

RESEARCH ARTICLE

Investigation of Secondary School Students' Mental Structures Regarding the Concept of Natural Disaster through Drawings

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ABSTRACT

This study aims to reveal secondary school students' perceptions of natural disasters through drawing. The study was conducted in the second semester of the 2022-2023 academic year. A total of 100 students, 50 fifth and 50 eighth-grade students, participated in the study. The data of the study, carried out using the phenomenology design from the qualitative research approach, were collected through the "Natural Disaster Drawing Form". During the study, the students participating in the study were asked to draw a picture of natural disasters and then answer two open-ended questions in the last part of the form. When the data obtained from the study were analyzed, it was seen that the students included natural disasters such as earthquakes, wildfires, floods, landslides, tsunamis, and erosions in their drawings. In addition, it was determined that students in both grade levels made drawings mostly about earthquakes, and the natural disaster they found most important was earthquakes. It was understood that the current natural disasters experienced in Türkiye were very effective in shaping the mental structures of the students. In addition, it was determined that there was no difference in students' drawings according to gender.

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1. Introduction

Environmental education is based on the tendency to preserve nature and the resources that exist with nature. Environmental education should not only teach people something but also affect their behavior. The main purpose of environmental education is to enable individuals to find solutions to problems by creating permanent behavioral changes in individuals (Şimşekli, 2004). With the change in today's conditions and the increase in excessive consumption, environmental problems are also increasing. This situation leads to the need for environmental education. Thanks to environmental education, individuals are sensitive to the

environment they live in and respect it (Gülersoy et al., 2020). The importance of environmental education in solving increasing environmental problems and leaving a livable world heritage is an indisputable fact (Uzel et al., 2019). For this reason, various legal arrangements have been made regarding the environment in order to leave a clean environment for future generations. The 56th article of the 1982 Turkish Constitution mentions the necessity of protecting the environment and preventing pollution, and explains that the measures that can be taken regarding the environment are not only the duty of the state but also a social issue. Society needs to be conscious in order to fulfill its responsibility for the environment.

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Undoubtedly, in order to fulfill this responsibility and protect the environment, society should have the necessary knowledge about the environment and environmental protection through education (Özdemir et al., 2009). This situation brings to mind the concept of environmental awareness. Environmental awareness is of great importance in protecting the environment and leaving a beautiful environment to society. Environmental awareness is a complicated phenomenon that is evaluated emotionally and behaviorally in individuals. There are people who have sufficient consciousness in protecting the environment and pollute the environment, as well as individuals who do not want to pollute the environment and do not turn it into action. This situation of using nature in line with their wishes has become unstoppable with the development of technology. This situation, which is increasing day by day, leads to environmental problems (Türküm, 1998). Environmental problem is defined as a universal problem that puts living life and biodiversity in the ecosystem at risk. With the rapid increase in population, unplanned urbanization, chemical pesticides used in agriculture, chemical wastes released into the environment cause environmental problems by disrupting the natural balance and causing a decrease in intraspecies diversity by endangering biodiversity.

Today's environmental problems can be characterized as air pollution, water pollution, soil pollution, nuclear pollution, etc. (Sağsöz & Doğanay, 2019). While air, water, soil and other pollution constitute environmental problems, another factor that causes environmental problems is natural disasters. People have faced natural disasters, which are one of the factors that cause environmental problems, from time to time. Destructive natural events such as floods, storms, earthquakes, floods, wildfires, erosion, and landslides cause loss of life and property and also cause environmental problems by disrupting the balance of nature (Güler & Çobanoğlu, 1994). Disasters are defined as unusual situations that endanger and limit human life and cause loss of life and property. Natural disasters cause many problems. The main one is environmental pollution. This pollution situation after disasters leads to environmental problems (Akcan, 2019).

