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## CHILDREN'S DRAWINGS ABOUT THE ENVIRONMENT

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**SUMMARY** Drawings by English and Mexican school children (7 to 9 years old--year three of primary education) were analysed to evaluate their environmental perceptions, and their major expectations and concerns for the future. The analyses considered whether culture and the school ethos with regard to the environment have an effect on the formation of environmental perceptions in young children. A total of 741 drawings were collected from eight schools: three in England and five in Mexico. Results show that children manifest a deep environmental concern in their pictures (37% depicted environmental problems). Children were pessimistic about the future; 54% thought the world will be in worse shape in 50 years time. Mexican children gave significantly greater importance to drawing rural places. Overall, however, children from these two countries, with significant structural and cultural differences, manifested more similarities in their drawings than differences. There was no strong evidence to suggest that children from schools with environmental policies developed a higher concern for environmental issues. Children's drawings are useful tools in providing valuable information for the assessment of children's environmental perceptions.

### [Introduction](#)

Drawing techniques provide a relatively easy way to gather social information from and about children (King, 1995). The use of drawings for evaluation purposes is a powerful tool, since most children tend to enjoy drawing without showing any sign of tension. While many children dislike answering questions, drawing tests can be completed quickly, easily and in an enjoyable way (Lewis & Greene, 1983). According to Chambers (1983), drawings avoid linguistic barriers and enable comparisons between groups of different languages and abilities. Crook (1985) argues that 'it is widely recognised that the content of children's drawings may provide insight into their feelings and thoughts about the world'. Children's drawings provide a 'window' into their thoughts and feelings, mainly because they reflect an image of his/her own mind (Thomas & Silk, 1990).

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In this study I analyse children's drawings as a tool to evaluate the environmental perceptions of English and Mexican school children, and their major expectations and concerns for the future. I enlist the environmental problems and type of places that children depict in their drawings and determine whether culture and the school ethos has an effect in the formation of environmental perceptions in young children.

## The Study of Children's Drawings

The modern study of children's drawings dates from the late 19th century (Thomas & Silk, 1990). Since then, the study has been used mainly for aesthetic, educational and clinical reasons.

There are three distinct traditions of research into the emotional-expressive aspects of children's drawings. First, drawings were analysed as projections of personality traits, interpreted mainly by Freud, within the theoretical framework of psychoanalytic theory and its derivatives. The second tradition, identified largely in the work of Koppitz (1968), attempted to devise and scientifically validate a classification of 'emotional indicators' to be found in children's drawing. The third tradition has been concerned with the ways in which normal children depict personally important or emotionally significant topics, rather than with personality assessment or clinical diagnosis. The work reported in this article follows this latter tradition. Children's drawings are used to explore their view of major problems in the world today and in the future.

Luquet (1913) assumed that children's drawings were based on an internal mental model. He proposed five stages of development:

- (1) Fortuitous realism (18 months to 2 years old). These first scribbles demonstrate awareness of pattern and increasing eye-hand co-ordination.
- (2) Failed realism (2 to 3 years old). Scribbles now become more recognisable by others. But still children of this age sometimes fail to co-ordinate the parts of a drawing.
- (3) Symbolic realism (3 to 4 years old). Children start to bring the details of a drawing into relationship with each other. Many of their drawings at this stage seem to be based on simple formulas or schemata.
- (4) Intellectual realism (5 to 7 years old). Drawings made by children at this stage contain elements which the child knows to exist, even though they cannot normally be seen. These illustrations are called 'transparency' or 'X-ray' drawings (e.g. a baby may be shown in the mother's womb). Intellectual realism reflects the impact of knowledge on drawing.
- (5) Visual realism (8 years and older). Children now begin to draw from a particular viewpoint,

use proportions and work out relationships accordingly.

Luquet's classification of drawing development has been important because of its influence on the subsequent work of Piaget, for whom drawing has a significant role in promoting cognitive development. According to Luquet (1913) and Piaget (1969), there is a parallelism between the child's intellectual development and their drawing development. As children grow older their drawings become more detailed, better proportioned and more realistic.

