rate, 7: Reading accuracy (%), 8: RC, 9: Writing success * $p < .05$ ** $p < .01$

When Table 2 is analyzed, it is seen that there is a positive and moderate level significant correlation between the attention ($r = .305$), VP ($r = .334$), WD ($r = .326$), and PA ($r = .361$) of the students in their preschool period and their reading rate in the first grade ($p < .01$). These results point out that children with high level of attention, VP, WD, and PA in the preschool period also have high level of reading rate in the first grade.

However, there is a negative low-level significant correlation between the RAN in the preschool period and reading rate in the first grade ($r = -.179$; $p < .05$). Since the naming success increases as the duration decreases in the rapid naming, this result obtained demonstrates that reading rates of the children who have low naming duration in the preschool period, and thus high naming success are high in the first grade.

It is observed that there is a positive low-level significant correlation between the reading accuracy of the students in the first grade and VP ($r = .198$) and PA ($r = .252$) in the preschool period ($p < .01$). The result of this analysis marks that children with a high level of VP and PA in the preschool have higher reading rate in the first grade than others. In addition to that, there is a positive and moderate level significant correlation between the reading accuracy ratio and their reading rate ($r = .611$, $p < .01$).

There is a positive low-level significant correlation between the RC level of the students in the first grade and attention ($r = .184$, $p < .05$), VP ($r = .251$, $p < .01$) and WD ($r = .190$, $p < .01$) in their preschool period, and there is a positive and moderate level significant correlation between their PA ($r = .345$, $p < .01$). This result implies that children with high levels of attention, VP, WD, and PA in the preschool have high levels of RC in the first grade. Furthermore, it is observed that there is a positive and moderate level significant correlation ($p < .01$) between RC in the first grade and the reading rate ($r = .548$) and writing achievement ($r = .405$).

It is observed that there is a positive low-level significant correlation ($p < .01$) between the writing achievements of the students in the first grade and attention ($r = .245$), VP ($r = .246$) and PA ($r = .273$) in the preschool period. There is a positive and moderate level significant correlation between the writing achievement in the first grade and WD in the preschool period ($r = .322$; $p < .01$). These results indicate that children with high level of attention, VP, PA, and WD in the preschool have high writing achievement in the first grade. Along with this, there is a positive and moderate level significant correlation between writing achievement in the first grade and the reading rate ($r = .308$, $p < .01$) and RC ($r = .484$, $p < .01$); and a positive low-level significant correlation with reading accuracy rate ($r = .161$; $p < .05$).

Table 3. The multiple regression analysis result regarding the prediction of reading rate of preschool period on the skills in the first grade

N=187	B	Std. Error	β	t	p
Stable	3.505	7.030	-	.499	.619
1	.186	.144	.093	1.289	.199
2	.701	.326	.150	2.151	.033*
3	1.340	.589	.164	2.276	.024*
4	.416	.131	.226	3.174	.002*
5	-.080	.037	-.149	-2.190	.030*
	R ² = 0.238	R = 0.488	F = 11.300	Durbin Watson: 2.019	p < .05

1: Attention, 2: VP, 3: WD, 4: PA, 5: RAN (duration/second) *p < .05

Table 3 contains the results of multiple regression analysis on the prediction of reading rates of the students by their skills in the preschool period. According to the Durbin Watson coefficient (2.019) in the analysis results, there is no multi-collinearity between independent variables. When Table 3 is examined, it is observed that there is a statistically significant correlation between preschool skills of the students and their reading speed in the first grade (R = 0.488, p < 0.05). In addition to that, the skills of the students in the preschool period have a significant impact on the reading speed in the first grade. According to the R² value, 23.8% of the total variance regarding reading rate of the students in the first grade is explained by their skills in the preschool period. And when the t test results regarding the significance of the regression coefficients are examined, it is seen that the VP, WD, PA, and RAN of skills in the preschool period predict the reading rate in the first grade.

