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UNDERSTANDING GENDER AND GRADE PREFERENCES OF CHILDREN IN GEOGRAPHY

CAROLINA MORALES

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Reviewed and approved* by the following:

Lynn S. Liben
Distinguished Professor of Psychology,
Human Development & Family Studies; and Education
Thesis Supervisor

Kenneth N. Levy
Associate Professor of Psychology
Honors Advisor

* Signatures are on file in the Schreyer Honors College.

ABSTRACT

This study sought to determine whether children's interests in geography vary in relation to children's age or sex. The project involved examining the responses from winners of their school's National Geographic Bee, a competition that produces far more male winners than female winners at all levels. The data came from the children's responses to questions on the National Geographic Bee School Winner Student Surveys about what they find most interesting about geography and what they find least interesting. The data were compiled using the Child Language Data Exchange System (CHILDES) and a coding system created for this study. A total of 216 responses from the National Geographic Bee School Winners on these questions were examined. In addition to responses from the National Geographic Bee School Winners, which involved participants interested in geography, data from students in National Geographic Society (NGS) Partner Schools were also used to contrast against the data from the National Geographic School Bee Winners. A total of 233 students provided responses on their interests in geography from the NGS Partner Schools. In both data sets, gender and grade similarities were observed with both liking the categories Cultural Geography most and Places second most, the order switching interchangeably across gender and grade. With liking subcategories, School Winners liked the People/Lifestyle subcategory most across gender. Female NGS Partner School students liked the People/Lifestyle subcategory and male NGS Partner School students liked History. With disliking categories, female School Winners disliked the Places category most and male School Winners disliked the Physical category most. Both male and female NGS Partner School students disliked the Cultural category most. Both male and female School Winners disliked the subcategory Nothing most. Partner School students disliked the People/Lifestyle subcategory most across gender. The data from this study shows that females and males, regardless of geographic ability, have similar geography interests and by improving efforts for females to build

on these interests and expand their geography achievement, more girls may be interested in pursuing geography and other professions that draw on geographic concepts and skills. This study may be useful for making recommendations to educators about the geography that is taught in classrooms to focus on these areas of geography that the children liked most but also teach differently and more effectively the areas that were not as popular.

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Introduction

A domain of learning and education that deserves further attention is the discipline of geography. Geography is an integrative discipline that brings together the physical and human dimensions of the world in the study of places, people and environments. It has a unique place within science because of its multidisciplinarity. It ties together the spatial analysis of natural and human phenomena and the interrelationships between them (Kubiatko et al, 2012). It studies the Earth's surface and the processes that form it, the relationships between people and environments and the connections between people and places (Liben & Downs, 2001).

In our increasingly globalized world, it has become a necessity for children to be "global citizens". This requires not only a familiarity with locations outside one's own country but also an understanding of cultural diversity and how nature and human forces constantly change the distribution of resources and ideas. The ability to be proficient in geography affects many areas of life, such as success in professions relating to science and mathematics and navigating the globally diverse world in which we live. Geographic literacy also has the potential to bring people an explanation of the changing world phenomena that originate from the relation between the nature and the society. Additionally, geographic knowledge is important within the United States because of the world leadership role held by the US. In order to maintain a leadership role and be globally sensitive, it is important for citizens to be proficient in geography (Bein, 1990).

Living in today's world requires sharing concerns about economic, political, social and environmental issues, all of which are found in geography. Even as early as the 1940s, the goal to produce geography readiness within our youth has existed, with studies conducting questionnaires to students, showing what must be emphasized and needed in order for children to be ready to succeed in geography in the classroom (Whipple, 1941).

Research that focuses on STEM fields of study and careers with a subset of STEM-Technology Education states that women are underrepresented in these fields (McCarthy & Berger, 2008). Science and math are two subjects that are closely tied with success in geography and thus show the potential consequences that lack of quality geography education is yielding to the profession outcomes of women. One study that underscores the importance of math in geography was done by Schneider (1976) who evaluated map and globe skills in a group of sixth grade students and teachers. Schneider found that less than thirty percent of the students could correctly identify lines of latitude and longitude, interpret physical maps, compute time, compare climates and form conclusions about maps. Less than fifty percent of the students could use graphic scale to calculate distances, use latitude and longitude to name places, or orient intermediate directions to one another. Teachers were also found to be deficient in these areas, which is particularly troubling. In another study, Epps & Savage (1980) made recommendations on integrating basic mathematical skills that are needed in order to understand scale, compute time and distance and graph and read tables as these are skills necessary for geography. These researchers created a curriculum unit for a team- taught middle school program combining math skills and map and globe skills and this proved to be successful in improving geography instruction.

Programs such as the one in the study above are indeed necessary, as the current geography education in the US is yielding less than successful results. A Gallup poll conducted for the National Geographic Society in 1988 reveals some troubling trends. After studying the geographic knowledge of people of different ages in the United States, the Gallup organization found that Americans of the ages 18 to 24 did worse than their peers in all the other countries. They were in fact, the only group in their age cohort to score worse than the oldest cohort (55 and older) within their own country (Gallup Organization, 1988). There is also evidence of gender

differences in geography learning and achievement between males and females. This gender disparity is evident in the National Geographic Bee, an annual competition sponsored by the National Geographic Society (Liben, 2001). The education division of the National Geographic Society (NGS) created this in 1989 for children in grade 4 through 8. The Bee begins by holding rounds of the contest in US classrooms using questions supplied by NGS. The 100 highest-scoring students in each state are eligible to participate in the Geography State Bee. After that, the winner of the state Bee is invited to Washington, DC to participate in the National Geography Bee. The National Geography Bee traditionally produces far more boy than girl winners of all levels. Of the twenty- three National Geography Bee winners so far, two have been female and the rest are male. These findings demand more research to investigate whether children's interests in geography vary in relation to children's age or sex and how geography attainment can be improved and the gender difference between boys and girls in geography can be ameliorated.

There is an abundance of research that suggests the need for improved geography education and learning in children as well as the need to close the gender disparity between boys and girls in geographic knowledge and understand their geography interests. In 1994, the National Center for Educational Statistics [NCES] conducted its first full assessment of geography in grades four, eight and twelve (LeVasseur, 1999). The results showed that males performed better than females, and white and Asian students outperformed other ethnic groups at all grade levels. The study found high levels of geographic illiteracy among women and minorities and this was thought to be due to lack of representation of these populations within the community of professional geographers. The scores also showed that for both sexes, the students were the least knowledgeable about physical geography.

Another study was done on winners of the school level competitions in the Geography Bee (Liben, 2001). Students were given a written test described earlier and were asked to respond

to more questions on their participation in their endorsement of cultural stereotypes and their participation in other competitions. A selected few within this sample also completed additional measures such as their travel experience. Parallel data from about 2,500 students who had participated in the bee but had not won and from 2,000 students who had the opportunity to participate in the bee but had not, was also gathered and used to compare against the data from the school bee winners. The study found interesting results. Although more boys than girls participated, there was not a huge difference in responses. There were also no differences between the general population of students who entered and did not win and those who did not enter and this result was found across gender. Predictors of success in boys and girls were also similar. The area in which there were sex differences was in the scoring on the written test of geographic knowledge. The differences were not large however; males scored higher on a 6-item water level test and on the mental rotation test. The study pointed towards another explanation for the gender gap present in the geographic bee. The selective mechanisms used in the National Geography Bee are with selecting students from the top at each level of competition. There may be many qualified girls but they're simply not reaching that highest level as much as males are. Gender stereotypes and bias may play a huge role in preventing these girls from reaching the highest slot.

Gender stereotypes and biases are found to have a huge influence at a very young age, one factor that could be affecting females' performance in geography (Patterson, 2012). One study examining self- perceived gender typicality, gender-typed attributes and gender stereotype endorsement found that children who perceived themselves as more gender-typical were more interested in same-gender-typed activities and occupations and held less enthusiasm towards activities and occupations that were not as gender typical (Patterson, 2012). This was predicted based on Liben and Bigler's (2002) dual pathway model of gender development. This model

shows that children who perceived themselves as less gender-typical had more egalitarian (less stereotyped) attitudes than children who perceived themselves as more gender-typical. If females see geography and being a geographer as a male typical activity rather than a female one they might be less interested in studying and learning geography.

While there has been a plethora of literature on gender differences in spatial skills between males and females in geography, there has been less on the topic that this thesis will investigate, which is gender differences in geography knowledge and interests. In the current geographic education reform movement, the topic of school children's attitudes toward geography or what factors might influence student preference for it as a school subject have not been studied much. This is important because research has seen that developing positive attitudes toward a subject in the beginning of life often affects whether a person chooses to learn more about the subject later (Carswell, 1970). Additionally, it has been found that when an individual's attitude towards a subject is positive, they are more comfortable in the classroom situation, are more active in the classroom and are able to be more effective in problem-solving (Kizilcaoglu, 2010). Also, when an individual is interested in something they then have a desire to learn it, study it, and gain knowledge about that subject. Systematic studies of student attitudes concerning any of the subjects in school are rare (Chase 1949, Jersild 1949, Greenblatt 1962, Herman 1963, Curry and Hughes 1965, Inskeep and Rowland 1965, Haladyna and Thomas 1979, Goodlad 1984). By exploring what the differences are between what males and females are interested in and their knowledge of geography, we can then use this information to give to educators to teach these topics in the classroom, to know that this aspect of geography needs to be taught more heavily or in a different manner or this aspect of geography is interesting to females and thus should be incorporated into the curriculum. This information is also helpful for geography educators and experts creating standardized exams and geography competitions such

as the National Geographic Bee, to design testing materials that best meet the needs of geography students and include material to attract both sexes. This will not only help close the gender gap in geography achievement between males and females, but it will also bleed into other areas of life such as closing the gap between males and female in STEM careers, by encouraging more females to go into careers and jobs in Science, Technology, Math and Science, including geography.

Kubiatko, Janko & Mrazkova

Kubiatko, Janko & Mrazkova (2012) examined how gender, grade level and favorite subject influenced the interests and knowledge of geography among Czech Republic children in four specific dimensions: geography as a school subject, geography and environment, importance of geography, and relevance of geography lessons to pupils' lives. The main purpose of this study was to determine if there is a difference between boys and girls attitudes on geography in the Czech Republic. This study examined the following research questions: (1) Are there any differences in the perception of geography regarding the gender of the respondents? (2) Are there any differences in the perception of geography considering the favorite subject of the respondents? (3) Does the grade level influence pupils' perception of geography? Based on these research questions the following hypotheses were created: (1) Boys have more positive perception of geography in comparison with girls. (2) Students who have a science subject as their favorite achieve a higher score in perception of geography in comparison with pupils who do not. (3) Younger students achieve higher score in perception of geography in comparison with older respondents.

Although geography is a constant part of the Czech educational curriculum, little research has been done on students' attitudes towards geography in the Czech Republic after the curriculum reform of 2005. In the Czech Republic, geography is embedded in science subjects,

and considered a science subject. This differs from American and British Education where geography is a part of social science subjects, as well as history, economy or civics. The Czech Educational Framework splits geography into seven educational fields: (1) Geographic Information, Sources of Data, Cartography and Topography; (2) A Natural Picture of Earth (3) Regions of the World; (4) The Social and Economic Environment; (5) The Natural Environment; (6) The Czech Republic (7) Geographical Fieldwork, Practice and Application.

The sample comprised of 540 lower secondary pupils attending Czech schools, with 315 females and 225 males. Teachers gave questionnaires to all students in the classes, regardless of the students' perception of geography. Participants ranged from 11 to 15 years of age. They attended lower secondary education in the Czech Republic: 94 pupils were from the sixth grade, 165 from the seventh grade, 155 from the eighth grade and 126 from the ninth grade. Pupils were divided into five groups according to their favorite subject: (1) science subjects (biology, chemistry, physics and geography), (2) technical subjects (mathematics, IT), (3) humanities (history, language, civics, arts and crafts, and music lessons), (4) health subjects (physical education and health education) and (5) students who do not have a favorite subject. The highest number of students was in the humanities subject group, (n=188) and the smallest number of pupils was in the "without favorite subject" group (n=67).

The students' responses on these dimensions were measured on a five-point Likert type. The questionnaire was divided into two parts. The first part consisted of demographic variables such as gender, age, grade level and favorite subject, and the second part is composed of attitude items. Questionnaire consisted of 27 items on students' perception of geography that were based on the 4 dimensions, (I) geography as a school subject, (II) geography and environment, (III) Importance of geography and (IV) Relevance of geography lessons to students' lives. These items were rated by the participants from 1 (strongly disagree) to 5 (strongly agree). The items were

worded both positively, such as “I like geography more than other subjects” and negatively, “Geography is not important in comparison with other courses”. A low score indicates a negative perception of geography and a high score indicates a high perception of geography. The sample items for dimension (I) are the following:

- I like geography more than the other subjects.
- Geography lessons are very difficult to me.

The sample items for dimension (II) are the following:

- Geography and nature are strange for me.
- Geographical knowledge can help with solving a problem that is connected with the environment.

The sample items for dimension (III) are the following:

- Geographical knowledge is important for understanding other subjects.
- I use geographical knowledge in everyday life.

The sample items for dimension (IV) are the following:

- Geography lessons develop my knowledge and skills.
- I am bored with geography lessons.

Results found that although boys achieved slightly higher score in comparison with girls, there was no significant difference found between boys and girls. However, there was a statistically significant difference between results when boys and girls were compared in the specific dimension I and IV. In both these dimensions, boys achieved a higher score than girls.