After an earthquake, which is one of the natural disasters, the piles of rubble spread around and the dust clusters generated during the removal of these piles damage the environment and cause environmental problems in the long term. After the earthquake, broken mains water pipes combine with various chemicals to contaminate the soil, and pollution is seen throughout the city as the contaminated water and soil rise to the earth's crust. The pollution in the air and water combines with dust and causes an increase in metal ions and creates a toxic effect (Dündar & Pala, 2002). Flooding is another natural disaster that is very common in our country as well as all over the world and damages the environment. Flooding is the uncontrolled dispersion of large masses of water in hollow areas with continuous or occasional flow along the slope.

Floods become a disaster in countries, causing loss of life and property. Destruction of vegetation, construction of houses and buildings on stream beds, lack of roads, electricity, etc. necessary for settlement, etc. cause floods to turn into disasters (E. Özcan, 2006).

Wildfires, another destructive natural phenomenon, have become dangerous with the effect of global warming. Strong wildfires occur when easily flammable materials are left in the forest. Situations such as the rapid increase in urbanization with the rapid development of the population, the burning of unwanted plant roots and parts left in the soil after harvesting lead to the formation of many fires, and the fires that occur turn into severe wildfires. This situation increases the possibility of loss of life and property (Ertuğrul, 2010). Intentional burning of forests and negligent behavior of people are other factors that account for the majority of fires. According to the results of research, it has been determined that 13,000 hectares of forest land are destroyed annually in Türkiye, and only 650 hectares of these are destroyed due to natural causes such as lightning strikes (Ergünay, 2007).

Another natural disaster that concerns Türkiye is landslides. A landslide is a natural disaster that occurs due to external factors and human activities. Landslides cause loss of life and property. In addition to endangering human life, landslides also cause damage to vegetation (K. Öztürk, 2002). Factors that cause landslides are climate activities, landforms, land surface, unplanned urbanization, unplanned urban areas (Ergünay, 2007). Another natural disaster that will cause great damage in the world is drought. Drought is an event that leads to a decrease in the rate of precipitation and a decrease in the rate of water with an increase in seasonal temperature. The differentiation in climatic conditions causes the continuity of drought and leads to the emergence of harmful effects. It is shown as one of the most important natural disasters for reasons such as the damage caused by drought and the lack of knowledge of the society about this situation (Partigöç & Soğancı, 2019).

The way to minimize the effects of natural disasters that cause great damage to human life is through disaster education. Lack of education is the reason why disaster and post-disaster losses and damages lead to great dimensions. It is an inevitable fact that the society, which does not know which disaster or disasters it will face in the region where it lives and is not aware of what kind of attitude it will follow when it encounters these disasters, will suffer loss of life and property in every event it faces as a disaster (Şengün & Küçükşen, 2019). Disaster education aims to prepare the society against possible disasters by gaining resilience against disasters. It enables individuals to find solutions to the problems they face and develop resistance against disasters (Mızrak, 2018). Formal education has a very important place in disaster education. Disaster trainings given in primary and secondary education not only raise awareness, provide community awareness, but also provide great

convenience in minimizing the great losses seen in disasters (Şengün & Küçükşen, 2019).

In this study, it is aimed to reveal the mental structures of 5th and 8th grade middle school students about the concept of natural disaster through drawing. Students' drawings and answers to the questions about the concept of natural disaster are important in terms of revealing their perceptions about this concept. In line with this purpose, answers to three questions were sought.

1. Under which concept categories are students' ideas about the concept of natural disaster grouped and do the categories differ according to grade level?

2. Do students' drawings differ according to gender?

3. Which natural disaster do students find the most important and does it differ according to grade level?

2. Method

2.1. Research Design

In this study, the phenomenology design from the qualitative research approach was used. Phenomenological design refers to the common meaning of individuals' lived experiences related to a phenomenon or concept (Creswell, 2013). It especially includes phenomena that can be encountered in daily life but not fully understood (Yıldırım & Şimşek, 2013). In this study, students' perceptions of natural disasters were tried to be examined in detail.