## Are Children's Drawings Different Among Cultures?

Kellogg (1970) has argued that there is a universal pattern of development in children's drawings and art. The following statement by Kellogg and O'Dell (cited by Grieve & Hughes, 1990) captures the perceived western view: 'Cultures the world over ... use the same forms to express what they wish to say. The forms may appear to change from one country to another but at heart they remain alike. The art of young children everywhere is identical'. Alland (1983), however, suggests that children in different cultures may differ not only in details of drawing style, but also in the basic strategies used to construct their drawing. Culture plays a fundamental role in the development of symbolic representations (Wales, 1990). According to Alland's theory, local cultural symbolism affects the way children draw. So, even if the mental representation of a person is essentially the same, the way in which that representation may be pictorially realised can differ fundamentally as a function of the representation's place in the culture and its iconography conventions (Wales, 1990).

## Children's Drawings and Environmental Perceptions

The use of children's drawings as a systematic measure to evaluate children's perceptions and attitudes towards the environment is still in the process of development. Children's drawings have been used mainly as emotional indicators for specific environmental problems, and to determine the attitudes children have towards different environmental situations. Brown et al. (1987) used children's drawings (children aged between 11 and 15), to reveal their changing perceptions of nuclear power stations. They compared children's drawings before and after the Chernobyl disaster. They found evidence of changes over time, with different features appearing, such as anti-nuclear missile protesters, radioactive waste, the Chernobyl disaster and the British nuclear fuels reprocessing plant (Sellafield). Matthews (1985) used children's drawings (children aged between 6 and 11), to represent their journey to school and home area by means of free-recall mapping, amongst other techniques. Children were able to trace complex routes and showed a good appreciation of place relationships in the area around their homes.

More recently, King (1995) used drawings from children between the ages of 5 and 15, to discover the variety and kinds of concerns children might have about the environmental crisis. She asked children to draw a picture about what it means to them when someone says, 'You have to save the planet'. She found that 87% of the children were very much aware of the

environmental crisis. Nearly half (47%) depicted themselves or others taking personal action for positive social/environmental change.

## Methods

### Study Sites and Subjects

Drawings included in this study belong to children from year three of primary education (7 to 9 years old). This age group was selected because at this stage the child's mind undergoes a developmental change (intellectually and socially; Piaget, 1969). I was interested to find out if within this developmental process children developed an environmental concern. If so, I wanted to explore the extent to which culture and the school ethos are an influential factor in this process.

To see how children depicted their views of the environment, a total of 247 children from England and Mexico were asked to draw three different pictures each. Because the development of a 'school ethos' in itself is clearly a function of multiple factors, I chose to gather comparable data in Mexico and England, two countries with significant structural differences in their educational system. Mexico is a developing country with a high biological richness. Its biodiversity is one of the highest in the world (McNeely et al., 1990, Ramamoorthy et al., 1993). England, on the contrary, is a developed country with low biodiversity. Both countries have important cultural differences. Altogether, I collected 741 drawings, 432 drawings from Mexican and 309 from English children. I sampled five schools in Mexico and three in England. The number of schools studied in Mexico was determined basically by my availability of time for fieldwork. The number of schools in England was limited by the acceptance of the specific schools to participate in this study. Criteria for choosing the schools included the following aspects (a) primary schools; (b) mixed schools; (c) school ethos with regards to the environment (i.e. the emphases in their orientation and interest on environmental issues); and (d) type of school (boarding and day schools). Environmental schools selected in this study, have a strong orientation towards the environment. They have been actively involved in local, national and international environmental projects. Schools with some interest in the environment were those that manifested an 'interest' on environmental issues, although they were not active in environmental projects, or had specific policies on these issues.

Schools were grouped according to their ethos with respect to environmental policies and whether they were day or boarding schools (Table 1). School names were changed to keep their anonymity.

Socio-economic level of children in this study varied. Most children were from middle-class families, but many at Cave school were from lower socio-economic class, and many children from Castle school were upper-class. Children growing up in different socio-economic levels acquire different cognitive abilities (Gray, 1991). Some of these socio-economic differences are

considered in this study, although their evaluation is not the main purpose of the study.

