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## Using Mnemonic Illustrations in First Reading and Writing: The Case of Turkish Alphabet

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### Abstract

This study aims to create mnemonic illustrations for the letters in the Turkish alphabet to be used at the stage of first reading and writing in the first grade. The principles of Pavio's Dual Coding Theory and Sweller et al.'s Cognitive Load Theory were used in the creation of mnemonic letters. This study was designed as a qualitative research in which photo-elicitation method was used in data collection. The study group of the research consists of 25 classroom teachers and 300 students who completed pre-school education and were about to start primary school. The data collection process of the research was carried out in two steps, the first one being data collection from classroom teachers, and the second one is gathering data from students who were about to start the first grade. As a result of the analysis of the data obtained from the research, visuals of objects whose name begins with each of the 28 letters of the 29 letters in the Turkish alphabet were determined based on certain criteria and mnemonic illustrations were created. Since there is no word in Turkish which begins with (ğ), the remaining letter, an object whose name ends with this letter was used as a mnemonic illustration. As a result, mnemonic illustrations were created for all of the lowercase letters of the 29 letters in the Turkish alphabet and 28 of the uppercase letters except one. In the findings section of the study, mnemonic illustrations for two uppercase and two lowercase letters were presented to provide an example.

**Keywords:** mnemonic illustration, first reading and writing, primary school

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### Introduction

There are 29 letters in the Turkish alphabet. 21 of these are consonants and 8 are vowels. The 28 letters in the alphabet may be placed in the beginning, middle or at the end of the word. However, there is no word that begins with the letter 'ğ', which is a consonant letter. This letter is located in the middle and at the end of words. Therefore, the capitalization of this letter is not possible.

Perceiving and recognizing letters are a prerequisite for the improvement of reading and writing skills (de Graaff, Verhoeven, Bosman, & Hasselman, 2007). The process of first reading and writing in Turkey is carried out with the method Sound Based Teaching of First Reading and

Writing. According to this method, the process of first reading and writing is carried out as follows (MoNE, 2019):

- Preparation for first reading and writing
  - a. Exercises of listening training
  - b. Exercises of developing finger, hand, and arm muscles
  - c. Painting and line work
- Starting the first reading and writing and progressing
  - d. Perceiving, recognizing, and distinguishing the sound
  - e. Reading and writing the letter
  - f. Creating syllables from letters, words from syllables, and sentences from words
  - g. Reading texts
- Independent reading and writing