2.2. Study Group

The study group of the research consists of 100 students studying in 2 different secondary schools in İstanbul in the 2022-2023 academic year. While determining the study group of the research, "simple random sampling" method, one of the random sampling methods, was used. In the simple random sampling method, all individuals constituting the universe have the possibility of being selected equally and independently (Keskin & Örgün, 2015).

In the curriculum program of the science course for the 2022-2023 academic years, the acquisition of the subject of natural disasters is included at the 5th grade level. For this reason, 5th and 8th grade levels were selected to better reveal the change in students' perceptions of natural disasters during their four-year secondary school education. In addition, personal and developmental characteristics of children such as previous disaster experience, age, gender, and educational status, as well as the degree of damage caused by natural disasters and losses after natural disasters are factors that determine the effects of natural disasters on children (Karabulut & Bekler, 2019). Therefore, gender factor was selected as another variable in the study.

The sample group consisted of fifty middle school students from the 5th and 8th grades. Twenty-eight fifth-grade students were female and 22 were male, while 26 eighth-grade students were female and 24 were male (Table 1). In order to ensure the confidentiality of the identity information of the students in the study, numbering was performed independently of the research. For this reason, the first student was named as S1, the second student as S2, and the 100th student as S100.

Table 1. Distribution of the students in the study group according to grade level and gender.

| Grade Level | Female | Male | TOTAL |
|-----------------------|--------|------|-------|
| 5 th Grade | 28 | 22 | 50 |
| 8 th Grade | 26 | 24 | 50 |
| TOTAL | 54 | 46 | 100 |

2.3. Data Collection Tools

"Natural Disaster Drawing Form" was used as a data collection tool. The Natural Disaster Drawing Form, which was prepared by taking expert opinion, consists of three sections. The first section includes information about the demographic characteristics of the students such as grade and gender. In the second part, students were asked to draw by using the phrase "Draw what comes to your mind when you think of natural disasters." In the third part, there were 2 open-ended questions about the picture drawn by the students. In order to determine the comprehensibility and applicability of the form, a pilot study was conducted with two students from the 5th and 8th grades. After the pilot application, the final version of the Natural Disaster Drawing Form was created by making the necessary corrections using the feedback from the students.

2.4. Data Collection

"Natural Disaster Drawing Form" was used to reveal students' perceptions of the concept of natural disaster. Drawings can be a good tool for analyzing children's perceptions, especially about the environment (Rodari, 2007). The Natural Disaster Drawing Form was applied to the students in the study group in the second semester of the 2022-2023 academic year. The application took two weeks to complete. During the application, the students were told that they were free to use the crayons and colors they wanted. Participants were given one class period, i.e., 40 minutes, to complete the form, and students who could not complete their drawings in the given time were given additional time. Some of the drawings made by the students are given in the Supplementary Figure 1.

2.5. Data Analysis

The descriptive analysis method was used to analyze the data obtained. The drawings made by the students were examined in detail, and the drawings referring to similar concepts were organized in the same category. For example,

drawings of landslides were categorized as landslides, while drawings of forest trees and fire were categorized as wildfires. The drawings were tabulated by converting percentages and frequency into numerical data under categories. The data obtained were analyzed, summarized and interpreted separately in terms of class level and gender variables. In addition, it was observed that some students included more detailed information about the related natural disaster and their thoughts about the picture they drew in their drawings. While analyzing the data, each student was coded as S1, S2.... S1 to S50 consisted of 5th grade students and S51 to S100 consisted of 8th grade students.

In order to ensure coding reliability in data analysis, the data were analyzed independently by two researchers. For the reliability of the data, Miles and Huberman (1994)'s "Reliability = Agreement / (Agreement + Disagreement) x 100" was used and it was concluded that the agreement between the researchers was 90%. In the literature, this rate is recommended to be 85% and above (Miles et al., 2020).