Table 4. The multiple regression analysis results regarding the prediction of preschool skills on reading accuracy achievement in the first grade

N=187	B	Std. Error	β	t	p
Stable	86.021	4.851	-	17.731	.000
1	-.114	.100	-.088	-1.149	.252
2	.393	.225	.128	1.748	.082
3	.675	.406	.126	1.660	.099
4	.293	.0901	.242	3.235	.001**
5	-.059	.025	-.166	-2.326	.021*
	R ² = 0.157	R = 0.396	F = 6.731	Durbin Watson: 2.055	p < .05

1: Attention, 2: VP, 3: WD, 4: PA, 5: RAN (duration/second) *p < .05 **p < .01

Table 4 presents the results of multiple regression analysis on the prediction of correct reading achievements in the first grade by their skills in the preschool period. According to the Durbin Watson coefficient (2.055) in the analysis results, there is no multi-collinearity between independent variables. When Table 4 is examined, it is observed that there is a statistically significant correlation between preschool skills of the students and their reading rate in the first grade (R = 0.396, p < 0.05). In addition, the skills of the students in the preschool period have an important effect on their reading achievement in the first grade. According to the R² value, 15.7% of the total variance regarding reading accuracy achievement in the first grade is explained by the skills in the preschool period. When the t test results regarding the significance of the regression coefficients are analyzed, it is seen that the VP, WD, PA, and RAN of preschool skills predict the reading rate in the first grade.

Table 5. The multiple regression analysis result regarding the prediction of reading comprehension (RC) level of preschool period on the skill in the first grade

N=187	B	Std. Error	β	t	p
Stable	1.023	1.971	-	.519	.605
1	.005	.040	.010	.134	.894
2	.163	.091	.130	1.790	.075
3	.174	.165	.079	1.053	.294
4	.142	.037	.287	3.858	.000**
5	-.013	.010	-.089	-1.254	.212
	R ² = .167	R = .409	F = 7.268	Durbin Watson: 1.576	p < .05

1: Attention, 2: VP, 3: WD, 4: PA, 5: RAN (duration/second) *p < .05 **p < .01

Table 5 shows the results of multiple regression analysis on prediction of RC of the students by their skills in the preschool period. According to the Durbin Watson coefficient (1.576) in the analysis results, there is no multi-collinearity between independent variables. When Table 5 is analyzed, it is seen that there is a statistically significant correlation between the preschool skills of the students and their RC level ($R=0,409$, $p<0.05$). In addition, the skills of the students in the preschool period have an important effect on RC in the first grade. According to the R^2 value, 16.7% of the total variance on the RC in the first grade is explained by the skills in the preschool period. When the t test results regarding the significance of the regression coefficients are examined, it is seen that the PA of the skills in the preschool period predicts RC in the first grade.

Table 6. The multiple regression analysis results regarding the prediction of preschool skills on writing achievement in the first grade

N=187	B	Std. Error	β	t	p
Stable	-.893	1.237	-	-.722	.471
1	.018	.025	.054	.724	.470
2	.120	.057	.149	2.090	.038*
3	.373	.104	.265	3.599	.000**
4	.050	.023	.158	2.169	.031*
5	-.003	.006	-.032	-.460	.646
	$R^2 = .205$	$R = .452$	$F = 9.320$	Durbin Watson: 2.086	$p < .05$

1: Attention, 2: VP, 3: WD, 4: PA, 5: RAN (duration/second) * $p < .05$ ** $p < .01$

Table 6 displays the results of multiple regression analysis on the prediction of writing achievements in the first grade by their skills in the preschool period. According to the Durbin Watson coefficient (2.086) in the analysis results, there is no multi-collinearity between independent variables. When Table 6 is analyzed, it is seen that there is a statistically significant correlation between the preschool skills of the students and their writing achievements in the first grade ($R=0,452$, $p<0.05$). In addition to that, the skills of the students in the preschool period have a significant impact on the reading speed in the first grade. According to the R^2 value, 20.5% of the total variance regarding writing achievement in the first grade is explained by the skills in the preschool period. When the t-test results regarding the significance of the regression coefficients are examined, it is observed that VP, WD, and PA of the preschool skills predict writing achievement in the first grade.

DISCUSSION

In this study, the prediction level of attention, VP, RAN, WD, and PA of children in the preschool period on their success in reading, RC, and writing in the first grade of elementary school was investigated longitudinally.

