

**Children's Understandings of the Notion of Earth:
An Exploratory Comparison of Canadian and Lebanese Children**

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A paper presented at the annual meeting of the National Association of Research in
Science Teaching, 1993, Atlanta

Comparing the knowledge and understandings of children from different cultures can provide insights to how culture affects the construction of knowledge and meaning. In addition, such comparisons help educators in both cultures understand the nature of the knowledge children bring with them into learning situations. The study described in the present paper examines children's general ideas about "Earth." This examination describes children's ideas from a more panoramic, rather than in depth, perspective. Such a perspective acts as a map of the territory, a map of children's views and understandings of their world and the planet. We also try in this paper to embed the analysis of the children's views in a contexts of meaning framework. This framework extends the notion of meaning beyond the ordinary view of knowledge as semantic and propositional.

Theoretical Background

The nature of the meaning that children bring with them into formal learning situations extends beyond what is typically assumed to be only formal or semantic knowledge (Bloom, in press, 1992a, 1992b). According to Macnamara (1982), meaning and concept are rarely distinguished. When Finley and Stewart (1982) discuss learning the knowledge of a particular discipline, they suggest (a) that meaning is attached to concepts and to the relationships between concepts and (b) that the intent is for students to "...learn selected networks of meaning" (p. 595). However, recent studies have described a number of non-semantic characteristics of meaning associated with children's understandings of certain scientific phenomena (Bloom, 1990; 1992a; 1992b). Such characteristics are involved in the personal construction of meaning and are referred to under the framework of "contexts of meaning." Contexts of meaning can be thought of as associations of multiple, personal understandings. Even with the risk of creating a static framework, it is necessary to formulate a descriptive typology as a working model of the cognitive context within which children make sense of their world. The typology includes (a) semantic knowledge, (b) personal experiences, (c) metaphors; (d) interpretive frameworks; and (e) emotions-values-aesthetics. In the present paper, a new typological category of elaboration-imagery is being added. This aspect has been discussed to some extent in previous papers (Bloom, 1992a, 1992b), but is so obvious in the data of the present study, that we are adding it to the formal list of typological components.

The contention is that children construct meaning with more than semantic knowledge alone. Personal experiences are commonly incorporated as significant components in

contexts of meaning. The process of constructing meaning involves inferring, generating metaphors and analogies, and so forth. Ideas change; new inferences are made; the content and character of contexts of meaning develop and change from moment to moment. In addition, anthropocentric, anthropomorphic (giving an object or animal the qualities or characteristics of humans), zoomorphic (giving an object or one kind of animal the qualities or characteristics of another kind of animal), and other interpretive frameworks, as well as emotions-values-aesthetics, come together to help form deeply entrenched personal meanings and to influence and guide associative and inferential processes. Interpretive frameworks and emotions-values-aesthetics have a strong effect on inferential processes, knowledge construction, and meaning-making (Bloom, 1992b).

Up to this point the sense of context has been a psychological one. Each personal meaning or understanding (out of a potential for many different understandings of a particular topic) has its own particular context. However, the notion of context can refer to sociocultural and physical contexts, as well. Both of these contexts affect how individuals understand and create meaning. From each perspective of context, the fundamental point is that context provides meaning. No action, event, or object has meaning separate from some context (Bateson, 1979). All understandings, actions, events, and objects occur within one or more sociocultural contexts. As Bruner (1990) contends, "...meaning grows out of use..." and "cultural contexts are always contexts of practice..." (p. 118). In terms of science learning, White (1988) suggests that cultural contexts influence thinking in ways that create differing conceptual constructions and that these different constructions "...are not wrong..."; it is just that "...concepts are invented and... mean different things to different people" (p. x).

When we compare the understandings of children from different cultural contexts, we need to be sensitive to how each particular culture affects the way children think and understand. McKinley, Waiti, and Bell (1992) have described nicely how Maori educators and other members of the community are approaching science education from the perspective of addressing contexts, multiple perspectives, and the negotiation of knowledge. What is being suggested is that the subject matter being studied must be examined within its context. So, western science explanations are studied within the context of western societies and their world view. Aboriginal science is studied within its context, as well. Students can construct multiple understandings (or multiple perspectives).

A search of the literature on children's understandings of the Earth has uncovered a few studies that have examined children's knowledge and understandings of a few specific concepts related to the Earth. Sneider and Pulos (1983), looked at children's

understanding of the shape of the Earth and of gravity. Nussbaum (1979) and Nussbaum, Novak (1976), Jones, Lynch, and Reesink (1987), and Klein (1982) examined children's understanding (or lack of understanding) of the Earth as a cosmic body. Archodidou and Vosniadou (1992) have examined children's understandings of the Earth from a broader, cultural perspective, and have uncovered a variety of different perspectives of the Earth as a cosmic body. All of the above research has focused on specific concepts or conceptual areas. However, an earlier study by Bloom (1990, June) explored grade 5 children's views of Earth. In this study, context maps were not used with the general topic of "Earth," but with the more specific topics of "Issues Facing the World" and "Forests." Another task that asked students to communicate their ideas about what life on Earth is all about was also utilized. In addition, a marsh land walking interview was also conducted. The results supported the theoretical framework of contexts of meaning. The children demonstrated a wide range of awareness of issues facing people and the environment. In addition, children's personal experiences and emotions-values-aesthetics provided a basis for elaborative expressions of their knowledge and views of Earth and life on Earth.

In the present paper, the notion of contexts of meaning and multiple understandings will be used to examine children's ideas of "Earth." In addition, contexts of meaning will be extended to incorporate cultural contexts, as well. Children from two very different cultures (North American, specifically Canadian, and Lebanese children) will be compared. The two major questions of this study are, (a) is the theoretical framework of contexts of meaning useful in describing how children from different cultural contexts make sense of their worlds and (b) how do children from two different cultures view the notion of Earth? When we mention the word, "Earth," what comes to mind? What meanings, understandings, and perspectives do children, as participants in a specific culture, bring into the arena of learning?

Method

In a study that compares two different cultures, it is critical that we consider the cultural context in which the subjects live. In the present case, we need to look at Lebanon and Canada (in a North American setting). The following segment of the Methods section will describe in some detail the cultural contexts of the two groups of students. After this discussion, the schools and students in the present study will be described. Data collection and analysis procedures will be described in detail in the final two portions of the Method section.

Cultural Contexts

Lebanon

The majority of the students interviewed in this study were born in 1982-1983. They witnessed various horrors associated with the Lebanese war (which began in the Spring of 1975) if not first hand, then at least through the experience of relatives and friends. At various times between 1982 and 1990, there were periods of random shelling of residential areas in Beirut, and other remote areas thought to be more secure in earlier years. In those times of escalated bombing, certain areas of Beirut and the suburbs became deprived of food, water, and electricity for extended periods of time. Under those conditions, waiting in long lines for bread or gasoline, and running to shelters for refuge became part of life. Throughout many rough times, schools tried to operate in as much as the conditions permitted.

Beirut, the capitol of Lebanon, is a big city whose population before the war was estimated at 1.5 million people, about half the population of the country. It is bordered by the Mediterranean sea to the West and hills and scenic suburbs to the northeast, east, and southeast. The heart of the business center, was totally destroyed in the war, and that area remains in ruins to this day. In addition to private theaters and art galleries, cultural centers associated with foreign consulates (which offered films, language lessons, and various cultural programs) continued to operate in certain parts of the city even during the war. Beirut is dominated by concrete buildings ranging from the rare and old two-story houses to the newer seven to 15-story buildings. The tallest building is about 50 stories high. There are very few green areas (or parks) left in the city.

