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INVESTIGATING THE RELATIONSHIP BETWEEN VISUAL LITERACY AND RAPID AUTOMATIZED NAMING SKILLS IN 5-6-YEAR-OLD CHILDREN

Abstract: This study aimed to determine the relationship between the visual literacy levels of children attending preschool education institutions and their rapid automatized naming skills. A total of 160 children, 77 girls, and 83 boys, aged 5-6 years, attending independent kindergartens, took part in the research. The "Personal Information Form," the "Visual Literacy Assessment Tool for Children Aged 5–6 Parent's Form," and the Rapid Automated Naming Test (HOTIT) were used to collect the data. The predictive correlational research design was used in the study; Pearson's correlation coefficient and "multiple regression" analysis were used to determine the predictors of visual literacy skills. It was found that there was a high negative correlation between the skills of the Rapid Automatized Naming Test and the picture sub-dimension and a similarly high negative correlation between the Rapid Automatized Naming Test color skills.

Keywords: Preschool, visual literacy, rapid automatized naming.

Introduction

In the century we live in, the criterion of healthy communication is no longer just verbal communication; the concept of visual communication has also been added to this communication path. In particular, some changes, such as technological developments and the ease of accessing visual technological products, draw attention to the need to focus more on visual elements in the process of interpreting and interpreting messages (Sahin, 2014). The concept of visual literacy was first introduced by Debes (1968) and defined as a group learning ability that individuals develop by seeing and including all other perception experiences in this process. According to Hortin (1980), this definition developed within the framework of different perspectives: the capacity to read and understand visual elements and to learn through visuals; Pettersson (1993) defines communication ability through various visuals as According to Heinic, Molenda, Russell, & ve Smaldino (1996), it is considered a tool used to interpret visual messages. To support the development of visual literacy skills, it should not be limited to including this concept as an add-on to any educational content; on the contrary, it should be considered as a specific area that provides individuals with the ability to communicate using visuals and provides opportunities to increase the quality of learning (Bleed, 2005). In the educational context, the concept of visual literacy is not used as a rival to traditional literacy; it is extremely important to consider it as a meaningful complement to it and to consider this content in curricula (Chauvin, 2003). In terms of skill area, it is

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possible to say that visual literacy is an interdisciplinary skill field that covers different fields such as anatomy, art, biology, communication, education, and engineering. In the context of visual literacy, skills such as understanding visual messages and producing creative visual messages attract attention (Pettersson, 2009).

Considering the basic concepts of visual literacy, Alberto, Fredrick, Hughes, Mcintosh, & Cihak (2007) talk about the content of reading pictures and logos. According to this, personal pictures, pictures describing the purposes of social usage areas, information posters, etc. Being able to distinguish and interpret the pictures in different ways defines the picture-reading process. However, in the logo reading process, the purpose and content of the logos are distinguished and understood. In another source, the concepts associated with the visual literacy process are mentioned without distinguishing between visual thinking, visual learning, visual language, visual communication, and visual literacy (Sahin & Kiran, 2011; Robertson, 2007; Gunay, 2008). images, figures, diagrams, etc. in the content of visual thinking to be able to interpret them using visual elements. Visual learning, on the other hand, takes place after the visual thinking process, and in this process, it is aimed to realize visual learning at higher levels such as picture and word combinations, graphics, video, and computers. It is emphasized that visual language has an alphabet for itself and is evaluated in categories such as body language, sign language, and symbol language (Sahin & Kiran, 2011). It is noteworthy that the message is conveyed through visual products without words in visual language (Robertson, 2007). Finally, the concept of distinguishing the image is pointed out by focusing on the similarities and differences of many images (Sahin & Kiran, 2011). Visual literacy, essential in the thinking process, is the basis of reading and writing and comes before classical literacy (Stokes, 2002 cited in Sahin & Kiran, 2011). When evaluated in this context, it is noteworthy that it is an area that can be associated with the rapid automatized naming skills.

Naming speed is based on an individual's ability to name visual symbols in the fastest and most accurate way. This process is related to how quickly the brain can organize visual and linguistic processes. The processes that are effective in the development of reading are also effective in the rapid automatized naming process; it allows the evaluation of children's reading development (Wolf & Denckle, 2005; cited in Bakir & Babur, 2018). In the fast automatic naming process, letters, shapes, colors, and numbers given in a complex order are named from right to left, accurately and quickly (Norton & Wolf, 2012). In this process, the naming times of familiar images are noted, and the results are expected to provide information about the processing speed of children. Processing involves the phonological production of quickly recalled information from long-term memory (Georgiou, Parrila, Cui, & Papadopoulos, 2013; cited in Surgen, 2019).