Among grades a statistically significant difference was also found. The sixth-grade pupils achieved the highest scores, and ninth-grade pupils achieved the lowest score. Tukey post-hoc test showed that pupils from the ninth grade achieved statistically significantly lower score in comparison with other grades and the sixth-grade students achieved statistically significantly higher score in comparison with the eighth-grade students. The influence of the favorite subject on the perception of geography was significant. Pupils with a science subject as the favorite subject achieved the highest scores and pupils who did not have a science subject as their favorite achieved the lowest scores. Interactions among independent variables were not statistically significant.

The overall statistical score indicated a relatively neutral perception of geography among Czech pupils. This result correlates with other studies, which focused on similar problems. Some reasons as to why such a neutral result was found towards geography can be due to the way students are being taught this subject in the Czech Republic. The students' geography lessons are being taught with a great amount of new information to be remembered, geography lessons are often taught by teachers not certified in geography and many beginner teachers get an insufficient amount of practice during their university studies and therefore are not yet so skilled in teaching geography. The first hypothesis of this study was not confirmed, since it was found that although boys achieved higher scores than girls, the difference was not statistically significant. In other studies that examine gender differences in geography, the results were similar to those found in this study; boys were found to like geography more in comparison with girls (Francis & Greer, 1999; O'Brien & Porter, 1994, Simpson & Oliver, 1985). The second hypothesis was confirmed as pupils who marked one of the science subjects as their favorite achieved more positive perception of geography in comparison with other groups of students. Similar results were found in another study where pupils who perceived geography as their favorite subject showed more

positive perception of this subject in comparison with other pupils (Brook, 1977). As stated previously, the study showed that pupils without a favorite subject achieved the lowest score. This finding shows that it's important to stimulate pupils' interest in school activities. It can subsequently improve their perception of all subjects, including geography. The third hypothesis could be accepted because the youngest pupils achieve higher score in comparison with older respondents. Additionally, if we look at research on attitudes towards other science subjects we find that pupils had less positive attitudes with increasing age (Prokop et al, 2007).

Falaye

Falaye (2006) explored geography knowledge in children internationally by examining the geography knowledge in Practical Geography, which is composed of map work, statistical maps and diagrams and elementary surveying, of Nigerian students under the 6-3-3-4 system, the country's universal primary education system scheme, and found no significant difference in the achievement of students in this subject. In 1977, the Nigerian government adopted the 6–3–3–4 system, which encompasses six years in primary school, three years in secondary school, three years in secondary senior school and four years in tertiary institution. This new 6-3-3-4 system shortened the Nigerian educational policy and the new length of the secondary education geography course from five to three years in secondary schools nationwide. This reduction in the life span of Geography teaching in secondary schools has some implications for Geography in Nigeria. The curriculum of the Nigerian educational system is grouped into Practical and Physical Geography, Human Geography, Regional Geography of Nigeria and Geography of Africa. Practical Geography has three components: (1) Map Work, (2) Statistical Maps and (3) Diagrams and Elementary Surveying. Map Work deals with reading and interpretation of maps based on a contoured survey map of part of West Africa and Practical Geography as used in this study excludes elementary surveying. Practical Geography is important because Physical and Human

Geography are important prerequisites to Practical Geography. Additionally, answering all the questions under the Practical Geography section is required during the Senior School Certificate Examination, while for other geography sections it's not. As a result, many students and teachers consider Practical Geography as the most important. Numerical ability has also been shown to influence students' achievement as well as gender (Adu, 2002; Emeke and Adegoke, 2001; Idowu, 1991; Majoribanks, 1987; Okpala, 1988). To illustrate the implications of this new system, the purpose of the study is to explore the influence of students' numerical ability and course affiliation on their performance, and also found out the moderating effect of gender on students' cognitive achievement in Practical Geography. The hypotheses of the study are that there is no significant difference in the achievement of male and female students in Practical Geography, there is no significant difference in the Practical Geography achievement of students offering Science and Commercial subjects, and there is no significant difference in the Practical Geography achievement of students of low, medium and high numerical ability, and there is no significant difference in students' achievement in Practical Geography based on the combined influence of gender, course of study and numerical ability (Falaye, 2006). In Nigerian public secondary schools the choice of geography automatically places students in either the Science or the Commercial group, depending on other subject combinations. In order words, only students in the Science or Commercial classes can offer Geography. Questions that this study is exploring are the following: What is the criterion variable for placing Geography students exclusively in the Science and Commercial groups? Does the selection pathway effect students' achievement in Practical Geography?

The four senior secondary schools offering geography in their final year involved in the study were selected from the Ibadan North area of Oyo state. The sample consisted of 367 students, with 157 female and 210 male students. The students were tested with The Numerical

Ability Test (NAT) which classifies the students into three ability groups: low, moderate and high ability groups. The Practical Geography Achievement Test (PGAT) was also used to measure students' achievement in Practical Geography.

The results showed that there was no significant difference in the achievement of female and male students in Practical Geography. However, a significant difference was found between students offering Science subjects and those offering Commercial subjects. The scores of Science students are higher than those of students in Commercial classes. The finding seems to suggest that the efficiency of students' course affiliation correlates with their achievement in Practical Geography. The achievement of students in this study is significantly differentiated by their levels of numerical ability. In terms of both course of study and numerical ability, the study demonstrates that students from Science classes performed better than students from Commercial classes owing to their higher numerical skill (Falaye, 2006). An examination of the mean scores of the two groups further confirms that Science students have higher academic advantages over the Commercial group in Physical Geography, which shows that those students assigned to Commercial classes are less able quantitatively. It is therefore not surprising that the streaming procedure adopted in assigning students to Arts, Science or Commercial class is strictly based on performance in Mathematics in the Junior School Certificate Examination (JSCE). Candidates who fail Mathematics are barred from Science and Commercial classes no matter what the students' interest. Only those who excel in Mathematics are allowed to offer Science and Commercial subjects. One could therefore infer that there is a strong influence of students' quantitative skill on student's achievement in Practical Geography.

With respect to the interaction effect of gender, course of study and numerical ability on students' achievement in the Practical Geography Achievement Test, none of the interactions was significant. The implication of this finding is that gender, course of study and numerical ability do

not jointly differentiate students' achievement in the Practical Geography Achievement Test. Therefore, regardless of gender, achievement in Practical Geography would appear to be influenced by the numerical ability and course of study of students at the senior secondary school level. This study further confirms that there is a strong correlation between numerical skill and performance in Science. It also further confirms the modern trend of quantification in Geography.

Kizilcaoglu

Kizilcaoglu (2010) looked at Turkish university students' attitudes and interests towards their world regional geography course. The purpose of the study was to explain the differences seen in student attitudes toward the world regional geography course in relation to gender and to explain the differences in attitudes towards this class in relation to students' academic fields. According to a definition by Papanastasiou (2002), an attitude is a person's positive or negative disposition toward objects, people, places, events and ideas. Although they cannot be observed, attitudes have a profound impact on an individual's behavior. There is a close relationship between student attitude and learning. Since there have been no studies in Turkey looking at student attitudes toward the World Regional Geography course, the researchers created a "World Regional Geography Course Attitude Survey" in order to find out student attitudes toward this course. The research questions were the following: Are there significant differences in student attitudes toward the world regional geography course in relation to student's gender? Are there significant differences in student attitudes toward the world regional geography course in relation to student's academic area?

The study sample was of freshmen, sophomore and junior year students in different academic areas who were taking a world regional geography course for the first time at institutions of education and science literature at a Turkish university. 473 students participated in the study, with 189 being male, and 284 being female, therefore 40% of the population was male

and 60% was female. A "Questionnaire on Attitudes toward the World Regional Geography Course" was developed as part of the study to measure student attitudes toward geography. Some sample statement items from this questionnaire are the following:

- The World Regional Geography course is exciting and entertaining.
- I am not interested in the World Regional Geography Course
- I really like the World Regional Geography Course
- I hate the World Regional Geography course.
- I'm wary of the World Regional Geography Course.

The statements, "I agree completely" and "I agree" were used to indicate if the student agreed with this statement item and felt positively towards geography and "I completely disagree" and "I disagree" were used as the negative statement items to express feeling negatively towards geography statement items. The statement "I'm undecided" was used for items that the student did not feel any positive or negative thoughts or ideas towards. The questionnaire was reduced from an original 34 attitude statements to 30 item statements after the survey items were reviewed and removed upon suggestion by a linguist. It was then given to 80 students for a pilot study, and found that through data analysis that 20 items were considered operable to use as part of the final actual survey. To increase the validity of the data, the researchers devised equal numbers of sentences containing positive and negative concepts. The questionnaire consists of 11 positive and 9 negative attitude statements.

The results found that for the question of whether there was any difference in the attitudes of the male and female students toward geography there was a 3.14 point difference in favor of the male students. The attitude toward World Regional Geography of the students in the

Social Studies Teaching showed a more positive significant difference compared to all of the other academic areas and that the students in the Geography section had a more significantly positive difference in their attitude toward the course compared to the students in class teaching, elementary school mathematics teaching and pre-school teaching. Negative attitudes toward the world regional geography course are present in class teaching, mathematics teaching and pre-school teaching students but there was no significant difference between those groups.

Hopwood

Hopwood (2004) builds further on pupils' interests and conceptions in geography in an English comprehensive school through creating a coding system to categorize pupils' responses on geography, using an open-ended poster task in which pupils illustrate what they think geography is, filling out a short questionnaire on geography knowledge, skills and values, interviews with a sub-sample of students asking them to explain their views and follow up interviews asking students about their geography posters and questionnaires. Research has found that there are a declining number of students continuing to study geography beyond the required geography education period in England (Adey & Biddulph, 2001; Kent, 1991). As a result, this study was formed to try to ameliorate and understand why this is. The purpose of this study was to clarify the nature of students' conceptions of geography and to reflect on a variety of techniques in order to inform a second phase of research (Hopwood, 2003). The research questions were the following: What is the knowledge and understanding associated with geography? What are the skills acquired in studying geography? What are the values associated with geography?

A multiple method case study was used, involving about sixty students in two mixed ability Grade 9 (ages 13-14) classes. Grade 9 was chosen as the final year of compulsory geography study in England. Brown and McIntyre's (1993) system for coding was used to code

and categorize data, progressing through six stages developed to deal with the different data generation techniques. In stage 1, analysis was done on the first item of the questionnaire, which asked students to write what they thought geography is about. For the question, what did the pupils think about geography in terms of knowledge, the question was broken down into two parts, considering content (what it is that geography studies) and the nature of that content (whether geographical knowledge is factual, involves opinions, is static or dynamic etc.). The students' thoughts of the content of geographical knowledge centered on the world, people and ways of life, countries, and problems or issues. A common theme in the closed, open, written, verbal and pictorial/symbolic form was that pupils saw geography as being the study of the world. Some examples that fell in this theme of the coding system were the following:

- Geography is all about understanding the world.
- Geography builds up a picture of the world; tells you and explains the problems of the world; [and] is the study of the world, its inhabitants and environments in general.

Another key geography theme was people, lifestyles, or ways of living. Some students' examples that fell under this theme were the following:

- Learning about the way people live everywhere.
- Geography is learning about the world and its population.

Countries were a key area of study for many students, although the variety within this theme was wide. Some examples that fell under this theme were the following:

- Knowing where countries are and what they are like.
- I think geography is about learning about the world and countries.

Issues and world problems were often cited as central elements of study in geography, with a particular emphasis on natural disasters. Some examples of responses that fell under this category were the following:

- Map work, looking at the world, natural disasters and people from other countries.
- Facts about countries, mapwork, earthquakes and volcanoes.

For some pupils' responses their geography thinking was incoherent and there was no single theme that fit in the coding system. It was found from interviews that students saw geography as being about issues or problems to which there may not be one solution, which was seen as a big difference between geography and other subjects. Pupils also saw geographical knowledge as dynamic rather than static, which was another unique factor.

The data generation techniques were to do an open-ended poster in which pupils were asked to produce something showing what they think geography is, a short questionnaire covering knowledge, skills and values, interviews with sub-sample of students, follow-up interviews talking to students about their posters and questionnaires asking them how they felt about the tasks and opportunities they were given to express themselves. Life skills were mentioned by some students as being crucial to studying geography, and these often related to personal ambitions and preferences, rather than more general skills. One example of a student when asked if he thought it was worth studying geography that falls under this theme is the following:

- It is because I'm trying to be a pilot.

Recognizing and understanding other people's perspectives and points of view was found as a skill in geography. Many students saw the knowledge and understanding they acquired in

geography as equipping them with skills. In regards to the theme of whether geography was a subject which embodied certain values, and whether respecting various opinions and fostering respect for cultures or the environment, and different opinions were voiced as to whether geography is value-neutral or not. Some examples of student responses that fit into this theme are the following:

- You learn how to look after the world properly.
- This is all studied to try and bring forth facts and opinions and to find solutions for different types of situations.

The third theme relating to values in the combined coding scheme was 'valuing values'. Students were aware of the importance of respecting others' point of view, cultures and their environments. One student response that falls under this theme is the following:

- Geography makes us better people through increased knowledge of countries.

Most students thought that their own opinions were valuable in geography. The conclusions from this study were that pupils saw geography as about the world, people and ways of life, countries, and world problems, and as a dynamic subject. Map work, life skills, understanding other people's perspectives and geographical knowledge were the main skills associated with the subject. This study has shown that these pupils' conceptions of geography are highly personalized, relating to personal experience and preference as well as to experiences of school geography. An alternative framework was also used to interpret the data, with individual student profiles being focused on. The information from the posters, interviews and open responses on the questionnaire produced similar data in terms of content and scope. Variations in the data were incorporated in the coding schemes with more general, shorter responses coded under more general codes and more complex, detailed responses being coded under sub-

categories of the categories. Reliability was assessed by comparing data generated over a long period of time and using different response formats. Validity was established by checking interpretations of data either through comparing different data sources relating to the same individual, or through the use of probes in interviews.

