Gender and Site-Name Recall of Geographic Sites Varying in Distance.

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Gender and Site-Name Recall of Geographic Sites Varying in Distance

A thesis
presented to
the faculty of the Department of Psychology
East Tennessee State University

In partial fulfillment
of the requirements for the degree
Master of Arts General Psychology

by
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December 2004

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Keywords:  Site-Name Recall, Gender Differences, Geographic Site-Name Recall
ABSTRACT

Gender and Site-Name Recall of Geographic Sites Varying in Distance
by
Joshua S. Godsey

The purpose of this research project was to replicate, refine, and extend research by Zinser et al. (in press) of the site-name, associative memory of male and female college students of nearby to very distant geographic sites. A test booklet included eight schematic aerial maps. The maps were of 20 to 50 geographic sites participants attempted to match with their names. The number of campus buildings, campus city sites, regional cities, U.S. cities, U.S. states, world cities, world countries, and world continents/bodies of water matched correctly were determined. A demographic questionnaire was also presented. Overall, men performed significantly better than women on the U.S. cities measure, world cities measure, world countries measure, and world continents/bodies of water measure. These results were interpreted to be consistent with the hunter-gatherer theory.
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CHAPTER 1
INTRODUCTION

Research suggests that men perform as well or better than women on various spatial perception tasks. These spatial perception tasks include the mental rotation, rod-and-frame, water-level, embedded figures, spatial relations, block design, and geographic tasks. The most consistent gender difference favoring men has been observed with the mental rotation task (Vandenberg & Kuse, 1978). According to Downs and Stea (1977) another finding is that women prefer to use topographic information (landmarks), and men prefer to use Euclidian (distance and compass directions) strategies in way-finding. The purpose of the proposed research is to study gender differences in knowledge of geographic sites varying in distance.

Theories of Spatial Perception

Evolutionary Theories

One theory that relies on the biological make-up of organisms is the hunter-gatherer theory (Choi and Silverman, 1997; Silverman and Eals, 1992). This theory suggests that men possess a superior sense of direction in the outdoors due to their hunter heritage, and women have superior spatial memory for things closer to home due to their gatherer heritage. In other words, men had to travel great distances to hunt for food while women stayed closer to home to gather food and to care for their offspring. Hunters and gatherers who were successful in these roles passed these skills on to their offspring.

Preparedness theory (Seligman, 1970) describes behaviors as being genetically influenced. If an organism is prepared or well-suited to perform a task, little or no learning or practice is required to perform the task. If an organism is not prepared or well-suited to perform a task, it will find the task more difficult to learn. Zinser, Palmer, and Miller (in press) suggested that this theory might be extended to gender differences in geographic knowledge. For example, if men perform better on geographic tasks, this may indicate that they are more prepared,
genetically, in interest or cognition, to perform these tasks than are women. This does not mean that women cannot perform as well as men, but that they might require more time and practice to perform as well as or better than men.

Conversely, Silverman and Eals (1992) found that women perform better on object memory than men, perhaps because of their gatherer heritage; men may be less prepared to perform on object memory genetically and, therefore, require additional effort to match the performance of women. In this research, participants were presented with drawings of objects and given 60 seconds to study the drawings. They then were presented with the same set of objects except this time the drawings contained additional objects and they were asked to identify the new objects. Finally, they were presented with the original set of objects again but this time some of the objects had been moved. The participants were asked to identify the moved objects. Silverman and Eals found that the women did better on both tasks than did the men.

Another explanation of gender differences in geographic abilities is found in the idea that men had to travel greater distances to locate a mate (Gaulin & Fitzgerald, 1986); men that were successful in mating passed on this skill. Perhaps those who possessed a good sense of direction were able to find mates and were able to pass on this skill through their genes. In support of this theory, Gaulin and Fitzgerald (1986) found that polygynous voles, versus monogamous voles, had superior spatial skills. Differences in brain structure may have played a significant role in the behavior of these animals. They found that the polygynous voles had larger hippocampi; the hippocampus has been implicated in mediating spatial perception. Other brain differences, that have been cited as playing a role in gender differences are hormones (Silverman & Phillips, 1993), hemispheric specialization (Harris, 1981; Kinsbourne, 1978; Sherman, 1978; Siegel-Hinson & Mckeever, 2002), and the size of the hypothalamus (LeVay, 1991).