3. Findings

3.1. Findings Related to the First Sub-Problem

In this section, the findings related to the research problem "Under which concept categories are students' ideas about the concept of natural disaster grouped and do the categories differ according to the grade level?" are given in Table 2.

Table 2. Percentage and frequency values of the categories of students' drawings according to grade level.

| Categories | Grade Level | | | | Total | |
|-------------------|-----------------------|----|-----------------------|----|-------|----|
| | 5 th Grade | | 8 th Grade | | | |
| | f | % | f | % | f | % |
| Earthquake | 20 | 30 | 22 | 31 | 42 | 31 |
| Wildfire | 18 | 27 | 10 | 14 | 28 | 20 |
| Flood | 13 | 19 | 15 | 21 | 28 | 20 |
| Landslide | 6 | 9 | 5 | 7 | 11 | 8 |
| Avalanche | 2 | 3 | 6 | 8 | 8 | 6 |
| Hurricane | 0 | 0 | 3 | 4 | 3 | 2 |
| Volcanic Eruption | 5 | 7 | 2 | 3 | 7 | 5 |
| Tsunami | 3 | 4 | 4 | 6 | 7 | 5 |
| Erosion | 0 | 0 | 3 | 8 | 3 | 2 |

According to Table 2, students' perceptions of natural disasters were grouped under nine categories: "Earthquake", "Wildfire", "Flood", "Landslide", "Avalanche", "Hurricane", "Volcanic Eruption", "Tsunami", "Erosion". In addition, those who depicted more than one natural disaster in their drawings were also added to the relevant categories. It is understood that 31% (f=42) of the students who participated in the study made drawings in the category of "Earthquake", 20% (f=28) in the category of "Wildfire", 20% (f=28) in the category of "Flood",

8% (f=11) in the category of "Landslide", 2% (f=3) in the category of "Hurricane", 5% (f=7) in the category of "Volcanic Eruption" and "Tsunami", and 2% (f=3) in the category of "Erosion". Accordingly, it was concluded that students mostly made drawings in the "Earthquake" category. This category was followed by the "Wildfire" and "Flood" categories, respectively. Students made drawings to be included in the "Erosion" category the least.

In the "Earthquake" category, 30% (f=20) of fifth graders and 31% (f=22) of eighth graders made drawings in this category. Based on this, it was concluded that the number of students drawing in the "Earthquake" category was close to each other in the 5th and 8th grades. In the "Wildfire" category, 27% (f=18) of the fifth graders and 14% (f=10) of the eighth graders made drawings in this category. In the "Flood" category, 19% (f=13) of the fifth graders and 21% (f=15) of the eighth graders made drawings to be included in this category, while the number of students in this category was close to each other. In the category of "landslide", 9% (f=6) of fifth graders and 7% (f=5) of eighth graders participated. In the "Avalanche" category, 3% (f=2) of fifth graders and 8% (f=6) of eighth graders made drawings to be included in this category. In the "Hurricane" category, no fifth grade student made a drawing, while 4% (f=3) of eighth graders did. In the "Volcanic Explosion" category, 7% (f=5) of fifth graders and 3% (f=2) of eighth graders made drawings that would be included in this category. In the "Tsunami" category, 4% (f=3) of the fifth graders and 6% (f=4) of the eighth graders made drawings in this category. In the "Erosion" category, it was determined that fifth graders did not make any drawings, while 8% (f=3) of eighth graders made drawings.

Some of the expressions used by the students regarding the question "What did you want to explain in the picture?" related to "Earthquake, Wildfire and Flood", which are the categories in which students made the most drawings, are given below.

- In the wildfire, animals such as cats and birds were poisoned by being exposed to a bad effect (S85).

- In the picture, there is a flood and everyone is crying, some cannot find their relatives, some cannot find their children (S62).

- I wanted to tell about the earthquake, we know that there were many earthquakes this year and I drew the picture by putting myself in their shoes (S8).

- I wanted to tell that the earthquake does not kill, but the buildings kill, people are very sad and the buildings collapse (S12).