## Data Collection

All drawings in each school were made during a single session, which lasted between 45 minutes and 1 hour. There was no discussion before the session, except to introduce the activity. To determine if a problem was perceived by children and depicted in their drawings, and to make sure that what children drew was clearly understood, additional information was gathered by interviewing the children when they finished their drawings.

Children were asked to pretend they were aliens from another planet and were sent on a special mission to planet Earth to describe how things looked. Children in this planet did not use words to describe things, but made drawings instead. Then, they were asked to make drawings based on the following statements:

- (1) You are approaching planet Earth in your spaceship. Draw it as if you were watching it from space. How does it look?
- (2) Each one of you has landed in a different place (this was to avoid children from copying each other). Nobody can see you because you are invisible. Look at everything carefully and try to draw as many things as possible.
- (3) Fifty years have passed since your first visit to planet Earth. You are sent down again to the place you visited before. Draw how it looks after so long.

Question 1 was used in order to set the mood and introduce children into the activity. Additionally this question provided valuable information on children's familiarity and knowledge about a common theme: planet Earth. Because this question had a fixed drawing subject, it provided comparative evidence on children's ability to draw and on possible cultural differences in their drawings. Questions 2 and 3 were used to evaluate children's perceptions about the present and their expectations and concerns for the future, respectively. These questions were basically to see if children depicted some problems through their drawings, and to identify the environmental problems children recognise. They also provided evidence about the places children were most interested in, or concerned about. Some environmental problems are likely to be associated preferentially with certain type of locations.

## Data Analysis

Using content analysis (Cohen & Manion, 1994), drawings from each of these statements were analysed separately. All drawings were then used in the construction of thematic categories. Based on the different patterns that emerged, I constructed categories for the responses to each

question. For the first statement, five categories were used: (1) undefined shapes to represent land and water; (2) recognisable shapes to represent countries and water; (3) only water; (4) undefined countries including some or all of the following elements (water, animals, plants, houses and humans); and (5) unrecognisable or incomplete drawings. For the second statement, four categories were established: (1) everything looks fine; (2) depiction of a problem; (3) not determined; and (4) unrecognisable places and situations. For the final statement, five categories were used: (1) things improve; (2) things get worse; (3) there is change but the respondent is unsure if it is for better or worse; (4) there is no change at all; and (5) unrecognisable or incomplete. Additional information was gathered from questions 2 and 3 in the exercise. This information was basically in two main areas: major problems that children perceived from the present world and in the future and places that children prefer to draw.

In terms of reliability and validity, and due to the development of this method for evaluating children's depiction of environmental problems, it was necessary to double check the criteria for analysing the information. Drawings were also interpreted by another researcher; a specialist in cognitive development of young children from the University of Cambridge reviewed the drawings according to each category.

Statistical analyses followed Sokal and Rohlf (1981), Zar (1984), and Siegel and Castellan (1988). Contingency tables, using the log likelihood ratio tests (G-test; Sokal & Rohlf, 1981; Zar, 1984) were employed to test for statistical differences in frequencies of categorical data. The G-test is equivalent to the more popular  $\chi^2$  (chi-square) test, but it is regarded as a preferable option as it is less sensitive to biases introduced by low frequencies (Sokal & Rohlf, 1981; Zar, 1984). Comparisons were made mainly between Mexico and England, between schools in each country, and between schools with different ethos. All statistical tests were two-tailed. A probability of 5% ( $p = 0.05$ ) was considered as the cutting point for statistical significance.