The stores in Lebanon resemble the little shops on the streets of New York City. The supermarkets are about a quarter of the size of the supermarkets found in the United States and Canada. Although small, they are packed with all kinds of imported goods. You can find almost everything you want, including good quality foods and merchandise. There may not be as many brands for every single product as found in North America, but there is a variety from which to choose.

Most of the students in the present study live in relative financial comfort. However, in such a small country as Lebanon, it is difficult the children not to be aware of the poverty that surrounds them, whether in the extended family, in the neighborhood, through the media, or in the society at large. They are aware of the trauma inflicting so many families displaced from their homes during the war, families that were well off then and are in severe poverty now. In the past few years the economic conditions have been

changing from bad to worse, causing high inflation and devaluation of local currency. The poor state of the economy has adversely affected the buying power of the Lebanese pound. The exchange rates and other financial concerns are topics of concern in most households, since any further devaluation of the currency translates into an immediate hike in the prices of goods. Students are aware of such inflation. Discussions of the exchange rate of Lebanese pound versus US dollar are as common as talking about the weather in more developed countries. Students are aware that what they can spend and how they spend it depend on the exchange rate of the money earned by their parents.

The parents of the students in the present study have professional or business sector occupations. Their homes almost certainly have televisions, VCRs, and radios. Television programs have increased in the last ten years or so from 5 to 12 channels, with programs from all over the world. In addition to locally produced programs, Lebanese families can view CNN news, MTV (music videos) types of programs, documentaries, an array of movies, and soap operas from the United States, Brazil, the United Kingdom, France, Egypt, Jordan, and Syria. The news coverage in Lebanon tends to be more international in nature covering many nations and several different points of view. Children enjoy many of the cartoons, such as "Tom and Jerry." In most cases, programs are broadcast in the language in which they were produced. Subtitles are often presented in two languages: Arabic and either French or English.

Canada

By contrast, Canada has not had any direct experience of war. However, there is certainly a level of violence that is a part of children's lives. The newspapers and news programs on television and radio contain many stories on the wars fighting occurring in the middle east and eastern Europe. There is less coverage of violence in other parts of the world. In addition, there is coverage of the more sensational murders from around North America. Local violence has been on the increase, but is not as prevalent as in larger Canadian cities, and, especially, not as prevalent as in large US cities. Since most of the major television networks from both the US and Canada are available, children in Canada are exposed to the same programs as children in the United States. In addition, there is growing concern in Canada about the levels of violence in prime time television programs and even in children's cartoons.

The population of the metropolitan area, of the present Canadian part of this study, is about 120,000. The city is at the end of Lake Ontario. Rural farm land can be reached by traveling fifteen kilometers (9 miles) to the west, north, or east (the lake, and the United

States on the other side, is to the south). The major employers in the area are a university, a military base and military college, one psychiatric and two medical hospitals, seven prisons, as well as a few major industries (i.e., Dupont, Northern Telecom, Alcan, etc.). The summer tourist business has grown into major "industry" over the past ten years or so, with a major emphasis on a variety of water sports, including Olympic sailing trials. The downtown area is quaint with a fairly wide range of shops and restaurants, some of which overlook a harbor with docks for many motor boats and sail boats. The heights of buildings are limited by law, with the tallest being about five stories high. In all parts of the city and surrounding suburbs, development regulations have required that each neighborhood has a park (a park is required for a certain number of households).

Extremes of poverty are not as evident in Canada as in the United States, because of the social benefits available. However, homeless individuals are visible locally, but to no where near the extent in other cities. Some areas of the city are contain housing for low income families. The houses, even in these areas that are considered bad by some of the local people, are reasonably well constructed, with the fundamentals of heat, water, electricity, and sewage. In many cities in the United States, poverty level housing may not contain some or any of these fundamentals.

Recreational activities are limited by the size of the city. There are no major museums (there are a few small museums). Most recreation outside the home, involves winter or summer sports (outdoors or through the YMCA, several skating rinks, and a couple of recreational centers), movie theaters, and going to one of the two major shopping malls. Many families in the area make regular trips to the United States for an afternoon of shopping, or to Toronto, Montreal, or Ottawa (all of which are about two to three hours away, except for shopping in the US, which is about an hour away).

The Schools and Students

The Lebanese Schools

The first school is located in a suburb to the east of Beirut on the top of a hill that overlooks a very scenic landscape featuring parts of the capital and the Mediterranean Sea, as well as other hills and snow covered mountains. The school is surrounded by pine trees. The second school is located in Beirut close to a major road that runs through the heart of the city. This school is surrounded by buildings and small shops.

Schools in Lebanon generally start between 7:30 or 8:00 in the morning and end about 2:30 in the afternoon. There are two breaks, a 20-25 minute break around 10:00 am and another 45 minute lunch break. The number of periods ranges between six and seven (at 45-50 minutes each). The curriculum tends to be quite traditional, despite efforts to modernize it. The curriculum includes sports and religious education in both schools. Typically, private schools have the freedom to make their own decisions about the curriculum and textbooks they use. As far as we know, environmental issues are not dealt with in the textbooks, and, if they are discussed in class, treatment of these issues are not at the same level in terms of the activities and exposure as found in North American schools. Environmental issues are not a priority for the population which is being manipulated demographically by regional and international politics. Apparently modern legislation and regulations relating to environment and ecology, in spite of their local and global importance are not a priority for a violence-ridden nation busy in salvaging its territorial integrity and asserting its political sovereignty.

While both schools are private, they are very different in terms of their religious orientations. Parents choose the schools based on how they feel the school's values match their own, or according to other considerations that are beyond the scope of this introduction. In both schools, students start learning French as a second language in first grade. The first school teaches science and social studies in French. The second one teaches science and social studies in Arabic. Both schools are ranked among the best in the country and have reputations for maintaining high standards.

The students selected for this study were all from grade 5 and were mostly 10 years old. Eighteen children were selected from one school and 14 from another school. They have experienced periods of violence from the war that spanned the first eight years of their lives.

The Canadian School

The Canadian school, located in the suburbs of a small city in Eastern Ontario, is a new Public school and in its second year of use. Most of the students come from middle to upper middle class neighborhoods in the area of the school. The school is located next to a Catholic Separate school ("Separate" and "Public" refer to the two types of school boards funded by the provincial government) in the middle of a residential neighborhood.

School starts at 9:00 am and continues through to 3:30 pm. There are a 15 minute recesses at 10:00 am and again at 2:00 pm. Lunch with a recess afterwards extends from

11:45 am to 12:45 pm. Some students go home for lunch; others bring their lunch and eat at school. The curriculum emphasizes a child-centered approach, including whole language. The elementary curriculum at this point in time does not list specific learning objectives, as are found in the elementary curricula in the United States. There are broad statements of goals, with a great deal of emphasis on process. The way in which this curriculum is interpreted by individual school boards, schools, principals, and teachers varies widely. Although most teachers in the school tend to be more progressive, some rely more heavily on traditional approaches. However, the school is involved actively in promoting an understanding of environmental issues. The children help in the maintenance of the school's vermiculture composting bins, which are kept inside the school.

As in the Lebanese schools, French as a second language is taught throughout the grades, although in this particular school it is taught as a separate subject as opposed to the language of instruction. The school is highly rated. Before the school was first opened, the teachers were hand picked for their expertise. The children attending this school are predominantly from a Protestant tradition of Christianity. Although the specific religious beliefs are not known, other beliefs could include Jewish, Hindu, Moslem, Buddhist, atheist, and so forth (most Catholic children attend the adjacent Catholic Separate school).