Phonological cycle; verbal information is stored in short-term memory, and the visual-spatial registry performs the function of storing visual information in short-term memory in the same process. The relationship between rapid automatic naming and reading, both skills use similar mental skills. From this point of view, it can be said that the mechanisms of seeing, recognizing/understanding, and pronouncing work similarly in both rapid automatic naming and reading (Pikulski & Chard, 2005). When both components are evaluated together; It is noteworthy that as the number, length, and complexity of each information entered increases, it becomes more difficult to remember. If the central manager is; it coordinates this process, encodes, and recalls data placed in long-term memory (Dehn, 2006, Gatherloce et al., 2004; cited in Demirtas, 2017).

One of the reasons why measurement tools that evaluate rapid automatized naming are frequently used in the field of education is that they offer a strong relationship with reading. Starting from here; the reading performance of the students is determined and the situations that cause reading failure can be investigated. Quick naming; includes components such as attention, visual discrimination, and phonological features, and these components are vital for rapid automatized naming to function (Denckla & Rudel, 1974; Wolff, 2014; Decker & Carboni, 2011; Siddaiah & Padakannaya, 2015) conceptualized the relationship between reading and rapid automatic naming as systems with overlapping perceptual, cognitive, linguistic, and motoric processes. Both reading and fast automatic

naming are based on the serial naming of images. For example, a student who is just learning to read makes vocalizations with the help of letters. At this point, it is thought that visual literacy skills are related to rapid automatic naming. Visual literacy, as it can be understood, includes the actions of "reading" and "writing". In other words, visual literacy is a process consisting of comprehension (reading) and narration (writing) skills. There are studies indicating that rapid automatic naming intervention is effective in terms of word reading speed (Wolf and Denckla, 2005 as cited Bakir & Babur, 2018) Wolf (2014) states that reading exercises supported by visuals affect rapid automatic naming. It is also stated in studies that such intervention studies are effective, especially in children with dyslexia (Vander Stappen, & Reybroeck, 2018). The rapid development of automatic naming skills can consist of letters, numbers, pictures, or colors. In many studies, it has been shown that children's performance in rapid automatic naming tests using alphanumeric expressions is a stronger predictor of literacy skills than performance in rapid automatic naming tests using pictures and colors (Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004; Savage, Pillay, & Melidona, 2008). However, significant correlations have also been reported between picture/color fast automatic naming performance and literacy skills (Albuquerque, 2012; Caravolas et al., 2012; Pauly et al., 2011).

In the century we live in, the individual now wants to see rather than read (Kress, 2003). It is increasingly important to understand, think about and produce images that have become a rapidly rising value over the last century; this situation increases the interest in visual literacy (Felten, 2008). Visual literacy is a skill that is necessary today because it makes thinking more specific. Most people now prefer to talk about the photo they see in the newspaper or the video they watch on TV rather than the books they read. The reason for this is; Although words are images that enable a person to understand what concepts and objects are; Because the photograph is concrete, it reflects the facts (Hoffman, 2000). Just as this situation has necessitated the necessity of learning the meaning of written words and written texts today, it has become a necessity to learn to read and understand the components of visual language (Parsa, 2007).

When the literature is examined, it is noteworthy that fast automatic naming is also discussed with names such as visual naming and continuous rapid naming (Norton & Wolf, 2012). This situation suggests that examining the existence of a possible interaction with the concept of visual literacy, which includes visual language, visual discrimination, visual thinking, reading pictures and logos, visual communication, and visual language, will contribute to the literature. In this context, this research is aimed to examine the rapid automatic naming performances of 5-6-year-old children and their predictive status of visual literacy skills.

Method

In this study, the predictor of visual literacy skills of rapid automatized naming skills of children aged 5–6 years and attending preschool education was investigated. A predictive correlational research design was used in the study. By examining the relationships between the variables, the changes in the dependent variable depending on the independent variable are explained (Buyukozturk, Kilic-Cakmak, Akgun, Karadeniz, & Demirel, 2008).

Participants

The study group of the research consists of children (n = 160) who are in the 5–6 age group and attend independent preschool education institutions in the central districts of Ankara. An appropriate sampling method was used to be easily accessible in the selection of the study group. The appropriate sampling method is to select the sample from easily accessible and applicable units due to the limitations in terms of time, money, and labor (Buyukozturk et al., 2008). The demographic characteristics of the study group are presented in Table 1.