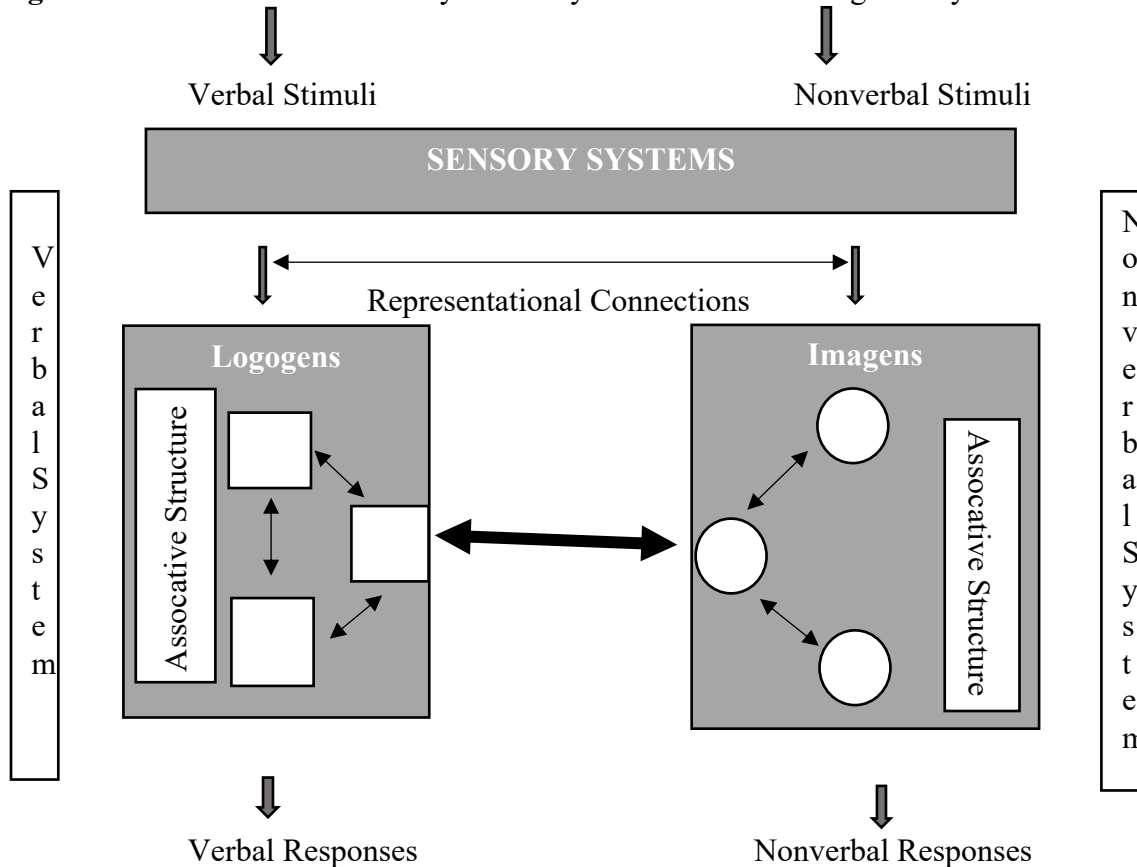
According to the steps above, firstly, necessary psychomotor and cognitive preparations are made for reading and writing skills with the method of *Sound Based Teaching of First Reading and Writing*. In the next step, activities are carried out to perceive, recognize and distinguish the sound of the letters in the alphabet acoustically and later to recognize the symbol of the sound (letter), in accordance with the stages mentioned by Armbruster, Lehr, and Osborn (2001). In this way, it was aimed to enable students to perceive, recognize and distinguish the sound from other sounds. At this point, it is necessary to explain the phonological awareness and phonemic awareness skills, which refer to perceiving, recognizing, and distinguishing the sound. Perceiving, recognizing, and distinguishing the sound is expressed as the phonological awareness skill and the use of the phonemic awareness skill which is included in the former skill. Since these skills are prerequisites for letter recognition and distinction, they are of critical importance for first reading and writing. Phonological awareness skill includes using the skills of noticing the phonemes that make up a word (Goswami & Bryant, 1990), recognizing those phonemes (Gray & McCuthen, 2006), distinguishing and manipulating them (Anthony & Francis, 2005), and accordingly, the ability to divide the words and syllables expressed in the language into smaller subunits (Allor, 2002; Denton, Hasbrouck, Weaver, & Riccio, 2000). Phonemic awareness, on the other hand, is the ability to notice and focus on each sound, and it is included in the phonological awareness skill (Chard & Dickson, 1999). In this study, it is expected that mnemonic illustrations which will be used in the process of perceiving, recognizing and distinguishing the sound will support children's phonological and phonemic awareness skills.

## Literature Review

In the process of perceiving and recognizing the sound, teachers usually give a verbal stimulus (the name of the object representing the sound) and a non-verbal stimulus (the visual of the object) at the same time, enable the processing of the two different stimuli for a situation and try to create a bond between them (Akyol & Temur, 2008). The associational connection established between these two units facilitates retrieval (Clark & Pavio, 1991, p. 152). For instance, when introducing the sound "e", the name of an object that begins with this letter is articulated "e.g. *elma* (meaning 'apple')", and its illustration "🍏" is demonstrated at the same time. Afterward, the letter representing the sound symbolically, and both the spelling and the illustration of the objects beginning with this letter are used. It is expressed that this method increases retrieval according to Paivio's "Dual Coding Theory". According to the Dual Coding Theory, memory consists of two

structures, one of them being verbal and the other one is non-verbal (representing perceptions) (Paivio, 1986). According to the Dual Coding Theory put forward by Paivio, the learner processes the verbal stimulus from the outside into the verbal system. If a visual stimulus is given in addition to this verbal stimulus, it is processed into the non-verbal system. Although these subsystems work differently, they evoke each other and establish connections between systems. If the stimulus for each subsystem increases, the association increases further by establishing an intra-system connection. According to the theory, the association becomes easier by the establishment of within-system and between-system connections, and the learner can remember more easily (Paivio, 1991). According to the Dual Coding Theory, this process is shown in Figure 1.

**Figure 1.** Verbal and Nonverbal Symbolic Systems of Dual Coding Theory



Source: Clark & Paivio, 1991, p.151

Note. The bold arrow represents between-systems connections, and thin arrows represent within-system connections.