Twenty-seven students were selected for this study from one grade 5 classroom. Most of the children have not been exposed directly to pervasively violent environments. A couple of the children had lived, until recently, in a major city. Although the economy in Canada is not particularly healthy, it is reasonably stable with a low rate of inflation and low interest rates. Most if not all students have at least one television in their homes, as well as a variety of radios, stereos, and assorted appliances.

Data Collection Procedures

Further information on context maps can be found in a recent paper by Bloom (1990, April). In short, however, context maps are brainstorming exercises that are constructed by connecting the generated terms or phrases (usually descriptions and examples) to the stimulus word or phrase (topic) which is located at the center of the page. In the present case, the children put "Earth" in the center of the page. The subjects were then instructed to connect any relationships they see between these terms or phrases by lines and label them appropriately. The resulting map has the terms or various perspectives arranged in a circular fashion around the topic word with labeled relations occurring between the

perspectives. However, in the present study only the generated terms (and any drawings), and not the links between terms, will be considered.

Prior to beginning this task, instructions were given on how to construct a context map. These instructions stated that they should brainstorm and write down as many ideas as they could think of about the topic in the center of the page. The ideas should be connected to the center word by a line. After they completed listing their ideas, they were told to look for ideas that were related in some way and connect these ideas with lines, and label these connections. In order to clarify these instructions, the class worked as a group through an example context map on "school." The word "school" was written on the chalkboard or a large piece of paper. The children's ideas were added to the map. After about five minutes, they were asked to look for ideas that could be related or linked. As they identified such links, they were asked to come up with a descriptive label for the link.

Following these instructions, 11" x 17" (or similar) sheets of paper. The researchers explained that they were interested in each of the students own ideas and that they should not share too much at this point. This point was emphasized by asking them not to talk to each other or look at each other's work until the tasks were complete.

As with any task, context maps provide a glimpse of a child's thinking and knowledge. When looking at the data from the context maps and interviews, it is important to realize that the typological categories of contexts of meaning are not necessarily mutually exclusive. A personal experience obviously fits into the "personal experience" typological category, but it can also fall within an emotions-values-aesthetics framework or within an interpretive framework. Although such overlap may be of concern from the perspective of instrument validity, the nature human cognition does not provide neatly packaged differentiations. This overlap and interrelatedness are part of the power of this wider sense of cognitive context of contexts of meaning. More details on how these various contextual components affect one another is described in Bloom (in press, 1992b).

The Lebanese maps were translated from either French or Arabic into English. When working with translated data, the interpretation of such data should be viewed with caution. As McKinley, Waiti, and Bell (1992) aptly point out, "there can...be no direct translation of words from one language and culture to another as language and thought are so closely interconnected. Language determines thinking to varying degrees" (p. 590). In light of this consideration of the difficulty of working with translated data, the following analysis of the results needs to be considered with this in mind.

Analysis Procedures

In order to gain an understanding of the data beyond a simple comparison of the actual words and phrases used, a categorization scheme was developed. The categorization scheme itself is an artificial construct, but serves as a way to place the data in related clusters for comparison between the groups. Although numerous different schemes could have been used, the point was to develop a framework that would allow for comparisons at a conceptual level.

The first level of categories is based on the previous theoretical framework of contexts of meaning. Further levels of this categorization scheme were generated to reflect the specific content of the data. A diagrammatic representation of this scheme appears in Figure 1. However, the diagram does omit more detailed categories beyond the categories appearing to the right of "People." These details are provided below (categories that appear on the diagrams in Figures 1, 2, and 3 appear in boldface below):

People

General

Individuals

Political

Popular, Sports, Entertainment

Science and Professional

Trade and Labor

Groups

Socio-Political

General

Civilizations

Countries

States, Provinces

Cities, Towns

Friends

Homes, Families

Cultural

Ethnic Groups

Languages

Activities and Functions

General

Professional, Occupational

Recreational

Human Physical Constructs

Transportation

Buildings, Structures

Weapons

Communication and Media

General

Media Entertainment

Money and Valuables

Other

Human Conceptual Constructs

Time

Direction

Religion

History

Other

Food

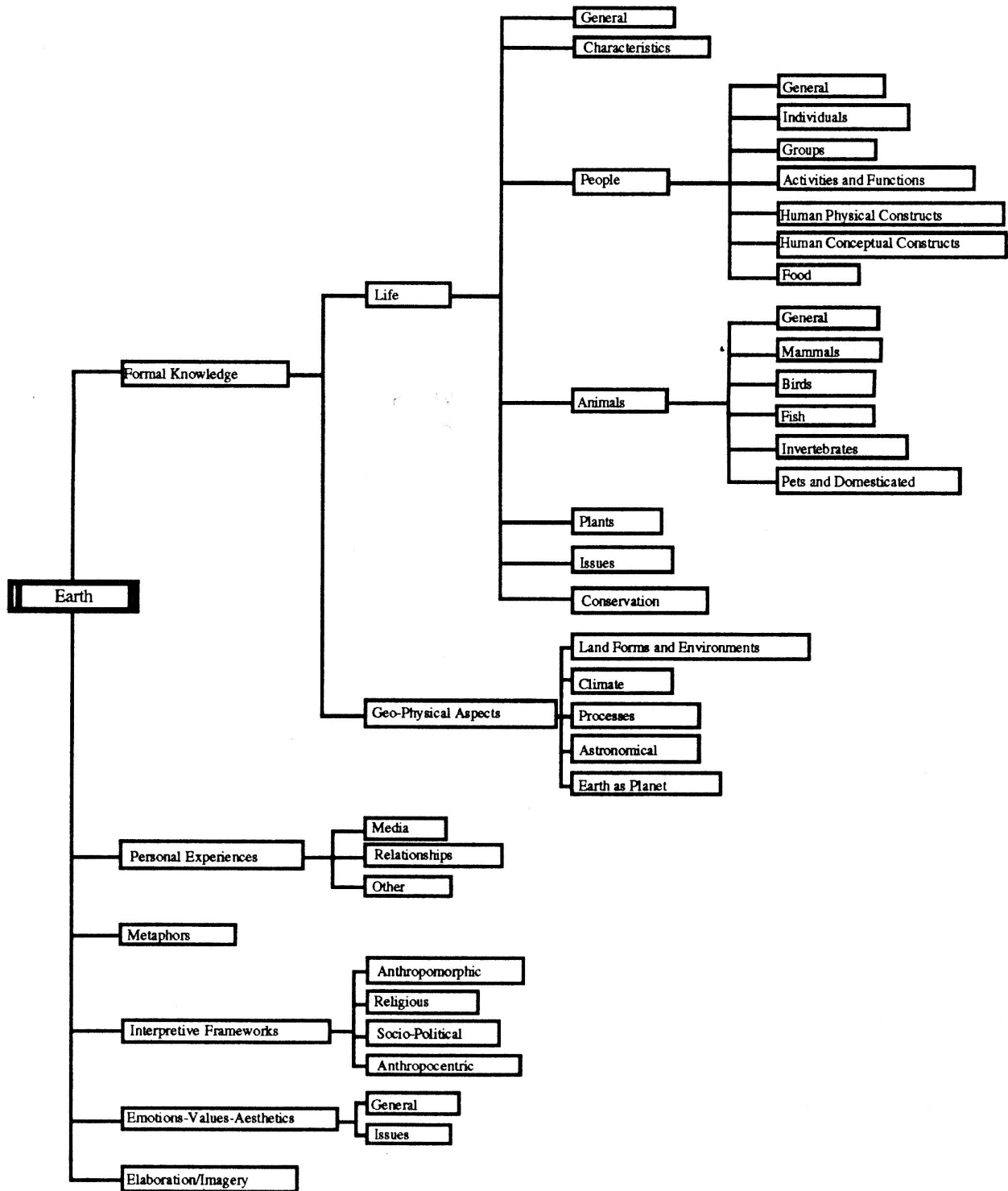


Figure 1. Diagram of the overall conceptual outline used in classifying the data.