The results indicated that the pupils saw geography as about the world, people and ways of life, countries, and world problems, and as a dynamic subject in which multiple points of view were considered. Map work, life skills, understanding other people's perspectives and geographical knowledge were the main skills associated with the subject. Values entered pupils' ideas in various ways, relating to respecting other people's points of view, and nurturing attitudes of respect for cultures or the environment. Additionally, the strong differences between pupils' conceptions as seen in the individual pupil profiles shows that the data generation techniques were sensitive to pupils' personal ideas about geography. The multiple method design adopted in this study was found to be very effective and fit the variation in the way students think and express themselves. The study concludes that these pupils' conceptions of geography may be better understood through individual pupil profiles that reflect the links between their ideas.

Hopwood

Hopwood (2009), the same researcher from above, investigated further on the results of the previous study by doing a qualitative study with 13-14 year olds being interviewed about their geography classroom experiences and ideas about the subject in general. It found that these students' ideas and interests were complex and multifaceted and the qualitative design of this study was effective in capturing these students' diverse and multifaceted responses over a long period of time.

Geography education in England is framed formally by the National Curriculum, which requires that students must study geography in the first three years of secondary school, which is through grades 7-9, covering the ages of 11-14. After that, geography study is optional. The study was a multiple case study, each case representing one of six pupils, using ethnographic methods with each case. The six case students were all in grade 9 (13-14 years) at the time of the study and towards the end of their compulsory geography study. One female and one male student were chosen randomly from a year 9 class taught by the participating teacher. The researcher made over 100 school visits in total, going to the classes of each selected course for three months. After the geography classes were over, interviews occurred with the student sample, with over 70 interviews being conducted, with at least 11 per case student. The first part of the study was to describe each of the six case pupils' conceptions of geography. After this, eight themes were identified: (1) people (2) environment, (3) education for sustainable development, (4) futures, space and place, (5) opinions (descriptive components), (6) interest (7) enjoyment, and (8) relevance and uses/importance of school geography (evaluative components). Out of the six students examined, three of the students' findings were discussed in this article. Bart, Matt and Sara, described their opinions about school geography. Bart described geography and his geographical learning experiences as comprising a big range of topics and phenomena that are linked in some way to "land". He also said that geography is about "where things are…a lot of stuff about maps and where countries are". Matt stated that his opinion of geography was, "If you think about it quite deeply everything can be made into geography". He felt that nature and culture were geography. There was also a strong sense of spatial location in Matt's personal definition of geography and his geographical learning. Sara described geography as about "people and places" and described learning in geography as about understanding things that affect people in different places.

The results found that Bart described school geography as involving the study of a variety of phenomena in terms of the location of things, focusing on location and spatial patterns. Matt's conceptions of more physical aspects of geography were also considered spatial. Sara's responses were found to be more "placeist" centered, with her stating that she studied particular places in school geography and focused less on where things are or where they occur and more about what different places are like. Among these three learners, there was a clear qualitatively different sense of school geography. Findings also suggest that it is important to situate pupils' ideas about place and space in the context of other ideas they have about geography and their geography classroom experiences. Bart felt that his geography learning experiences were linked to land, Matt saw geography as taking on a global perspective, and Sara interpreted her learning in geography lessons in terms of people and places, spatial variation and the place-specific nature of human experiences. It may be that pupils' conceptions of school geography might not function as singular, coherent and conceptual frameworks but rather through a variety of loosely related ideas. These results also suggest that students may be actively constructing their own understandings of school geography.

Kitchin

Kitchin (1996) examined everyday geographic knowledge of Welsh females and males by also conducting case studies, and using both quantitative exercises and qualitative interviews, to explore if females and males differ in their everyday geographic knowledge and spatial competence. It is widely found that males and females differ in both their local geographic knowledge and in the ability to remember, comprehend, manipulate and communicate spatial concepts such as relative positioning. Many researchers suggest that this difference in knowledge and spatial ability is present across the life-span. Boys are encouraged to enroll on science and mathematics-based courses that develop spatial skills (Liben, 1981), whereas females take more

language-based courses in which they perform better (Feingold, 1988). Self et al., (1992) and Golledge et al., (1993) have noted, however, that specific training can improve the results of both sexes, with the largest improvements in women. Females and males differing in their knowledge and their ability to process spatial information raises the following three research questions: 1) In terms of geographic education, are females being unfairly disadvantaged by taking the same tests as males? 2) Do differences in geographic knowledge indicate variances in patterns of spatial behavior and use of the environment? 3) If this is the case, why do females and males interact with space differently? It may be that girls suffer problems of metacognition, possessing less confidence in their ability to perform the required task. Two case studies were done, separated by a year, to explore if females and males differ in their everyday geographic knowledge and spatial competence.

The participants were first year undergraduates in Swansea, Wales. They were recruited from first-year geography practical courses and had similar geographic training and access to maps and geographic details of the Swansea area. In the first study, 177 respondents, 93 females and 84 males, were divided into six groups. Each group's respondents undertook four different cognitive mapping tests from a total set of 13 and their spatial products were compared. In the second study, 40 respondents, 20 females and 20 males, were divided into two groups. The first group, consisting of 10 females and 10 males did the sketch map test 2 and cloze procedure test 2. The remaining students undertook the projective convergence test and the orientation specification test. All the respondents completed the tests using a think-aloud protocol procedure, which is when the respondents describes their actions or thoughts while performing a task. Through using it, the study hopes to understand the knowledge and cognitive processes used in problem-solving.

The results from both the first and second studies indicate that there were very few differences in either geographic knowledge or in spatial ability. The results indicate that there were no significant differences between females and males on any of the comparable variables. Results from the second study appear to indicate that there were no differences in the type, or adoption, of strategies of spatial thought. Females and males both used the same common strategies and task-specific strategies of thought. It was found however, that although the strategies adopted were the same, on the cloze procedure test the time of their adoption differed with males only swapping strategy once they had become completely stumped. Females, on the other hand, swapped strategies much earlier. This difference in strategies did not lead to significantly different results but it suggests that males are more likely to continue using a successful strategy until it becomes commonplace, whereas females explore different ways of attempting the task. In the first study on the sketch map test males made their maps more path oriented and females made them more node oriented. Males included more linear features such as roads and females included more nodal features such as the university, halls of residence, railway station and shopping areas. In conclusion, the study finds that differences in cognitive map knowledge and abilities between males and females are limited when given the same geographic training and patterns of spatial behavior. The results suggest that by the age of 18, if age, education and social differences don't exist, males and females have equal cognitive mapping knowledge and ability. However, since all of the participants had the same specialized geographic skills and the same education so it is not representative of the general population. This study also provides evidence that differences occurring in adulthood are likely to be socially and culturally produced. The results indicate that geographic education does not need to be tailored to meet any specific needs of either sex and that females have the same intelligence to learn and develop geography knowledge for scientific careers.

Beatty & Troster

Beatty & Troster (1987) examined the gender disparity in geography knowledge through focusing on place locations and map skills of undergraduate students'. They conducted five experiments on undergraduate students' locating place locations on maps and it found that gender differences cannot be attributed to differences in capacity to learn place locations on maps.

In an effort to collect normative data regarding geographical knowledge of the many regions of the United States, this study examined US undergraduate students. In an effort to maximize the chance that the data would provide an accurate estimate of the geographical knowledge of the region of residence, nearly all of the samples were students from the state in which they were located.

In Experiment 1, the experiment participants used a Fargo Map Test (FMT) as a standardized means of assessing remote memory for spatial knowledge. The subject first reported all of the places (city and state for places in the United States, city and country for places outside the United States) she/he lived in for at least one year throughout his/her lifetime, and the age range during which she/he resided in each. Then the subject targeted items on a series of 18 outline maps.

In Experiment 2, 43 males and 52 female undergraduate students participated in the experiment. Subjects were shown an outline map of the 48 contiguous states and subjects were asked to locate each target city by writing the number that corresponded to its location on the map in the space after the printed name of the city (Beatty & Troster, 1987). After completing the first part of the test, subjects were asked to locate 10 gross features of US geography by writing the code letters. They completed the revised version of the FMT used in Experiments 2 and 3, which was modified with locating the 30 cities on the outline map of the United States, subjects also

named the state in which each city was located. For travel history, subjects also indicated which of the 48 continental states they had visited or traveled through by surface transportation anytime in their lives. The subjects were also asked how they spent their last vacation, the amount of history, government, and geography courses they have taken in high school and college (Beatty & Troster, 1987). They also discussed how often they watched the weather on local television news and on national television news.

In Experiment 3, 63 males and 65 female undergraduates were recruited for the study. The same version of the FMT used in the previous experiments was administered, with the subjects being required to learn a new map with states on it.

In Experiment 4 of the study, the concept of discovering whether the basis of the gender difference in geographical knowledge might be related to differences in past exposure to sources of information about geography, or in the way males and females get information from sources was investigated. In Experiment 4 and 5 the study sought to discover correlates of accurate performance on tests of geographical knowledge that might also exhibit consistent variation with gender.

In Experiment 5 of the study, the purpose was to do a replica of Experiment 4 and explore other possible correlates of geographical knowledge that might be related to gender differences. The sample for the experiment was given a FMT and a pathfinding test testing egocentric orientation. The hypothesis of Experiment 5 was that males would acquire knowledge about the location of places on an unfamiliar map more rapidly than females if training occurred under conditions of incidental learning.

Results for Experiment 1 found that the pattern of gender differences is readily apparent on the US map, which involves locating gross geographic features, maps of the home regions,

which demand more precise localization. Gender was the best predictor of performance on both measures of geographical knowledge, with 8.6% of the variance on the US map and 4.2% of the variance on the average performance on the regional maps. The results of this study found that males more accurately located gross features of the US geography, US cities, and tri-state cities than did females. Males performed more accurately than females on both the path finding and stick reversal.

In Experiment 2 of the study, the results suggested that college-aged males perform more accurately than females on tests of geographical knowledge. Males located geographical features on all parts of the map test more accurately than females. Males also performed more accurately when asked to name the state in which of the 30 cities was located. Males traveled more extensively than females and significant gender differences were observed on the number of states, U.S. cities, and tri-state cities visited. In contrast, when asked to learn the locations of towns on a new map, the performance of males and females was similar. When subjects were asked to rate the extent to which they would attend to various types of visual information if they read a news story about an event in an unfamiliar place, ratings for maps were higher by males than by females. Lastly, when asked who would plan a route to an unfamiliar place, significantly more males than females responded that they would.

In Experiment 3 of the study, males located places on all of the measures of "real" geographical knowledge more accurately than females. However, when asked to learn the locations of towns on a new map, the performance of males and females was quite similar. Performance on the new map learning test was not correlated with performance on any measure of geographical knowledge.

In Experiment 4, gender difference in years of education was significant. Males more accurately located gross features of U.S. geography, cities, and tri-state cities than did females.

Males also performed more accurately when asked to name the state in which each of the 30 US cities was located.

In Experiment 5, gender differences on all measures of geographical knowledge were statistically significant confirming the results of Experiments 2-4. There were no gender differences on any of the measures of travel history.

Among college undergraduates, males consistently outperform females on tests of geographical knowledge. The data suggests that the gender differences in geographical knowledge are not likely to arise from differences in egocentric or allocentric orientation and tests of geographical knowledge is positively correlated with the extent to which people have traveled and lived in various regions of the country. This makes sense since travel exposes you to salient geographical features and memory for these experiences can aid localization of specific places in geography courses and on map tests.

Beatty

Beatty (2002) investigated gender differences in geography through map finding as well, examining the importance of driving experience on Oklahoma City residents' ability to find locations on maps.

To find whether any aspect of driving was critical to the sex difference in geographic knowledge the study examined males and females in three different age groups; the performance of individuals who were too young to drive and two groups of younger and older drivers. Geographical knowledge was measured using a map of the Oklahoma City area.

Ninety-eight residents of the Oklahoma City area participated in the study. All were employees or related to employees of the Oklahoma Health Center. The participants were divided

into three groups, Group 1 (individuals less than 16 years of age), and two groups of drivers, Group 2 (individuals of 16-29 years of age) and Group 3 (individuals of 30-60 years of age). All of the individuals in the two latter groups had driver's licenses and regularly drove. Participants gave their age, sex, education and years of residence in the Oklahoma City metropolitan area. They then tried to locate each of 18 cities on the Oklahoma City (Metro) Map Test. Since the state map is featureless, two orientation cues were given: first, the position of true north was indicated by an arrow, second, solid lines representing the location of interstate highways and other major expressways were shown to depict their course through the entire section of the state map.

The results found that the males tested displayed superior geographical knowledge. Although accuracy of place location improved markedly with age for both males and females, the majority of the sex differences were comparable among young non-drivers, young drivers and older drivers. Older participants had visited more of the target places. As expected, older participants located more places accurately and males located more places accurately than females but the age group interaction did not approach significance. Differences in the number of places located accurately between the young non-drivers and the younger drivers were highly significant while differences between the same groups in the number places visited were not significant. In the present study, the strength of the relationship between places visited and places located was significantly higher for males than for females. Education, places visited and sex as main effects accounted for significant variance. The results of these analyses are consistent with the idea that the sex difference in geographical knowledge does not depend on driving experience. Differences in the amount of places located correctly between Group 1 (young non-drivers), and Group 2 (young drivers) were very significant. In contrast, differences between the same groups in the number of places visited were not statistically significant.