## Results

1. You are approaching planet Earth in your spaceship. Draw it as if you were watching it from space. How do you see it?

Overall, almost 70% of the children perceived planet Earth as a round object with undefined shapes to represent land and water on it (Fig. 1). Some children were able to draw well-defined countries (18.2%). Mexican children drew Mexico and some included part or all of the American continent, while English children preferred to draw Great Britain and Europe. There were only two drawings (0.8%), showing in great detail shapes of different countries and continents. These drawings were made by one Mexican and one English child. Some 5.3% of the sample represented planet Earth only with water. These drawings were all by Mexican children from Cave School. Only 3.7% of the children, most of them English, included (in a diagrammatic way) other elements in their picture such as animals, trees and humans, amongst other things. In this category, one English boy drew planet Earth much more as a cartoon picture: the world had a

sad face, was holding too many buildings, and was polluted. It was clear that this boy perceived a world that is in pain and in need of help. A small proportion (2.8%) of drawings were unrecognisable (drawings were difficult to interpret, were not clear, or were incomplete), and only 0.8% of the children did not draw any picture at all.

2. Each of you has landed in a different place. Nobody can see you because you are invisible. Look at everything carefully and try to draw as many things as possible.

Nearly 43% of the children did not depict a problem in their pictures. Drawings in this category showed harmony in the environment, everything looked all right. There was a sense of well being, where flowers, trees, water, sun, animals and people shared the environment in harmony. Nevertheless, 36.7% of the drawings depicted at least one problem. In these pictures, children responded with graphic images of decay and destruction where things were not going well. Some of the major problems represented by children in their drawings were: pollution, nuclear waste, war, violence, rubbish, deforestation, loss of species, global warming, natural disasters, and others. Some children (12.1%) drew specific places, including supermarkets, airports, chocolate factories, theme parks, bakeries, and farms. There was not enough information in these drawings to determine whether children were perceiving some kind of problem or not. Only 7.7% of the drawings showed unrecognisable places and situations. No significant differences were found between Mexican and English children.

A high proportion of Mexican schools (45%) represented their pictures as 'everything looks fine' (Fig. 2a). However, children from Cave school depicted more social and environmental problems in their drawings (violence, rubbish, air, and water pollution). Children from this school belonged to a lower socio-economic class, so their perception towards these problems was strongly affected by being exposed to them.

A larger percentage of children from Hill School made drawings with unrecognisable places, while no children from Pine and Cave schools made drawings with these characteristics. This resulted in overall significant differences between the Mexican schools ( $G = 24.54$ ,  $df = 12$ ,  $p < 0.025$ ).

In the case of English schools, children from Tower school drew more pictures in the category of 'everything looks fine' than the other schools (Fig. 2b). There were, however, no significant differences in the responses of these schools.

When the school ethos was considered, there were no statistically significant differences between them. Children from schools with environmental policies were no more concerned about the environmental crisis than children from the other schools. However, children from schools with environmental policies scored the lowest percentage (38%) on perceiving the worlds as if everything looks fine. They were more pessimistic.

Children were generally more likely to draw rural places (29.6%) than urban settings (18.6%). However, Mexican children gave significantly greater importance to drawing rural places than English children ( $G = 6.45$ ,  $df = 1$ ,  $p < 0.025$ ). About 17% of children included scenes of the sea in their drawings, whilst only 2% drew places with snow. Some children (12.6%) preferred to draw rural scenes with urban settings in their pictures. Specific places such as airports, schools, parks, and farms amongst others, were drawn by 12.1% of the children. Only a small percentage of the drawings were unrecognisable or not clear (7.7%). Figure 3 shows which places English and Mexican children preferred to draw.

Results in this study revealed that children from schools with no environmental policies were amongst the ones who preferred to draw more rural settings than children from other school ethos (42%). Significant differences were found in the places depicted in children's drawings when these were considered by school ethos ( $G = 48.58$ ,  $df = 18$ ,  $p < 0.001$ ). In particular, significant differences were found on the following categories of children's favourite places: mixed (rural and urban), sea, specific places and unrecognisable places (Fig. 4).

3. Fifty years have passed since your first visit to planet Earth. You are sent down again to see how it looks after so long.

Children's hopes for the future were not very optimistic. Overall, 54% thought that the world would be in worse shape after 50 years. Their drawings revealed a deep concern for problems such as pollution, war, global warming, loss of species, acid rain, rubbish, deforestation, and lack of water, amongst others. As a consequence of these, they thought that the world will suffer immense damage: continents will split off, the sun will blow up, meteorites will destroy Earth, earthquakes will destroy the world, the world will overflow, Martians will conquer Earth, the world will be overpopulated, and everything will be destroyed.