This process, explained by the Dual Coding Theory, reduces the cognitive load of the learner by preventing extraneous cognitive load formation, according to the Cognitive Load Theory (Sweller, van Merriënboer & Paas, 1998; Paas, Tuovinen, Tabbers, & van Gerven, 2003). In this theory, cognitive load is generally explained as a structure that represents the load that fulfills a task (Sweller et al., 1998). Three types of cognitive loads are mentioned in the Cognitive Load Theory. These are intrinsic cognitive load, extraneous cognitive load, and germane or effective cognitive load (Paas et al., 2003). Cognitive load theory focuses on the role of working memory in the learning process by using these three concepts of cognitive load (Cooper, 1998). Extraneous cognitive load is basically the load created by learning materials that are not prepared effectively and efficiently in the learning process (Paas et al., 2003). This type of cognitive load is undesirable

and unnecessary in the process. Since this load causes the formation of a cognitive load out of purpose, it results in a load that is not necessary for learning and that challenges the working memory (Gerjets, Scheiter, & Catrambone, 2004). Intrinsic cognitive load is the load that occurs in the working memory of the learner resulting from the difficulty of the subject, in order to learn the content (Cooper, 2010). Since the intrinsic cognitive load cannot be changed, designing the teaching materials for the subject to be taught in a way through which the extraneous cognitive load is reduced (Seufert, Janen, & Brunken, 2007) can provide the desired learning outcomes. Effective cognitive load, on the other hand, emerges with the formation of schemas. It is a type of load that is desired since it helps to learn new knowledge and skills (Paas et al., 2003).

There are studies in the literature in which different methods are used for the teaching of sounds and letters. It has been demonstrated that studies that made matches such as letter-sound and letter-name found out a positive effect on early reading and writing (Ball & Blachman, 1991; McBride-Chang, 1999). On the other hand, there are also studies that have been successful in recognizing and remembering the sound and letter in the process of first reading and writing by focusing on the development of skills such as phonological awareness (Schneider et al., 2000) and sound classification (Bradley & Bryant, 1983), which have a positive effect on reading and writing skills. In addition to these strategies, it is stated in the literature that the use of mnemonics in the teaching of letters improves mental association and organization. With this strategy, verbal and non-verbal coding are done simultaneously, making the recall process easier (de Graaff et al., 2007).

In this direction, in the present study, it was aimed to create mnemonic illustrations that would support the retrieval of sounds and letters in the stage of first reading and writing. This study focuses on the teaching of the first sub-level of the second stage of Sound-Based Teaching of First Reading and Writing, as also mentioned in the introduction, which is implemented in primary schools in Turkey. It is thought that the use of mnemonic illustrations created in this step will enable the formation of two different logogens with a stimulus to the non-verbal system of the dual coding theory, and the associative connection between these two logogens will naturally emerge. In this way, retrieval of the sound and the letter will be easier. When looked at the viewpoint of cognitive load theory, it is thought that learning will be more effective and efficient since it is a material that reduces ineffective cognitive load, that is, extraneous cognitive load. Although there are studies on mnemonic illustrations, when Turkish resources were examined, it was seen that no similar study focusing on Turkish alphabet was conducted. In this direction, such a study is thought to fill this gap and contribute to the development of the relevant literature. In addition, when the literature on mnemonic illustrations was examined, it was noticed that while the dual coding theory was mentioned in the context of the theoretical framework of the mnemonic illustrations method (de Graaff et al., 2007; Fulk, Lohman, & Belfiore, 1997; McKenzie, Spence, & Nicholas, 2018; Nicholas, McKenzie, & Wells, 2017), no theoretical explanation about the cognitive load theory was given a place. In this study, as mentioned above, the relationship of the method of mnemonic illustrations both with the principles of the dual coding theory and with those of the cognitive load theory is explained. Accordingly, establishing a relationship with the principles of cognitive load theory in creating mnemonic illustrations in this study is thought to contribute to the relevant literature.



## **Methods**

The current study is a qualitative research consisting of interviews with classroom teachers, students about to start primary school, and field experts of first reading and writing. Interviews were conducted on the processes of determining the appropriate visuals for each letter in the Turkish alphabet, showing the objects suggested by the teachers to the students, and on why the students remembered these visuals better and why they chose this visual. Photo-elicitation method was used in the presentation of the illustrations and the interviews. The photo-elicitation method is used to reveal the opinions of the participants by including the photographs in the interviews (Harper, 2002). In this study, visuals were presented in line with the data obtained from the field in order to reveal the opinions of the students who were about to start the first grade of primary school in line with the purpose of the research, and their preferences, along with their reasons, were recorded.

