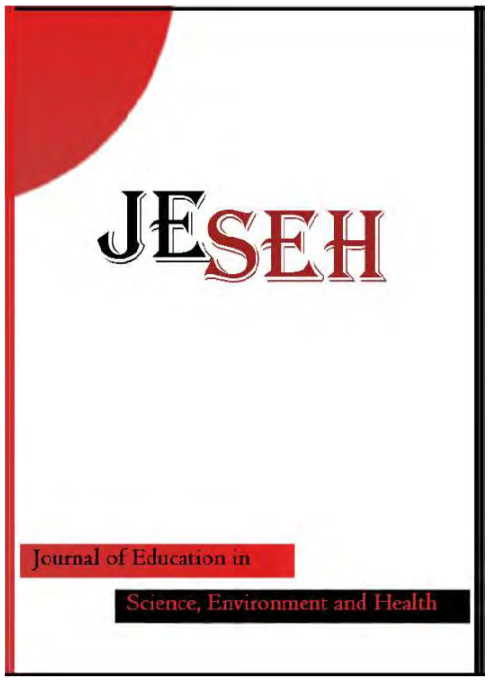


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# Causes, Consequences and Solitions to Environmental Problems from the Eyes of Preschool Children

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**Abstract**

This study is a case study that investigates the perceptions of preschool children about the causes, consequences, and solutions to environmental problems. A total of 41 children participated in the study. The data were obtained by using the draw and explain the technique, which included 3 different drawings and telling the children about the causes, consequences, and solutions of environmental problems. In the analysis of the data, the content analysis method was used. As a result of the research, it was found that the preschool children's perceptions were limited; however, as the age group grows, it has been determined that the icons used in the pictures related to the causes, consequences, and solutions of the environmental problems vary. It was revealed that the children associate the causes and consequences of environmental problems with pollution and the ways of solving environmental problems with the prevention/elimination of this pollution. It has been observed that the number of children related to the destruction of nature and irresponsible consumption of natural resources with environmental problems is very limited. In order to improve children's perceptions of environmental problems, it is suggested that teachers and parents should give more space to activities and games related to the environment in daily flow.

## Introduction

The environment is all of the living and inanimate objects that living things can meet all their needs in order to survive (Zayimoğlu-Öztürk et al., 2015). The intense need for raw materials, energy, and space as a result of advances in technology and rapid population growth; has caused the destruction of the natural environment and resources and the deterioration of the natural balance in our environment (Kahyaoğlu & Kaya, 2012). The density of wastes accumulating in nature has reached levels that threaten the ecological balance (Yücel & Morgil, 1998). These events, which directly or indirectly affect the life of living things negatively, are defined as environmental problems (Göney, 2004). Many negativities such as unplanned urbanization, drying up and polluted water resources, diminishing biodiversity, destroyed nature, consumed natural resources, increasing traffic density, fertile agricultural lands filled with residential areas or industrial facilities, increasing pollution, climate changes, global warming, melting of polar glaciers. It is one of the environmental problems that people try to take precautions (Efe, 1999). Due to the current environmental problems reaching unmanageable levels, children are now born into a more polluted, poorer world, where climate changes are intense, natural products are decreasing and biodiversity is being destroyed (Ahi & Alisinanoğlu, 2016). The increase in today's environmental problems, where human impact is felt intensely, directly or indirectly, has revealed the necessity of educating people in a more conscious and sensitive manner towards the environment. In other words, informing people about the causes and possible consequences of environmental problems and making them sensitive to these problems; These problems have reached a critical level today because they threaten vitality (Harman & Çelikler, 2016). Training to be given to individuals about protecting the environment from their childhood years will yield more effective results than the laws arranged to prevent environmental problems (Aksoy & Karatekin, 2011). Unless people make certain changes in their lifestyles that pollute the environment and cause environmental problems, it is obvious that environmental problems that threaten the vitality and the world cannot be solved (Selvi, 2007). For this reason, it is very important to provide environmental education to individuals of all age groups that will enable them to be more conscious and sensitive to the environment (Pınar & Yakışan, 2016).

Environmental education was defined in the Tbilisi Conference, the first international conference on the environment, held in 1977. It is defined as 'all the efforts made to prevent a new one to these problems, aiming to develop the population of the country' (UNESCO, 1978; cited in Kurt Gökçeli, 2015). A qualified

environmental education provides support to individuals in making effective decisions in order to protect the environment in which they live and transforming this into behavior (Nagra, 2010). It is very important to start environmental education from an early age (Wells & Davey-Zeece, 2007). Because children who recognize their environment from an early age and display sensitive and protective attitudes and behaviors towards their environment tend to continue this approach in the later stages of their lives (Robertson, 2008). In addition, most of the children today live away from nature due to increasing environmental problems and the necessity of living in urban conditions. Under these conditions, it seems possible for children to get to know the natural environment and develop positive attitudes and behaviors towards the environment only with environmental education given to them from an early age (Kurt Gökçeli, 2015). Children who have a sufficient understanding of the environment can be a part of the solution of these problems over time, as they have knowledge about environmental problems (Marin & Yıldırım, 2004). Therefore, raising children's awareness of the causes and consequences of environmental problems and environmental protection from their childhood is important in terms of raising a generation that is more sensitive to the environment and protecting the environment and can produce solutions to existing environmental problems (Özkul, 2018).