PA is one of the preschool skills considered within the scope of the factors affecting the reading and writing achievements of Turkish children in the first grade. PA has an important place with respect to its relationship with the method used in reading and writing teaching in the first grade of Turkish primary schools. In the process of "Sound based first reading and writing teaching" conducted in the first grades, the main expectation from students is to be able to distinguish the sounds. Along with that, this process also includes skills such as being able to recognize the sound at the beginning and the end of the word, to syllabify the words or to combine the syllables, and realizing that words make up sentences which also constitute the sub-dimensions of PA. When the function of PA in establishing the letter-sound relation during the reading and writing acquisition and the act of reading is evaluated, it is assumed that Turkish children with PA skill acquired at early ages would have more effective reading and writing process in the first grade of primary school, and their RC levels would increase along with reading and writing. In line with the results obtained from the studies similar to the current study (Levesque, Kieffer & Deacon, 2018; Lonigan, Burgess & Anthony, 2000), it is safe to presume that students who are familiar with phonemes would substantially improve their word recognition skills during reading; therefore, automaticity and fluency would also increase. Hence, fluency increasing in accordance with PA is considered to have a feature that also allows students to be able to allocate more time for comprehension during reading.

It can be articulated that reading is a process of perceiving, distinguishing, and interpreting written symbols, while writing is the process of transferring the information created in the mind on the ground with symbols that are visually distinguished from each other. VP is one of the active preschool skills during the process in which eyes recognize and perceive letters and symbols on the ground and distinguish them from each other while reading. VP, which starts to develop in the preschool years, has an important role in daily lives of children, exhibiting developmental characteristics appropriate for their ages and expected academic performances during their school years. (Brown, Rodger & Davis, 2003). In the process of acquisition and use of literacy, which forms the basis of these academic performances, the child should be able to visually perceive and distinguish the figures and letters written on the paper (Razon, 1982). Additionally, s/he should also be able to comprehend the similarities/differences between symbols and use the visual location (right-left; up-down) that eye movements would need while performing acts of reading-writing (Ryan, 2003). This occurs with the VP skill that develops during the literacy development process in the preschool period. Eyes do not constantly move during reading; they perform jumping and pausing movements within the lines (Batemanazan, Jaafar and Salehuddin, 2014). These movements constitute the physiological dimension of reading. An individual performs long jumping movement for the known visual stimuli and short jumping movement for the stimuli that s/he has not encountered before. Visual stimuli perceived and recognized as a result of these eye movements are transmitted to the brain. These visual stimuli are written symbols on the page. Written symbols transmitted to the brain become meaningful through bringing previous experiences and prior knowledge together in individuals' minds. In this way, reading is performed successfully. Similarly, the symbols seen with the visual-textual copying skill are perceived and distinguished better; they can be successfully and accurately transferred to writing. As a result of this study, it has been determined that the VP skills of Turkish children in their preschool period are essentially related with their reading (rate and accuracy), RC, and writing skills in the first grade. In addition, it has been observed that the VP developing in Turkish children during preschool period is a skill that can predict the reading rate and writing achievements in the first grade at an early age. Based upon studies that are similar to the results of this research (Kaiser et al, 2009; Kenneth, 1982; Wang, Yin & McBride, 2015), it can be declared that the process of reading and writing, which are fundamentally visual and perception procedures, is influenced by the VP of individuals. It can be asserted that for the symbols (letters) used during writing to be physically produced correctly, the structure of the symbol should be perceived correctly first. Visually correct and complete perception of symbols would pave the way for their mechanically successful production during writing. In similar vein, it can be stated that individuals with good VP skills would be able to recognize, perceive and distinguish each symbol unit that makes up words more quickly and accurately during reading. It can be indicated that the increase in reading achievement (rate and accuracy), which is basically an act of understanding (Duke & Carliske, 2011), supports the development of comprehension skills. The connection between RC and VP can be explained in this way. In the same vein, as Barret (1965) argued, VP and discrimination are considered to have an important position especially upon the reading abilities of the first grade students.