Photo-elicitation method has been used in the fields of sociology and anthropology (Harper, 2002). On the other hand, Clark-Ibanez (2004) kept the photo-elicitation method among the interview methods. He determined this method as an additional data collection tool in a study he conducted in two primary schools. When the relevant literature is examined, it is seen in some studies that this method is carried out by including the photographs, taken by the researchers in the context of the subject, in the interview (Harper, 2001; Schwartz, 1992), while in other studies it is conducted by including the photographs, taken by the participants of the interview in the context of the subject, in the interview (Clark-Ibanez, 2004). In this study, no photo shooting process was conducted by the researcher or participant students, instead, stock images that could represent the objects were used. The purpose of this process is to create a mental association process to identify the most familiar objects for each letter and the visuals of these objects from the students' perspective. In the interviews conducted with the students, in which these visuals were included, students were shown different visuals for each letter respectively, and asked, "Which picture is the most familiar to you among these visuals? Would you choose this?" After the students explained their preference, they were asked "Where do you see this object most, why did you choose this one?" in order to make sure that the student preferred the visual that he was genuinely familiar with. Student responses for the visuals were recorded, all the answers were brought together, and as a result of the analysis, they were taken into consideration in the creation of the illustration that would represent the letter.

## ***Participants***

In this study, data were collected from two different groups to create mnemonic illustrations. First of all, data were collected from 25 classroom teachers working in Gaziantep. Afterward, as a result of the data obtained from the classroom teachers, the data were collected by interviewing 300 students who will start the 1<sup>st</sup> grade in this province. Criterion sampling was used to select the participants (Patton, 2002; Smith & Osborn, 2004). The criteria for participation in the study of classroom teachers were to have taught first grade last year; the students have completed their pre-school education and will start the 1<sup>st</sup> grade in primary school.

### ***Data Collection and Data Analysis Process***

The mnemonic illustrations were tried to be determined in this study in order to represent the 29 letters in the Turkish alphabet. In the creation of the mnemonic illustrations, the objects beginning with the letter to be taught were determined. In this way, it was aimed to enable students to perceive, recognize and distinguish the sound from other sounds.

### ***The Process of Creating Mnemonic Illustrations***

The creation of the mnemonic illustrations was conducted in accordance with the procedure followed by Ehri, Deffner, and Wilce (1984). The shape of the letter is a striking feature of the illustration of the represented object, or the object itself, and the first sound of the object is the letter to be learned. At this point, researchers considered two criteria in determining which letter to match with which object:

- a. It is an object with which students are familiar in their daily life and
- b. The visual of the determined object is in accordance with the symbol of the letter, that is, the illustration of the object is adapted to the symbol of the represented letter.

At this point, the following stages were followed in determining the mnemonic illustrations:

- 25 classroom teachers from the field were interviewed about each letter and the illustrations that would represent it, and they were asked to use a form to write down object names beginning with each letter at a level that would allow children to remember. Since the data obtained started to repeat, there was no need to collect data from more teachers.
- Afterward, according to the responses from classroom teachers, the illustrations of the objects representing each letter were put in order based on the frequency of preference on a form and presented to 300 students who were about to start primary school. Students were asked to choose pictures that were familiar and explain the reason for this choice.
- In line with the students' preferences, the objects to represent each letter were decided by interviewing researchers and 3 field experts specialized in first reading and writing.
- Lastly, the illustrations of the objects representing each letter were drawn by an expert in the field of visual arts. By explaining the purpose of the study and the process carried out in the study, the expert of visual arts was enabled to understand the context of the study and to take this context into consideration while making the drawings. Additionally, the process was tried to be embodied by showing examples of mnemonic illustrations prepared in different studies to the expert of visual arts (de Graaff et al., 2007; Fulk et al., 1997; McKenzie et al., 2018; Nicholas et al., 2017). The illustrations obtained were added to the fonts on Microsoft Word.

The object names representing the symbol of the letter were presented to the visual art expert according to the preferences of the teachers and the students; however, while drawing the symbol of the letter, the objects ranked second in the preferences were worked on, instead of the objects with low power of representation. It was decided to represent the uppercase and lowercase letters with the same objects, but some differences were made due to the difference in the symbols of certain uppercase and lowercase letters.

## Findings

The illustrations of the letters were prepared as a result of the data obtained from classroom teachers, students who were about to start primary school, field experts of first reading and writing, and researchers. Accordingly, while words are beginning with each of the 28 of 29 letters in Turkish, no words are beginning with one letter, (ğ). This letter is either in the middle or at the end of the word. Considering this, an object which ends with this letter was preferred (e.g. "ağ" (meaning 'net')) to represent this letter. Therefore, since there is no word beginning with this letter, a mnemonic illustration for the uppercase letter of this letter was not created.