3.2. Findings Related to the Second Sub-Problem

In this section, the findings related to the research problem "Do students' drawings differ according to gender?" are presented. Students' perceptions of the concept of natural

disasters in the categories of “Earthquake”, “Wildfire”, “Flood”, “Landslide”, “Avalanche”, “Hurricane”, “Volcanic Eruption”, “Tsunami”, “Erosion” are re-examined in terms of gender variable. The pictures drawn by the students are analyzed according to the gender variable and the data are presented in Table 3.

Table 3. Percentage and frequency values of the categories of the pictures drawn by the students according to gender.

| Categories | Female | | Male | |
|-------------------|--------|----|------|----|
| | f | % | f | % |
| Earthquake | 20 | 29 | 20 | 32 |
| Wildfire | 12 | 18 | 15 | 24 |
| Flood | 14 | 21 | 12 | 19 |
| Landslide | 6 | 9 | 3 | 5 |
| Avalanche | 5 | 7 | 3 | 5 |
| Tornado | 2 | 3 | 3 | 5 |
| Volcanic Eruption | 3 | 4 | 2 | 3 |
| Tsunami | 3 | 4 | 3 | 5 |
| Erosion | 3 | 4 | 1 | 2 |

Analyzing Table 3, in the “Earthquake” category, 29% (f=20) of the girls and 32% (f=20) of the boys made drawings appropriate to this category. In the “Wildfire” category, 18% of girls (f=12) and 24% of boys (f=15) made drawings appropriate to this category. It is seen that there are more male students in this category. In the “Flood” category, 21% of girls (f=14) and 19% of boys (f=12), in the “Landslide” category, 9% of girls (f=6) and 5% of boys (f=3), in the “Avalanche” category, 7% of girls (f=5) and 5% of boys (f=3), in the “Tornado” category, 3% of girls (f=2) and 5% of boys (f=3), In the category of “Volcanic Eruption”, 4% of the girls (f=3) and 3% of the boys (f=2), in the category of “Tsunami”, 4% of the girls (f=3) and 5% of the boys (f=3), and in the category of “Erosion”, 4% of the girls (f=3) and 2% of the boys (f=1) made drawings in accordance with this category.

Female students made the most drawings in accordance with the “Earthquake” category with a rate of 29% (f=20). This category was followed by “Flood” with 21% (f=14), “Wildfire” with 18% (f=12), “Landslide” with 9% (f=6), “Avalanche” with 7% (f=5), “Volcanic Eruption”, “Tsunami” and “Erosion” with 4% (f=3), and “Hurricane” with 3% (f=2). On the other hand, 32% (f=20) of the male students made drawings in accordance with the “Earthquake” category. This category was followed by “Wildfire” with 24% (f=15), “Flood” with 19% (f=12), “Landslide”, “Avalanche”, “Hurricane” and “Tsunami” with 5% (f=3), “Volcanic Eruption” with 3% (f=2) and “Erosion” with 2% (f=1). The natural disaster that the girls participating in the study least preferred to draw was in the category of “Hurricane”. On the other hand, the least preferred natural disaster by boys was in the category of “Erosion”. When the findings are analyzed in general, it is seen that in the drawings

made by male and female students, girls draw more in some categories and boys draw more in some categories.

3.3. Findings Related to the Third Sub-Problem

In this section, the findings related to the research problem “Which natural disaster do students find the most important and does it differ according to grade level?” are presented. The data obtained by analyzing the students' explanations on the natural disaster drawing form are given in Table 4 below.