The preschool period, as in all development areas and concepts, has critical importance in acquiring and transferring the acquisitions aimed at protecting the environment (Essa, 2005; Güler-Yıldız, 2017; Smith, 2001). In Palmer et al.'s (1999) study, which aimed to increase the knowledge level of preschool children about the environment, to enable them to develop positive attitudes towards the environment, to enable them to acquire meaningful environmental experiences in order to understand the events occurring in the environment, and to enable them to transfer their experiences to their own lives, when appropriate environmental education is given, children's concepts about the environment They have revealed that they can perceive and begin to exhibit more responsible behaviors, that is, they transfer what they have learned to their lives. Environmental education should be addressed at younger ages in order for children's perceptions of the environment to be shaped at an early age and for their gains at this age to form the basis for their future attitudes and behaviors (Erten, 2004; Smith, 2001). In one of the studies conducted in the context of environmental education in the preschool period, Grodzinska-Jurczak, Stepska, Nieszporek, and Bryda (2006) revealed that preschool children in Poland have sufficient basic concepts about the environment, but exhibit inappropriate behaviors towards the environment. Meiboudi et al. (2011) revealed in their research that preschool children's attitudes towards the environment could be improved by having pictures about the environment made on the wall. In another study, Akbayrak and Kuru Turaşlı (2017) revealed that environmental activities to be carried out in the preschool period improve children's environmental perceptions and awareness. Özkul (2018), on the other hand, revealed that children's perceptions of the environment and environmental problems in this period are mostly limited to garbage and pollution.

Before planning a qualified environmental education program that will raise awareness of children about the environment and environmental problems; it is necessary to reveal the perceptions of these children about the environment and environmental problems, to identify the deficiencies, and to plan the education program accordingly. Although the preschool period has critical importance in the context of environmental education, academic studies are very limited at the national and international levels (Özkul 2018; Kurt Gökçeli, 2015). Studies conducted to determine the perceptions of children about the environment and environmental problems and to develop these perceptions are mostly at primary and secondary school level (Keleş & Keleş, 2018; Laura & Alfredo, 2010; Pınar & Yakisan, 2016; Yalçınkaya, 2013). In addition, the findings of these studies; reveal that children's perceptions of environmental problems are limited to "garbage" and "environmental pollution" even at the primary school level. Again, the findings of these studies reveal that children's perceptions of protecting the environment are limited to "not polluting" and "preventing/warning polluters" (Gülhan & Yurdatapan, 2014; Yılmaz et al., 2016).

This study, it is aimed to reveal the perceptions of preschool children about the causes, consequences, and solutions of environmental problems. In this context, answers to the following research problems were sought in this study:

1. What are the perceptions of preschool children about the causes of environmental problems?
2. What are the perceptions of preschool children about the consequences of environmental problems?
3. What are the perceptions of preschool children about solutions to environmental problems?

It is thought that the findings of this research will guide preschool teachers and educators who design preschool education programs to include environmental education more in daily practices.

## Method

### Research Design

A qualitative case study design was used in the research since it was aimed to determine the perceptions of children about environmental problems in detail through the pictures they drew and interviews. A case study is a qualitative approach in which researchers collect detailed and in-depth information about a current situation or situation (Creswell, 2007). This research was designed with a single case-holistic design, one of the qualitative research designs. The holistic single-case design is a case design in which there is an analysis unit for a particular case, and the anomalies or peculiarities of this unit are examined holistically (Yin, 1984).

### Research Sample

41 children aged 3-6 years (8 children 3 years old, 15 children 4 years old, 18 children 5 years old) attending a public kindergarten in Turkey participated in this research. The sample was determined by a convenient sampling method. The school where the data is collected is also the practice kindergarten of the university. The sample was chosen from among the students whose parents gave permission and who wanted to participate in the study voluntarily.

### Data Collection

In this study, the draw-and-tell technique was used to determine children's perceptions of the causes, consequences, and solutions of environmental problems (Bracett- Milburn, 1999; Özsoy, 2012; Shepardson, 2005). This technique is a diagnostic technique that includes children's drawings and explanations about their drawings and is used to understand the concepts that children have and how they structure their thoughts about these concepts (McWhirter et al., 2000). Studies reveal that pictures to be drawn by children are a powerful tool in analyzing the images in children's minds (Rodari, 2007). Again, studies reveal that drawing is the easiest way for children to express their feelings and thoughts, and especially young children can explain situations that they cannot express verbally enough with the pictures they made (Yavuzer, 2005). Drawing a picture is both instructive and ensures that children do not feel any pressure during the research (Barraza, 1999). Drawing a picture makes it possible for young children to visually identify the information in their inner world, to understand their emotions, and to reveal their true thoughts (Minkof & Riley, 2011). When the drawings are analyzed well, it is known that no matter how complex the concept is, it clearly reveals the cognitive structures of individuals and is also effective in revealing the existing schemas in the mind and the relations of these schemas with other schemas (Schafer, 2012). For these reasons, drawing pictures is a popular method used in research for many years (Ahi & Sinanoğlu, 2010).