Although accuracy of place locations improved markedly with age for both male and females, replicating an earlier find, the magnitude of sex differences was comparable among young non- drivers, young drivers and older drivers. Variables that influence accuracy of geographical knowledge including age, education, years of residence in the relevant region and travel history (i.e., places visited) cannot be responsible for the sex difference in accuracy because at each age group there were no sex differences on these measures. The findings also find that the sex difference in geographical knowledge can result when individuals gather the necessary spatial information entirely by being passively transported. The results should be interpreted with caution however, because the sample sizes in the adolescent non-driver group, Group 1 were small. Another reason that further replications and findings are needed is because the measure of geographical familiarity or places visited measures only whether a place has ever been visited, but does not consider the frequency or recent visitations of these visits.

Montello et al.

Montello (1999) further investigated the gender differences in geography knowledge when it comes to wayfinding, map use and place learning by having an older population set perform a large battery of spatial and geographic tasks. The tasks were tests of directly acquired spatial knowledge from a campus walk, map-learning tests, tests of object-location memory, a verbal spatial task and various self- report measures of spatial competence.

79 participants participated in this study, consisting of 43 females and 36 males. The age range was from 19 to 76 years and the mean age was 47. Participants were very similar in regards to income and education. They lived in the Santa Barbara area for about the same number of years and had nearly equal amounts of self-reported contact with local landmarks, familiarity with the campus, and knowledge of world and US cities. Seven groups of battery tasks were given to participants: (1) Psychometric Tests, (2) Campus Route Learning, (3) Map Learning, (4)

Extant Geographic Knowledge, (5) Object Location Memory, (6) Verbal Spatial Descriptions and (7) Self-Reported Measures. In battery test (4), Extant Geographic Knowledge, participants answered questions about local, national and international place locations they knew from prior experience, either direct sources such as travel or indirect sources such as maps.

It was found that males reported a greater ability to judge distances and more use of direction in thinking about their environment. The finding that males favor survey-type knowledge acquisition with the use of metrics while females favor route-type knowledge acquisition with non-metric modes shows that teachers should use a mixed mode in the classroom and geography should be taught to cater to both. The results also found males outperforming females on tests of recently acquired spatial knowledge of places from experience rather than from testing or map derived knowledge. This shows that perhaps males' experience out in the physical environment, being encouraged to play and get rough outside may be an advantage that has led to better geography skills. Additionally, it could be due to the toys that boys play with that foster their spatial relationships such as Lego's, Lincoln logs, climbing and riding toys. This is in stark comparison to girls who generally play with dolls, drawing painting, board games and dress up.

Francek

Francek (1993) also examined geographical knowledge and gender differences of students through maps and place locations, examining their scores on a geography survey on maps, place locations and size perception with the geography gender difference decreasing in high school and being virtually absent at the college level.

708 students were surveyed using an identical written questionnaire. Grades 7-12 from public and parochial students from Mount Pleasant, Michigan and all years of undergrad at

Central Michigan University, including students enrolled in teacher preparation classes participated. In junior and senior high schools, the survey was given to geography and science class students. Since the survey was given during the first week of class, it was a measure of background rather than information learned in a particular course. Students were asked to select which subject they were most interested in and no significant trends were observed between students' expressed interests and the correctness of their responses. The questions were based on place locations, size of geographic features and latitude and longitude. Examples of questions on the survey are the following:

- Norway and Sweden have about the same latitude as which of our states?
- Which if the following states is the northernmost?

The results found that for the questions in which there were significant differences upper level college students generally scored best. Students in junior and senior college-level classes and a geography-teacher-preparation class did significantly better than the average overall response rate. The increased amount of geography to which students in junior and senior college-level classes and geography-teacher-preparation class students have been exposed resulted in higher test scores. With gender, junior high males performed significantly better than females on half of the survey questions. The gender-based difference decreased in high school and was nonexistent at the university level. Among college students, map use scores for females and males were almost identical. In regards to geography interest, students were asked to select which subject (mathematics, science, languages, history, or geography) they were most interested in. No significant trends were observed between students' expressed interests and the correctness of their responses.

Bein

Bein (1990) administered a baseline geography test covering geographic ability in map skills, place-name location, physical geography and human geography to over 3,000 Indiana College students enrolled in introductory geography courses and the results found statistically significant gender differences in geography interests. It was hypothesized that students taking the geography course as an elective would score higher than those taking it as a requirement.

A geographic skills test was administered during the 1987 Fall Term at 18 Indiana universities to more than 3,382 students enrolled in freshmen geography courses. The test was given during the start of classes so that course content would not influence the results and it would reflect solely their current geography knowledge. The questions tested them on their knowledge of map skills, physical geography, place name geography and human geography. Questions 1-8 were on map skills, 9-20 were on place-name identification, 21-40 were physical geography questions and 41-75 were human geography questions. Personal questions on their major course of study, state of residence, year in school, number of residences in different places, frequency of travel outside of home state, sex, ethnic group, age, reasons for taking geography, previous geography courses in high school or in college were also asked to the participants to help in understanding their acquisition of geographic knowledge. This test used in the study, the Competency-Based Geography Test Secondary Level, Form II, was created by the National Council for Geographic Education (1983). At the time of the study, little geography was taught in the Indiana schools and there was no state curriculum requirement for a high school geography course and only one School Corporation in Indiana required high school geography for graduation. Despite Indiana requiring that geography be integrated into the teaching of social studies, the certification requirements for Indiana elementary teachers do not require taking a geography course. The Geography Educators Network of Indiana (GENI) wants to use the results

of this test as a baseline to measure future gains in geographic understanding and to make recommendations to the Indiana State Board of Education.

Results of the exam show that the 3,382 students scored highest on the place-name-identification part of the test with a mean score of 75 percent. Students scored 70 percent on map skills, 63 percent on human geography and 58 percent on physical geography. Arts and Science students scored significantly higher than students majoring in business, education and other subjects. With regard to school year, there was a statistically significant difference among freshmen, sophomores, juniors and seniors. The older students scored higher on the test. Graduate students scored highest on the exam. With the number of states lived in after the age of 17, there is a definite pattern and statistically significant difference among the student scores from the test. There is a direct relationship between times traveled and test scores as those who traveled score higher. There is a statistically significant relationship between the number of places students have visited outside of their home states and their test scores.

Geographic abilities seem to be acquired by traveling to many places not by living at a young age in different places. Well-traveled individuals scored significantly higher on test questions that involved maps. Students who had enrolled in previous geography courses in high school did not score better on the test as hypothesized. Students who had at least one university geography course, however, scored significantly higher than those who had none. Taking additional university courses did not increase the scores with any statistical significance. It was hypothesized that students taking the geography course as an elective would score higher than those taking it as a requirement and this proved to be true. Both high school and college students who described their previous geography course or courses as boring scored lower than those students who thought their previous geography courses were interesting. In regards to gender, men scored higher than woman in statistically significant way. The study feels that this difference

is not due to a difference in aptitude but rather a difference in exposure to geography. Travel, which was the strongest contributor to geographic skills, may be more accessible for men than women. Since high school geography was not statistically significant in this study, females who took it in high school would not have an exposure advantage. For physical and human geography, older people scored significantly better, but this was not the case for place-name identification abilities. Older people were believed to score better not because of they had more chances to travel but because of the totality of experience that augments with age. The lack of influence that previous high school geography courses had on achieving high geography test scores suggests that the geography teaching in Indiana high schools must be looked at and improved.

Walker

An important aspect of better understanding children's interests and knowledge in geography is to create appropriate tests to measure it. Walker (2006) did just that, exploring children's interests and knowledge in geography by developing and validating the Test of Geography-Related Attitudes (ToGRA) which measures student attitude on four scales: 1) leisure interest in geography; 2) enjoyment of geographic education; 3) career interest in geography; and 4) interest in place. This instrument was modeled after the Test of Science-Related Attitudes (TOSRA) created by B.L. Fraser, which is designed to measure seven distinct science-related attitudes among secondary school students. These scales are called Social Implications of Science, Normality of Scientists, Attitude to Scientific Inquiry, Adoption of Scientific Attitudes, Enjoyment of Science Lessons, Leisure Interest in Science, and Career Interest in Science (Fraser, 1978). The ToGRA was approved and validated from a field test sample of 388 ninth-grade World Geography students who responded to the Web-based instrument.

There are links between student affect and learning. Students tend to be more proficient at a certain subject if they enjoy what they are studying and learning, they are involved, they are

comfortable in the classroom environment, and they are in a good mood. Despite this, there is little attention given to assessing student affect in substantial ways. The affective-trait measurement that is typically done in schools is done by informal teacher observation and results in conduct grades, which only emphasizes students being "good" in class. Affective traits are internal states that have bearing on what students are likely to do and it is evident in student attitudes. Affect is different from students' opinions or beliefs in that attitudes have a tendency to be consistent and are composed of three components: (a) affective component (b) cognitive component and (c) behavioral component. The affective component is related to one's feelings associated with something, the cognitive component is related to one's evaluative belief or thinking related to something's value, while the behavioral component of attitude is related to the action one takes in response to something.

The sample for this study was ninth grade students in a San Antonio, Texas high school that all attended the 17 World Geography classes. Responses were collected from 399 ninth grade World Geography students over one month. Of the 399 original responses, 11 were not usable. Three hundred and eighty-eight responses were used in the analysis step of Stage 3 where item and factor analyses were conducted to (1) refine the ToGRA scales; and (2) to provide evidence regarding reliability and validity of the refined scales. The development of the ToGRA utilized the intuitive-rational strategy in which only items with high internal consistency remain in the final version. The categories were leisure interest in geography, enjoyment of geography and career interest in geography.

This study is important because it establishes an instrument that can be utilized by researchers and practitioners to determine students' attitudes toward geography and geographic-oriented education. When educators and teachers can identify determinants in students' attitudes with the aid of the ToGRA, they can have opportunities to alter those determinants to improve

cognitive performance by supporting those factors that help in establishing positive student attitudes in geographic learning.

Sack

Sack (1998) explored the gender differences in geography interests of Texan children from fourth through sixth by surveying them on their attitudes towards geography as a school subject and as one of the social studies. The study analyzed a large set of geography-related attitudinal and classroom data collected in 1983 and 1993 from fourth through sixth grade students in the San Marcos, Texas public schools. It discussed how well the children liked geography, if students' attitudes toward geography changed in the decade of geographic reform and whether positive or improved attitudes toward geography are associated with classroom factors. The study was also interested in teaching methods since they felt that if some teaching methods or techniques were associated with greater student interest in geography, teachers can use these methods or techniques to improve student attitudes toward the subject. This in turn will improve their geographic literacy and the likelihood that they will want to study geography as they get older. This study focused on San Marcos fourth through sixth graders because in those grades students are asked to extend their geographic knowledge beyond the local level to the state (fourth grade), nation (fifth grade), and world (sixth grade). In these upper elementary grades children should be integrating many important geographic concepts like regions, adaptations, interactions, interrelatedness and spatial distributions and patterns. The social studies portion of the curriculum had a major geographic component.

In spring of 1983, all 35 fourth through sixth grade classes in San Marcos public schools, a total of 889 students, were included in this research. The 1993 data set consists of 539 individual student participants, which was about one-third of the students in these upper elementary grades. Data was collected in the same manner in both study years. The researchers

visited each class for about 45 minutes and administered questionnaires to the students and their teachers. The children examined a list of six school subjects, and after a talk about the subjects, they were asked to write the number 1 next to their favorite of the six. They were then asked to put a number 2 next to their second favorite and so forth until they had given the rank from 1 to 6 to their least favorite of the listed subjects. The six subjects included in the study were art and music, geography, mathematics, physical education, reading and science. Time was taken to define, explain and discuss the traditional social studies disciplines in terms appropriate to the children's grade levels. Key words were printed on the board to remind the children of their definitions. The students recorded their rankings of the listed social studies subjects from their most to least favorite as they had for the school subjects. The teachers responded to a self- given written questionnaire. Data collected from the teachers was class size, years of teaching experience, their ranking of the six school subjects and the six social studies subjects by interest and by how well they liked teaching them and the number of college courses they had taken in each of the school subjects and social studies involved in the survey. They also encountered a list of four teaching methods (discovery, expository, inquiry, and lecture) and 42 teaching techniques and were asked to check off which ones they use when teaching geography. The mean rank given to each subject or study was calculated. Attitudes toward geography, both as one of the school subjects and as one of the social studies, was obtained by considering the frequency distribution of ranks given to geography by certain sub-groups of participants. The eight subgroups analyzed included all students, boys, girls, fourth graders, fifth graders, sixth graders, teachers and classes. An individual class's rank of geography is the median rank given to the subject by the students in that class.

In general, geography was not popular with the 1,428 students surveyed in San Marcos. Students in each of the study years considered geography the least favorite of the listed school

subjects. A statistically significant improvement in the frequency distribution of ranks occurred over the decade for geography as a school subject among the boys, girls, sixth graders, and, perhaps most importantly, among the combined group of all students. Within-year comparisons of subgroup responses regarding geography as a social study disclose some statistically significant differences. Its overall standing as a social study rose from fourth to third favorite between 1983 and 1993. Geography is in fact the only social study on the list, which improved in standing over the decade. Statistical comparisons of the gender-specific data reveal that both boys and girls in 1993 liked geography as a school subject better than their respective counterparts did in 1983. In neither 1983 nor 1993 was there a statistically significant difference in how girls versus boys ranked geography as a school subject. Between the two study years the popularity of geography as a social study improved among the girls, but saw no statistically significant improvement among the boys. However, in 1983 the boys had ranked geography as a social study better (median = 3) than the girls had (median = 4). By 1993 the girls' ranking of geography as a social study had risen to match that of the boys, so that there was no longer a statistically significant difference between the two gender groups. In all cases, the median rank given to geography by the teachers was much more favorable than that given by the children and these differences are statistically significant. Classes with teachers who used more active combinations of teaching methods when teaching geography ranked it as a social study significantly better than classes having teachers who used more passive combinations of teaching methods for geography.