A brief description of how the figures used in the diagrams were calculated is necessary. Initially, the frequency of occurrence of each term or phrase was calculated for each group (each school). If the same term was used more than once by a particular individual, the term was only counted once for that individual. So, the frequencies represent the number of individuals using a particular term or phrase. The frequencies were then converted to percentages by dividing the frequency number by the total number of students in that group. Then as the classification of terms continued, the frequency percentage was carried along with the term. If the same term or phrase was classified in several different categories, the frequency percentage was carried along with each occurrence in the categorization scheme. Once all of the terms were placed in categories, then the total of the frequency percentages was calculated. The percentage figures that appear in the diagrams represent the number of items contained in that category based on the total of all frequency percentages for that group. In other words, the percentages that appear in the diagrams represent the number items in particular categories as a percentage of the total number of items classified (the total includes multiple categorizations of items). Items were placed in multiple categories when characteristics of a particular word in a phrase or of the particular item warranted classification in a two or more categories.

In addition to the diagrammatic representations in Figures 1 through 3, a comparative listing of the outline was developed. This listing juxtaposes the data from each of the three schools within the framework of the outline. Within any one category similar terms appear next to each other in each of the three columns (the columns represent the schools). If a match between schools does not exist, then that particular item appears on a line by itself. Such a listing of the data allows for more detailed analysis of patterns between the schools. Excerpts of this listing appear in Tables 1 through 8.

Results

When comparing the work of children from two different cultures, we have to be careful about the assumptions we bring to bear on our interpretations of the data. In the following discussion of the results, we will try to tread carefully as we compare the nature of the response patterns and content of the context maps. Much of what will be discussed will probably generate more questions than answers, but the results should point to useful directions for further exploration.

General Patterns

An initial tabulation of the more frequently included items of the context maps from each of the three schools appears in Table 1. The items that appear frequently and are found in the maps from all the schools are (a) animals, (b) people, (c) mountains, (d) flowers, (e) water, (f) tree, (g) cars, and (h) countries. From the same list, the items in the maps from the Canadian school that do not appear in the Lebanese schools include (a) Canada, (b) lakes, (c) round, (d) recycle, (e) provinces, (f) pollution, (g) green, (h) big, (i) blue, and (j) USA. The notion of "round," as item "C" in the previous list, however may be connected with the term "spherical" from the Lebanese context maps. All of the items that appear frequently in the list from the Lebanese schools appear in one form or another in the Canadian school maps. Because of difficulty of working with translations and the need to look at the data conceptually, "agriculture/planting" from the Lebanese children does not appear in the lists of the Canadian children, but is related to "farming" in the Canadian list. The notions of pollution and conservation ("recycle") are not evident in Lebanese schools. It is also worth noting that the Lebanese children did not mention their own country. In fact, they mentioned no other countries by name.

Comparing the lists of words is useful up to a point. The difficulty, especially with context maps that have been translated from Arabic and French into English, is that lists of words do not provide for effective conceptual comparison. In order to accomplish a conceptual comparison, the context map items have been organized into a classification scheme based on a combination of a pre-existing theoretical framework (Contexts of Meaning [Bloom, 1990, 1992]) and the nature of the items themselves. Working within the framework of Contexts of Meaning, the data are categorized as representing formal knowledge, personal experiences, interpretive frameworks, emotions-values-aesthetics, and, a new aspect, elaboration-imagery. No explicit evidence of metaphors was found. Within each of the contexts of meaning aspects, the data were then placed in further sets of categories (a detailed explanation of this categorization scheme is discussed in the Methods section). An example of the general categorization scheme is represented diagrammatically in Figure 1.

Table 1. Items appearing most frequently (among 25% or more of the students) in the Context Maps from each country. Boldfaced items appear in the maps of the Canadian school and one or both of the Lebanese schools. Items followed by three asterisks (***) indicate, for the Canadian school, that the item does not appear in any of the context maps from either Lebanese school.

Canadian School			Lebanese Schools		
Students	Items		Students	Items	
%	#		%	#	
89	24	people 123	44	14	animal/animals
85	23	animals 129	41	13	plants
74	20	water 112	41	13	car/cars
67	18	trees 105	38	12	sea/seas
67	18	food	38	12	mountain/mountains
48	13	grass	38	12	water
44	12	mountains 82	38	12	trees
44	12	land	34	11	person/people
44	12	Canada ***	34	11	house/houses
41	11	lakes ***	28	9	flower/flowers
37	10	flowers 65	28	9	building/buildings
37	10	countries 62	28	9	soil
33	9	sun	28	9	agriculture/planting
33	9	round ***	28	9	buildings
33	9	recycle ***	25	8	country/countries
33	9	provinces ***	25	8	vegetables
33	9	pollution ***			
33	9	oceans			
33	9	cars 74			
33	9	air			
30	8	moon			
30	8	green ***			
30	8	blue ***			
30	8	big ***			
26	7	U.S.A./USA ***			
26	7	life			
26	7	birds			

When the diagrams of the Canadian and Lebanese schools are compared, a striking similarity between the two groups is evident (see Figures 2 and 3). The same general types of information are present in both groups of children. Except for explicit use of metaphors, the major aspects of contexts of meaning are represented in both groups. Within the formal knowledge aspect, both groups of children include about equal proportions of information related to life on Earth and to geo-physical aspects. Similar emphasis on personal experiences, interpretive frameworks, and emotions-values-aesthetics is evident among the children in both schools.

The major differences occur in the lack of particular categories in the Lebanese schools, which are, (a) "Characteristics" under "Life", (b) "Mammals" under "Animals", (c) "Conservation" under "Life", (d) "Media" under "Personal Experiences", (e) "Socio-Political" under "Interpretive Frameworks", and (f) "Anthropocentrism" under "Interpretive Frameworks". The only category not evident in the Canadian context map data that is evident in the Lebanese data is "Anthropomorphism" under "Interpretive Frameworks". In addition, elaboration-imagery as a component is considerably more apparent among the Lebanese group (6%) than among the Canadian group (0.7%). Information related to groups of people was more evident in the Canadian school (15%) than in the Lebanese schools (4%).

From an overall perspective, these two very different cultural groups are very similar in their general patterns of responses. The differences from this perspective appear to be relatively insignificant. However, in order to better understand the differences and similarities between the two groups, a closer look at the specific content of the classification scheme is necessary.