In this study, data were collected by having children draw 3 different pictures on different days about environmental problems (causes, consequences, and solutions). On the first day, a blank picture paper was distributed to the children, and the children were asked, 'What do you think are the causes of environmental problems? Can you explain your thoughts on this subject by drawing pictures on the blank papers given to you? On the second day, he distributed a blank picture paper to the children again and asked the children, 'What do you think are the consequences of environmental problems? Could you explain your thoughts on this subject by drawing pictures on the blank papers given to you?' On the third and last day of the application, a blank picture sheet was distributed to the children, and the children were asked, 'How do you think environmental problems can be solved? Could you explain your thoughts on this subject by drawing pictures on the blank papers given to you?' The children were asked to explain each picture they drew immediately after that drawing, and the researchers noted the children's explanations about the pictures down. It is used in order to define the explanations about the pictures drawn by the children, the icons they use in their drawings, and to place these icons under the correct themes.

### Data Analysis

The interpretative content analysis method was used in the analysis of the data (Banks, 2001). Interpretive content analysis is a qualitative data analysis method in which various themes, topics, and phenomena are determined and interpreted based on data from the data (Giarelli & Tulman, 2003). For this purpose, in the analysis of the data, all the pictures (41X3 pieces) were first examined in order to get a general idea, and all the

icons drawn by the children in their pictures were defined as the codes of the research. New codes obtained during the analysis were added to the code list. In order for the coding to be reliable, two researchers analyzed the pictures semantically separately and the symbols in the pictures were coded using the prepared code list. The coding made by the researchers was compared and a common point of view was tried to be developed in the analysis. The reliability formula of Miles and Huberman (1994) was used to calculate the consistency between encoders. In the first calculation, the inter-coder consistency was calculated as 92%. Icons on which there is no consensus were revised and a common understanding was developed for analysis. In this way, the coding was completed and these codes were gathered under various themes determined based on the relevant literature. The research findings were reported using descriptive tables containing percentages and frequencies, and together with these tables, the pictures drawn by the children and their explanations about the pictures were included in the findings section.

## Findings

### Children's Perceptions of the Causes of Environmental Problems

Most of the children stated (75.60%) that garbage caused environmental problems in their pictures. It has been revealed that 7.31% of children associate environmental problems with industrial wastes, 2.43% with the destruction of nature, and 2.43% with irresponsible consumption of natural resources. It was determined that these children mostly included the theme of garbage and industrial waste in their pictures (Table 1). The distribution of the themes related to the causes of environmental problems in children's pictures by age is summarized in Table 2.

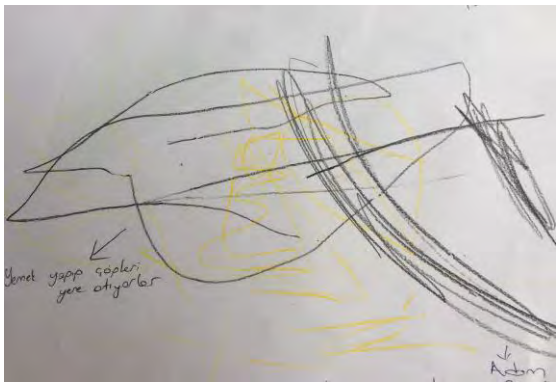
Table 1. The intensity of the detected themes on the causes of environmental problems in the pictures (N:41)

| Themes | f | % |
|---|---|---|
| Garbage | 31 | 75.60 |
| Industrial waste | 3 | 7.31 |
| Destruction of nature | 1 | 2.43 |
| Irresponsible consumption of natural resources | 1 | 2.43 |

Table 2. Distribution of themes on causes of environmental problems by age

| | Age 3 (N=8) | | Age 4 (N=15) | | Age 5 (N=18) | |
|---|---|---|---|---|---|---|
| Themes | f | % | f | % | f | % |
| Garbage | 5 | 62.50 | 13 | 86.66 | 13 | 72.22 |
| Industrial waste | 0 | 0 | 1 | 6.66 | 2 | 11.11 |
| Destruction of nature | 0 | 0 | 0 | 0 | 1 | 5.55 |
| Irresponsible consumption of natural resources | 0 | 0 | 1 | 6.66 | 0 | 0 |

When Table 2 is examined, it is seen that the majority of children in the 3-year-old group (62.50%) associate the reason of environmental problems with not throwing garbage on the ground (Picture 1). The rest of the children in this group did not make any drawings about the causes of environmental problems.




In this picture about the causes of environmental problems, a girl who wants to enter the pool by the pool, a trashcan and garbage on the ground are drawn. In this picture, the child stated that the garbage thrown on the ground caused the environmental problems, this garbage also polluted the water, the girl who wanted to enter the pool could not enter the pool because of the garbage, and therefore she was upset.

