



www.ijones.net

Investigation of Secondary School Students' Visual Perception and Attitudes towards Graphic Design

Mevlüt Ünal 

Necmettin Erbakan University, Türkiye

Alper Demirel 

Ministry of National Education, Türkiye

To cite this article:

Unal, M. & Demirel, A. (2024). Investigation of secondary school students' visual perception and attitudes towards graphic design. *International Journal on Social and Education Sciences (IJonSES)*, 6(4), 535-549. <https://doi.org/10.46328/ijones.704>

International Journal on Social and Education Sciences (IJonSES) is a peer-reviewed scholarly online journal. This article may be used for research, teaching, and private study purposes. Authors alone are responsible for the contents of their articles. The journal owns the copyright of the articles. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of the research material. All authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations regarding the submitted work.



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

Investigation of Secondary School Students' Visual Perception and Attitudes towards Graphic Design

Mevlüt Ünal, Alper Demirel

Article Info

Article History

Received:

18 March 2024

Accepted:

21 August 2024

Keywords

Visual perception

Graphic design

Attitude

Secondary school students

Abstract

The relationship between visual perceptions and graphic design of secondary school students is of great importance in terms of the development of their artistic skills. This link is directly related to how students interpret the visual world and how they express these interpretations through graphic design. The aim of this study is to examine the relationships between visual perception and attitudes of secondary school students towards graphic design in terms of some variables. The research conducted with the comparative relational screening model was conducted on 168 students studying at a private secondary school in Türkiye. The research data were collected using the 'Visual Perception Test' and the 'Attitude Scale Towards Graphic Design'. The data were analyzed using 'Descriptive Statistics', 'Independent Samples t test' and 'Multiple Regression Analysis' techniques. According to the research findings, the visual perceptions of the participating students were found to be above the average level, while their attitudes towards graphic design were found to be at a high level. Students' visual perceptions and attitudes towards graphic design differ according to the gender variable. Finally, visual perception significantly predicts students' attitudes towards graphic design.

Introduction

The process of individuals acquiring knowledge and skills, which begins in their own families during their childhood, continues later through educational programs in educational institutions (Sönmez & Balci, 2024). Today, artists, whether young or old, students or professionals, must have the knowledge of art to be able to explain the theoretical and theoretical presentation of the work of art they produce (Susuz & Öztürk, 2023). Individuals who participate in art as both viewers and creators not only develop and increase their own cultural capital, but also cause an increase in their social capital (Tuncel, 2023). Art education has an important place within the scope of general education (Ciddi, 2019). Art has always adapted to the technology of its time and benefited from it. Technologies that are now considered traditional were considered new and modern when they first emerged (Özmen & Dalkıran, 2017). In today's world where digital and technological forces prevail, it is necessary to combine science and therefore technology with art and see it as a whole, and to question and recreate society and education (Ozturk, 2023). The relationship between visual perceptions of secondary school students and graphic design is of great importance for the development of their artistic skills, critical thinking skills and

creative problem-solving skills. This relationship is directly linked to how students interpret the visual world and how they express these interpretations through graphic design (Ceylan, 2019; Eisner, 2002; Elkilany & Yousef, 2021). Visual perception plays a critical role in helping students develop their artistic skills. Visual perception includes the ability to understand the basic elements of graphic design such as color, shape, pattern, and composition. The better secondary school students perceive these elements, the more successful they can be in graphic design. Therefore, the development of visual perception skills enables students to produce more creative and technically competent works in graphic design (Bottrell, 2011; Chmela-Jones et al., 2007; Kanat, 2019).

Visual perception is the ability to recognize and discriminate visual stimuli and to decipher these stimuli by making connections with previous experiences (Frostig, 1968; Wade & Swanston, 2013). Visual perception is significant because it affects image and imagination. In visual perception, the individual distinguishes, interprets, classifies and generalizes visual stimuli in a meaningful way in order to understand the information received through the sense of sight. The development of visual perception continues until the end of adolescence. Visual perception development is crucial in the development of social and sensory areas as well as the cognitive development of the individual (Flavell et al., 1978; Jaafar, 2021; Slater, 2004). Individuals with visual perception problems have problems in other areas as well as areas based on visual perception. Individuals who can perceive correctly through art education gain the ability to transfer what they perceive (Battist, 1967; Mostert, 2020).

Visualization can be defined as the ability to describe, transform, generalize, narrate, prove and reflect visual information. Visual perception processes are the process of perceiving and processing visual information coming from sensory and mental processes (Gal & Linchevski; Ware, 2019). In children, visual perception ability is a developing process. Visual perception skills develop rapidly in early childhood and approach the adult level around the age of eleven to twelve. By the age of nine, children's visual perception skills are well developed. Children's perception of shape-ground develops rapidly between the ages of three and five and stabilizes between the ages of eight and ten, perception of position in space completes its development between the ages of seven and nine, the ability to fix shape develops rapidly between the ages of six and seven and stabilizes between the ages of eight and nine, and the perception of more complex spatial relationships continues to develop throughout childhood and reaches the adult level by the age of ten (Bezrukikh & Terebova, 2009; Tsai et al., 2008). Educational activities and daily life skills require a combination of vision, visual perception and visual motor skills.