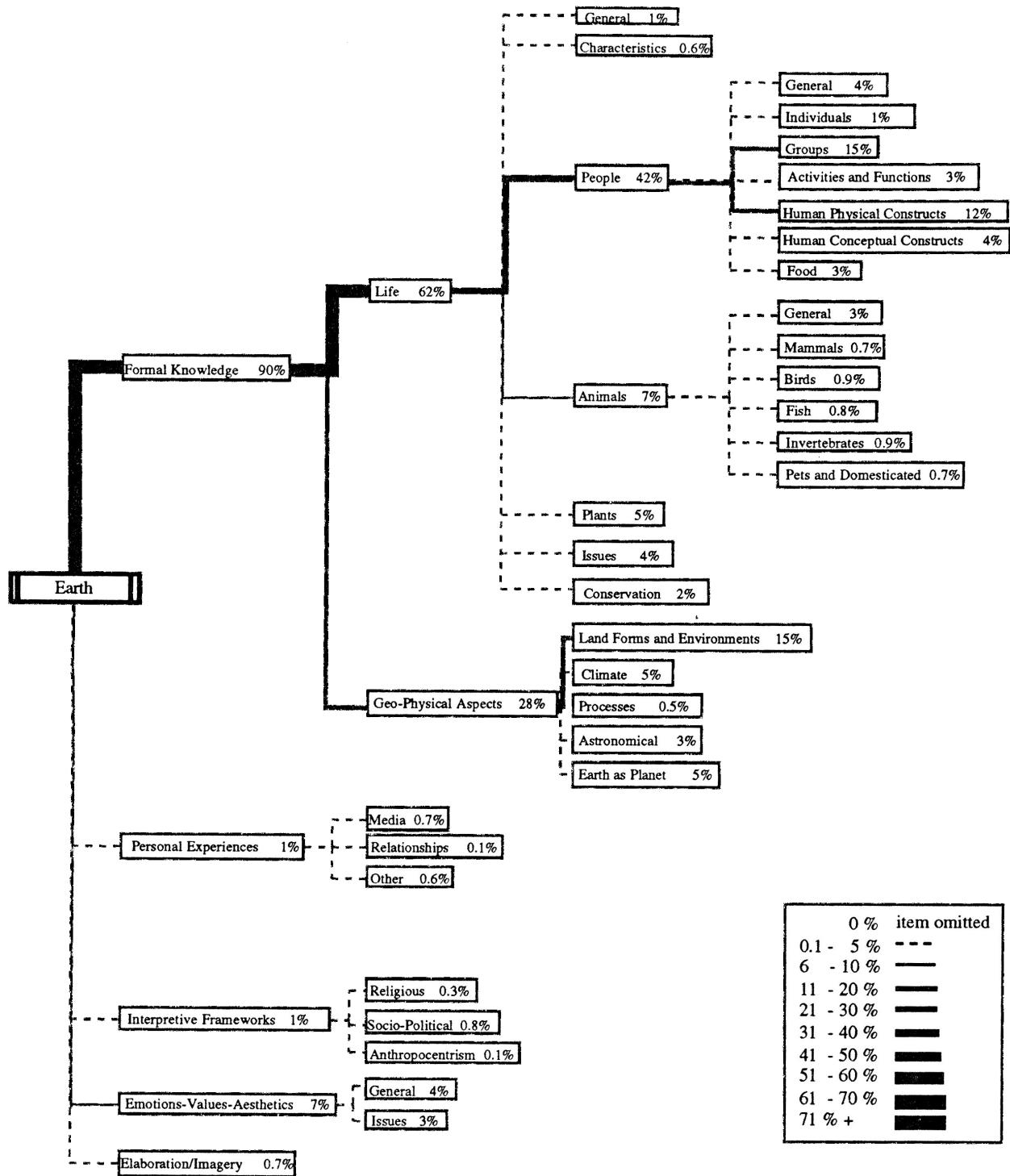


Figure 2. A diagrammatic representation of the conceptual categorization of data from the Canadian school (percentage figures refer to the number of items in particular categories out of the total number of items in all categories).

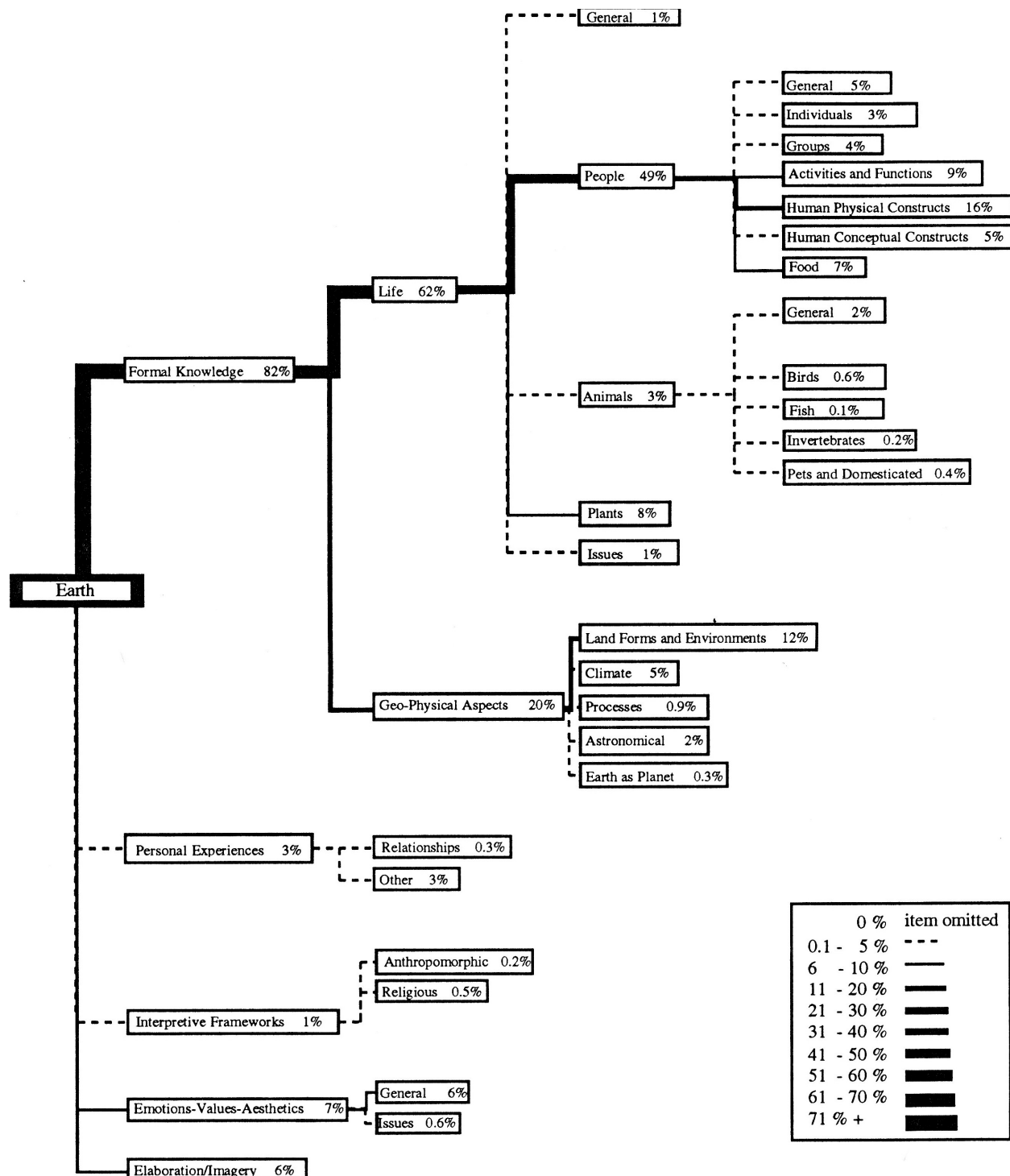


Figure 2. A diagrammatic representation of the conceptual categorization of data from both the Lebanese schools (percentage figures refer to the number of items in particular categories out of the total number of items in all categories).

Specific Patterns

Formal Knowledge

As we work through the categorization scheme, both groups mention general aspects of "Life", such as "life", "living things", and "nature." However, only the Canadian children mention characteristics of life, such as "age", "births", "deaths", "growing", "foot", and "hair." Under general aspects of people, both groups include similar kinds of information, such as about people, children, poor, and rich. Differences arise between the two groups as we look at the categories of individuals and groups of people. Table 2 depicts the differences in the information included in the context maps between the two groups. The Canadian children focused on individual political roles with one person mentioning a popular sports figure, in addition. The Lebanese children focused their attention on trade and professional roles, with only one person mentioning a political role. In addition, one Lebanese child mentioned "Einstein."