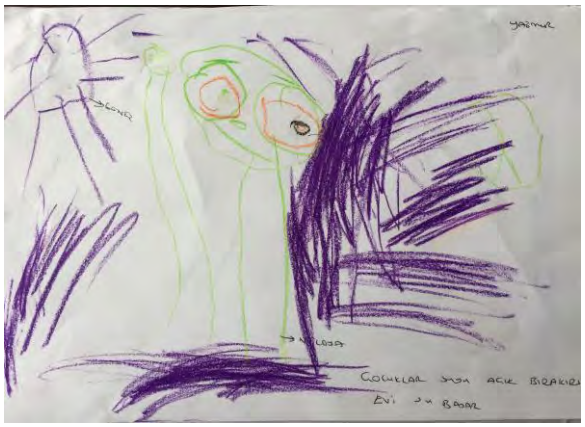
Picture 1. A picture with the theme of 'garbage' (3 years old)

When Table 2 is examined, it is seen that a great majority (86.66%) of children in the 4-year-old group associate the cause of environmental problems with not throwing garbage on the ground, as in the 3-year-old group (Picture 2).

In this picture about the causes of environmental problems, a girl who wants to enter the pool by the pool, a trash can, and garbage on the ground is drawn. In this picture, the child stated that the garbage thrown on the ground caused environmental problems, that this garbage also polluted the water, that the girl who wanted to enter the pool could not enter the pool because of the garbage, and therefore she was upset.

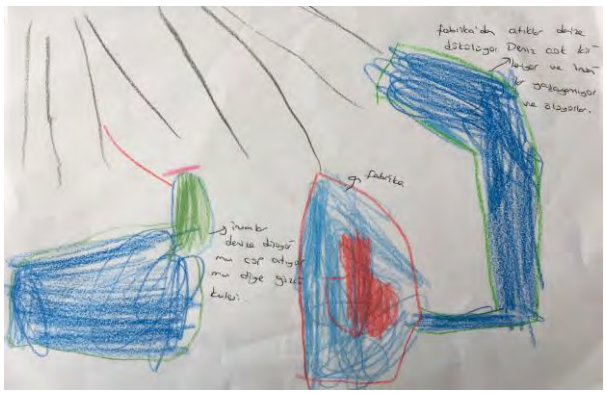
Picture 2. A picture with the theme of 'garbage' (4 years old)

6.66% of the children in this group included the theme of irresponsible consumption of natural resources (Picture 3) and 6.66% of them included the theme of industrial waste (Picture 4) in their drawings.



In this picture about the causes of environmental problems, the sad children are drawn in green, and the surrounding waters are drawn in purple and scattered. In this picture, the child stated that the water left open causes environmental problems, that we should not waste water unnecessarily, and that if we leave the taps open at home, the house may flood.

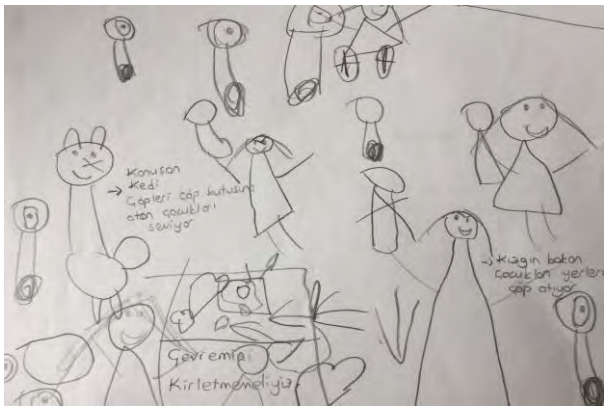
Picture 3. A picture with the theme of 'irresponsible consumption of natural resources' (4 years old)



An observation tower and a factory are drawn in this picture
about the causes of environmental problems. In this picture, the child stated that the wastes left in the sea from the factories caused the environmental problems, that the sea was polluted in this way, and that this situation threatened people's lives.

Picture 4. A picture featuring the theme of 'industrial wastes' (4 years old)

When Table 2 is examined, it is seen that the majority of children in the 5-year-old group (72.22%) associate the cause of environmental problems with not throwing garbage on the ground as in other age groups (Picture 5).




In this picture, which is about the causes of environmental problems, figures of people who throw garbage and do not throw garbage are drawn. Children who do not throw garbage on the ground are depicted as happy; children who throw garbage on the ground are depicted as angry. In this picture, the child stated that the garbage thrown on the ground caused environmental problems.

Picture 5. A picture with the theme of 'garbage' (5 years old)

11.11% of the children in this group included the theme of industrial waste (Picture 6) and 5.55% including the theme of the destruction of nature (Picture 7) in their drawings.


In this picture, which describes the causes of environmental problems, the sea, black oil, and pale algae are drawn on the surface of the sea. In this picture, the child stated that oil wastes polluting the seas cause environmental problems and algae disappear due to pollution.

Picture 6. A picture with the theme of 'industrial wastes' (5 years old)

In this picture about the causes of environmental problems, children jumping into the dirty sea with a slide are drawn. In this picture, the child has associated environmental problems with polluted seas; He stated that throwing the killed animals into the sea pollutes the seas and that there are no trees because they cut down the trees.