The great disparity in attitudes toward geography expressed by teachers and their students remains a subject worthy of further investigation. Interestingly enough for some reason, the teachers' positive attitudes toward geography were not being transferred to the students, at least not to the same degree. This study tentatively suggests, then, that student attitudes toward geography might improve with the increased use of teaching methods that involve active student

participation, thus possibly extending to lower grades similar findings by Bramwell (l987) concerning teenagers' reactions to geography. This continued low rating of geography relative to the other school subjects requires some consideration. First, it indicates that the many years of neglect received by geography in the schools will not be overcome quickly or easily. Second, probably like most elementary teachers, few of the surveyed San Marcos teachers had received much university training in geography. Third, it is probably unrealistic ever to expect geography to attain first ranking by a majority of elementary students when it is competing with such subjects as physical education and art and music. Nevertheless, the large number of students who rated geography as their least favorite subject is distressing, and a problem deserving of additional attention.

Eve et al.

Eve et al. (1994) examined geographical knowledge among students by administering a survey assessing four aspects of geographic knowledge including cultural, spatial and map reading considerations to over 300 college students and the results found significant gender differences in geography knowledge and interests as well as within geographic literacy, race and age.

The sample consisted of 313 students taking general-level English and sociology courses at a major southwestern U.S. public university. Questions on the questionnaire included questions about age, gender, college class and major, prior travel, interest in travel and past geography course work. Other questions included inquiries on each respondent's race, reading habits, career interests, parents' education and travel habits, family immigration history, and the size and geographical area of the community in which they had been raised and were living at the time of the survey. 50 multiple choice questions were given to assess respondents' geographic abilities. The multiple choice exam assessed geographic knowledge in four different ways, through

questions on spatial locations of major geographical entities, a blank political map of the world with 10 countries or regions labeled A through J and students were asked to match the letters with a list of names, cultural literacy questions were included that dealt with characteristics of society and environment associated with various geographic locations and 10 photocopied images of constructed landmarks were included and respondents were to assign icons to the correct country.

Results found that the sample scored highest on icon recognition and lowest on questions of intercultural knowledge. Correct responses for the map reading and general geographic portions of the test were both very close to 70%. The students did best with questions about First and Second World countries with 71% correct responses for both categories, and poorest with questions regarding the Third World with 65% correct responses. 3 of the 20 general geography questions and 4 of the 10 cultural questions were answered properly by less than 50% of respondents. On the mapping section of the survey, on which respondents were to assign the correct name from a list of 10 countries or regions to a map of the world with those 10 places labeled “A” through “J”, the majority answered correctly in every case. Correct responses on icon recognition were more likely to be given on recent structures such as the Eiffel Tower than on ancient structures like Stonehenge.

There was a statistically significant relationship between class standing and performance on the survey. Freshmen scored in the top half only 33.8% of the time, whereas seniors scored in the top half 64.2 % of the time. This may be partly explained by greater exposure to college courses from which seniors learned geographic knowledge. Additionally, seniors are older than freshmen and age will be seen as a strong correlate of performance. Grade point average was also another factor that influenced test scores. Students with GPAs above 3.5 achieved scores falling in the upper half of overall scores 67.6% of the time. Students with GPAs below 3.5 had scores falling in the upper two of the four scoring groups between 35.2% of the time and 51.3% of the

time. However, it was found that even respondents who are better students in general, this being measured by their higher GPA, may not have equally strong geography skills. Engineering and natural science majors had the highest overall geographic literacy scores, scoring in the top two groups 55% and 69% of the time, respectively. The corresponding scores for social science major (39.6%) and business majors (40.2%) were the lowest of any major except for nursing (26.6%). The comparatively low score for social science majors is surprising and disappointing since these are the students expected to be well rounded and excel in general knowledge areas such as geography. Other troubling findings were that only 10.9% of business majors scored in the highest group and education majors, the students that plan to someday teach courses such as geography, achieved scores in the third or fourth group only 39.1% of the time. Increased reading was associated with higher scores however, there was no correlation between particular magazines and improved geographic knowledge. There was no correlation between recency of geography course work and geographical knowledge.

The greatest correlates of geographic knowledge were race, age and gender. Whites were more likely to score higher than were respondents of other races. A dramatic change was apparent between younger and older students, with a sharp cleavage point at around age 27: 40.5% of 18-20 year olds and 46.5% of 21 to 26 year olds scored in the third or fourth groups. 75%, though, scored as highly. The strongest predictor regarding geographic literacy of all was gender. Of the students whose scores were in the lowest group, 77.6% were females and 22.4% were male. Of those in the highest scoring group, 9.1% were female and 90.9% were male. Females scored in the top two groups 25.3 % of the time; males achieved such scores 64.2% of the time. These findings suggest that there are perhaps geographical differences in interest, cognitive style or socialization between the male and female students.

Henrie et al.

Henrie et al. (1997) also explored geography knowledge and interests of students by surveying these students from junior high through college on map skills covering physical, human and regional aspects of geography through creating and administering the Knowledge of Geography (KOG) test.

The researchers felt there has a not been a study that addressed differences for major subfields within geography and how these differences change with increased education and it chose to explore that. The study had three major purposes and these were to evaluate gender differences in geographic knowledge across four major subfields of geography, to examine the pattern of gender differences from junior high school, high school and elective courses in college to advanced college geography courses and to explore how various family, school, and personal interest variables relate both to geographic knowledge and to gender differences in knowledge. The Knowledge of Geography Test was created for this study to assess students' knowledge about geography. The test included four sections: (1) physical, (2) human, (3) regional and (4) map skills.

Two studies were done to create a reliable instrument. For the first study, 100 multiple choice questions were given to 183 college students enrolled in intro psychology courses. The Personal Information Questionnaire was created with 15 item questions to garner information on demographic, school, family and personal interest variables that might affect geographic knowledge and add to gender differences. (Henrie et al, 1997). Questions were on age, gender, present educational level, highest level of education completed by mother, highest level of education completed by the mother, highest level of education completed by father, number of sisters and brothers, number of classes in geography beyond the sixth grade, number of hours per week spent reading magazines and/or books, where the student gets most of his/her knowledge

about current events, number of hours per month watching travel or geography-oriented programs, whether the student had collected stamps or coins, number of US states and Canadian provinces visited, number of countries visited outside of the United States and Canada, and whether the student was considering a teaching career. Participants were 1,564 students, junior and senior high school students and college students enrolled in psychology, education and geography classes. In the second study, participants were 1,564 students comprised of junior and senior high school students as well as college students. Instructors gave the questionnaire and the Knowledge of Geography Test to all the students.

Results found that geographic knowledge improved with advancing educational level. In regards to gender, males outperformed females in all of the five student groups and within each of the four subfields, averaging 13% higher. Correlations between gender and test performance were statistically significant on map skills, human geography and full scale scores in junior high and on physical geography and full-scale scores in senior high. At the college level, performance differences favoring males were significant across all the subfields. The interaction of gender with the linear education trend indicated an increasing male advantage with increasing education. At the junior and senior high levels, hours of reading and gender were the only predictors of performance. For education/psychology and introductory geography students, the variables of gender, sisters, domestic travel, and hours of reading were predictive. For advanced geography students, only gender and geography classes were significant predictors.

In conclusion, the study found that the best predictors of geographic knowledge were hours of reading, number of sisters, ACT scores and gender. Surprisingly, there was no evidence that the number of geography classes taken, hours watching geography-oriented TV programs, and current events information sources, there was no evidence that these factors contributed to differences in geographic knowledge.

The results in this article similar to the ones in Eve et al study, failed to explain how students acquire knowledge about geography, although stronger students (as indicated by ACT scores in this study and grade-point averages in the Eve et al. study) and students who read beyond the required class material tended to have more geographic knowledge. The finding that the number of sisters was associated with higher levels of geographic knowledge among college students could possibly indicate that females are more likely to share academic knowledge with siblings or motivate each other to succeed in academic goals (Henrie et al, 1997). Males in this study outperformed females, and this gender gap became larger with increased education. This study has shown that males do not just perform better than females on map skills but also on physical, human and regional geography. This study indicated that males have a higher level of background geographic knowledge rather than outperforming females in the classroom. This is supported with the study comparing final grades from a sample of geography classes that participated in our study showed no significance difference between males and females in classroom performance. The mean differences between genders in this study was very significant however, with males averaging 13% higher than females even with the material on the test being what most college faculty would consider rudimentary. This study brings two approaches in mind with its results, that the gender difference reflects an actual difference in background geographic knowledge. If that is the case, then it's clear that children's educational experiences are not socializing males and females equally towards an international perspective. It is possible that children learn most of their facts about geography from topics are not equally captivating for males and females. The second approach is to think that some or all of the gender differences in geographic knowledge are due to test factors that are unrelated to background knowledge.

As all this literature shows, males and females have diverse interests and knowledge in geography, and in an attempt to extend the modest sized literature currently out there on this

topic, and explore further the patterns of geography interests of males and females, the current study will be a descriptive one that will center on examining the data from the National Geographic School Bee winners and the children from National Geographic Partner Schools on what they find most and least interesting about geography. Expanding on methods of data analysis that were used to conceptualize geography themes in this prior literature such as the coding system in Hopwood (2004), a coding system based on common categories and subcategories within geography will be created to code the children's keywords from their responses. The common themes found in Hopwood (2004) and Hopwood (2009) will also be taken in mind in building the categories in the coding system.

Methods

Participants

This study involved two types of participants, National Geographic Bee School Winners and children from NGS Partner Schools. These children were from elementary and middle schools and ranged from fourth to eighth grade.

A total of 216 National Geographic Bee School Winners were selected randomly among a pool of students who provided responses to specific questions from a longer survey about geography interests and skills. In particular, participants answered the questions "What do you find most interesting about geography?" and "What do you find least interesting about geography?" We limited the sample selected to sixth grade to eighth grade winners since there were extremely few fourth and fifth grade male and female winners. 36 National Geographic Bee School Winner Student Surveys from each grade of sixth, seventh and eighth grade girls and sixth, seventh, and eighth grade boys were sampled (108 girls, 108 boys) These winners qualified for entering into these competitions by winning their school National Geographic Bee and going through the preliminary rounds and a semi-final or tiebreaker round, in the event of a tie. The National Geographic Bee School Winners' geography skills were measured on the Qualifying Test, which is a 70-item test that all school winners take to determine who qualifies for the state bee. Only the top 100 scorers on the Qualifying Test advance to the state bee.

The children from the NGS Partner Schools were children in schools that participate in the Bee but were not necessarily winners themselves. These schools were identified as "partners" because they agreed to participate in on-going research projects related to student success on the Bee. A total of 233 children from the NGS Partner Schools participated in a quiz about geography

and a survey about geography interests, including the same two questions the winners answered about what they find most and least interesting. This sample included students from fourth to eighth grade. A total of 45 fourth graders participated (25 girls, 20 boys), 44 fifth graders (18 girls, 26 boys), 77 sixth graders (35 girls, 42 boys) 45 seventh graders (14 girls, 31 boys) and 11 eighth graders (5 girls, 6 boys). These children in addition to answering the two questions this study is focusing on took a brief, 28-item geography quiz.

Materials

Both sets of participants were given different questionnaires supplied by the National Geographic Society. The National Geographic Bee School Winners were each supplied a questionnaire after they had won their school bee, with a variety of geography questions. The children from the Partner Schools were given the Geographic Bee Study, which also included a variety of geography questions. For the purpose of this study, the following questions were used:

- What do you find to be the most interesting part or parts of geography?
- What do you find to be the least interesting part or parts of geography?

The students each wrote an open-ended questionnaire response as to what their most and least favorite part or parts of geography were. An example of a child's handwritten response to the two questions is the following:

- What do you find to be the most interesting part or parts of geography?

I really like studying countries like Europe, Russia, and Japan. Russia has interested me since I was young, and I would really like to travel to other countries.

- What do you find to be the least interesting part or parts of geography?

I would think it would be weather and climate. I don't hate any part, but weather and climate has to be my least favorite.

These questionnaires were transcribed and coded for keywords by two independent coders. Discrepancies were resolved by a third coder.

The NGS Partner Schools were given surveys about geography interest, travel experience, and a 28-item quiz about geography knowledge. The quiz questions were drawn from actual questions asked in all rounds of the National Geographic Bee in previous years. Twelve were multiple choice with two options, four were multiple choice with three options, and twelve were open-ended. Because the questions were drawn from all rounds of the actual Bee, with four questions drawn randomly from each of seven rounds, they included US and World geography and advanced in roughly ascending order of difficulty. A sample question includes, The Great Artesian Basin provides valuable water to many areas, including parts of New South Wales and Queensland, on which continent?

The National Geographic Bee School Winners were given the National Geographic Bee School Winner Survey, which had questions on various parts of geography after they had won their school Bee. These children also took the Qualifying Test to qualify for the state bees.

Again, responses to interest questions were coded for keywords by two independent coders and discrepancies were resolved by a third coder.

Coding

The following two methods were used for compiling data for the National Geographic Bee School Winners: Child Language Data Exchange System (CHILDES) and a coding system.