Table 2. A comparison of "Individual People" mentioned by Canadian and Lebanese children (percent figure refers to the number of students; asterisks indicate the number of times that particular item is placed in other categories).

Canadian School	Lebanese Schools	
% Items	% Items	
Political		
7 me		
4 mayor		
7 presidents	3 president of republic	
4 Prime Minister		
4 prince		
4 princesses (Diana)		
4 Queen (Elizabeth)		
4 Royalty		
Popular/Sports/Entertainment		
4 Scott Pipen - Chicago Bulls		
Science and Professional		
	3 Einstein	
	3 I love (like) its physicians	****
	3 teaching	**
	6 engineering	**
Trade and Labor		
	3 I love (like) its merchants	***
	6 farmer/farmers	
	3 selling	**
	34 agriculture/planting/plant (on it)	**

Within the Groups of people category (see Table 3), there a number of interesting differences between the two groups. Under the General category of Sociopolitical groups, several of the Lebanese children concentrate on concepts of government. Under the category "Countries," the Canadian children list a number of different names of countries, while the Lebanese children mention "countries" in general (only one child mentioned Lebanon itself) and their personal connections to countries. The same sort of pattern is evident under the category "States," where the Canadian children mention states and provinces by name and the Lebanese children do not. Both groups show similar information about towns and villages. Surprisingly, however, the Lebanese children do not mention any information about families or friends. This is surprising since the idea of family in Lebanon tends to be very important.

Table 3. A comparison of groups of people mentioned by Canadian and Lebanese children (percent figure refers to the number of students; asterisks indicate the number of times that particular item is placed in other categories).

Canadian School	Lebanese Schools
% Items	% Items
Socio-political	
General	
4 borders	3 constitution
	3 government
	6 laws
	3 execution of laws
	3 United Nations
	9 army **
Civilizations	
4 civilization	
Countries	
44 country(-ies)	25 country/countries
	3 it's got lots of countries **
4 Australia	
44 Canada	
4 Canada 125	
4 China	
4 France	
4 Germany	
4 Greenland	
7 India	

(Table continued)

Table 3 (continued)

Canadian School	Lebanese Schools
% Items	% Items
7 Italy	
4 Japan	
11 Mexico	
4 Russia	
26 USA	
4 USSR	
	3 Lebanon
	3 I feel my country ****
	3 the country of Christians ****
	3 I love to travel to all its countries *****
States/Provinces	
15 state(s)	3 state (dawlah)
4 state-province	
37 province(s)	
4 British Columbia	
4 Manitoba	
11 territories	
	3 regions
Cities/Towns	
30 city/cities	9 city/cities
11 capital(s)	3 capitals
4 Toronto	
19 towns	
4 village	12 village
	3 I love the villagers ****
Friends	
19 friends	
Homes/Families	
30 home(s)	
4 house (mine yours)	
19 house	
15 family(-ies)	
4 my family	

Although we cannot make claims about causal relations, several factors may play a role in the differences between the two groups. Exposure to the media (i.e., news programs on the Media), personal experiences with travel, and personal experiences with living in

different parts of the country and of the world may contribute to the type of information mentioned by the Canadian children. On the other hand, the school learning and the relative lack of exposure to the media, especially to the type of news coverage common in Canada and the United States, may contribute to the type of information listed by the Lebanese children.

Under the category of Human Physical Constructs and its subcategory, Transportation, both groups included similar types of information, such as, airplanes, boats, cars, trains, and roads. With the category Buildings, both groups listed similar information, including buildings, houses, schools, churches, stores or shops, factories, and farms. Some of the items that were not similar included pools, shelter, skyscrapers, tent, and Sky Dome (Toronto baseball and football stadium) for the Canadian children, and included supermarkets, pizzeria, bank, pyramids, China Wall, and Babel Tower for the Lebanese children. In the case of the present comparison, the Sky Dome seems to be specific to the culture of Canada. In terms of the category Weapons, one Canadian child mentioned "guns" with accompanying drawings of some examples. In the Lebanese schools, one child mentioned "armaments" and three children mentioned "army."

In the General category under Communications and Media, 22% of the children in the Canadian school listed TV and radio, while other individuals listed "newspaper" and three names of specific newspapers, as well as "pictures" and "phone." In the same category, only one Lebanese child mentioned "books." Under Media Entertainment, one Canadian child listed the names of the Teenage Mutant Ninja Turtles, while other individuals mentioned Star Trek VI, "music" (four individuals), "music sounds," "art," and other TV and video game related information. Nothing was mentioned under this category by the Lebanese children.

A comparison of the children's inclusion of items related to food is presented in Table 4. Both groups include the general categories of food, such as, fruits and vegetables, however the Lebanese children provide more specific examples of fruits and vegetables, as well as of meats and grains. Candy, ice cream, soft drinks, and pizza are mentioned in the Canadian group, but not in the Lebanese (however, "pizzeria" is mentioned by a Lebanese child).

Table 4. A comparison of "Food" mentioned by Canadian and Lebanese children (percent figure refers to the number of students; asterisks indicate the number of times that particular item is placed in other categories).

Canadian School	Lebanese Schools
% Items	% Items
4 crops	3 nutrition
4 vitamins	16 food
70 food(s)	3 I love its food ****
11 fruit(s)	22 fruits
4 apples	3 apples
	3 bananas
	3 oranges
	6 strawberries
11 vegetables	25 vegetables
	3 lettuce
	3 spinach
	3 tomatoes
	3 potatoes
7 meat	3 chicken **
	3 eggs
	6 grains
	3 wheat
	3 bread
	3 herbs **
	3 parsley
7 pizza	
4 candy	
4 ice cream	
	6 salt
4 drinks	
4 drinking water	
4 pops	

Under the category of "Animals," both groups mention animals, in general, as well as, aquatic or sea animals and dinosaurs. No mammals (other than domestic "cows") are mentioned by the Lebanese children. Among the Canadian children, "mammals," "whales," "beavers," "lion," "squirrels," and "rabbits" are mentioned. Both groups of children mention birds, fish and invertebrates (only "bees" are mentioned by one

Lebanese child, whereas, with the Canadian group, six mention "bugs," two mention "insects," and one mentions "ants"). Under the animal category, "Pets and Domesticated," "cats," "dogs," "cows," and "horses" are mentioned by Canadian children, and only "cows" and "chicken" are mentioned by Lebanese children.

As in the "Food" category, the Lebanese children provide more specific examples of plants. Both groups mention "plants," "flowers," "trees," and "grass," but only the Lebanese children mention the following: herbs, orchards, foliage, jasmine, roses, and cedars. One Lebanese child also mentions "plant soil."

Under the categories "Issues" and "Conservation," the Canadian children list many more specifics about issues, most of which concern the environment. The overlap between the two groups of children occur with "garbage," "war," "peace," "poor," and "hunger" (these are the extent of the issues mentioned by the Lebanese children). The Canadian children mention "reduce," "reuse," and "recycle" under the category of "Conservation." What is interesting about this list is that "war" is mentioned by only one Lebanese child (in a country that has seen much war in recent years) and by three Canadian children. In addition, environmental issues dominate the list of items generated by the Canadian children. In Lebanon, the concern for post-war survival is probably more important than concerns for the environment.

Table 5. A comparison of "Issues" and "Conservation" mentioned by Canadian and Lebanese children (percent figure refers to the number of students; asterisks indicate the number of times that particular item is placed in other categories).