Visual perception is defined as the ability to recognize, discriminate and interpret visual stimuli by associating them with previous experiences. Visual perception is not only the ability to see well, but also a thinking process and the result of a series of mental processes (Tuğrul et al., 2001). Gordon et al. (2019) defined visual perception as shape-ground perception, visual integration, visual discrimination and object recognition. Five different criteria were mentioned in the measurement of visual perception: spatial relations, shape-ground, location in space, shape invariance and hand-eye coordination (Hammill et al., 1993). The meaning of seeing and visuality begins with perception, but visual perception begins with the effects of the act of seeing. The process of seeing is the basis of visual perception. Visual perception is a form of perception that makes a comparison between objects and the background. The most prominent factor is contrasts. Objects and shapes perceived visually are identified and the

message becomes meaningful (Cornsweet, 2012; Schreuder, 2014). Visual perception is influenced by experience and culture. According to Genç & Sipahiaoğlu (1990:13), "the characteristics of objects, past experiences and prejudices are effective in the visual perception of our environment". Interpretation, which is formed by analyzing the aesthetic effects of the image, is another step of visual perception. The object, subject and image is intended to be interpreted by the person by making use of his/her previous experiences. According to Karoğlu (2006:45); "interpretation, meaning, is dependent on the thoughts conveyed through the subject".

The individual realizes a significant part of his/her impressions of the external environment through vision. In order for visual perception to be realized, the individual must first be psychologically ready to see. What the individual wants to see and needs to see among the chaos of images surrounding him/her is important in the process of visual perception. For example, students can perceive bright and vivid colors more easily, while they dislike pastel colors. Cognitive processes are an important factor in the realization of visual perception. What a child can and cannot perceive and what kind of meanings he/she will attribute to the images he/she perceives sensually are associated with his/her life experience and knowledge to a great extent (Flavell et al., 1981; İnceoğlu, 2004).

Visual perception is not only the ability to see, but it is also the ability to distinguish, recognize, group and interpret visual stimuli by associating them with previous experiences (Kurtz, 2006). Visual perception is not only the ability to see well, but it is also interpreted by the eye and the brain. For example, when we see a shape consisting of four lines, we perceive it visually. However, recognizing that it is a "square" is a thinking event (Duru, 2008). Visual perception develops rapidly in children. By the age of nine, children's visual perception skills become apparent (Brian et al., 2018).

The development of visual perception skills in children is hidden in the difference between looking and seeing. While looking is expressed as a movement of the eye, seeing is to bring awareness to the movement of the eye. Visual perception occurs when children observe patterns, colors and phenomena in nature and their environment (Bezrukikh & Terebova, 2009). Thanks to visual stimuli, children begin to recognize the objects around them and learn their names. By recognizing objects, their view of the world changes and they begin to make sense of the world. The presence of different colors in the universe also improves children's visual perception skills. Visual perception skills, which directly contribute to learning processes, are also important for children's cognitive development. Visual perception skill, which plays an important role in children's exploration of nature, environment and objects, develops language, motor and creative expression skills. Activities such as reading books, solving mathematics, drawing and playing games support children's visual perception skills (Lester, 2003).

Visual perception in art is crucial for understanding and interpreting works of art. Visual perception is linked to receiving, processing and interpreting visual information. Analyzing artworks with visual perception is critical for the viewer to experience the artwork and make sense of the artwork (Florensky, 2006). Visual perception is a combination of the visual senses. Our eyes receive visual information about artworks and this information is processed in our brain. The viewer's experience affects visual perception. Visual perception includes visual elements such as colors, lines, structure, spaces, light and shadow. It emphasizes that the basic elements of human

perception, especially shape, volume, color and movement, are the basic elements of art. It also states that in order to safeguard human perception and to understand the cells of human beings and the parts of their art, it aims to bring them together to form a holistic perception. This approach is based on the Gestalt principle and extends to a point where basic principles are included (Arnheim, 1988; Rollins, 2003). In this study, the visual perception performance of children in Hong Kong with accepted norms in the developmental visual perception test (DTVP-2) was compared and examined whether there were significant differences between children's gender, age and grade. The study sample consisted of 289 six- and seven-year-old children attending primary school in Hong Kong. The highest results were obtained in spatial location, spatial relations and hand-eye coordination subtests. Differences between classes were significant in all subtests except hand-eye coordination and visual motor speed. On the other hand, there was no statistically significant difference between boys and girls in all test scores except for the scores in copying and figure ground subtests. It has been concluded that it is necessary to ensure the appropriateness of visual perception test standards for the specific cultural groups evaluated.

Works of art are interpreted differently by each person. When the sight of the eye encounters a work of art, an intellectual creativity begins in the mind. The richness of the images in memory is hidden in the interpretation of the human being towards the work of art. As a matter of fact, it is argued that the effect created by works of art is essentially at the intellectual level (Benjamin, 2020). Graphic design has an important place in the field of art and visuality. Graphic design enables messages to be conveyed effectively and aesthetically, which is one of the most fundamental elements of visual communication. Graphic design is at the center of visual communication. People perceive information more quickly and effectively visually. Therefore, graphic design makes messages more understandable and impressive. Graphic design has a great significance in terms of both aesthetics and functionality as an area where art combines with visual communication. As both a means of artistic expression and a cultural and educational communication method, graphic design has an indispensable place in contemporary visualization (Lupton, 2024; Meggs & Purvis, 2016; Yang & Hsu, 2017).