Picture 7. A picture featuring the theme of 'destruction of nature' (5 years old)

**Children's Perceptions of the Consequences of Environmental Problems**

When thepicturesof the children in the study group were examined, it was revealed that the majority of the children (56.51%) associated the consequences of environmental problems with water pollution. In the category of the consequences of environmental problems, 19.5% of the children included the impact on humans, 17.07% on animals, 9.75% on air pollution, 9.75% on natural disasters, 4.87% on plants and 4.87% on soil pollution. determined (Table 3).

Table 3. The intensity of the themes identified about the consequences of environmental problems (N:41)

| Themes | f | % |
|---|---|---|
| Water pollution | 23 | 56.09 |
| Impact on humans | 8 | 19.51 |
| Impact on animals | 7 | 17.07 |
| Air pollution | 4 | 9.75 |
| Natural disasters | 4 | 9.75 |
| Impact on plants | 2 | 4.87 |
| Soil pollution | 2 | 4.87 |

It is summarized in Table 4 that the themes related to the content of environmental problems in children's pictures can be experienced.

Table 4. Distribution of themes on the consequences of environmental problems by age

| | Age 3 (N=8) | | Age 4 (N=15) | | Age 5 (N=18) | |
|---|---|---|---|---|---|---|
| Themes | f | % | f | % | f | % |
| Water pollution | 0 | 0 | 10 | 66.66 | 13 | 72.22 |
| Impact on humans | 1 | 12.50 | 4 | 26.66 | 3 | 16.66 |
| Impact on animals | 1 | 12.50 | 3 | 20.00 | 3 | 16.66 |
| Air pollution | 0 | 0 | 1 | 6.66 | 3 | 16.66 |
| Natural disasters | 2 | 25.55 | 0 | 0 | 2 | 11.11 |
| Impact on plants | 1 | 12.50 | 0 | 0 | 1 | 5.55 |
| Soil pollution | 0 | 0 | 1 | 6.66 | 1 | 5.55 |

As seen in Table 4, it has been determined that the majority of children in the 3-year-old group (25.55%) associate the consequences of environmental problems with natural disasters (Picture 8).

In this picture about the consequences of environmental problems, a very hot sun has been drawn. In this picture, the child stated that environmental problems caused the sun to be very hot and that the sun could explode and cause disasters.

Picture 8. A Pictures featuring the theme of 'natural disasters' (3 years old)

It was revealed that some of the children in the 3-year-old group included the themes of the effects of environmental problems on people, animals and plants in their pictures (Picture 9).

In this picture about the consequences of environmental problems, human, animal and plant figures are drawn. In this picture, the child expressed that environmental problems can make people, animals and plants sick.

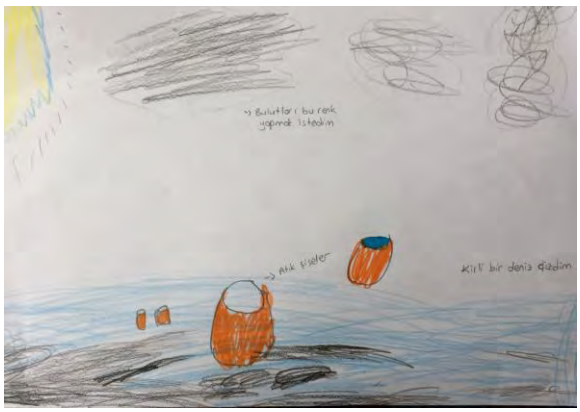
Picture 9. A Picture with themes of 'impact on humans', 'impact on animals' and 'impact on plants' (3 years old)

As can be seen from Table 4, it was revealed that the majority of children in the age group of 4 (66.66%) included the theme of water pollution in their pictures about the consequences of environmental problems (Picture 10).


In this picture about the consequences of environmental problems, various garbage is drawn in the sea and the sea. In this picture, the child expressed that one of the environmental problems, garbage can cause water pollution.

Picture 10. A picture with the theme of 'water pollution' (4 years old)

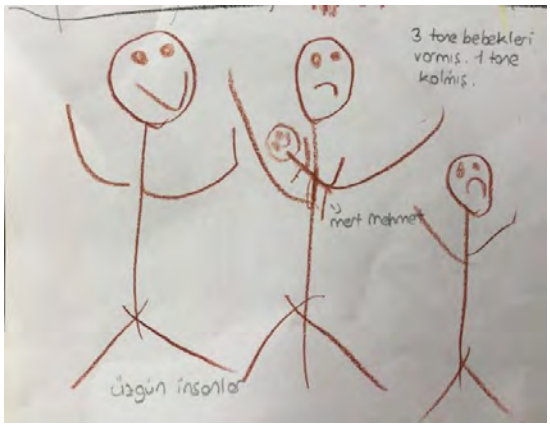
As seen in Table 4, it has been revealed that children in the age group of 5 mostly associate the consequences of environmental problems with water pollution (Picture 11).




In this picture about the consequences of environmental problems, the sea surface is drawn in black because it is dirty, and the clouds on the sea are also drawn in black because the environment is polluted. In this picture, the child stated that the water was polluted as a result of environmental problems.