For 22% of the children there was still some hope for the future. Their drawings revealed that things will improve and the world will get better. Technology will help in this process. A cleaning system for air and water pollution will be developed. Wars will be over, and everyone will live in harmony with each other.

About 18% of the children expressed some change for the future. But this future was uncertain, they were not sure if the change was going to be for the better or worse. Examples of these drawings were mainly the transformation of small towns into big cities (development). Significantly more English children depicted uncertain changes in their drawings, when compared to Mexican children ( $G = 4.59$ ,  $df = 1$ ,  $p < 0.05$ , Fig. 5). Drawings of very few children (2.8%) showed no change at all after 50 years.

The children's vision for the future was more pessimistic than optimistic in all schools, except for Hill school (Fig. 6). Children's drawings from Hill school showed significantly more uncertainty compared to drawings from other Mexican schools ( $G = 10.91$ ,  $df = 4$ ,  $p < 0.05$ ). They believed

that in 50 years time, there was going to be some change, but they were not sure of the direction of this change. Significantly more children's drawings from Star school showed no change in the future ( $G = 10.09$ ,  $df = 4$ ,  $p < 0.05$ ).

There were no significant differences found between English schools (Fig 6b). About 55% of English children thought that things will get worse in the near future.

According to the school ethos, significantly more children's drawings from schools with no environmental policies showed no change in the future ( $G = 7.84$ ,  $df = 3$ ,  $p < 0.05$ , Fig. 7). Half of the children from schools with environmental policies (50.6%), think that the world in 50 years time will be worse. They also showed the highest level of uncertainty (28%) and a low level of optimism for the future (13.3%). Children from schools with some interest in the environment but with no environmental policies, and those from boarding schools with no environmental policies, showed the highest percentage of those perceiving an optimistic view for the future.

## Discussion

### Children's Drawings

Everything we perceive is influenced by the perception of other people (Mays, 1985). An extraordinary example was the result of how children see Earth from space. Almost 90% of the children had previous knowledge of how the Earth looked from space. At least 70% were able to draw undefined shapes to represent land and water, and nearly 20% drew recognisable countries and continents. Children showed not only their ability to draw, but also put together their knowledge and their visual perception. These elements are vital for the development of the higher thinking processes and mental representations. Drawings are affected by knowledge, age and the ability to draw. In this case, children's age and cognitive development were important factors to consider. Except for some children at Cave school, all children in this study were approximately at the same stage of drawing development ('visual realism', according to Luquet's (1913) classification). Traditional theoretical approaches suggested that children's drawings principally reflect their state of conceptual and intellectual development. Children often know more than their drawings reveal (Grieve, 1990).

Results in this study showed that children from two countries with significant structural differences manifested more similarities in their drawings than differences. The schemata in some of the drawings by children from both countries were very similar, and some depicted the same things. It is important to mention that children in this study were from urban areas and most of them belong to middle-class schools. Differences between children's drawings were probably less apparent mainly because of three major factors: (1) children's similar socio-economic level, (2) the fact that children were from urban places, and (3) they have similar access to information (e.g. television, computers). What would have happened if we had compared drawings from rural

children? I believe that the development of patterns in the way children process information varies in each culture. Interest and experience are two crucial elements that intervene in the process on how people restore and manipulate information. Munn (1973), has studied the essence of the use of symbols by central and western Australian aboriginal groups. He mentioned, for example, that Walbiri iconography uses around 16 signs to signify a variety of things or relations in varying contexts. For them a circle may be a circling movement, an encircling object, a campfire, a tree, a hole, a waterhole, an egg or a dog (curled up in camp).

Local symbolism and familiarity was found in children's drawings. There was a tendency for Mexican children to draw their own country, and for English children to draw the United Kingdom in their pictures. Pictures are a common part of our everyday life, therefore children use their drawings to recreate things they are familiar with (Matthews, 1992).