For both the NGS Partner School data and the National Geographic Bee School Winners, the information was compiled in Excel spreadsheets for input into CHILDES and statistical software.

For both the National Geographic Bee School Winners and the National Geographic Bee Partner School data, keywords were identified from each of the child's most and least responses. Through the keywords the geography interests of the children could be analyzed and measured more easily. The keywords were identified by extrapolating the main idea(s) from each child's response. Two independent coders coded verbatim responses for keywords and discrepancies were resolved by a third coder. Coders made judgments about the sentences and their responses. An example would be the following:

- Verbatim Most Interesting Part of Geography Response: studying the culture of different countries, history.
- Most Interesting Part of Geography Response's keyword: culture, history.

In creating the coding system, categories were derived from the keywords themselves. An initial coding system to categorize the responses based on the frequencies from CHILDES was created by taking notecards with the children's keyword responses from CHILDES on each card, and physically putting the keywords of similar themes into piles. By looking at these piles, common themes in geography were found and were established as categories. These categories and subcategories were then examined by the investigators and graduate students of the project. In the initial coding system the following nine categories based on the keywords were found: Physical, Meta Process, General, Testing Assessment, Places, Maps, Cultural, Travel, Uncodable, Facts. Table 1 provides the 21 total subcategories associated with each of the categories previously mentioned, as well as examples of responses provided by students. Through this coding system, we can explore the question of whether when asked to self-report on which

aspects of geography they find most and least interesting, do responses by boys and girls differ with respect to the categories of geography mentioned by gender or grade.

Table 1 - Initial Coding System Categories and Subcategories with Examples of Student Responses

Category	Sub-Category	Examples of Student Responses
Physical	Land	• **"howlandformationsmade"** • **"mountainranges"** • **"shiftingcontinents"** • **"landforms"** • **"elevation"**
	Water	• **"oceans"** • **"waterways"** • **"rivers"**
	General Physical	• **"climate"** • **"weather"** • **"geology"** • **"physical"** • **"nature"** • **"environment"** • **"naturalresources"** • **"topography"**
Meta Process	Learning	• **"learningnewstuff"** • **"learningonecertaincountry"** • **"relearningwhatialreadyknow"** • **"notlearning"** • **"thingsialreadyknow"** • **"studyingboringstuff"** • **"searchingforinformation"**
	Memorizing or Retrieving	• **"rememberingcountriesnames"** • **"memorizing"** • **"factsplaces"** • **"factscountries"** • **"randomfactsabouttheearth"** • **"mapfacts"**
	Language	• **"definingwords"** • **"language"** • **"pronunciation"** • **"vocabulary"** • **"geographicalterms"**
General	Everything	• **"everything"** • **"almosteverything"**

Category	Sub-Category	Examples of Student Responses
		• **"everythingelse"**
	Nothing	• **"nothing"** • **"nothinginteresting"** • **"none"**
	Geography General (utility) Purpose, Value	• **"geography"** • **"manytypesofgeography"** • **"geographyisallaroundyou"** • **"generalknowledge"** • **"amountofstuffintheworld"** • **"practical"**
Testing/Assessment	Specific to Bee	• **"championshipround"** • **"geobees"** • **"beeparticipation"** • **"scienceportionofbee"**
	Questions (probably Bee)	• **"hardquestions"** • **"geographicanalogies"** • **"logicalquestions"** • **"nonmultiplechoiceproblems"**
	General Evaluation	• **"work"** • **"assignments"** • **"homework"** • **"longtests"**
Places	Specific region/country	• **"differentcountries"** • **"Russia"** • **"middleeast"** • **"chinasgovernment"** • **"continents"** • **"Europe"**
	US/states/capitals	• **"statefacts"** • **"statecapitals"** • **"unitedstatescapitals"** • **"usgeography"** • **"studyingusa"**
	Unspecified regions/countries	• **"worldwidegeography"** • **"worldlandmarks"** • **"politicalregions"** • **"national parks"**
	Locations (features)	• **"locations"** • **"whereplacesare"** • **"locationonamap"** • **"placelocations"** • **"featureslocations"** • **"borders"** • **"distance"**

Category	Sub-Category	Examples of Student Responses
		• **"distancefromwhereilive"** • **"pointingoutplacesonmap"**
	Coordinates	• **"latitude and longitude"** • **"coordinates"**
Maps	Map Use/Creation	• **"labelingmaps"** • **"usingmaps"** • **"coloringmaps"** • **"mapping"** • **"mapskills"** • **"readingmapelevation"**
	General Maps	• **"roadmaps"**
Cultural	People/Lifestyle	• **"peopledifferentthanme"** • **"administrativedivisions"** • **"creatures"** • **"diversity"** • **'thingspeopledidtoeachother"** • **"imagininghowpeoplelive"** • **"scarypeople"** • **"customs"** • **"traditions"** • **"agriculture"** • **"trade"** • **"religion"** • **"animals"** • **"flags"** • **"governmentissues"** • **"politics"**

Category	Sub-Category	Examples of Student Responses
	History/historical events	• **"timeperiods"** • **"historyofcountryorempire"** • **"historicalgeography"** • **"ageofthings"** • **"americanhistory"** • **"worldwartwo"** • **"worldhistory"** • **"ancientcivilizations"** • **"slavery"** • **"presidents"**
Travel		• **"hopingtovisit"** • **"travel"** • **"realizingicantgothere"**
Uncodable		• **"illegible"** • **"lea"** • **"traits"** • **"mysteries"** • **"hard"** • **"challenging"** • **"simplethings"** • **"questionsaboutgeographyinterests"**

The initial coding system shown in Table 1 was then shortened down to include the most popular and comprehensive categories that student's responses fell under. The final coding system was comprised of the following six categories: Physical, Meta Process, General, Testing/ Assessment, Places, Maps, Cultural, Travel and Uncodable. The researcher then coded all the 570 total keywords from the school National Geographic Bee School Winners and NGS Partner School children's responses' into the appropriate category on Excel spreadsheets. Table 2 lists the final coding system with the 23 subcategories and examples of responses provided by the students for each category.

Table 2 - Final Coding System Categories and Subcategories with Examples of Student Responses

Category	Sub-Category	Examples of Student Responses
Physical	Land	• **"howlandformationsmade"** • **"mountainranges"** • **"shiftingcontinents"** • **"landforms"** • **"elevation"** • **"topography"** • **"geology"**
	Water	• **"oceans"** • **"waterways"** • **"rivers"**
	Weather/climate	• **"climate"** • **"weather"**
	General Physical	• **"physical"** • **"nature"** • **"environment"** • **"naturalresources"**
Meta Process	Learning	• **"learningnewstuff"** • **"learningonecertaincountry"** • **"relearningwhatialreadyknow"** • **"notlearning"** • **"thingsialreadyknow"** • **"studyingboringstuff"** • **"searchingforinformation"**
	Memorizing or Retrieving	• **"rememberingcountriesnames"** • **"memorizing"** • **"factsplaces"** • **"factscountries"** • **"randomfactsabouttheearth"** • **"mapfacts"**
	Language	• **"definingwords"** • **"language"** • **"pronunciation"** • **"vocabulary"** • **"geographicalterms"**
	Cognitive Evaluation	• **"challenging"** • **"simplethings"** • **"hard"**
General	Everything	• **"everything"** • **"almosteverything"**

Category	Sub-Category	Examples of Student Responses
		• **"everythingelse"**
	Nothing	• **"nothing"** • **"nothinginteresting"** • **"none"**
	Geography General (utility) Purpose, Value	• **"geography"** • **"manytypesofgeography"** • **"geographyisallaroundyou"** • **"generalknowledge"** • **"amountofstuffintheworld"** • **"practical"**
Testing/Assessment	Specific to Bee	• **"championshipround"** • **"geobees"** • **"beeparticipation"** • **"scienceportionofbee"**
	Questions (probably Bee)	• **"hardquestions"** • **"geographicanalogies"** • **"logicalquestions"** • **"nonmultiplechoiceproblems"**
	General Evaluation	• **"work"** • **"assignments"** • **"homework"** • **"longtests"**
Places	Specific region/country	• **"Russia"** • **"middleeast"** • **"chinasgovernment"** • **"Europe"**
	US/states/capitals	• **"statefacts"** • **"statecapitals"** • **"unitedstatescapitals"** • **"usgeography"** • **"studyingusa"**
	Unspecified regions/countries	• **"worldwidegeography"** • **"worldlandmarks"** • **"politicalregions"** • **"national parks"** • **"differentcountries"** • **"continents"** • **"administrativedivisions"**
	Locations (features)	• **"locations"** • **"whereplacesare"** • **"locationonamap"** • **"placelocations"** • **"featureslocations"** • **"borders"**

Category	Sub-Category	Examples of Student Responses
		• **"distance"** • **"distancefromwhereilive"** • **"pointingoutplacesonmap"**
	Coordinates	• **"latitude and longitude"** • **"coordinates"**
Maps	Map Use/Creation	• **"labelingmaps"** • **"usingmaps"** • **"coloringmaps"** • **"mapping"** • **"mapskills"** • **"readingmapelevation"**
	General Maps	• **"roadmaps"**
Cultural	People/Lifestyle	• **"peopledifferentthanme"** • **"creatures"** • **"diversity"** • **'thingspeopledidtoeachother"** • **"imagininghowpeoplelive"** • **"scarypeople"** • **"customs"** • **"traditions"** • **"agriculture"** • **"trade"** • **"religion"** • **"animals"** • **"flags"** • **"governmentissues"** • **"politics"**
	History/historical events	• **"timeperiods"** • **"historyofcountryorempire"** • **"historicalgeography"** • **"ageofthings"** • **"americanhistory"** • **"worldwartwo"** • **"worldhistory"** • **"ancientcivilizations"** • **"slavery"** • **"presidents"**
Travel		• **"hopingtovisit"** • **"travel"** • **"realizingicantgothere"**
Uncodable		• **"illegible"** • **"lea"** • **"traits"**

Category	Sub-Category	Examples of Student Responses
		• **"mysteries"** • **"questionsaboutgeographyinterests"**

For this same data, CHILDES was used to code the keywords from each of the categories to produce frequencies of the most commonly occurring keywords from each of the student's responses. Subsequently, files in CHILDES were created for each combination of the following variables: Grade Level (Grades 4 through 8), Gender and Interest in Geography (Most and Least). The data files allowed examination of the utterances (frequency of words) based on gender and grade.

Results

Overview

The Statistical Package of the Social Sciences (SPSS) was used to determine averages, percentages, maximum and minimum, and frequencies of the National Geographic Bee Winners and National Geographic Society Partner School data. For the statistical analysis samples, only the first keyword from each of the children's keyword responses was used.

The research goal of this study was to examine whether males and females have different interests in geography and whether that could possibly be affecting their geography achievement. These results found that males and females interests in geography were actually quite similar, regardless of whether the students were very proficient in Geography (National Geographic Bee School Winners) or not necessarily so (National Geographic Society Partner School Children). In both data sets, gender and grade similarities were observed with both liking categories Cultural Geography most and liking Places second most, the order switching interchangeably across gender and grade. With liking subcategories, School Winners liked People/Lifestyle subcategory most across gender and the female NGS Partner School Children liked the People/Lifestyle subcategory and the male NGS Partner School Children liked History. With disliking categories, female School Winners disliked the Places category most and male School Winners disliked the Physical category most. Both male and female NGS Partner School Children disliked the Cultural category most. Both male and female School Winners disliked the subcategory Nothing most, meaning that they didn't have any specific dislikes or that they disliked everything equally. Partner School Children disliked the People/Lifestyle subcategory most across gender.

The Geography Quiz scores of the National Geographic Society Partner School Children and the Qualifying Test scores of the National Geographic Bee School Winners were split into

high and low using a median split. There was a discrepancy with gender with 57.4% of girls scoring below median, and 42.6% of girls scoring above the median. For boys, 42.6% of boys scored below the median and 57.4% of boys scored above the median.

National Geographic Bee School Winners

With the School Winners, there were 33% from each of the grades in the data set, with 33% being from 6th, 7th and 8th grade. Within this data set, the lowest Qualifying Test score is 17 out of 70 and the highest is 69 out of 70. The mean Qualifying Test Score of the National Geographic Bee School Winners is 53.57 out of 70.

Gender Differences Analysis by Like Category–National Geographic Bee School Winners

As seen in Table 3, for each of the nine categories in the final coding system: Physical, Meta Process, General, Testing/Assessment, Places, Maps, Cultural, Travel and Uncodable, there were several differences on what particular category of geography male and female winners indicated liking.

Girls indicated liking the Cultural geography category most, with 30.6% of girls liking it and the second category girls indicated liking most was Places, with 22.2. % of girls reporting that they liked it.

Boys indicated liking the Cultural geography category most as well, with 30.6% of boys liking it and the second category boys indicated liking most was also Places, with 28.7% of boys reporting that they liked it.

Gender Differences Analysis by Like Subcategory-National Geographic Bee School Winners

As seen in Table 4, for each of the following 23 subcategories that fell under the 9 categories: Physical: Land, Water, Weather/climate, General Physical. Meta Process: Learning, Memorizing or retrieving, Language, Cognitive Evaluation. General: Everything, Nothing and Geography General (utility) Purpose, Value. Testing/Assessment: Specific to Bee, Questions (probably Bee), General Evaluation. Places: Specific region/country, US/states/capitals, Unspecified regions/countries, Locations (features) and Coordinates. Maps: Map Use/Creation, General Maps. Cultural: People/Lifestyle, History/historical events, there were several differences on what particular subcategory of geography male and female winners indicated liking.