Picture 11. A Picture with the theme of 'water pollution' (5 years old)

It was determined that the children in this group mostly included the themes of the effects of environmental pollution on humans and animals (Picture 12, Picture 13, Picture 14).

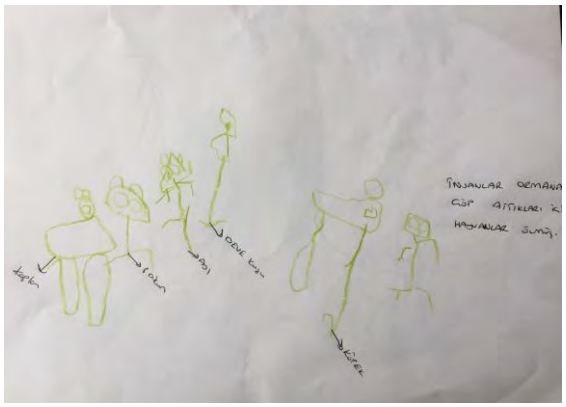



Sad human figures are drawn in this picture about the consequences of environmental problems. In this picture he drew, the child stated that two babies of a family with three babies died due to environmental problems.

Picture 12. A Picture with the theme of 'effect on people' (5 years old)


Sad people and a polluted sea are drawn in this picture about the consequences of environmental problems. In this picture he drew, the child stated that people's boats were sunk due to environmental problems (pollution of the sea) and people were harmed by it.

Picture 13. A picture with the theme of ''effect on people' (5 years old)



In this picture, which is about the consequences of environmental problems, figures of animals and animals are drawn. In this picture, the child stated that people throwing garbage in the forests causes environmental problems and this situation kills the animals in the forest.

Picture 14. A picture with the theme of 'the effect on animals' (5 years old)

**Children's Perceptions of Solutions to Environmental Problems**

When the pictures drawn by the children about the solutions to environmental problems are examined, it is seen that 14.63% of the children warn/prevent the pollutants, 12.19% do not throw the garbage on the ground, again 12.19% collect the garbage, 7.31% use the recycling and 4.87% save the living things. It was seen that they included protection themes (Table 5).

Table 5. The intensity of the detected themes on the solutions of environmental problems in the pictures (N:4**)**

| **Themes** | **f** | **%** |
|---|---|---|
| Warn/prevent the pollutants | 6 | 14.63 |
| Do not throw the garbage on the ground | 5 | 12.19 |
| Collect the garbage | 5 | 12.19 |
| Rcycling | 3 | 7.31 |
| Save the living thing | 2 | 4.87 |

The distribution of the themes that children include in their pictures about the solutions to environmental problems, according to age, is summarized in Table 6.

Table 6. Distribution of themes on solutions to environmental problems by age

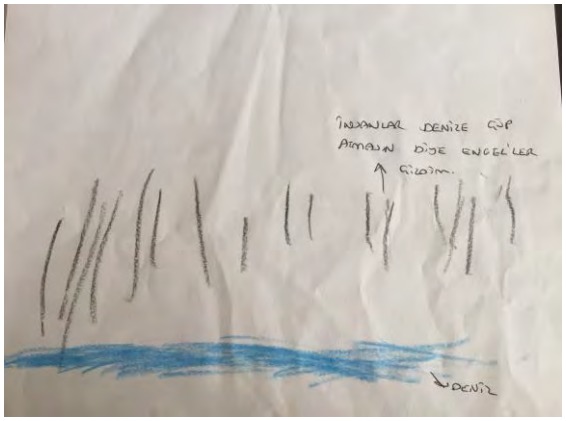
| Themes | Age 3 (N=8) | | Age 4 (N=15) | | Age 5 (N=18) | |
|---|---|---|---|---|---|---|
| | f | % | f | % | f | % |
| Warn/prevent the pollutants | 0 | 0 | 3 | 20.00 | 3 | 16.66 |
| Do not throw the garbage on the ground | 3 | 37.50 | 1 | 6.66 | 1 | 5.55 |
| Collect the garbage | 1 | 12.50 | 2 | 13.33 | 2 | 11.11 |
| Rcycling | 0 | 0 | 1 | 6.66 | 2 | 11.11 |
| Save the living thing | 0 | 0 | 0 | 0 | 2 | 11.11 |

As can be seen from Table 6, children in 3 garbage can think that all problems can be solved by collecting the garbage they cause. In the pictures of the buttons, the themes of recycling, living things and improving the environment are put in the pictures.


In this picture, the child can express that environmental problems can be solved by throwing the garbage into the trashcan and with garbage trucks.

Picture 15. A picture with the theme of 'don't throw garbage on the ground' (3 years old)

When Table 6 is examined, it is seen that children in the age group of 4 see throwing garbage into nature as the cause of environmental problems, and they focus more on preventing those who do this (Picture 16) and collecting garbage (Picture 17) in order to eliminate this problem.