Table 1. Demographic characteristics of the study group

Variables	Subcategories	N	%
Gender	Girl	83	51,9
	Boy	77	48,1
Age	5 year	14	8,8
	6 year	146	91,3
Pre-school education period	1 year	63	39,4
	2 years or more	97	60,6
Birth order	First child	81	50,6
	Second child	19	11,9
	Third child	60	37,5
Mother age	20-29 year	37	23,1
	30-39 year	102	63,7
	40-49 year	21	13,2
Mother's educational status	Literate	34	21,3
	Primary school	40	25,0
	Secondary school	56	35,0
	University	30	18,7
Father age	20-29 year	10	6,2
	30-39 year	106	66,3
	40-49 year	44	27,5
Father's educational status	Literate	8	5,0
	Primary school	35	21,9
	Secondary school	70	43,8
	University	47	29,3

When Table 1 is examined, 51.9% (n =83) of the children participating in the study were girls and 48.1% (n =77) were boys. It is seen that 91.3% of them are in the age group of 6 (n =146) and 8.8% (n =14) of them are in the age group of 5. When the duration of children's preschool education is examined, 39.4% (n =63) benefited from preschool education for one year and 60.6% (n =97) for two years or more; in the birth order variable, it was determined that they were the first child at most with a rate of 50.6% (n =81). Most of the mothers were between the ages of 30-39 with a rate of 63.7% (n =102). It is noteworthy that the number of fathers is the highest in the same age group with a rate of 66.3% (n =106). When the mother's education level was examined, 40% of the mothers were primary school graduates (n = 64); fathers were found to be secondary school graduates with 43.8% (n = 70).

Data Collection Tools

General Information Form: In the general information form prepared by the researchers to obtain demographic information about the children participating in the study and their families, there are questions about the age and gender of the child, the duration of preschool education, the order of birth, and the age and education level of the parents.

Visual Literacy Assessment Tool for 5-6 Years Old Children-Parent Form: The form developed by Ozkubat (2015) includes 14 items for parents to evaluate their children's visual literacy. In the findings obtained from the validity and reliability analyses of the form, the KMO value is.909, Bartlett Sphericity The test value is also significant [$x2 = 3745,794$ p<.01]; in the exploratory factor analysis results of the test, a single factorial structure emerged and the factor load values of the items were between 0.54 and 0.82; the eigenvalue was 7.41; Cronbach's Alpha value was 0.93; the explained variance was found to be 52.97%. If the maximum score that can be obtained from the scale evaluated with a 5-point Likert scale is 60, the minimum score that can be obtained is 14.

Rapid Automatized Naming Test: The scale developed by Bakir and Babur (2018) consists of four subtests consisting of pictures, colors, numbers, and letters. Each subtest is presented on separate cards, and five different symbols are arranged in a shuffled sequence to be repeated ten times on five separate lines. In

this study, only the picture and color subtests were used since the study was conducted with a preschool group sample. In the pictures subtest, pictures of dogs, flowers, hands, pencils, and tables that children often encounter in their immediate surroundings; in the colors subtest, the colors black, blue, green, red, and yellow are expected to be named quickly. In the application phase of the scale, an attempt is made to determine whether the children know these symbols without a time limit, and the unsuccessful children are not taken to the test. When the actual practice is started, the child is asked to say the items on the card accurately and quickly without skipping. In each subtest, the tester determines the child's performance in total minutes and seconds by keeping time with a stopwatch. During the application, the child's corrections and errors are recorded. the construct validity of the test, the relations between the subtests (Pictures, Colors, Numbers, and Letters) were examined using the Pearson correlation coefficient. The analysis revealed that the correlations between the subtests ranged from.67 to 83. With this, the relationships between chronological age and test scores were examined using the Pearson correlation coefficient and the findings revealed that there are significant negative relationships between the age of the child and the performance shown in the test.