It is worth noting that Mexican children from only one school represented planet Earth with only water. There are three possible reasons for that: (1) lack of information; (2) poor ability to draw, (these children might have been in a different stage of drawing development--symbolic realism); and (3) these children might simply have viewed planet Earth from a perspective in which the oceans were the dominant factor; around 70% of the Earth is covered by water. Based on observations made at this school, the first two explanations are more likely.

## Children's Environmental Perceptions

In King's (1995) research, one possible explanation as to why children were very much aware of the environmental crisis, might have been that her approach was targeted. When she asked children what to do, she was already telling them that the world needed some help. Children knew from the beginning what to draw. They had a strong bias toward depicting specific environmental problems. The phrase 'You have to save the Planet', and similar ones, are widely known. They have environmental connotations. People usually relate them to: recycle, do not throw rubbish, save endangered species, save the rainforests, and many others. They are phrases that have been widely used around the world. Politicians, environmental groups, and some industries are among those who constantly use these phrases for their own interest.

In this study, a more open approach was used to find out whether or not children were concerned about the environmental crisis. Results revealed that even though the technique was designed to avoid biasing the content of the drawings, children showed deep environmental concern in their pictures. When asked to draw the second picture (how they see things now), a high percentage (36.7%) depicted some major problems. Most of these problems were related to the environment (pollution, nuclear waste, deforestation, loss of species, and global warming). Throwing away rubbish and polluted cities were dominant themes. Air polluters ranked as the most frequently represented environmental culprits, symbolised by factories, car exhaust, and radioactive emissions. This showed how strongly the environmental crisis is affecting young children in their everyday life. It also confirms the theory that children draw not only what they know, but what

they see. Children from one Mexican school (Cave school) depicted more social and environmental problems in their drawings. The socioeconomic level might be an important explanation to this particular case. Many children from this school are poor and probably feel more exposed to such problems.

## Effects of School Ethos

Are children from environmentally oriented schools more aware of the environmental crisis? In this study there was not a strong tendency to indicate that children from schools with environmental policies were more concerned about the environment than children from other schools. However, in a study about children's knowledge and understanding of ecological concepts (Barraza, 1996), the author found that when children were asked to identify their major source of environmental information, the school ethos played an important role. In that study, children from schools with environmental policies listed school as the first source of environmental information. It is possible to suggest that children who are constantly involved in environmental projects at school have more information on environmental issues. Therefore their perception towards the world crisis may have a different angle and could be 'environmentally biased'. Children with interests on environmental issues, who often have access to environmental information, tend to develop a 'green mind'. This might have been a reason why 38.6% of children from schools with environmental policies perceived the world to be not as healthy as compared with children from schools with no environmental policies (48.3%).

It is not very reassuring to know that young children do not perceive the future world as an ideal place to live. For more than half of the children (54%) things will get worse in the future. This tendency may be the result of a constant bombardment of environmental issues to the children. In the 1990s, cultural and commercial aspects of environmentalism are commonplace. Children are constantly used as social icons and political symbols in environmental messages about saving the world and are targeted as a consumer market for 'green' products (King, 1995). Children are afraid of what may happen in the future. They have seen and heard about these issues in books, cartoons, commercials, television shows, movies, and videos. They are receiving much information very rapidly. They need information and time to understand and assimilate the complexity of the environmental crisis.

## Children's Favourite Places

A small percentage of children (12.1%) drew specific places where no apparent problems were depicted. Most of these drawings revealed children's favourite things to do or places to be (chocolate factory, theme parks, airports, bakeries, amongst others). According to Van-Summers (1984), children draw because they find it satisfying to produce pictures, in particular, pictures that symbolise and express their interests and experiences. It was found that children generally prefer to draw rural areas. In these pictures children often drew animals, flowers, water, mountains, the sun and trees. According to Koppitz (1968) animals and flowers are amongst the

most popular topics of children drawings. Other things children like to draw are houses, cars, boats, and planes (Koppitz, 1968), and these were represented in the drawings.

Although children in this study were from urban settings, about 30% drew rural places. Mexican children gave significantly greater importance to drawing rural places than English children. One possible explanation for this is that in Mexico about 42.6% of the population still live in rural areas (CONAPO, 1994). Besides, children often associate rural areas with adventure and fun, and this also represents getting away from pollution and noise.