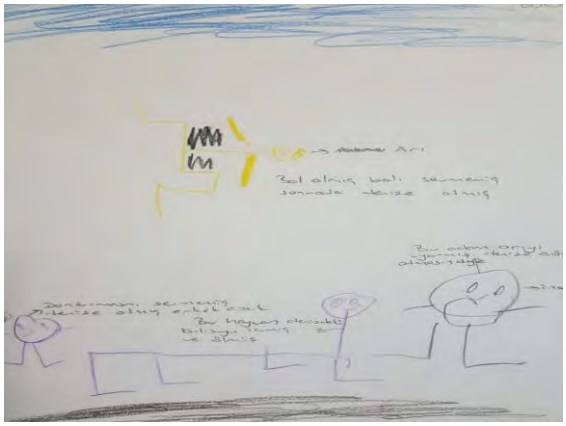

In this picture, which is about the solution to environmental problems, obstacles are drawn around the sea and the sea. In this picture, the child stated that obstacles to be built around the sea can prevent those who throw garbage in the sea, and environmental problems can be solved in this way

Picture 16. A picture with the theme of 'warning/preventing polluters' (4 years old)


This garbage bag, filled garbage bags and garbage is thrown on the ground, made on the solution ways of environmental problems, were drawn. In this picture, the child stated that environmental problems can be solved by collecting the garbage thrown on the ground by people by finding garbage bags.

Picture 17. A picture with the theme of 'collecting garbage' (4 years old)

Finally, when the pictures were drawn by children in the age group of 5 about the solutions to environmental problems are examined; it has been observed that children mostly use the theme of warning/preventing those who pollute the environment in their pictures (Picture 18).



In this picture, which is about the solutions to environmental problems, human and animal figures polluting the sea, an animal dying in a polluted sea, and a person warning those who pollute the sea are drawn. In this picture, the child stated that the bee throwing honey into the sea and the child throwing his ice cream cause pollution of the sea, animals die in the polluted sea, and warning those who pollute the sea can solve environmental problems.

Picture 18. A picture with the theme of 'warning/preventing polluters' (5 years old)

Some of the 5-year-old children participating in the study included the theme of recycling in their pictures and stated that using recycling could prevent environmental problems (Picture 19).


Recycling boxes are drawn in this picture about solutions to environmental problems. In this picture, the child stated that environmental problems can be solved by separating garbage and using recycling bins.

Picture 19. A picture with the theme of 'recycling' (5 years old)

## Results and Discussion

As a result of the research, it was determined that the preschool children included in the study generally associated the causes of environmental problems with pollution (garbage and industrial wastes) (Table 1). Especially all of the children in the age group of 3 used only the theme of garbage in their pictures about the causes of environmental problems. It has been determined that the themes used regarding the causes of environmental problems have diversified as the age group gets older (Table 2). When the children's pictures of the consequences of environmental problems were examined, it was revealed that the children in the age group of 4 and 5 mostly included the theme of water pollution in their pictures (Table 3). In general, it has been determined that children in these age groups associate the consequences of environmental problems with the formation of pollution (water, air and soil pollution), as well as the causes of environmental problems. It has been revealed that the children in the 3-year-old group symbolize that environmental problems cause natural disasters, unlike children in the 4- and 5-year-old groups (Table 4). In general, it has been determined that the effect of environmental problems on living things (humans, animals, plants) is mostly focused on the effect of environmental problems on humans. It was observed that the children in the study group had a limited understanding of the solutions to environmental problems. In general, it has been determined that they associate the solutions to environmental problems with the prevention/elimination of pollution (warning/blocking the polluters, not throwing the garbage on the ground, collecting the garbage) (Table 5). In terms of age group; It has been determined that the children in the 3-year-old group mostly associate solving environmental problems with not throwing garbage on the ground and collecting the garbage on the ground, and the children in the 4 and 5 age groups use the theme of warning/preventing the polluters in their pictures more than the other themes. It was noted that children in the age group of 3 did not include the theme of recycling in their pictures. It has been revealed that as the age group related to the consequences of environmental problems grows, the diversity of the themes used in the pictures increases. There were children in the age group of 5 who stated that the use of recycling and the protection of living things are effective in tackling environmental problems. When the findings are evaluated in general, it is seen that preschool children's perceptions of environmental problems are

limited; however, as the age group gets older, it has been determined that the themes in the pictures related to the causes, consequences, and solutions of environmental problems diversify. Again, in general, it has been revealed that preschool children associate the causes and consequences of environmental problems with pollution, and the solutions to environmental problems with the prevention/elimination of this pollution. It has been observed that the number of children who associate the destruction of nature and the irresponsible consumption of natural resources with environmental problems is very limited.