The visuals preferred by the teachers participating in the study for the letters were arranged in order of frequency. For example, the frequencies for the objects preferred by 25 classroom teachers for the "a" sound are given in Table 1 (Arranged based on the 1st preference).

**Table 1.** Frequency Table for the Visuals Preferred by the Classroom Teachers for the "a" Sound

Preferred Objects	1st prefer (f)	2nd prefer (f)	3rd prefer (f)	Total (f)
Araba (car)	7	4	4	15
Ahtapot (octopus)	6	7	5	18
Ağaç (tree)	5	3	4	12
Aslan (lion)	4	4	1	9
Arı (bee)	3	4	5	12
Astronot (astronaut)	-	3	6	9
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>75</b>

When Table 1 is examined, it is seen that visuals of the objects preferred by the teachers were found, brought together, and presented to the students. The visuals in the table were presented to the students, and they were asked to choose the most familiar object. In addition, the opinions of the students about their preferences were gathered to make sure that the students preferred them based on the familiarity criterion. The visuals of the objects representing each letter were decided in this way and thus the stage of creating mnemonic illustrations was started. For the example of the letter "a" given in the table, as a result of the visuals presented to the students according to the order of preference of the teachers, the students preferred the car in the 1<sup>st</sup> row and the tree and octopus in the 2<sup>nd</sup> and 3<sup>rd</sup> rows with the same frequency. This information is presented to the visual art expert. As a result of his studies, the expert stated that embedding car and tree visuals in the letter "a" would make representation difficult. Therefore, he chose the octopus as a mnemonic illustration.

As an example, two lowercase and two uppercase letters, the names of the objects representing these letters and their illustrations are as follows:

**Table 2.** Example Mnemonic Illustrations and Explanations

Mnemonic Illustration Examples	Object's Name in Turkish and the Letter It Represents
	Object's name = <b>bot</b> (boots) The letter represented= <b>b</b>
	Object's name= <b>zincir</b> (chain) The letter represented= <b>z</b>
	Object's name= <b>Fil</b> (elephant) The letter represented= <b>F</b>
	Object's name= <b>Robot</b> (robot) The letter represented= <b>R</b>

When Table 2 is examined, four different examples of mnemonic illustrations are seen, which were prepared for letters as a result of examining the data obtained from teachers and students and sharing this examination with field experts.

### Conclusions

As a result of this study, mnemonic illustrations were created in order to help students remember sounds and letters in the stage of first reading and writing, in accordance with the Turkish alphabet. Mnemonic illustrations were prepared for the lowercase letters of all 29 letters in the alphabet. On the other hand, mnemonic illustrations were created for the uppercase letters of 28 letters. Because no word begins with the remaining letter, (ğ), this letter does not have an uppercase letter. Therefore, no mnemonic illustration was prepared for this letter.

In this study, it was sought that the object to represent the letters should start with that letter in the creation of the mnemonic illustrations. It was thought that this would support phonological and phonemic awareness. Focusing on letter-sound acquisition and letter recognition skills of children with special needs, Fulk et al. (1997) also created mnemonics in this way. de Graaff et al. (2007) also preferred objects starting with that letter to represent the letter and worked with kindergarten students and achieved more successful results with this method than the other two methods they

used. McNamara (2012) focused on letter recognition and letter-sound knowledge and achieved successful results by working with preschool children.

As stated in the literature review section on the functioning of the mnemonic illustrations created in this study, the principles of both dual coding theory and cognitive load theory were used. When the relevant literature is examined, it is seen that although the principles of cognitive load theory are not mentioned, the principles of dual coding theory are frequently mentioned (de Graaff et al., 2007; Fulk et al., 1997; McKenzie et al., 2018; Nicholas et al., 2017). In this context, a contribution to the literature has been made with the explanations brought within the scope of the cognitive load theory.

## **Recommendations**

In line with the findings obtained from the study, the following can be suggested. Experimental studies can be conducted to interpret the effectiveness of the created mnemonic illustrations. Furthermore, by using the created mnemonic illustrations, the opinions of teachers and students regarding this practice can be examined and suggestions can be provided for the original study for necessary corrections.

## **Limitations**

The data obtained from this study were collected from students and classroom teachers working in a specific region. Teachers working in different regions may prefer different objects as mnemonic illustrations. This situation leads to a limitation regarding what kind of results the created mnemonic illustrations could produce in different groups. Additionally, although scientific principles were followed clearly in the process of creating the obtained mnemonic illustrations, it is not possible to comment on the effectiveness of these mnemonic illustrations, since they were not implemented on participants.

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