Girls indicated liking the People/Lifestyle subcategory most, with 25.9% of girls indicating they liked it most. This makes sense, as the category Cultural, which is what this subcategory falls under, was the most popular category with girl winners. The second subcategory girls reported liking most was Unspecified regions/countries. This subcategory falls under the Places category, which also makes sense, as Places is the second most favorite category selected by girl winners.

Boys indicated liking the People/Lifestyle subcategory most as well, with 17.6% of boys indicating they liked it most. This is not surprising, as the category Cultural, which is what this subcategory falls under, was the most popular with boys. The second most liked subcategories the boys liked were History and Unspecified regions/countries, with 13% indicating so each. This makes sense as history falls under the most popular boy category, Cultural and unspecified regions/countries falls under the second most popular category, Places.

Gender Differences Analysis by Dislike Category-National Geographic Bee School Winners

As seen in Table 5, for each of the nine categories in the final coding system: Physical, Meta Process, General, Testing/Assessment, Places, Maps, Cultural, Travel and Uncodable, there were several differences on what particular category of geography male and female winners indicated disliking.

Girls indicated disliking the category Places most, with 26.9% disliking it, and the second category girls indicated disliking most was Meta Process, with 18.5%, and a close third category girls indicated disliking most was Physical, with 17.6% indicating so.

Boys indicated disliking the category Physical most, with 21.3% disliking it, and the second category boys indicated disliking most was General, with 17.6%, and a close third category boys indicated disliking most were Places and Cultural, with 16.7% indicating so each.

Gender Differences Analysis by Dislike Subcategory-National Geographic Bee School Winners

As seen in Table 6, for each of the following 23 subcategories that fell under the 9 categories: Physical: Land, Water, Weather/climate, General Physical. Meta Process: Learning, Memorizing or retrieving, Language, Cognitive Evaluation. General: Everything, Nothing and Geography General (utility) Purpose, Value. Testing/Assessment: Specific to Bee, Questions (probably Bee), General Evaluation. Places: Specific region/country, US/states/capitals, Unspecified regions/countries, Locations (features) and Coordinates. Maps: Map Use/Creation, General Maps. Cultural: People/Lifestyle, History/historical events, there were several differences on what particular subcategory of geography male and female winners indicated disliking.

Girls indicated disliking the subcategory Nothing most, with 13% of girls indicating they disliked it most. The second most disliked categories were Weather and Memorizing/Retrieving, with 9.3% indicating so each.

Boys indicated disliking the subcategory Nothing most, with 15.7% of boys indicating they disliked it most. The second most disliked categories were People/Lifestyle, with 12% of boys indicating they disliked it most.

Grade Differences Analysis by Like Category-National Geographic Bee School Winners

When examining what category of geography the National Geographic Bee School Winners liked the most across all grades (6^{th}-8^{th}), category similarities were found.

As seen in Table 8, sixth graders indicated liking the Cultural category most, with 36.1% indicating they liked it. The second most liked category was Places, with 22.2% indicating they liked it.

As seen in Table 8, seventh graders indicated liking the Places category most, with 31.9% indicating they liked it. The second most liked category was Cultural, with 26.4% indicating they liked it.

As seen in Table 8, eighth graders indicated liking the Cultural category most, with 29.2% indicating they liked it. The second most liked category was Places, with 22.2% indicating they liked it.

National Geographic Society Partner School Children

With the NGS Partner School Children, there were varying percentages of participants from each of the grades in the data set, with 19.3% being from 4^{th}, 18.9% being from 5^{th}, 33% being from 6^{th}, 19.3% being from 7^{th}, and 4.7% being from 8^{th} grade. Within this data set, the

lowest Geography Quiz score is 0 out of 28 and the highest is 25 out of 28. The mean Geography Quiz Score of the NGS Partner School Children is 11.99 out of 28.

Gender Differences Analysis by Like Category-NGS Partner School Children

As seen in Table 3, for each of the nine categories in the final coding system: Physical, Meta Process, General, Testing/Assessment, Places, Maps, Cultural, Travel and Uncodable, there were similarities on what particular category of geography male and female Partner School Children indicated liking.

Girls indicated liking the Cultural geography category most, with 29.9% indicating they liked it. The second most liked category was Places, with 28.9% indicating they liked it.

Boys also indicated liking the Cultural geography category most, with 34.4% indicating they liked it. The second most liked category was also Places, with 31.2% indicating they liked it.

Gender Differences Analysis by Like Subcategory-NGS Partner School Children

As seen in Table 4, for each of the following 23 subcategories that fell under the 9 categories: Physical: Land, Water, Weather/climate, General Physical. Meta Process: Learning, Memorizing or retrieving, Language, Cognitive Evaluation. General: Everything, Nothing and Geography General (utility) Purpose, Value. Testing/Assessment: Specific to Bee, Questions (probably Bee), General Evaluation. Places: Specific region/country, US/states/capitals, Unspecified regions/countries, Locations (features) and Coordinates. Maps: Map Use/Creation, General Maps. Cultural: People/Lifestyle, History/historical events, there were several differences on what particular subcategory of geography male and female partner school children indicated liking.

Girls indicated liking the People/Lifestyle subcategory most, with 20.6% indicating they liked it. The second subcategory girls liked most was the US (including states, capitals)

subcategory, with 14.4% indicating they liked it. The females liking the US subcategory is also interesting, perhaps US travel is important for these children.

Boys indicated liking the History subcategory most, with 21.6% indicating they liked it. The second subcategory boys liked most were the Unspecified regions/countries subcategory, with 18.4% indicating they liked it. The first finding is not surprising as for the male school winners, the history subcategory was the second most liked subcategory and the unspecified regions/countries subcategory is interesting as it shows that the boys wrote down more general regions or countries rather than US ones like the girls did.

Gender Differences Analysis by Dislike Category-NGS Partner School Children

As seen in Table 5, for each of the nine categories in the final coding system: Physical, Meta Process, General, Testing/Assessment, Places, Maps, Cultural, Travel and Uncodable, there were many similarities on what particular category of geography male and female Partner School children indicated disliking.

Girls indicated disliking the Cultural category most, with 29.9% indicating they disliked it. The second category girls disliked most was the Meta Process category, with 14.4% disliking it. Meta Process follows the trend from the female school winners where memorizing was one of the second disliked subcategories, with memorizing being under the Meta Process category.

Boys indicated disliking the Cultural category most, with 27.2% indicating they disliked it. The second category disliked most was the Places category, with 13.6% disliking it.

Gender Differences Analysis by Dislike Subcategory-NGS Partner School Children

As seen in Table 6, for each of the following 23 subcategories that fell under the 9 categories: Physical: Land, Water, Weather/climate, General Physical. Meta Process: Learning, Memorizing or retrieving, Language, Cognitive Evaluation. General: Everything, Nothing and

Geography General (utility) Purpose, Value. Testing/Assessment: Specific to Bee, Questions (probably Bee), General Evaluation. Places: Specific region/country, US/states/capitals, Unspecified regions/countries, Locations (features) and Coordinates. Maps: Map Use/Creation, General Maps. Cultural: People/Lifestyle, History/historical events, there were several similarities on what particular subcategory of geography male and female Partner School Children indicated disliking.

Girls indicated disliking the People/Lifestyle subcategory most, with 23.7% indicating they disliked it. The second subcategory girls disliked most were Uncodable, with 11.3% indicating they disliked it.

Boys indicated disliking the People/Lifestyle subcategory most also, with 20.8% indicating they disliked it. The second subcategory boys disliked most was also Uncodable, with 12% indicating they disliked it.

Grade Differences Analysis by Like Category-NGS Partner School Children

When examining what category of geography the National Geographic Bee School Children liked the most across all grades (4^{th}-8^{th}), the categories between the grades were very similar.

As seen in Table 7, 4^{th} graders indicated liking the Places category most, with 31.1% indicating so. The second most liked category was Cultural, with 20% liking it.

As seen in Table 7, 5^{th} graders indicated liking the Places category most, with 34.1% indicating so. The second most liked category was Cultural, with 31.8% liking it.

As seen in Table 8, 6^{th} graders indicated liking the Cultural category most, with 35.1% indicating so. The second most liked category was Places, with 27.3% liking it.

As seen in Table 8, 7^{th} graders indicated liking the Cultural category most, with 42.2% indicating so. The second most liked category was Places, with 26.7% liking it.

As seen in Table 8, 8th graders indicated liking the Places category most, with 45.5% indicating so. The second most liked category was Cultural, with 27.3% indicating so.

Discussion

As described earlier, this study sought to determine whether males and females differ in regards to their interests in geography and whether this may be a factor in the achievement gap between males and females. These results found that males and females interests in geography were actually quite similar, regardless of whether the students were very proficient in Geography (National Geographic Bee School Winners) or not necessarily so (National Geographic Society Partner School Children). In both data sets, gender and grade similarities were observed with both liking Cultural Geography most and liking Places second most, the order switching interchangeably across gender and grade. With liking subcategories, School Winners liked People/Lifestyle subcategory most across gender and the female NGS Partner School Children liked the People/Lifestyle subcategory and the male NGS Partner School Children liked History. With disliking categories, female School Winners disliked the Places category most and male School Winners disliked the Physical category most. Both male and female NGS Partner School Children disliked the Cultural category most. Both male and female School Winners disliked the subcategory Nothing most. Partner School Children disliked the People/Lifestyle subcategory most across gender.

These results could be interpreted in several ways. In regards to females indicating liking the Cultural geography category most and Places second most, this met my expectations as prior literature has shown that girls are more interested in cultural geography and girls tend to be better at verbal and language skills, which is present in Cultural Geography (Liben, 1981). This also replicates the findings found in Bein (1990), which found that students scored highest on the place-name identification part of the test with a mean score of 75%. It was interesting however,

when males indicated liking the Cultural geography category most and the second category Places most as well. In regards to the similarities found between the female and male School Winners, this may be due to the fact that both males and females have to perform at a high level and study and be proficient in the same areas of geography in order to qualify and win their School Geography Bees. Thus, the boys and girls may tend to like the same types of geography due to being exposed and studying the same material. The similarities found between the male and female Partner School Children could be due to the fact that they are studying the same geography curriculum in school and thus may develop similar geography interests.

The coding system categories of Cultural and Places being the most popular among both data sets may be because more of these categories cover material that falls under information more applicable to their real lives such as Cultural's subcategories are, People/Lifestyle and History/historical events, two topics that are present in our lives as well as in well- established courses such as History, Social Studies and even Sociology, Government, or Religion. These courses might also appeal more to both genders.

The fact that the subcategory People/Lifestyle is most popular among the School Winners and female NGS Partner School Children is also telling as it shows that within the most popular Cultural category, they preferred People/Lifestyle over History/historical events. This may be due to People/Lifestyle being more applicable to real life. It could even be due possibly to the saturation of "people/lifestyle" pop culture news on the internet and in magazines. Children as a result to this societal exposure may be more interested in areas of geography that teach them about people and lifestyle. With the male NGS Partner School Children, however, History was the most popular subcategory. This may indicate that certain females may be more interested in people and lifestyle knowledge than males.

However, with disliking categories and subcategories within School Winners, there was more variability. For the female school winners, they disliked the Places category, the category

they also liked most. This could be due to many of their first keyword responses simply falling into that category and there being a higher volume of responses in that category to either like or dislike. Male School Winners disliked the Physical category most. The finding that boys dislike the category Physical most is especially surprising, since a lot of literature has shown that boys are better at physical geography due to it involving spatial skills more (Montello et al, 1999).

In regards to subcategories, both male and female School Winners disliked the subcategory Nothing most. The fact that these children found most that they didn't dislike anything in Geography may be due to the fact that these children are school winners in geography and their attitude might be as a result of them being very proficient in geography already.

Both male and female NGS Partner School Children disliked the Cultural category most, simultaneously liking it most as well and this may be due again to the larger number of Cultural keyword responses for the children to put under what they like or dislike. Additionally, they also disliked the Uncodable Category most.

Both male and female NGS Partner School Children disliked the People/Lifestyle subcategory most. This may be due to there being more responses in general that fit under the People/lifestyle subcategory or that these girls prefer the only other subcategory Cultural Category, history/historical events. The second finding points to the thought that the parts of geography that the children disliked might not function as singular, coherent and conceptual frameworks, a sentiment that was expressed in the Hopwood (2009) study.

The finding that across grade and gender, both data sets liked Cultural most and Places second most, is very telling. It shows that there are not nearly as many differences in what children are interested to between grade as previously thought. It also may shed light for the need to differentiate and extend the current geography curriculum being taught to make sure that children from grades as diverse as 4^{th} through 8^{th} are not studying the exact same material and make sure they are well rounded in all areas of geography.

This study is limited in several regards. First, there are limitations in regard to the sample. The sample sizes for the study were small and thus should not apply to the general population without replicating with a larger sample size. The participating children included a very specific group, that group being the school National Geographic Bee School Winners, and a more varied group, that being the children from the NGS Partner School data. Although the National Geographic Bee School Winners sample had an equal number of male and female responses, the National Geographic Society Partner School Children data had more male than female responses, with 97 girls and 125 boys.

Second, by only using the first response that the child wrote down in his or her response to what they find most or least interesting about geography as the keyword of the child in SPSS, we were not able to fully capture the entire geography interests of each child. It could be that there were other diverse interests between gender and grade within geography that we didn't find because they were the child's third or fourth response. However, by choosing the first response, we felt that that might at least be one of the child's strongest and most truthful feelings on what they like or dislike in geography.