Table 4. Which natural disaster students find the most important and its variation according to grade level.

| Categories | 5 th Grade | | 8 th Grade | |
|-------------------|-----------------------|----|-----------------------|----|
| | f | % | f | % |
| Earthquake | 42 | 50 | 44 | 50 |
| Wildfire | 14 | 17 | 8 | 9 |
| Flood | 11 | 13 | 10 | 11 |
| Landslide | 5 | 6 | 5 | 6 |
| Avalanche | 5 | 6 | 8 | 9 |
| Tornado | 0 | 0 | 6 | 7 |
| Volcanic Eruption | 0 | 0 | 0 | 0 |
| Tsunami | 7 | 8 | 6 | 7 |
| Erosion | 0 | 0 | 0 | 0 |

As seen in Table 4, based on the answers given by the students to the question “What do you think is the most important natural disaster?”, the most common answer is “earthquake” with 86 students, followed by “wildfire” with 22 students, “flood” with 21 students, “tsunami” and “avalanche” with 13 students, “landslide” with 10 students, and “hurricane” with 6 students. From this point of view, it is concluded that students find earthquakes the most important among natural disasters and hurricanes the least important. When analyzed by grade level, 50% (f=42) of the 5th graders stated that “Earthquake” was the most important disaster, while 50% (f=44) of the 8th graders stated this. On the other hand, 17% (f=14) of 5th graders and 9% (f=8) of 8th graders preferred the “Wildfire” category as the most important natural disaster. When we look at those who preferred the “Flood” category, it is seen that 13% (f=11) of the 5th graders and 11% (f=10) of the 8th graders. In the category of “landslide”, it is seen that an equal number of 5th and 8th grade students gave answers, 6% (f=5). Again, when Table 4 is analyzed, it is seen that 6% (f=5) of the 5th graders and 9% (f=8) of the 8th graders selected “Avalanche” as the most important natural disaster. While no 5th grade students stated that they found the natural disaster “Hurricane” important, 7% (f=6) of 8th grade students chose it as the most important natural disaster. When we look at those who preferred the “Tsunami” category, it is seen that 8% (f=7) students from the 5th grade and 7% (f=6) students from the 8th grade. Students at both grade levels did not find the natural disasters in the “Volcanic Eruption” and “Erosion” categories important.

4. Discussion and Conclusion

In this study, the “Natural Disaster Drawing Form” was applied to measure the perceptions of 5th and 8th grade middle school students about natural disasters. The data obtained from the form were coded according to the grade level of the students and their frequencies and percentages were determined. When evaluated in general, according to the data obtained from the drawings, it was determined that students made few drawings of avalanches, hurricanes, volcanic eruptions, tsunamis, and erosions natural disasters.

When the findings are analyzed, it is seen that the students mostly made drawings in the “Earthquake” category. This category is followed by “Wildfire”, “Flood”, “Landslide”, “Avalanche”, “Volcanic Eruption”, “Tsunami”, “Hurricane” and “Erosion”. It can be interpreted that the fact that the students made the most drawings in the “Earthquake” category may be due to the fact that Türkiye is an earthquake country as well as the effect of the February 6 (in 2023) earthquake that happened very recently. In addition, it is seen that there were no drawings in the “Hurricane” and “Erosion” categories in the 5th grade. From this point of view, it can be inferred that the students did not draw because the concept of “Erosion” was not included in the 5th grade science learning outcome. In the research data, it is noteworthy that the least number of drawings were made about the concepts of “Hurricane” and “Erosion”. In the study conducted by Gençoğlu (2019), it is seen that students' cognitive structures towards the concept of erosion are weak, but they are conscious about the measures to be taken. Again, in the study conducted by Tokcan and Yiter (2017), students associated the concept of “erosion” with landslides, which led to misconceptions. Another point that draws attention in the study is that as a result of the study conducted by Gençoğlu (2019), it was seen that the cognitive structures of the students towards the concept of “Wildfire” were weak, while in this study, it was seen that the students made the most drawings in the category of “Wildfire” after “Earthquake”.