Learning Theories

Gender differences in spatial memory have been observed not only in adults, but also in children. Investigators like Goldberg and Lewis (1969) reported gender related differences on a wide
range of behaviors. They found that 13-month old boys displayed less dependency, more exploratory behavior, and more vigorous play than their female counterparts. One interpretation is that a difference in upbringing may have played a major role in the differences that are evident between men and women. Hart (1979) found that parents allowed their boys to explore up to twice as far from home than their girls. Pomerantz and Ruble (1998) found that parents encourage boys to explore their environments while discouraging girls from doing the same. Thus, children who are encouraged to explore may develop a better sense of direction.

Using a quasi-experimental design, Quaiser-Pohl (2001) compared the spatial cognition of second, fourth, and sixth graders living in four neighborhoods in an East German town. Spatial ability was measured with the water-level task, rod-and-frame test, mental rotation tests, and their drawing of the neighborhood. Data on the spatial behavior of the children were gathered by semi-structured interviews. The results yielded significant age, gender, and neighborhood differences on accuracy of maps of the neighborhoods and gender differences between neighborhoods. Children from large geometrically organized cube-shaped apartment buildings performed the best on spatial cognition tasks; children living in the old-town neighborhoods performed the worst. Overall, the results were interpreted to reflect the influence of exploration on spatial abilities. The more children explore, the better they perform.

Gender differences may be largely due to men and women using different cognitive styles. McGuinness and Sparks (1983) wrote that women may have the knowledge but they may not display it unless asked for it. To determine this, they performed two experiments. In the first experiment participants were supplied with a 9" X 11" sheet of white paper and were told that the sheet of white paper represented the perimeter of the campus. They were then asked to draw a map of the campus and to pretend that a friend was coming to visit but that they would be unable to take them around campus. Each participant was given up to 30 minutes to complete the map. The participants were then asked to complete a short questionnaire that included their length of attendance at the school, whether they live on- or off-campus,
mode of transportation, age, extracurricular activities, the buildings they most frequently encounter, and their major. The results were evaluated by performing between groups t-tests (men and women) on five variables; major roads and paths included, spatial coordinate errors, relative deviation error, extra items included, and number of missing buildings. No significant difference was found on the number of buildings missed. However, significant differences were found on the remaining four variables. Overall, the men included many more roads and paths than did the women; the men displayed far fewer errors on absolute spatial coordinates; the women included more extra items on their maps; and the women were more accurate on their relative deviation to the central target point. In most aspects the maps of the men and women were very different. The most notable difference was that the women included very few connectors such as roads, paths, and bridges.

In an attempt to determine why women omitted roads, bridges, and paths in their maps McGuinness and Sparks (1983) performed a second study. In this experiment, they asked the participants to draw all of the possible routes to three campus buildings (drawn to scale) on a sheet of paper. The participants were asked to sketch in all roads, paths, bridges, and steps using symbols provided in the legend. They were also asked to estimate the time it would take to walk between these buildings. Maps were scored using an overlay technique. A transparent map was placed over the sketched map and two judges scored the accuracy of the maps independently. In the second experiment women displayed more of what they knew compared to the first experiment. Of the items measured, only roads and bridges showed a significant difference due to sex; men were more accurate than women. The mean score also showed that the men were significantly more accurate over all conditions. The investigators found that women typically began their plans with important buildings and later connected the buildings with the roads. The men did the opposite. They began by drawing roads first and later arranging buildings according to the roads. This research suggested that women organize according to proximity and grouping while men organize by establishing a set of coordinates. In other words, women focus on landmarks and the
distances between the landmarks while men focus on road networks and other connectors which provide a framework for the building locations. Women tend to use bottom-up processing.