Design responds to changing themes that govern our view of the world (Ambrose and Harris, 2009). It can be said that design is a phenomenon at the basis of all arts, which has a structure in itself and a planning behind this structure, beyond making a model, mold or ornament. The act of designing includes all kinds of activities related to the organization of the structure to be created. In other words, design is a creative action that pursues a specific purpose (Becer, 2008). Graphic design is a creative visual art discipline that includes many fields. It can include art direction, typography, page layout, information technology and other creative aspects. This diversity means that there is a fragmented landscape for design practice within which designers can specialize and focus (Ambrose & Harris, 2009). Communication materials that contain visuals capture our attention and keep us motivated to participate (Cook, 2006: 1974). However, the perceptions, attitudes and use cases of the producers and consumers of visuals play an important role in their effectiveness (Maddalena & O'Reilly, 2018: 219). According to the American Institute of Graphic Arts (AIGA), graphic design is defined as "the art and practice of planning and projecting ideas and experiences through visual and textual content". In other words, graphic design communicates certain ideas or messages in a visual way. The graphic information in these visuals must meet the requirements of clarity, accuracy and readability (AIGA, 2022: 2). Graphic design is a part of everyday life and visual culture in shaping the products we use and the information we consume (Barnard 2005: 213).

The importance of visual arts education, especially in raising contemporary and modern individuals, is increasingly understood (Öztürk & Öztürk, 2024). The place of graphic design at the secondary school level is very important for students to develop their visual communication skills and explore their creativity. Graphic design teaches students to express information visually and supports their problem-solving and critical thinking skills in this process (Hanawalt, 2018). For secondary school students, graphic design is a tool for expressing themselves creatively. Basic graphic design elements such as drawing, color selection, typography, and composition help students develop their artistic skills (Ametordzi et al., 2012). In this process, students learn to create visual messages and this increases their capacity for creative thinking (Krause, 2006; Salehudin, 2019). On the other hand, graphic design plays an important role in developing visual literacy skills. Students learn how an image is created, what messages it can convey and how these messages are perceived. This helps them to more consciously understand the visual world around them (Burmark, 2022).

In order to raise artists and individuals with high cultural awareness, it is necessary to establish and develop a good and efficient educational infrastructure (Ozturk, 2017). Graphic design helps students develop critical thinking and analysis skills. When evaluating a design, students analyze elements such as composition, aesthetics and functionality. In this process, visual perception captures their attention and allows them to critically review their designs. These skills are important not only in artistic fields but also in general academic achievement (Tishman et al., 1993). The relationship between secondary school students' visual perception and graphic design has a critical place in their artistic and cognitive development. Visual perception helps them develop both their aesthetic sensitivity and their critical thinking and creative problem-solving skills. Therefore, if educators develop strategies to strengthen this relationship, it may positively affect students' overall educational achievement.

The role of emotions, enthusiasm and happiness in the creation of works of art is of course very great. In design and design applications, needs are at the forefront. It can be said that product and material designs arising from needs take an artistic form with the embellishment of emotions. In this context, it is thought that examining the relationships between visual perception and attitudes towards graphic design will make important contributions to the field of art and education. However, it was observed that studies on visual perception were mostly conducted at preschool and primary school level (Asem et al., 2023; Ho et al., 2015; Hong & Lim, 2021; Noghabi et al., 2010; Safaei et al., 2014; Vitova, 2018; Yoon & Park, 2018), whereas studies on graphic design (Ceran, 2022; Giloi & Du Toit, 2013; Kanat, 2019; Riyanti et al., 2017; Souleles, 2012) focused on university level.

For this reason, the study aimed to examine the relationships between secondary school students' visual perception levels and their attitudes towards graphic design. In this framework, answers to the following questions were sought.

- What is the level of visual perception of secondary school students?
- What is the level of attitudes of secondary school students towards graphic design?
- Does the visual perception of secondary school students differ according to gender?
- Do secondary school students' attitudes towards graphic design differ according to gender?
- To what extent do secondary school students' visual perceptions predict their attitudes towards graphic design?

Method

This study began by first identifying the problem in focus. Basic theories, research, publications and literature were reviewed in the process of determining the problem related to visual perception and graphic design attitudes of secondary school students. After deciding on the research topic in general, the literature was reviewed to determine the boundaries of the content of the topic, and a framework based on the sub-problem questions related to the research was created. As a result of these processes, a comparative relational survey model was used to examine the visual perception and graphic design attitudes of secondary school students in terms of some variables (Krause, 2018). Within the framework of this model, firstly, the visual perception levels of the participants and the secondary school students were described and then these variables were examined comparatively according to the gender variable. In the last stage of the study, the relationships between visual perception and attitudes towards graphic design of secondary school students were examined.

Study Group

The study group was determined online over the internet as it coincided with a period when schools were on vacation. First of all, a googledocs file was prepared in which voluntary participation in the study was approved and started. Some demographic data and visual perception and attitude towards graphic design scale items were added to this file. In addition to volunteering, the target group was determined as secondary school students who can use computers and cell phones. The relevant googledocs link was shared with the social media group where they shared class information by obtaining permission from a private school administration. Ip system was used to prevent data re-entry during the research process. The link was first shared in May 2023 and was removed approximately one month later. In this way, feedback was provided from 171 secondary school students. Within the scope of the data obtained from the demographic information form, it was understood that 3 of the participant students were not secondary school students and the responses of the relevant participants were excluded from the analysis process. In this context, the study was conducted on 168 secondary school student participants based on convenience sampling principles. 68 of the students were female and 68 were male. Again, 51 of the participant students were studying in the 5th grade, 68 in the 6th grade and 49 in the 7th grade. Students in the last year of secondary school were not included in the study because they were preparing for a central exam (LGS).

Data Collection Tools

Visual Perception Test:

This test, developed by Uluç (2019), is made up of 13 multiple-choice questions and each question contains four options. The evaluation of the test is based on a total of 100 points by giving 7.69 points to each correctly answered question. Therefore, the lowest score that can be obtained from the test is 0 and the highest score is 100. As the score obtained from the test increases, students' visual perception skills increase. The Visual Perception Test was tested with a pilot study on 200 5th grade students in 3 different public schools. After the item analysis of the test, 7 questions were eliminated from the initial version of the test consisting of 20 questions and the difficulty of the test was calculated as 0.84. It was developed to determine the visual perception levels of children. The test takes

an average of 30 minutes and is administered individually. The test can be administered by psychologists, occupational therapists, educators, diagnostic specialists, and others interested in children's visual perception (Uluç, 2019).