The reason for this situation can be thought to be the wildfires that occurred in many provinces, especially in Manavgat district, in 2021 and deeply affected the whole of Türkiye. Likewise, when the research data are analyzed, it is seen that the concepts of “Tsunami” and “Volcanic Eruption” were drawn at a low rate of 5% after “Hurricane” and “Erosion”. The reason why the tsunami natural disaster was drawn less by the students can be interpreted as the fact that this disaster is not seen in Türkiye. Again, the study conducted by Karakuş and Önger (2017) supports this situation. Tsunami received the least response in the students' ranking of disaster types. Chueh (2007) concluded that conceptual knowledge of earthquake and volcanic eruption is not related to students' grade level. In this study, it was observed that students did not make any drawings about some of the natural disasters. From this point of view, it can be thought that students do not know

these natural disasters. Again, in the study conducted by Mohammed Thohir (2023) with university students, it was concluded that students with more disaster knowledge are more prepared for disasters that may occur. Again, when we look at the results of the study, it was seen that the most important disaster found by the students was an earthquake. Yıldız (2023) concluded in his study that the disaster that children consider dangerous is related to the region where they live. This study can be interpreted in this way since it was conducted in the province of Istanbul, where major earthquakes were experienced in the past.

Uzun et al. (2022) wanted to measure students' perception of natural disasters in their study, and as a result, it was seen that the most frequently expressed natural disasters by students were earthquakes, floods, avalanches, and landslides, respectively. In another study conducted by Değirmenci et al. (2019), social studies textbooks were examined in terms of disaster awareness, and as a result of the research, it was determined that earthquake, which is a natural disaster that is very common in the world and in our country, was more frequently included in the textbooks than other disasters. In the study conducted by Güneş and Çelik (2021), it was seen that the most common disaster in Türkiye between 1900 and 2021 was an earthquake. Günaydın et al. (2019) also had the participants draw pictures and as a result of the findings, it was seen that the first concept that came to mind when disaster was mentioned was earthquake. It is seen that the results are similar in this study. Looking at other studies, Dikmenli and Yakar (2019) and Bulu (2023) measured the perception of pre-service teachers towards disasters using the “Disaster Awareness Perception Scale” and according to the results of the research, it was realized that the perception of individuals who had previously faced disasters was higher. Again in this study, it can be thought that students chose the disaster they found most important or drew a picture depending on their experiences. In contrast to these, F. Öztürk (2019) applied a word association test in his study and concluded that students associated the concepts of flood, landslide, volcanic eruption the most and earthquake, hurricane and tornado the least. In another study conducted by Durna (2009), according to the research data, it was realized that the active lecture method applied to the students helped them to develop their perception of natural disasters better. Yel (2023) revealed students' perception of climate change by using the drawing method in his study. Yalçınkaya (2013), Özsoy (2012) and H. Özcan and Demirel (2019) used the drawing method in their studies.

When the drawings made by the students were analyzed according to the gender variable, it was determined that male and female students made drawings that would be included in the “Earthquake” category at most, and it is seen that the drawing data in other categories are close to each other. It was seen that there was no significant difference depending on the gender variable.

When the natural disasters that students found important were analyzed according to the grade level, it was seen that students in both grade levels gave the answer “earthquake” the most. This situation supports the fact that earthquakes, which occur in almost every region of our country, are considered important because they cause deep material and moral losses. Another striking part of the findings is that students did not give the answer of erosion and volcanic eruption at both grade levels. This situation can be associated with experience and natural environmental conditions. Since there are no active volcanoes and volcanic eruptions today, it can be thought that students did not give the answer of volcanic eruption. Erosion, on the other hand, may not have been answered since it is not seen in the region where the students who participated in the application live.

The results of this study are limited to the schools where the study was conducted, the sample and the data collection tool used. The study was conducted in the central districts of a metropolitan city in western Türkiye. It is thought that conducting studies with wider participation to include other regions of Türkiye and to cover all school levels may be more effective in revealing the mental structures of students towards natural disasters.