One of the preschool developmental features that prepare children for writing practice from an early age is the WD of the children. During this period, children draw lines that cannot be described as writing and scribble by drawing letters and shapes. They attempt to imitate adult writing by pretending to write. All these elements have great importance for the developmental writing process of the child (Griffith et al., 2008). Drawing lines and scribbling enable children to master the use of written language, a complex and mental process, in compliance with its rules (Bodrova and Leong, 2007). According to Vygotsky's approach, these drawings and scribbles are characterized as sort of writing activity. According to Vygotsky, all kinds of drawings carried out by preschool children are expressed as prerequisites for writing in the later years. (Bodrova & Leong, 2007; Ceo, 2009). In this period during which gross motor activities used actively while scribbling and drawing take place, the groundwork is laid for fine motor skills that are used for writing process in the following years. Scribbles and drawings that are characterized as writing by children can be evaluated as initial acts for children to reach writing maturity by using writing tools effectively. As a result of this study, it has been observed that the WD of children in their early years is a strong predictor of the writing skills in the first grade of primary school. In his studies on children's early writing attempts, Clay (1975) points

out that activities supporting the WD, such as scribbling and drawing, have a critical role in exploring writing for children (cited in Griffith et al., 2008). In line with these results, as Matera (2008) and Pierce (2003) also states, it can be implied that in order for children to exhibit a successful mechanical writing performance in their elementary school years, their WD should be supported, and they should be prepared for formal writing in preschool period. Starting from early ages, it is thought that providing children experiences with paper and pencil, introducing them to the writing tools and guiding them to use these tools actively, establishing an environment where they can be occupied with writing activities and having writing materials in easily accessible places would support WD. In this way, children would be encouraged to write in the writing environment they are in through the writing materials (Vacca, Vacca, Gove, Burkey, Lenhart & McKeon, 2006), and while realizing the relation between written language and spoken language (Griffith et al., 2008), they would also have a solid and fast start for the writing skill.

One of the preschool skills involved in the process of recognizing the letters that make up words during reading, transmitting them to the mind and perceiving them, and converting them into phonemes and then vocalizing is the RAN. In the process of RAN, symbols are recognized, perceived, and voiced from left to right as quickly as possible (Norton and Wolf, 2012). Rapid naming, which is similar to reading in terms of physical and mental process, is thought to be related to reading skills with respect to rapid recognition and correct vocalization function of the symbols. While establishing the connection between RAN and reading, Wolf and Denckla (2005) indicate that both skills have similar motor, linguistic, and cognitive stages. During the act of reading, while transforming visually received letters into sounds, the individual also carries out the voicing procedure for the visual symbols perceived in the rapid naming process. In this framework, reading achievement of individuals is considered to be related to the RAN. As a result of this study carried out with Turkish children, it has been determined that the RAN skills of children in their preschool period are significantly related to their reading rate in the first grade. The obtained findings are similar to the results of the studies in the literature conducted with children whose mother tongue is different (Norton and Wolf, 2012; Wang, Yin & McBride, 2015; Wolf and Denckla, 2005). The decrease in time for RAN indicates that naming achievement increases. Therefore, it can be indicated that individuals who can recognize and voice the symbols they see in a shorter period of time recognize the letters they see during reading faster and convert them into phonemes. In this respect, it can be indicated that the RAN skill is among the sub-skills that are actively used during the act of reading and working in the background of the mind. The results obtained from this study carried out with Turkish native children also reveals the function of the RAN not only in languages where a letter is vocalized with multiple sounds, but also in Turkish where each letter is vocalized with only one sound.

Limitations

There are three different limitations of this study. The first is that the study was carried out with Turkish children. The findings may vary in children with different languages. The second limitation is that the study group consisted of 187 students at lower and middle socioeconomic levels. This may limit the generalizability of the findings to larger numbers and higher socioeconomic level children. The third limitation is that a total of eight different skills of children were measured; five being in the kindergarten, and three being in the first grade. In the process of taking measurements, these may have compelling tasks for those who have not developed literacy skills in the kindergarten and for students who have reading writing difficulties in the first grade.

Conclusion and Inferences

The early years of life are critical times for children to prepare for later reading writing skills, and for them to acquire and develop their early literacy and other skills in the preschool period. In this longitudinal study, the relationship between reading, RC, and writing skills and preschool skills of the individuals has been determined. With the results obtained, the skills that should be prioritized in preschool education have been brought to the fore in order to be able to prepare for the next education steps. In addition to that, by determining the skills that children have starting from preschool period,

this study have indicated the way to determine the possible literacy difficulties that they may experience in the following years.

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