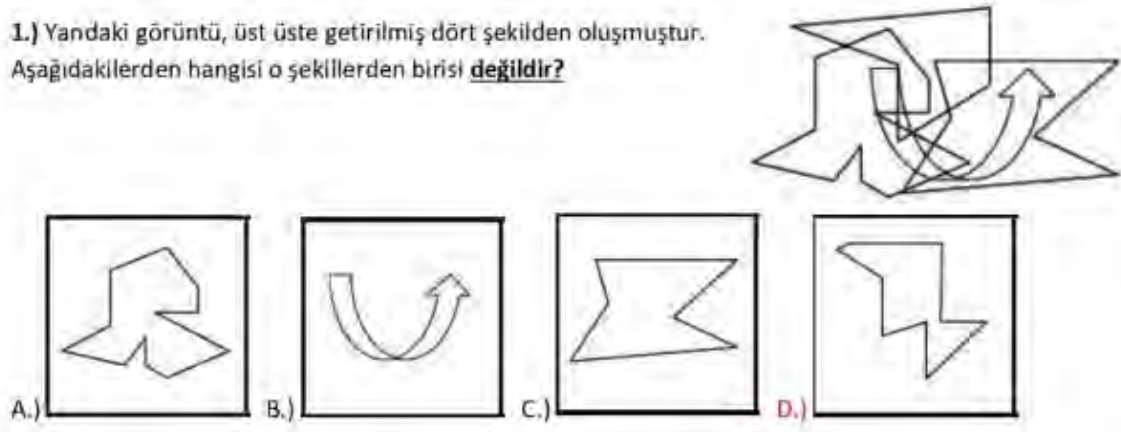


Figure 1. One of the Questions of Visual Perception Test

Attitude Scale Towards Graphic Design

Attitude Scale Towards Graphic Design is a scale developed by the researcher to measure the attitudes of secondary school students towards graphic design. This scale has a Likert-type 5-grade structure and consists of a total of 12 questions. In the development phase of the scale, firstly, a literature review was made, and then the opinions of experts with doctorates in the fields of visual arts, measurement and evaluation, educational programs and teaching were consulted. In this way, an item pool in Likert form was created. These items were administered to a test group and validity and reliability analyses were performed on the data.

Exploratory factor analysis was applied to explore the factor structure of the Attitude Towards Graphic Design Scale. Kaiser-Mayer-Olkin (KMO) test was applied to test the suitability of the data structure in terms of sample size for factor analysis. $KMO \geq 0.90$ indicates that the sample size is at an excellent level (Shrestha, 2021). The KMO value was calculated as 0.92. According to this value, the sample size is sufficient for factor analysis. The suitability of the data for factorization can be determined by applying Barlett Sphericity test. The results showed that the data were suitable for factorization (Barlett Sphericity ($\chi^2(68) = 5125.66$; $p < 0.001$).

Factor analysis was performed by applying the Principal Component Analysis method. A single factor with an eigenvalue greater than one was formed. Accordingly, it was decided that a single factor structure was appropriate for the scale and the scale items were forced into a single factor in the next analysis. The value of 0.40 was determined as the cut-off point for factor loadings (Comrey & Lee, 1992). As a result of the exploratory factor analysis, it was observed that the factor loadings of the items in the scale took values between 0.46 and 0.82. The one-factor structure explained 43% of the total variance.

Cronbach's alpha coefficient was calculated to determine the reliability of the attitude scale. Values between 0.60-

0.80 indicate that the instrument is highly reliable and values between 0.81-1.00 indicate that the instrument is highly reliable (Tabandeh et al., 2022). The alpha coefficient calculated for the scale factors is .91. The obtained coefficient showed that the reliability of the measurement tool based on internal consistency was at a high level.

Sample Items:

- Graphic design often interests me.
- I would like to do graphic design work.

Data Analysis Techniques

Before analyzing the data obtained from the scales within the scope of the study, it was examined whether they exhibited normal distribution or not by considering the kurtosis and skewness coefficients. In this context, it was seen that the kurtosis and skewness values of the dependent and independent variables of the study were between -2 and +2 and it was accepted that the scores of these scales exhibited a normal distribution. In this context, "Independent Sample t Test" and "Multiple Regression Analysis" techniques of parametric statistical techniques were used to analyze the attitudes and visual perceptions of secondary school students towards graphic design.

Results

In the study, descriptive analysis findings regarding the research variables are given in Table 1 and Table 2. Comparison findings regarding the attitudes of the participant students towards visual perception and graphic design according to the gender variable are given in Table 3 and Table 4. Regression analysis findings regarding the effect of visual perception level on attitudes towards graphic design are given in Table 5.

Table 1. Descriptive Analysis of Visual Perception Levels of Secondary School Students

	N	Minimum	Maximum	Mean	Std. Deviation
Visual Perception	168	23.07	92.28	67.01	18.38

The table shows the descriptive statistics results regarding the scores of the secondary school students from the visual perception scale. The average score of the participating students from the visual perception scale was calculated as 67.01 ± 18.38 . According to these average values, it was seen that the visual perception of the secondary school students was above the medium level.