This study is limited only to the sample group, but when the literature is examined, it is revealed that our findings are in line with the findings of the limited number of studies conducted with preschool children. Akbayrak and Kuru Turaşlı (2017) also conducted an experimental study; revealed that the children gave the most garbage answer about those polluting the environment in the preliminary and final interviews. They have determined that environmental activities designed as games improve children's environmental awareness and provide diversification of their answers to the questions asked in the research. For example, children who do not mention factors such as rotten fruits and vegetables, glass, cans, clothes, paper in the preliminary meeting about the factors that pollute the environment; It was reported that they mentioned these variables in the last interview. Again in this study, the researchers revealed that environmental activities designed as games also improve children's awareness of what can be done to protect the environment. It has been determined that children mostly give answers such as not throwing garbage on the ground, throwing the garbage in the garbage can, and warning those who throw garbage on the ground, as stated in the findings of the current study, about protecting the environment. They revealed that after the play-based environmental activities, the children's answers to this issue also diversified, and the awareness about using the recycling bin increased (Akbayrak & Kuru Turaşlı, 2017). In another study, it was revealed that preschool children mostly associate environmental problems with behavioral pollution (people's attitudes and behaviors such as throwing garbage on the ground, polluting the environment), water pollution, and air pollution (Özkul, 2018). The findings of this study are similar to the current research findings in that the majority of children in this period associate environmental problem with pollution, and when pollution is mentioned, water pollution is often portrayed. Studies on the environment and environmental problems at the primary and secondary school levels have also revealed similar findings with the current research. Erten (2003) reported in his study that primary school students see garbage as a big problem for the environment. In another study, Yılmaz, Bedur, and Uysal (2016) revealed that primary school 5th-grade children mostly gave the answer "garbage" to the question of what environmental problems they see in the environment they live in. In a study by Gülhan and Yurdatapan (2014) in which they investigated the effects of inquiry-based activities on primary school students' attitudes and behaviors related to the environment; It was revealed that the children in both the experimental and control groups gave answers in the pretest and posttest about what can be done to prevent environmental pollution, mostly not to throw garbage on the ground and to warn those who throw garbage. It was determined that after the inquiry-based environmental activities, they detailed the answers in the experimental group and the use of recycling was added to the answers given by the children.

## Conclusion and Recommendations

It is seen that the perceptions of children about environmental problems in the preschool period are mostly limited to pollution. Considering that children's perceptions of recycling and the protection of natural resources are insufficient, it is thought that teachers and parents giving more space to activities and games related to protecting the environment (living creatures and natural resources) in the daily flow may contribute to the development/enrichment of children's perceptions on this subject. . Studies show that play-based environmental activities improve students' environmental awareness, that children participate more willingly and enjoy these activities more (Polys et al., 2017; Turgut & Yılmaz, 2010). Therefore, it is suggested that especially game-based activities should be included frequently in environmental education to be given to children.

Environmental education in the preschool period; is based on two main points, the first of which is to ensure the interaction of the child with the environment and the other to support the healthy development of the child (Wilson (1996). Therefore, the environmental education to be given to the child in this period should primarily ensure the interaction of the child with the outside world. Researches show that environmental education programs in the open-air increase children's environmental awareness (Fishman, 2005; Jean, 2010) In this sense, outdoor environmental activities can be a good alternative in terms of enabling children to gain positive experiences about their environment.

Recently, various projects have been carried out to improve children's understanding of a particular dimension of the environment in Turkey. For example, the cartoon named “Water Ambassadors” broadcast on TRT Child; It is a cartoon prepared within the scope of the "Water Ambassadors Education and Awareness Raising Technical Assistance Project", which is a European Union Project, and in parts of this cartoon, it is tried to give the main idea of how important it is to protect water to children. In the soil education project titled “We Know the Land with Tipitop and His Friends” supported by the Scientific and Technological Research Council of Turkey (TÜBİTAK), preschool children were educated and it was determined that the understanding of the children on this subject improved significantly (Gülay et al., 2010). It is recommended to disseminate such projects.

As mentioned in the introduction, academic studies are mostly related to upper-age children, and studies conducted in the pre-school period are quite limited. It is recommended to increase environmental studies to be conducted with preschool children. Studies reveal that the effects of the education programs followed in pre-school institutions and the models based on the program on children's attitudes and awareness about the environment creates significant differences. For example, Alparslan (2019) examined the effect of preschool education institutions that adopted the Montessori method, ecological-based approach, and the Ministry of National Education (MoNE) mainstream (state schools) education model on the environmental awareness and attitudes of 54-66 month-old (4-5-year-old) children. The researcher reported that the ecologically centered attitudes of the children educated in ecological-based schools are more positive and environmental awareness is higher than the children in other schools. In his study, the researcher stated that the attitudes and awareness of the children attending the school that implement the MoNE program are lower than the preschool education institutions that apply the Montessori method and ecological-based approach. The researcher reported that the significant difference between the children studying in ecological-based schools and the children studying in schools that implement the Montessori model and the MoNE program may be due to the fact that the Montessori method is not fully understood in our country and the lack of teachers and programs in the environmental practices in MoNE’s schools. On the other hand, studies examining the national preschool curriculum in the context of environmental gains reveal that the achievements are limited and the curriculum should be improved in this sense (Erdaş-Kartal and Ada, 2018; Erdogan et al., 2012; Gülay & Ekici, 2010). It is suggested that the findings of these studies investigating the effects of preschool education programs and their contents in the context of environmental education, as well as our current study, which reveals which subjects children have more limited perceptions about the environment, should be taken into account in preschool education program studies.

## Scientific Ethics Declaration

We declare that the scientific ethical and legal responsibility of this article published in JESEH journal belongs to us.

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