In the case of the children who thought that things will improve and will get better in the future, their drawings revealed a sense of harmony with nature. Many of these drawings were representations of rural settings, where the lack of buildings and cars was notorious. Many others had a futuristic view, where air transport will dominate and new technology will be prevalent. A vision not unlike that often represented in films.

## Conclusions

The children's drawings in this study appeared to be responding to social messages about the environmental crisis. Environmental problems affect the way children perceive life. Children as young as 7 to 9 years old showed a deep environmental concern in their pictures. Nearly 37% of the children depicted some kind of environmental problems in their drawings. Children were worried and cared about the world. Some feared an uncertain future, others had a pessimistic view, and very few showed an optimistic outlook for the near future.

Children's drawings from this study support Kellogg's theory (1970) that there is a universal pattern of development in children's art. There were more similarities than differences among the English and the Mexican drawings. The common patterns observed in the present study, however, may be related to how individuals from different countries share and have access to information.

There was no strong evidence in this study to suggest that children from schools with environmental policies developed a higher concern on environmental issues, as compared with children from other school ethos (but see Barraza, 1996).

Cognitive development and drawing skills were important factors to consider when analysing children's pictures. The information children have about an environmental issue will be crucial for its mental representation. Results in this study reveal that children aged 7 to 9 have some key information of environmental concepts such as: acid rain, nuclear waste, pollution, global warming and recycling. Further research should be carried out to identify some general principles governing children's depictions of significant environmental problems (e.g. pollution, nuclear waste, global warming, among others). Children's drawings can thus provide valuable information on the development of children's environmental perceptions.

The strategies used by children in making drawings are of interest not only because they allow us to make a more satisfactory analysis of children's art, but also because they open up the possibility of progress in understanding the development of planning and organising skills in general (Thomas & Silk, 1990). This study showed that much about children's perceptions and environmental information can be revealed through drawings.

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TABLE 1. Characteristics of the schools taking part in this study. The number in parentheses indicates the number of children participating in each school. Total number of children was 247.

School ethos	Country	
	England	Mexico
Day school--environmental policies	Walnut (32)	Hill (16) Pine (27)
Day school--some interest in the environment, but no environmental policies	Tower (28)	Orchard (34)
Day school--no environmental policies	--	Star (32)
Boarding school--no environmental policies	Castle (43)	Cave (35)

GRAPH: FIG. 1. Perception of planet Earth from space. Asterisks indicate statistical differences (G-test) between both countries for those particular drawing categories (\*\*p < 0.01; \*\*\*p < 0.001).

GRAPH: FIG. 2. Children's views of the present as expressed in their drawings; (a) Mexican schools; (b) English schools. The asterisk indicate statistical differences (G-test) between the Mexican school for that drawing category (\* $p < 0.05$ ).

GRAPH: FIG. 3. Places depicted in children's drawings of their view of the present; Mexico and England (see text for details). The asterisk indicate statistical differences (G-test) between the two countries for that drawing category (\* $p < 0.05$ ).

GRAPH: FIG. 4. Places depicted in children's drawings of their view of the present; school ethos. Asterisks indicate statistical differences (G-test) between school ethos for those drawings categories (\* $p < 0.05$ ; \*\* $p < 0.01$ ).

GRAPH: FIG. 5. Children's expectation of the future (50 years time) as expressed in their drawings; Mexico and England. The asterisk indicate statistical differences (G-test) between both countries for that drawing category (\* $p < 0.05$ ).

GRAPH: FIG. 6. Children's expectation of the future (50 years time) as expressed in their drawings; (a) Mexican schools, (b) English schools. Asterisks indicate statistical differences (G-test) between Mexican schools for those particular drawing categories (\* $p < 0.05$ ).

GRAPH: FIG. 7. Children's expectation of the future (50 years time) as expressed in their drawings; school ethos. The asterisk indicate statistical differences (G-test) between school ethos for that drawing category (\* $p < 0.05$ ).

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