Table 2. Descriptive Analysis of Secondary School Students' Attitudes Towards Graphic Design

	N	Minimum	Maximum	Mean	Std. Deviation
Attitude	168	1.40	5.00	3.52	0.86

Table 2 shows the descriptive statistics results regarding the scores of the secondary school students on the attitude scale towards graphic design. The average score of the participating students on the attitude scale towards graphic design was calculated as 3.52 ± 0.86 . According to this average value, it was seen that the attitudes of the secondary school students towards graphic design were positive and at a high level.

Table 3. Visual Perception Levels of Secondary School Students According to Their Gender

	Gender	N	Mean	Std. Deviation	t	P
Visual Perception	Female	84	69.13	17.34	1.99	0.04
	Male	84	64.90	19.26		

According to the Independent Samples t test results in the Table, it was seen that the visual perception levels of secondary school students showed a significant difference according to the gender variable ($p < 0.05$). The visual perception levels of female students were found to be significantly higher than their male peers.

Table 4. Attitudes of Secondary School Students Towards Graphic Design According to Their Gender

	Gender	N	Mean	Std. Deviation	t	P
Attitude	Female	84	3.82	0.80	2.03	0.03
	Male	84	3.23	0.91		

According to the Independent Samples t test results in Table 4, it was seen that the scores obtained from the attitude scale towards graphic design of secondary school students showed a significant difference according to the gender variable ($p > 0.05$). The attitudes of female students towards graphic design were found to be significantly higher compared to their male peers.

Table 5. Relationships between Secondary School Students' Visual Perception and Attitudes towards Graphic Design

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	2.398	.234		10.253	.000
	Visual Perception	.017	.003	.361	4.994	.000
R=0.36; R ² =0.13; F= 24.94; $p < 0.05$						

Table 5 shows the results of multiple regression analysis conducted to predict the visual perception levels of secondary school students and their attitudes towards graphic design. According to the analysis, visual perception predicts the attitudes of students towards graphic design at a statistically significant level ($F = 24.94$; $p < .05$). This visual perception explains 13% of the change in attitudes towards graphic design. As the visual perception levels of secondary school students increase, their attitudes towards graphic design increase positively.

Discussion

In this study, visual perception levels and attitudes towards graphic design of secondary school students were examined on a relational basis. According to the research findings, the visual perception levels of the participating

students were above average; however, their attitudes towards graphic design were found to be positive and high. As to Thomson et al. (2013), while children and young people are more interested in graphic design, adults and older individuals exhibit more negative tendencies and attitudes. In recent years, with the developing technology, children are exposed to more visual stimuli. However, visual perception can affect many areas of daily life, especially the performance of children in many courses at school (Jung et al., 2014). Visual perception has been found to be related to skills requiring eye-hand coordination, shape-ground perception, visual closure, visual-spatial ability and position in space (Baluoti et al., 2012; Bellocchi et al., 2017; Lipowska et al., 2011).

Significant differences were found in the visual perception levels of students in terms of gender. Female students have higher visual perception levels compared to their male peers. This result is similar to the findings of the studies conducted by Cheung et al. (2009), Cheung et al. (2006), Chraif (2013), Davis et al. (1986), Norman et al. (2018) and Yamada (2015). Similarly, students' attitudes towards graphic design differed by gender. Female students' attitudes towards graphic design were more positive and higher than their male peers. In the study conducted by Ceran (2022) on university level students, female students achieved higher averages than their male peers.

The final finding of this study is about the relationships between secondary school students' visual perceptions and their attitudes towards graphic design. According to the regression analysis results, secondary school students' visual perceptions significantly predict their attitudes towards graphic design. As secondary school students' visual perceptions increase, their attitudes towards graphic design increase positively. Studies show that students with advanced visual perception skills are more successful in graphic design courses and develop more positive attitudes towards these courses (Özsoy, 2011). This reveals that visual perception can affect students' attitudes towards graphic design. In addition, it is stated that students who receive visual arts education are more successful in graphic design courses and have more interest in this field (Demir, 2013). The relationship between secondary school students' visual perceptions and their attitudes towards graphic design is quite complex and multifaceted when the cognitive and emotional development stages experienced by the students are taken into consideration. Students in this age group develop their abstract thinking skills while also beginning to shape their aesthetic perceptions (Hailey et al., 2015; Stuppy, 1987; Yenawine, 2013). Therefore, it can be said that visual perceptions can significantly affect their attitudes towards graphic design during this period. Visual perception includes how individuals process, interpret and respond to visual information from their environment. The visual perceptions of secondary school students are related to how they see and evaluate color, shape, layout and other visual elements. During this period, students' visual perceptions can shape their attitudes towards graphic design. For example, students with a more developed visual perception can more easily grasp graphic design elements and develop a more positive attitude towards this field.

Conclusion and Recommendations

It can be said that there is a strong relationship between the visual perceptions of secondary school students and their attitudes towards graphic design. Within the framework of this research, the relationship between visual perception and graphic design education can be considered as an important factor affecting both the academic and

artistic interest levels of students. Students with more developed visual perceptions can approach graphic design studies with a more positive attitude. Therefore, studies aimed at developing visual perception skills in secondary school education can increase students' interest in graphic design and their success in this field. Secondary school students' attitudes towards graphic design are related to how much they are interested in this field, how valuable they find the studies in this field, and their desire to participate in graphic design activities. Students' attitudes towards this field can be directly related to their visual perception skills. For example, students with a strong visual perception may find graphic design more interesting and meaningful. This research was conducted with secondary school students. Studies on different age groups should also be conducted and their visual perception levels should be examined. Studies on this subject should be focused on. The effects of students' visual perception levels on other courses should be investigated. The effects of visual perception levels on other age groups should be investigated. Appropriate teaching methods and techniques should be added to the education and training program for the visual perception development of children.