	Canadian School		Lebanese Schools	
	%	Items	%	Items
Issues				
	4	problems **		
	37	garbage **	3	garbage
	4	garbage -- we don't need it		
	4	waste **		
	4	pollution/polluted **		
	4	smog **		
	7	hole in ozone layer**		
	11	ozone (layer)		
	7	endangered animals **		
	4	endangered species **		
	4	vandalism **		
	11	war(s) **	3	war **

(Table continued)

Table 5 (continued)

Canadian School		Lebanese Schools	
%	Items	%	Items
	15 peace ***		6 peace ***
	4 non peace *****		
	7 freedom *****		
	4 nonfreedom *****		
	4 poor		3 I feel for the poor ***
	4 hunger **		3 hunger **
Conservation			
	19 reuse		
	15 reduce		
	33 recycle		

Both groups of children listed similar aspects of the geo-physical environment, including continents, forests, coasts or beaches, deserts, seas, islands, mountains, volcanoes, rivers, springs, soil, stones, rocks, and sand. The most notable difference in this category is the inclusion of metals, copper, iron, and tin by the Lebanese children and the inclusion of valleys, waterfall, bays, bogs, and plains by the Canadian children. Many climatic features are common between the groups, although the Canadian list has more variety. Both groups list air, oxygen, atmosphere, clouds, rain, and snow. The Canadian children also mention ice, storms, tornadoes, wind, hail, cold, warm, and hot.

Personal Experiences

Information linked to personal experiences from context maps tends to be somewhat less explicit than information gained from conversations. The information on the maps tends to be in the form of single words or short phrases. Although a great deal of the information included in the maps can have ties to children's personal experiences, only those that tend to require lower level inferences are included in this category. For example, the information included in the Formal Knowledge category of "Media and Communication" (discussed previously) that relates to specific movies and video games, such as the names of each Teenage Mutant Ninja Turtle and "Star Trek VI, Scottie," are reasonably apparent as aspects of personal experiences. The only inclusions in the subcategory of Media, as just described, are provided by the Canadian children.

Under the subcategory of Relationships, one Canadian child mentioned the term "friendship," which can be considered as related to personal experiences. One Lebanese child mentioned "I love [or like] to know its people" and "I love [or like] the villagers."

Both of these statements point to the possibility of experiences with people, in general, and villagers, more specifically.

The subcategory "Other" contains many of the more elaborate items introduced within the Lebanese group (see Table 6). The elaboration and emotions involved in many of these appear to connect these statements with personal experiences. In addition, certain aspects in the Canadian group list, such as "music," "music sounds," and "phone!" seem to connect with personal experiences. The exclamation point following phone adds a certain emotional tag to an otherwise formal knowledge type of item. In the Lebanese list of items, the statement, "gathering around shiny flowers," depicts an image that has more than likely been a personal experience of that particular child.

Table 6. A comparison of "Other" types of "Personal Experiences" mentioned by Canadian and Lebanese children (percent figure refers to the number of students; asterisks indicate the number of times that particular item is placed in other categories).

Canadian School		Lebanese Schools	
%	Items	%	Items
15	music ***		
4	music sounds ***		
4	phone! ***		
7	travel **	3	travel **
		3	I love to travel to all its countries *****
		3	I feel my country ****
		3	I love its physicians ****
		6	play/play (play on it) **
4	friendly **	3	friendly **
		3	gathering around shiny flowers ****
		3	I love its animals ****
		3	I love its snowy mountains ****
		3	I love its green mountains ****
		3	I love its food ****
		3	I love its education ****
		3	I love to know its language ***
		3	I love its houses ****
		3	I feel the joy ***
		3	I feel the love ***
		3	I love its being love ***
		3	I love the sun in my country *****
		3	I love (like) its merchants ***
		6	walk (on it)/walking (on earth) **

Interpretive Frameworks

Categorizing items as interpretive frameworks involves a certain degree of inferring. The notion of "our world" (see Table 7) points to a framework that views the world as ours (as humans' world). Such a notion can be categorized as anthropocentric. The notions of peace and particularly freedom point to a certain way of viewing and interpreting the sociopolitical context. "Freedom" and "non freedom" are mentioned by a couple of Canadian children. Under the "Religious" subcategory both groups mention church and God. The statement by one Lebanese child that "cars move on it" is an interesting example of how the nature of language influences the way in which we interpret the world we experience. In this case, the specific word in Arabic translated as "move" has an anthropomorphic form. A form that means "walking," as in people walking. Other forms of the Arabic term for "move" could have been used instead, but they were not.

Table 7. A comparison of "Interpretive Frameworks" mentioned by Canadian and Lebanese children (percent figure refers to the number of students; asterisks indicate the number of times that particular item is placed in other categories).

Canadian School	Lebanese Schools
% Items	% Items
Anthropocentrism	
4 our world **	
Socio-Political	
7 freedom ***	
4 non freedom **	
15 peace ***	6 peace ***
4 non peace **	
Religious	
4 church **	3 churches ***
7 God **	3 God (created the Earth) **
	3 blessings **
Anthropomorphic	
	3 cars move on it [anthropomorphic form of move] ***

Emotions-Values-Aesthetics

Emotions-values-aesthetics (EVAs) are evident in a number of cross categorized items in both groups (see Table 8). Such items can have elements of personal experiences and formal knowledge characteristics. Children in both groups mentioned aspects of relationships, aspects of beauty, and happiness or joy. One Lebanese child's context map

was entirely concerned with his "love (or liking)" of a variety of aspects of Earth, such as "I love its physicians," "I love to know its language," and so forth. This case and the other examples are explicit demonstrations of the importance EVAs can have on children's understandings of their world. EVAs also provide strong personal connections to a variety of topics and understandings.

Table 8. A comparison of selected items categorized as "Emotion-Values-Aesthetics" mentioned by Canadian and Lebanese children (percent figure refers to the number of students; asterisks indicate the number of times that particular item is placed in other categories).

Canadian School		Lebanese Schools	
%	Items %	%	Items %
4	friendly **	3	friendly **
4	friendship **	3	friendship **
4	sharing		
		3	giving **
26	like/love/lovable/loving	9	love **
		3	I feel the love ***
		3	I love its being love ***
		3	I love to travel to all its countries *****
		3	I love its physicians ****
		3	I love its animals ****
		3	I love its snowy mountains ****
		3	I love its green mountains ****
		3	I love its food ****
		3	I love to know its people ***
		3	I love its education ****
		3	I love the villagers ****
		3	I love to know its language ***
		3	I love its houses ****
		3	I love the sun in my country *****
		3	I love (like) its merchants ***
4	happiness	3	joy **
		3	I feel the joy ***
4	fun		
7	nice		
4	sadness		

(Table continue)

Table 7 (continued)

4	bad!	
4	smelly	
4	ugly!	
4	weird people	
4	art **	
15	music ***	
4	music sounds ***	
		9 fashion **
		16 beauty **
		3 gathering around shiny flowers ****
		3 I feel my country ****
		3 people (comfort of) **
		3 nurturing **
		3 morals **
		3 goodness **
		3 fortune **
		3 order **
		3 orderliness **
4	neat	
11	clean **	6 cleanliness **
7	dirt **	