Data Collection and Analysis

The research was carried out in the province of Ankara. Before the study was conducted, necessary permissions were obtained from the relevant institutions, and the study was carried out voluntarily. The Visual Literacy Scale and the Rapid Automatized Naming Test (HOTIT) were administered to children aged 5–6 who were attending preschool education and who agreed to participate in the study, and their parents were asked to fill in the General Information Forms. 160 measurement tools, which were determined to be filled in completely, were evaluated. Analyses were performed after the data was entered into the SPSS program. Before the analysis, it was checked whether there were extreme values, and it was seen that the "linearity" and "multivariate normality" assumptions of the regression analysis were met. The graph of standardized deviation values and standardized predicted values shows that the linearity assumption is met (Figure 1). It is seen that there is no significant deviation from the normal distribution in the graph of the cumulative probability distribution drawn, observed, and expected regarding the standardized deviation values (Figure 2). A "Pearson Correlation Coefficient" was used to determine whether there was a significant relationship between the variables, and a "multiple regression" analysis was conducted to determine the predictors of visual literacy skills. The findings were evaluated at the significance levels .01 and.05 (Buyukozturk et al. 2017).
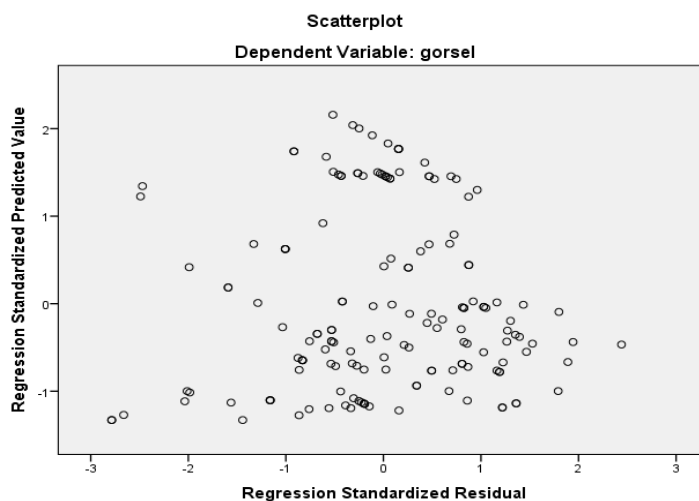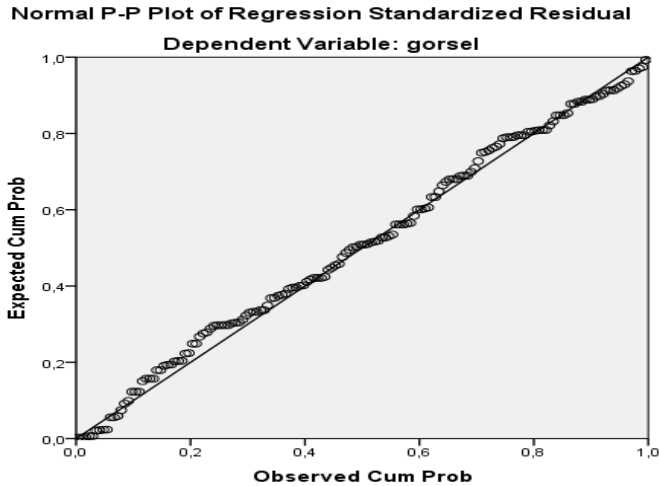
Figure 1. *Cumulative Probability Observed and Expected*

Figure 2. *Standardized Estimates of Values and Deviations*

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: gorsel

Results

The results of the Pearson Product Moments correlation coefficient analysis showing the relationship between children's visual literacy skills and the HOTIT test in the study are given in Table 2.

Table 2. *Simple correlation coefficients, average and standard deviation values between children's visual literacy skills and hotit test sub-dimensions*

Variables	Visual Literacy	Picture	Color
Visual Literacy	1		
Picture	-,829**	1	
Color	-,733**	-,579**	1
Average	55,68	76,47	82,55
SS	8,89	26,36	23,48

*p<,001

When the simple correlation coefficients in Table 2 are examined, a negative high correlation (r = -,829**, p,001) was found between children's visual literacy skills and the HOTİT Painting Skills subtest, and the visual literacy skills of the children and the HOTİT Color Skills subtest. Similarly, the tests had a strong negative correlation (r = -.733**, p.001).

Multiple regression analysis was conducted regarding the prediction of children's visual literacy skills by HOTIT test subtests. The HOTIT subtests were taken as the independent variables, and the children's visual literacy skills were taken as the dependent variables in the regression equation. The findings are given in Table 3.

Table 3. *Multiple regression findings regarding the prediction of visual literacy skills by the sub-dimensions of the hotit test*

Variables	B	S.H.	Beta	T	P
Constant	59,490	2,335		25,481	,000
Picture	-,205	,015	-,609	-13,365	,000
Color	-,144	,017	-,381	-8,357	,000
R=,885	R²=,784				
F$_{(2,157)}$=284,145	P=,000				

When the findings in Table 3 are examined, the HOTIT color subtest shows a significant relationship with children's visual literacy skills. (R =.885, R2 =.784, p =.000). Predicting visual literacy skills of the HOTIT picture subtest (β=-.609 t=-.13.365, p=.000) and color subtest (β=.381 t=-8.357, p=.000) in terms of values included in the regression equation was also found to be significant. As a result, it can be said that the color and picture sub-dimension of HOTIT is highly effective for visual literacy skills in children.