References

- Ambrose, G., & Harris, P. (2009). *The Fundamentals of Graphic Design*, Switzerland: AVA
- Ametordzi, S., Osei-Poku, D. P., & Eshun, E. F. (2012). Pedagogical situations and learning outcomes in graphic design in selected senior high schools in the Kumasi Metropolis of Ghana. *International Journal Of Innovative Research & Development*, 1(9), 179-191
- Arnheim, R. (1988). Visual dynamics. *American Scientist*, 76(6), 585-591.
- Asem, M., Narayanasamy, S., Ahmad, M., Kadar, M., & Hairiol, M. I. (2023). Association between visual perception and Socioeconomic status in Malaysian preschool children: Results from the test of visual perceptual skills-4. *Children*, 10(4), 749.
- Barnard, M. (2005). *Graphic design as communication*. Routledge, London, UK.
- Battist, S. (1967). Child Art & Visual Perception. *Art Education*, 20(1), 20-27.
- Becer, E. (2008). *İletişim ve grafik tasarım*. Ankara: Dost Kitabevi.
- Bellocchi, S., Muneaux, M., Huau, A., Lévêque, Y., Jover, M., & Ducrot, S. (2017). Exploring the link between visual perception, visual-motor integration, and reading in normal developing and impaired children using DTVP-2. *Dyslexia*, 23(3), 296-315.
- Benjamin, W. (2020), *Pasajlar*, Yapı-Kredi Yayınları, İstanbul.
- Bezrukikh, M. M., & Terebova, N. N. (2009). Characteristics of the development of visual perception in five-to seven-year-old children. *Human Physiology*, 35, 684-689.
- Bottrell, C. (2011). Graphic image-making skills for literacy development. *The Australian Journal of Language and Literacy*, 34(3), 308-321.
- Brian, A. S., Haegele, J. A., Bostick, L., Lieberman, L. J., & Nesbitt, D. (2018). A pilot investigation of the perceived motor competence of children with visual impairments and those who are sighted. *Journal of Visual Impairment & Blindness*, 112(1), 118-124.
- Burmark, L. (2002). *Visual Literacy: Learn To See, See To Learn*. Association for Supervision and Curriculum Development, 1703 N. Beauregard St., Alexandria, VA 22311-1714 (ASCD stock no. 101226: member price \$18.95, nonmember price \$22.95).

- Ceran, S. (2022). *Grafik tasarım eğitimi alan lisans öğrencilerinin hazır imge kullanımına yönelik tutumları*. (Doctoral dissertation), Necmettin Erbakan University, Turkey.
- Ceylan, S. (2019). Students' Perception of Architectural Design. *The International Journal of Design Education*, 14(2), 1.
- Cheung, P., Poon, M., Leung, M., & Wong, R. (2006). The Developmental Test of Visual Perception-2 normative study on the visual-perceptual function for children in Hong Kong. *Physical & occupational therapy in pediatrics*, 25(4), 29-43.
- Cheung, P., Poon, M., Leung, M., & Wong, R. (2006). The developmental test of visual perception-2 normative study on the visual perceptual function for children in hong kong. *Physical and Occupational Therapy in Pediatrics: A Quarterly Journal of Developmental Therapy*, 25(4), 29-43.
- Cheung, S. H., Fang, F., He, S., & Legge, G. E. (2009). Retinotopically specific reorganization of visual cortex for tactile pattern recognition. *Current Biology*, 19(7), 596-601.
- Chmela-Jones, K. A., Buys, C., & Gaede, R. J. (2007). Visual learning and graphic design: a cooperative strategy. *South African Journal of Higher Education*, 21(4), 628-639.
- Chraif, M. (2013). Gender influences in peripheral and central visual perception for the young. *Procedia-Social And Behavioral Sciences*, 84, 1100-1104.
- Ciddi, M.L. (2019). Development of painting education before and after the republic in Turkey. *Science, Education, Art and Technology Journal (SEAT Journal)*, 3(2), 62-68.
- Comrey A. L., & Lee H. B. (1992). *Interpretation and application of factor analytic results*. In: *A First Course on Factor Analysis*, 2nd edn. Hillsdale, NJ: Lawrence Erlbaum, 250–254.
- Cook, M.P. (2006). Visual representations in science education: the influence of prior knowledge and cognitive load theory on instructional design principles. *Science Education*, 90(6), 1073–1091.
- Cornsweet, T. (2012). *Visual perception*. Academic Press.
- Demir, S. (2013). Görsel sanatlar eğitimi ve grafik tasarım derslerinde başarı arasındaki ilişki. *Sanat ve Tasarım Dergisi*, 2(3), 45-58.
- Duru, H. (2008). *Gelişimsel Görsel Algı Testi-2'nin 6 Yaş Çocukları İçin Güvenirlilik ve Geçerlik Ön Çalışması*. Master Thesis. Marmara Üniversitesi Eğitim Bilimleri Enstitüsü, İstanbul.
- Eisner, E. W. (2002). *The Arts and the Creation of Mind*. Yale University Press.
- Elkilany, E. A., & Yousef, W. (2021). Cultivating Creativity of Graphic Design and Multimedia Students: The Perceptions of Arab Faculty and Experts. *SAGE Open*, 11(4), 21582440211058198.
- Flavell, J. H., Everett, B. A., Croft, K., & Flavell, E. R. (1981). Young children's knowledge about visual perception: Further evidence for the Level 1–Level 2 distinction. *Developmental psychology*, 17(1), 99.
- Flavell, J. H., Shipstead, S. G., & Croft, K. (1978). Young children's knowledge about visual perception: Hiding objects from others. *Child Development*, 1208-1211.
- Florensky, P. (2006). *Beyond vision: Essays on the perception of art*. Reaktion Books.
- Frostig, M. (1968). *Pictures and patterns. Teacher's Guide*. New York
- Gal, H., & Linchevski, L. (2010). To see or not to see: Analyzing difficulties in geometry from the perspective of visual perception. *Educ. Stud. Math*, 74, 163-183.
- Genç, A., & Sipahioğlu, A. (1990). *Görsel algılama: Sanatta yaratıcı süreç*. Sergi Yayınevi.
- Giloi, S., & Du Toit, P. (2013). Current approaches to the assessment of graphic design in a higher education