Elaboration and Imagery

From the examples of the data we have seen so far, two basic forms of expression are evident. One form is fairly concise, consisting of one to two words or so. The other form is more elaborate and often invokes imagery. For example, a total of 19 children from both countries mention "flowers," which is a concise statement. On the other hand, one of the Lebanese children mentions "gathering around shiny flowers." This statement not only mentions flowers, but also provides a further description of the flowers ("shiny") and places these flowers in a situational context, which points to a connection with personal experience, as well. In the present study, seven (22% of) Lebanese children included one or more items indicative of elaboration-imagery. Most of the responses from three of these children were demonstrative of elaboration-imagery. On the other hand, the Canadian children had only a few such elaborate or image provoking statements. Examples include (a) "the inside of a nose" (with accompanying drawing), (b) "blue sky," and (c) "only planet with life." However, 16 (59%) of the Canadian children included drawings as a part of or in addition to their context maps. Fourteen of the children included drawings of the Earth. Almost all of the drawings were colored green and blue,

and a few were quite accurately drawn in terms of the shape and placement of continents, including a white polar region. One child listed (a) the names of the four Teenage Mutant Ninja Turtles with illustrations of each, (b) "Scott Pipen" with a drawing of a person in a Chicago Bulls uniform, (c) "Hockey" with the drawing of a hockey goalie, and (d) "Baseball" with a drawing of a Blue Jays catcher and a Pirates batter swinging at a pitch. Another boy illustrated each of his context map items. Examples of which include, a rather grotesque inside of a nose (which has already been mentioned), an old pirate with a peg leg, a huge ice cream cone with at least 25 scoops, a male peeing in a toilet, and a green and blue Earth labeled "the world." Other objects depicted in drawings (if a drawing occurs more than once the number is provided in parentheses following the name of the item) included moon (2), sun (2), ringed planet, other planets, people (2), space station "Freedom," space shuttle (2) (one space shuttle included an extended Canadarm), stars, Canadian flag, and cartoon character type of face. Although the Canadian children did not provide as much verbal elaboration as the Lebanese children, over half of the Canadian children provided pictorial imagery.

Discussion

The present study generates more questions than answers. Certainly broad generalizations about cultural differences cannot be made from this particular study. However, we can develop some of the questions that emerge from the data. In addition, we can begin to describe some of basic patterns of understandings evident in the differences and similarities between the two groups.

Although context maps are limited in the scope of the information they elicit, they do provide one means of assessing children's meaning-making from a more holistic perspective. The data certainly support the viability of using the theoretical framework of contexts of meaning across different cultures. Although the specific content may vary, children in these two very different cultures make sense of their world and their experiences in similar ways. Obviously, formal knowledge is the dominant aspect. However, the other aspects of contexts of meaning (personal experiences, interpretive frameworks, emotions-values-aesthetics, and elaboration-imagery) are also significant contributors to the meaning children bring with them into learning situations.

The relative emphases on various formal knowledge categories are remarkably similar between the two cultural groups (refer to figures 2 and 3). Not surprisingly, the heaviest emphasis of items in the context maps deals with aspects related to life on Earth. This

particular emphasis is dominated by details related to people. In both groups, the dominant category under "People" is "Human Physical Constructs." Even on the level of the specific content of this latter category, the similarities are surprisingly consistent, except for the items under "Communications and Media." Although the Lebanese children have televisions, VCRs, and radios, they do not mention them. In fact, there is little explicit evidence of the influence of media on what the children say. On the other hand, the Canadian children not only mention televisions, radios, newspapers, and telephones, but they mention items that are directly related to media, such as characters from video games, the names of movies, and so forth. What accounts for such similarities throughout most of the conceptual category of human physical constructs? What accounts for the striking differences with the items under the category of media? One possible explanation for the difference in the media category is the dominant position of television and video game entertainment in the everyday lives of Canadians and Americans. One Canadian child's context map was dominated by video game characters. In fact, this particular child tends to incorporate these characters (Teenage Mutant Ninja Turtles) into every possible school related activity, as well. The case with this child is extreme. However, in another study on machines, most of the other children mentioned their Nintendo or other types of video games, when asked about what machines that had and used in their homes (Bloom, 1993, raw data). Another viable explanation for such a difference between the two cultural groups and their different emphases on media may concern their differing school cultures. In the Canadian school, children, if they are not encouraged, are at least permitted to discuss their personal, home experiences and to incorporate these experiences in relevant classroom activities. And, as with the case of the one child who incorporates ninja turtles into every activity, the teachers will at least tolerate extremes in bringing personal experiences and interests into classroom activities. However, in the Lebanese schools discussions of television programs and other recreational activities tend not to be viewed as appropriate. So, although the Lebanese children may watch the same TV shows and have similar interests to the Canadian children, expressions of such interests may not be expressed.

Why did the children in both cultural groups mention war as little as they did? In a country besieged by war in recent years, one would expect those experiences to dominate the children's thinking about Earth and life on Earth. Yet, very little evidence of war and war related events or emotions appears in the data of the Lebanese children. The statements the Lebanese children did make include "war" by one child, "army" by three children, "armaments" by one child, and "peace" by two children. On the other hand, the children seem to portray a rather positive image of Earth. Some of their statements are poetic, like "gathering around shiny flowers." Others deal with the objects and events of normal everyday life or with particular emotions, values, and aesthetics,

such as, "beauty" from five children, "love" from four children. Individual children mention a variety of other such statements, including giving, nurturing, goodness, fortune, morals, order, friendship, and joy. Such a view of the world is quite remarkable considering what the children have experienced throughout most of their lives.

Lebanese children mention virtually nothing about environmental and conservation issues, while such topics were fairly common with many Canadian children. As mentioned previously, this particular difference is probably related, at least in part, to the aftermath of war and the troubled economy, and to the lack of emphasis in the curriculum and textbooks. Concerns for economic survival, as well as physical survival, out-weigh concerns for the environment. Further exploration of this particular topic in developing countries and other cultures may provide some interesting perspectives on the role of cultural beliefs and world views on concerns for the environment.

The final aspect of the data to consider in the present paper is the difference in the nature of the children's use of elaboration and imagery. As mentioned, the Lebanese children tended to be verbal in the elaboration and imagery, while the Canadian children tended to be pictorial. The use of context maps in other studies with Canadian children supports a pattern of frequent use of drawings (Bloom, in press; 1990, June). One consideration of possible influencing factors may include the nature of activities in the home between the two cultures. The Lebanese families tend to be closer and to spend more time together. Talking may have a more dominant role in the lives of children. In Canada, with many children living in single family homes or in homes with two working parents, children have a tendency to watch more television. Visual experiences may play a larger part in the lives of these children. Another possible factor in the relative lack of drawing among the Lebanese children may relate to the previously discussed "school culture." The Canadian school (as well as most North American schools) incorporate and encourage children's drawings and other artwork in a variety of classroom activities across the curriculum. The Lebanese schools may not encourage the same degree of integration of artwork in textually oriented tasks. Evidence of such separation of tasks is apparent with one of the Lebanese children who drew some pictures separate from the context map task.

What can we say about what is meaningful to children? We suspect that personal experiences play a much larger role than is immediately and explicitly evident in the data. Much of what the children include in their maps is probably strongly tied to their experiences of seeing and participating in events, visiting and seeing the objects of human construction and the natural, geo-physical objects. In addition, children of both cultures construct meaning with various interpretive frameworks, emotions-values-aesthetics, and elaboration-imagery. Although metaphors were not particularly evident

in the context maps (which tend not to elicit many metaphors) of either group, we suspect that such constructs are used by children in both cultures. The notion of contexts of meaning (of meaningful understandings that include more than semantic conceptual knowledge) as an important framework for understanding how children make sense of their worlds appears to be viable across cultures. Using such a framework for exploring differences and similarities between different cultural may be a fruitful embedding further research. The basic components of the contexts of meaning framework (i.e., personal experiences, metaphors, interpretive frameworks, emotions-values-aesthetics, and elaboration and imagery) may be globally applicable, but the specific content of these components and the nature and emphasis of how these components are used in making sense of everyday phenomena may be highly distinctive among different cultural groups.

Acknowledgments

A major portion of this study was supported by a research grant (#410-92-0110) from the Social Sciences and Humanities Research Council of Canada (SSHRC). The authors also wish to recognize support from the Department of Educational Development, University of Delaware.

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