Conflict of Interest

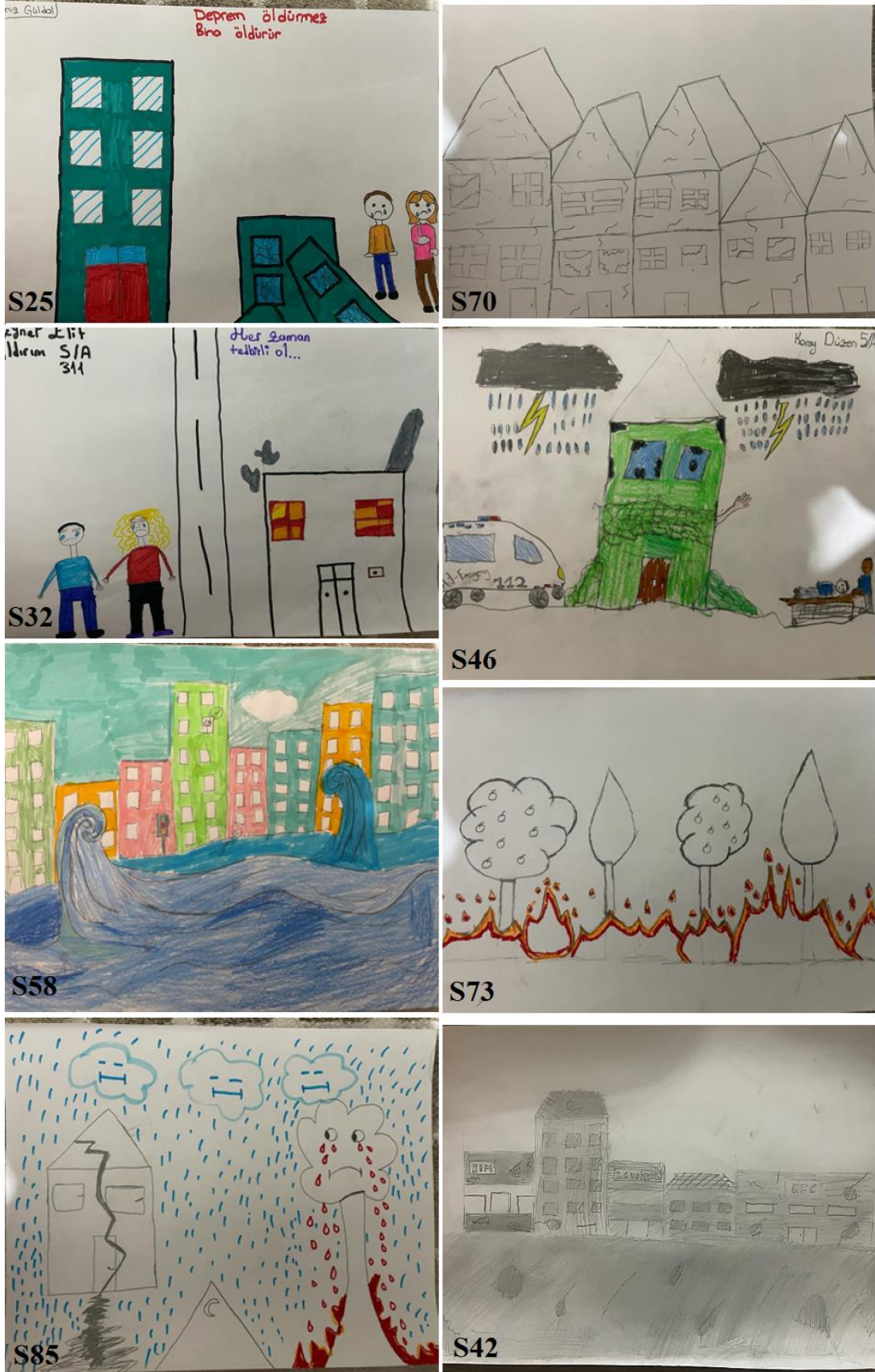
The authors declare that they have no conflict of interest.

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Supplementary Information



Supplementary Figure 1. Students' natural disaster drawing examples.