- context. *International Journal of Art & Design Education*, 32(2), 256-268.
- Gordon, N., Hohwy, J., Davidson, M. J., van Boxtel, J. J., & Tsuchiya, N. (2019). From intermodulation components to visual perception and cognition-a review. *NeuroImage*, 199, 480-494.
- Hailey, D., Miller, A., & Yenawine, P. (2015). Understanding visual literacy: The visual thinking strategies approach. *Essentials of teaching and integrating visual and media literacy: Visualizing learning*, 49-73.
- Hammill, D.D., Pearson, N.A. & Voress, J. (1993). *Developmental Test of Visual Perception*. Examiner's Manual, Texas: Pro-Ed. Pub.
- Hanawalt, C. (2018). School art in an era of accountability and compliance: New art teachers and the complex relations of public schools. *Studies in Art Education*, 59(2), 90-105.
- Ho, W. C., Tang, M. M. M., Fu, C. W., Leung, K. Y., Pang, P. C. K., & Cheong, A. M. Y. (2015). Relationship between vision and visual perception in Hong Kong preschoolers. *Optometry and Vision Science*, 92(5), 623-631.
- Hong, M., & Lim, H. (2021). Analysis of Types of Students' Visual Thinking and Instructional Effects in Elementary Science Classes. *Journal of Korean Elementary Science Education*, 40(1), 100-112.
- İnceoğlu, M. (2004). *Tutum-Algı İletişim*. Ankara: Elips Kitap.
- Jaafar, G. A. H. (2021). Development of Visual Perception Skills in Children. *Psychology And Education*, 58(3), 1546-1576.
- Jung, H., Woo, Y. J., Kang, J. W., Choi, Y. W., & Kim, K. M. (2014). Visual perception of ADHD children with sensory processing disorder. *Psychiatry Investigation*, 11(2), 119.
- Kanat, S. (2019). The Perception of Graphic Design Concept on Students Study on Graphic Design. *Journal of Education and Training Studies*, 7(5), 65-75.
- Karoğlu, A. (2006). *Eстетik*. Ankara: Evren Yayıncılık, Milli Eğitim Bak. Yay
- Krause, M. S. (2018). Associational versus correlational research study design and data analysis. *Quality & Quantity*, 52(6), 2691-2707.
- Krause, S. (2006). The effect of Art and Design as a high school subject on the academic development of graphic design students. In *Society for Information Technology & Teacher Education International Conference* (pp. 3159-3166). Association for the Advancement of Computing in Education (AACE).
- Kurtz, L. A. (2006). *Visual Perception Problems in Children with AD/HD, Autism and Other Learning Disabilities*. London Jessica Kingsley Publishers: A Guide for Parents and Professionals
- Lester, P. M. (2003). *Visual communication: Images with messages*. Thomson.
- Lipowska, M., Czaplewska, E., & Wysocka, A. (2011). Visuospatial deficits of dyslexic children. *Medical Science Monitor: International Medical Journal Of Experimental And Clinical Research*, 17(4), CR216.
- Lupton, E. (2024). *Thinking with Type: A Critical Guide for Designers, Writers, Editors, and Students* (Revised and Expanded). Chronicle Books. New York
- Maddalena, K. & O'Reilly, C.A. (2018). Dissolving the divide between expert and public—improving the science communication service course. In *Scientific communication: principles, practices, and pedagogies*. Edited by H Yu and KM Northcut. Routledge, New York, New York. pp. 219–238.
- Meggs, P. B., & Purvis, A. W. (2016). *Meggs' history of graphic design*. John Wiley & Sons.
- Mostert, W. (2020). *The development of visual perception in artwork in the primary school* (Doctoral dissertation), Cape Peninsula University of Technology.