Discussion

Among the results obtained from the research, it is a remarkable finding that the rapid automatized naming of color and picture subtests predicts the visual literacy skills score. When the obtained results are considered as a whole, the result is mostly in the context of visual literacy; It is thought to originate from the basic concepts of visual reading and visual language. The findings are thought to be related to the concepts of visual and verbal memory. In this sense, verbal memory is the type of memory that is responsible for learning and remembering verbal information. The coding of words takes place in the left prefrontal cortex of the brain (Floel et al., 2004). Visual memory, on the other hand, is the form, location, etc. of visual stimuli seen before. It is defined as the ability to be remembered visually with its qualities (Budak, 2003). Sozen (2005), in his research, concluded that there is a moderately positive and significant relationship between verbal spontaneous recall score and long-term visual memory score.

In the findings of the research, the fact that the rapid automatized naming of color and pictures subtests predicts the visual literacy skills score can be explained by the expression of the individual's ability to integrate visual symbols quickly, fluently, and accurately in the definition of rapid automatized naming skills (Georgiu et al., 2013). Bakir and Babur (2018), at the advent of the rapid, automatized naming skill, emphasize the importance of the brain's combining visual information and language processes in the fastest way possible. Savage et al. (2005) conducted a study on the relationship between rapid automatic naming and fluent reading, it was found that phonological processing tasks predicted reading accuracy and comprehension, while fast number naming predicted reading accuracy and speed. Hulme, Zhou, Tong, Lervag, & Burgoyne, (2019) investigated the longitudinal determinants of the development of Chinese word reading skills and the potential bidirectional relationships between Chinese word reading and oral language skills. In this study, it was determined that first reading also predicted the growth in vocabulary knowledge and morphological structure. This model shows that the early stages of learning to read Chinese require semantic (vocabulary) and visual skills in addition to phonological skills. When these researches are considered in the context of visual literacy content; The definition of visual literacy made by Pauwels (2008) draws attention. According to him, visual literacy is noticing, defining, and interpreting visuals far beyond the understanding of "paying attention to the picture" (Gillenwater, 2014).

Rapid automatic naming skills, attention, learning, language, comprehension, comparison, etc. affect the individual throughout his life. It seems to be closely related to the working memory model, which includes cognitive processes (Alloway, Rajendran, & Archibald, 2009; Baddeley & Hitch, 1974; Karakelle & Ertugrul, 2012). In this model, the working memory is the central manager responsible for visual-spatial copying that processes visual information, the phonological loop that takes speech-based information into the system, and attention (Act. Kurtaran, 2021) and visual literacy; It is noted that it emphasizes communication, thinking, learning, meaning creation, expression and aesthetic purposes (Avgerinau & Ericson, 1997).

The research was conducted to determine the predictive status of visual literacy skills of the rapid automatic naming of color and picture subtests, and it contains some limitations. This research is limited to a sample of 160 children aged 5-6 years attending independent kindergartens in Ankara. It was assumed that the skills that were the subject of the research could be measured with the measurement tools used, and no other measurement tool was used.

Conclusion and Recommendations

In the Pearson Product Moment Correlation Coefficient analysis results, which reveal the relationship between the Visual Literacy Assessment Tool for Children Aged 5–6 Parent's Form, and HOTIT; It was concluded that there was a high negative correlation between the visual literacy skills of the children participating in the study, and the HOTIT Drawing Skills subtest, and Color Skills subtest.

According to the multiple regression analysis regarding the prediction of children's visual literacy skills by the HOTIT subtests; it was concluded that the Color, and Picture Subtest, one of the HOTIT subtests, revealed significant relationships with the visual literacy assessment tool scores.

In line with the findings obtained from the research; conducting this study in larger samples allow a more detailed examination of the relationship between rapid automatic naming and visual literacy; with this; It can be suggested to plan new studies with measurement tools that evaluate the contents of visual perception, visual reading, visual language, visual thinking, visual interpretation, which form the dimensions of visual literacy with different age groups. This study was handled with a sample of children receiving preschool education. In subsequent studies, children of the same age group with and without preschool education can be compared.

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