Third, through using keywords derived from the children's original responses and using a coding system with categories and subcategories to place their keywords, although the categories and subcategories were developed on the basis of the keywords themselves and were established with the expertise of distinguished researchers in the field of psychology as well as geography, there was a degree of extrapolation as to what the keyword from the original response should be and whether the child's actual answer really did pertain to what the category was defined as and the subcategory was defined as.

Fourth, the sample of questionnaires and surveys used and recorded as responses from both data sets were randomly selected from piles of questionnaires.

There are strengths in this study however, and ones that can be incorporated in future studies exploring this topic. One strength is that there was an even number of male and female school winners in our population set, with the total number being 216, and 108 male and female participants each. Another strength is that we created an original coding system with categories and subcategories to code the keywords taken from the children's responses. Studies exploring this topic have not yet incorporated the creation of a coding system based on children's keywords or general ideas, from their responses. Coding system themes however, have been created and done to explore geography interests in children such as in Hopwood (2004) and Hopwood (2009). The geography themes found in Hopwood (2004) such as, Study of the World, Countries, Map Reading/Map Work, Issue and World Problems as well as in Hopwood (2009) such as Environment, People, Education for Sustainable Development were ideas that were encapsulated in our coding system. Thirdly, this study was done comparing the geography interests of children in the US and this is important as many of the recent articles I found on geography interests and knowledge were from studies done in foreign countries, not from the US.

There are many possible studies that can be designed to examine the interests of children in geography and grade further. As the data sets that we used were open ended responses of children and children's responses of how much they liked certain aspects of geography, a future study might examine more responses of children on their interests in geography in a multiple choice format. Another study might examine whether children's gender affects their geography skills when it comes to age ranges outside of grades 4-8. Another question that was present on the National Geographic Bee questionnaire that would be interesting to examine would be the travel experience of the children and whether that also affects their preference to like cultural geography more than physical geography. A possible study might be to examine two National Geography Bee Winner samples, one in which is the same age as the children now and another that is an older population.

One aspect of this study to explore further is why there is so much literature on this in the late 80's, early 90's and not as much in the late 2000's. The recent articles on gender differences in geography interests and knowledge I found were from foreign countries not from the US. This is very troubling and more research on this topic needs to be conducted, particularly in the US.

Another question that this study has brought up is why there isn't a National Geographic Bee for high school students. The National Geographic Bee competitions have been a great tool to motivate fourth through eighth grade students to pursue and learn geography but it is equally important to continue to nurture this interest and knowledge in high school, particularly for influencing students' career and major choices in college and beyond. This study included using data from National Geographic Society Partner Schools, from classrooms, and the National Geographic School Bee Winner data was also taken in with the opinions of the winners' teachers and their performance in their classrooms. Doing more research in the classroom would be helpful since it can shed more light on the educational geography practices and teachings occurring in the US, which is the area of geography that is most important in regards to children, but doing qualitative research and interviews with the children, interviewing and observing these children for several years, rather than taking their responses to questionnaires and analyzing them as I did. By doing other studies on this same topic and devoting several years to it, more data on geographic knowledge and interests between males and females can be discovered and explored.

This study's results run counter to the stereotypes perpetuating that boys are more interested in geography. Both males and females indicated liking the same types of geography, regardless of their aptitude in it and their grade. I predict the data from this study may be useful for making recommendations to educators about the geography that is taught in classrooms to focus on these areas of geography that the children liked most but also teach differently and more effectively the areas that were not as popular. Additionally, if both girls and boys share the same geography interests there may be less difference in their performance and a way to continue to get

boys and girls interested in the same areas and improve their learning and achievement Further, by bolstering efforts for females to build on these interests and expand their geography achievement, more females may be interested in pursuing competitions such as the National Geographic Bee, geography and other professions that draw on geographic concepts and skills. This is paramount, as gender differences in knowledge can contribute to social inequality with knowledge acting as a filter, preventing males or females from equal participation in life. By further understanding what types of geography girls or boys like and why, we can prevent possible gender differences in geography knowledge from forming and close the gender gap in geography achievement for good.

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APPENDIX A: TABLES

Table 3. Percent of children in each sample who indicated liking a particular category of geography content

	Winners		Partners	
	Girls	Boys	Girls	Boys
Physical	13.9	7.4	8.2	11.2
Land				
Water				
Weather				
General Physical				
Meta Process	11.1	12.0	7.2	4.0
Learning				
Memorizing/Retrieving				
Language				
Cognitive Evaluation				
General	12.0	8.3	4.1	4.8
Everything				
Nothing				
Geography General				
Testing/Assessment	1.9	0	5.2	1.6
Specific to Bee				
Questions(probably Bee)				
General Evaluation				
Places	22.2	28.7	28.9	31.2
Specific region/country				
US/states/capitals				
Unspecified regions/countries				
Locations (features)				
Coordinates				
Maps	3.7	9.3	8.2	5.6
Map Use/Creation				
General Maps				
Cultural	30.6	30.6	29.9	34.4
People/Lifestyle				
History/historical events				
Travel	0	0	0	.8
Uncodable	4.6	3.7	8.2	6.4

Note. Values listed are percentages.

Table 4. Percent of children in each sample who indicated liking a particular subcategory of geography content

	Winners		Partners	
	Girls	Boys	Girls	Boys
Physical				
Land	9.3	4.6	4.1	4.8
Water	.9	0	2.1	.8
Weather	.9	0	0	0
General Physical	2.8	2.8	2.1	5.6
Meta Process				
Learning	5.6	4.6	3.1	1.6
Memorizing/Retrieving	3.7	3.7	0	0
Language	.9	2.8	2.1	1.6
Cognitive Evaluation	.9	.9	2.1	.8
General				
Everything	4.6	4.6	0	1.6
Nothing	1.9	.9	1.0	1.6
Geography General	5.6	2.8	3.1	1.6
Testing/Assessment				
Specific to Bee	.9	0	0	1.6
Questions(probably Bee)	0	0	4.1	0
General Evaluation	.9	0	1.0	0
Places				
Specific region/country	.9	.9	1.0	0
US/states/capitals	4.6	5.6	14.4	8.8
Unspecified regions/countries	11.1	13.0	11.3	18.4
Locations (features)	5.6	9.3	2.1	4.0
Coordinates	0	0	0	0
Maps				
Map Use/Creation	.9	.9	4.1	.8
General Maps	2.8	8.3	4.1	4.8
Cultural				
People/Lifestyle	25.9	17.6	20.6	12.8
History/historical events	4.6	13.0	9.3	21.6
Travel	0	0	0	.8
Uncodable	4.6	3.7	8.2	6.4

Note. Values listed are percentages.

Table 5. Percent of children in each sample who indicated disliking a particular category of geography content

	Winners		Partners	
	Girls	Boys	Girls	Boys
Physical	17.6	21.3	8.2	8.8
Land				
Water				
Weather				
General Physical				
Meta Process	18.5	11.1	14.4	11.2
Learning				
Memorizing/Retrieving				
Language				
Cognitive Evaluation				
General	13.0	17.6	5.2	9.6
Everything				
Nothing				
Geography General				
Testing/Assessment	5.6	3.7	11.3	8.0
Specific to Bee				
Questions(probably Bee)				
General Evaluation				
Places	26.9	16.7	11.3	13.6
Specific region/country				
US/states/capitals				
Unspecified regions/countries				
Locations (features)				
Coordinates				
Maps	3.7	2.8	8.2	9.6
Map Use/Creation				
General Maps				
Cultural	11.1	16.7	29.9	27.2
People/Lifestyle				
History/historical events				
Travel	0	.9	0	0
Uncodable	3.7	9.3	11.3	12.0

Note. Values listed are percentages.

Table 6. Percent of children in each sample who indicated disliking a particular subcategory of geography content

	Winners		Partners	
	Girls	Boys	Girls	Boys
Physical				
Land	4.6	3.7	5.2	4.8
Water	1.9	3.7	0	0
Weather	9.3	7.4	1.0	0
General Physical	1.9	6.5	2.1	4.0
Meta Process				
Learning	6.5	4.6	7.2	8.0
Memorizing/Retrieving	9.3	3.7	2.1	2.4
Language	0	1.9	1.0	.8
Cognitive Evaluation	2.8	.9	4.1	0
General				
Everything	0	0	3.1	4.8
Nothing	13.0	15.7	2.1	4.8
Geography General	0	1.9	0	0
Testing/Assessment				
Specific to Bee	0	.9	0	.8
Questions(probably Bee)	2.8	.9	3.1	2.4
General Evaluation	2.8	1.9	8.2	4.8
Places				
Specific region/country	0	.9	1.0	.8
US/states/capitals	6.5	2.8	2.1	2.4
Unspecified regions/countries	7.4	4.6	4.1	5.6
Locations (features)	4.6	5.6	3.1	2.4
Coordinates	8.3	2.8	1.0	2.4
Maps				
Map Use/Creation	2.8	1.9	2.1	7.2
General Maps	.9	.9	6.2	2.4
Cultural				
People/Lifestyle	6.5	12.0	23.7	20.8
History/historical events	4.6	4.6	6.2	6.4
Travel	0	.9	0	0
Uncodable	3.7	9.3	11.3	12.0

Note. Values listed are percentages.

Table 7. Percent of Partner School children in 4th and 5th grade who indicated liking a particular category of geography content

	Partners	
	4th Grade	5th Grade
Physical	6.7	13.6
Land		
Water		
Weather		
General Physical		
Meta Process	4.4	2.3
Learning		
Memorizing/Retrieving		
Language		
Cognitive Evaluation		
General	4.4	0
Everything		
Nothing		
Geography General		
Testing/Assessment	8.9	0
Specific to Bee		
Questions(probably Bee)		
General Evaluation		
Places	31.1	34.1
Specific region/country		
US/states/capitals		
Unspecified regions/countries		
Locations (features)		
Coordinates		
Maps	11.1	6.8
Map Use/Creation		
General Maps		
Cultural	20.0	31.8
People/Lifestyle		
History/historical events		
Travel	0	0
Uncodable	13.3	11.4

Note. Values listed are percentages.

Table 8. Percent of children in 6th, 7th and 8th grade who indicated liking a particular category of geography

	Winners			Partners		
	6th Grade	7th Grade	8th Grade	6th Grade	7th Grade	8th Grade
Physical	5.6	11.1	15.3	11.7	6.7	9.1
Land						
Water						
Weather						
General Physical						
Meta Process	12.5	11.1	11.1	7.8	4.4	9.1
Learning						
Memorizing/Retrieving						
Language						
Cognitive Evaluation						
General	8.3	12.5	9.7	2.6	11.1	9.1
Everything						
Nothing						
Geography General						
Testing/Assessment	1.4	0	1.4	3.9	0	0
Specific to Bee						
Questions(probably Bee)						
General Evaluation						
Places	22.2	31.9	22.2	27.3	26.7	45.5
Specific region/country						
US/states/capitals						
Unspecified regions/countries						
Locations (features)						
Coordinates						
Maps	9.7	5.6	4.2	6.5	4.4	0
Map Use/Creation						
General Maps						
Cultural	36.1	26.4	29.2	35.1	42.2	27.3
People/Lifestyle						
History/historical events						
Travel	0	0	0	0	2.2	0
Uncodable	4.2	1.4	6.9	5.2	2.2	0

Note. Values listed are percentages.

ACADEMIC VITA

Carolina Morales
(919) 946- 6990
cmcmorales076@gmail.com

Education

Schreyer Honors College, The Pennsylvania State University, 2013
Bachelor of Arts Degree in Psychology, Minor: History, 2013
Thesis: Understanding Gender and Grade Preferences of Children in Geography
Thesis Supervisor: Lynn S. Liben

Research

Research Assistant in the Cognitive and Social Development Lab
Director: Dr. Lynn S. Liben, Penn State University
Fall 2010-Spring 2012

Research Assistant in the Cognitive Skills Acquisition Lab
Director: Dr. Richard Carlson, Penn State University
Spring 2010-Fall 2010

Honors/Awards

Clifford Chance Scholar	Summer 2013
College of the Liberal Arts Enrichment Award	Spring 2013
The Fund for American Studies Academic Excellence in Economics Award	Fall 2012
Excellence in Communication Certificate	Fall 2012
College of the Liberal Arts Enrichment Award	Fall 2012
Schreyer Honors Scholar	Fall 2011-present
Paterno Fellow in Psychology	Fall 2011-present
Winner of the Miss Latina Penn State Pageant: Miss Latina Penn State	April 2011-April 2012
Women in Science Exposure Research Program (WISER) Participant	Spring 2010-Fall 2010
Dean's List Honor Roll	Spring 2010-present

Leadership Experience and Activities

Intern at US Department of Justice, Consumer Protection Branch Fall 2012
- used the software CaseMap to create digests for consumer depositions that were used by attorneys to prepare for summary judgment and for use at trial
- conducted document review in FDA criminal case against a major pharmaceutical company
- worked on FDA projects for attorneys and paralegals in office
- conducted research to answer and respond to consumer letters

Latino Caucus 2010-2012

- Chair of Latino Film Series 2011-2012
- Co-Chair of Latino Film Series 2010-2011

- Member of THON Committee 2010-2012

Miss Latina Penn State 2011-2012
- ambassador for the Latino community at Penn State and spoke at several events throughout the year
- created an educational program on Diabetes and how it affects Latinos and members of the community
- completed several hours of community service

Member/Cantor of Pasquerilla Spiritual Center Choir 2009-2012

Member of University Choir 2009-2010

Member of Schreyer Honors College Literacy Committee 2011-2012

American Red Cross Volunteer, State College Summer 2011

Adult Learner ESL Tutor Fall 2011