- Noghabi, R. K., Ashkan, M., Dortaj, F., & Mahmoudian, H. (2010). Construction and Normalization of the Visual Perception Test for the preschool and elementary school students in Tehran City. *International Journal of Psychology*, 4(2), 50-61.
- Norman, J.F., Dowell, C.J., Higginbotham, A.J., Fedorka, N.W., & Norman, H.F. (2018). Cinsiyet ve yaş, mesafenin görsel algısını modüle eder. *Dikkat, Algı ve Psikofizik*, 80, 2022-2032.
- Özmen, A. F., & Dalkiran, A. (2017). Dijital baskı teknolojilerinin türk resim sanatındaki yeri. *Tarihin Peşinde Dergisi*, 17, 47-70.
- Özsoy, V. (2011). Ortaokul öğrencilerinin görsel algıları ve sanat eğitimi. Ankara: Gazi Üniversitesi Yayınları.
- Ozturk, O.T. (2017). University students' perceptions on statue works. *Science, Education, Art and Technology Journal (SEAT Journal)*, 1(1), 31-44.
- Ozturk, O.T. (2023). Examination of 21st century skills and technological competences of students of fine arts faculty. *International Journal of Education in Mathematics, Science, and Technology (IJEMST)*, 11(1), 115-132. <https://doi.org/10.46328/ijemst.2931>
- Ozturk, M.S. & Ozturk, M.U. (2024). Investigation of the relationship between creative personality traits and internet usage of fine arts faculty students. *International Journal of Education in Mathematics, Science, and Technology (IJEMST)*, 12(2), 513-531. <https://doi.org/10.46328/ijemst.3999>
- Riyanti, M. T., Erwin, T. N., & Suriani, S. H. (2017). Implementing Project Based Learning Approach to Graphic Design Course. *Journal of Education and Practice*, 8(15), 173-177.
- Rollins, M. (2003). The mind in pictures: Perceptual strategies and the interpretation of visual art. *The Monist*, 86(4), 608-631.
- Safaei, L. E. I. L. A., Bafrooeb, K., & Yarmohammadian, A. H. M. A. D. (2014). The Effectiveness visual of perception skills to improve reading performance of elementary second grade students with learning disabilities. *J. Sci. Res Indian*, 7(1), 269-274.
- Salehudin, M. (2019). The influence of creative learning assisted by Instagram to improve secondary school students' learning outcomes of graphic design subject. *Journal for the Education of Gifted Young Scientists*, 7(4), 849-865.
- Schreuder, D. A. (2014). Vision and visual perception. Archway Publishing.
- Shrestha, N. (2021). Factor analysis as a tool for survey analysis. *American journal of Applied Mathematics and Statistics*, 9(1), 4-11.
- Slater, A. (2004). *Visual perception*. Blackwell handbook of infant development, 5-34.
- Souleles, N. (2012). Perceptions of undergraduate Graphic Design students on the educational potential of Facebook. *Research in Learning Technology*, 20.
- Sönmez, B., & Balcı, Ö. (2024). Okul Öncesi Eğitim Programının Öğretmen ve Yönetici Görüşlerine Göre Değerlendirilmesi. *Medeniyet Ve Toplum Dergisi*, 8(1), 61-82.
- Stuppy, V. M. (1987). *Developing visual awareness and aesthetic perception in a secondary level watercolor painting course*. California State University, Long Beach.
- Susuz, M., & Öztürk, M. S. (2023). Türk Resim Sanatında Bir Öncü Hareket Olan D Grubu'nun Düşünsel Temelleri. *Konya Sanat*, 6, 244-257. <https://doi.org/10.51118/konsan.2023.35>
- Tabandeh, A., Jia, G., & Gardoni, P. (2022). A review and assessment of importance sampling methods for reliability analysis. *Structural Safety*, 97, 102216. <https://doi.org/10.1016/j.strusafe.2022.102216>

- Tishman, S., Jay, E., & Perkins, D. N. (1993). Teaching Thinking Dispositions: From Transmission to Enculturation. *Theory into Practice*, 32(3), 147-153.
- Tsai, C. L., Wilson, P. H., & Wu, S. K. (2008). Role of visual- perceptual skills (non-motor) in children with developmental coordination disorder. *Human Movement Science*, 27, 649-664.
- Tuğrul, B., Aral, N., Erkan, S., & Etikan, İ. (2001). Altı Yaşındaki Çocukların Görsel Algılama Düzeylerine Frostig Gelişimsel Görsel Algı Eğitim Programının Etkisinin İncelenmesi. *Journal of Qafqaz University*, 8, 67- 84
- Tuncel, G. (2023). Sosyal Bilgiler Öğretmenleriyle Estetik Metinleri Keşfetme Yolculuğu: Bir Eylem Araştırması. *Ahmet Keleşoğlu Eğitim Fakültesi Dergisi*, 5(2), 488-510. <https://doi.org/10.38151/akef.2023.66>
- Uluç, E. (2019). *Zenginleştirilmiş eğitim programının geometri ders ve görsel algı başarısı ile matematik tutumuna etkisi*. (Master Thesis). Aydın: Adnan Menderes Üniversitesi Sosyal Bilimler Enstitüsü.
- Vítová, J. (2018). Diagnostics of preschool children visual perception. In *ICERI2018 Proceedings* (pp. 21-25). IATED.
- Wade, N., & Swanston, M. (2013). *Visual perception: An introduction*. Psychology Press.
- Ware, C. (2019). *Information visualization: perception for design*. Morgan Kaufmann.
- Yamada, Y. (2015). *Gender and age differences in visual perception of pattern randomness*. *Science Postprint*, 1(2), e00041.
- Yang, C. M., & Hsu, T. F. (2017). New perspective on visual communication design education: an empirical study of applying narrative theory to graphic design courses. *International Journal of Higher Education*, 6(2), 188-198.
- Yenawine, P. (2013). *Visual thinking strategies: Using art to deepen learning across school disciplines*. Harvard Education Press.
- Yoon, H. G., & Park, J. (2018). Elementary school teachers' use of visual representations and their perceptions of the functions of visual representations. *Journal of Korean Elementary Science Education*, 37(2), 219-231.

Author Information

Mevlüt Ünal

 <https://orcid.org/0000-0002-8220-7480>

Necmettin Erbakan University

Faculty of Fine Arts and Architecture

Köyceğiz Mah., Demeç Sok., No:39/2

Meram /KONYA

Türkiye

Contact e-mail: mevlutunal@erbakan.edu.tr

Alper Demirel

 <https://orcid.org/0000-0002-0451-2420>

Ministry of National Education

Batıkent Şehit Demet Sezen Girls Anatolian Imam

Hatip High School

Ankara

Türkiye