Ward, Newcombe, and Overton (1986) also suggested that gender differences may be due to a style preference. Participants were asked to give directions from maps (perceptually available or memorized). Measures included, use of landmarks, use of relational terms, use of cardinal directions, use of mileage estimates, and frequency of omission and commission errors. Men used more mileage estimates and cardinal directions and made fewer errors than women. Women used more landmark and relational terms than did men. Although women made more errors than men, they knew more details when asked for them. It was just a matter of sharing them. It appeared that women were less likely to give the information unless they were specifically asked for it.

These studies suggest that the observed gender difference, in spatial and geographical knowledge may be largely due to a difference in cognitive styles. Consistent with this observation, Harris (1981), Feingold (1998), Voyer, Voyer and Bryden (1995) concluded that the spatial perception gender gap has been closing.

Research by Bein (1988) suggests that there is a strong correlation between travel experience and geographic knowledge, that is, the more people travel the better they perform on geographic tasks. On a baseline geography test, which consisted of map skills, place-name location, physical geography, and human geography, men scored significantly better than women in all of the above areas. Bein argued that the difference was not due to aptitude but due to a difference in experience with geography. This research suggested that travel is the greatest contributor to one’s geographic ability and that travel is more accessible to men than to women.

Sanz De Acedo Lizarraga and Garcia Ganuza (2003) reported that with training boys (minors) and girls (minors) can significantly improve on the mental rotation task and can transfer learning to a visualization test. A control group was used as a means of comparison. During the pretest, both the experimental group and the control group were tested to determine their abilities on mental rotation tasks and transfer of learning to a
visualization test. The experimental group underwent an intervention that consisted of a training program that had participants practice mental rotation and visualization problems. Participants in the experimental group underwent sessions twice a week for 6 weeks. Each practice session was divided into three phases. The first phase was an introduction. In this phase, instructions were discussed, materials were handed out, and the students were reminded that the auxiliary cube was only to be used when they experienced difficulty solving one of the items. The auxiliary cube was a tool that helped the participants better visualize the items. The second phase was individual work. During this phase participants performed their assigned tasks. If they actually used the auxiliary cube, they were to write a “Y” next to their answer, and if they did not utilize the cube they were to write “N”. The third phase provided correction and feedback. In this phase teachers made comments on the responses, and participants were able to correct their work. During the posttest, both the control and experimental groups were assessed once again using the same measures used in the pretest to determine the effectiveness of the training.

The results indicated that there was no difference between the experimental group and the control group on the pretest. When comparing the pretest and posttest scores of the control group there was no difference on the mental rotation test but there was a significant difference on the transfer of learning to a visualization test. On comparing the pretest and posttest scores in the experimental group there were significant improvements on both the mental rotation and visualization tasks. In other words, participants who received training improved their performance on both mental rotation and the transfer of learning to a visualization test. Sanz de Acedo Lizarraga and Gauza (2003) found no gender difference in spatial ability either before or after the intervention; however, they found that both boys and girls improved equally from the training.

Are Gender Differences Conditional?

Scali, Brownlow, and Hicks (2000) studied whether gender differences could be due to demand characteristics, that is, they
studied whether gender differences were affected by practice, experience, and instructions. College students completed spatial perception, visualization, and mental rotation tasks under three conditions. The first condition emphasized speed; the second condition emphasized accuracy, and the third and final was a control. The participants were also asked to rate their spatial ability. The results revealed no gender difference under speed instructions. However, much like previous literature, men outperformed women on spatial ability tests.

O'Laughlin and Brubaker (1998) studied gender differences in college students on self reported spatial abilities as well as performance on mental rotation and cognitive mapping. Participants viewed a brief videotape of the interior of a three-bedroom, one-level home. One video had furniture while the other did not. They were then asked to draw a map of the floor plan. Men performed better on the mental rotation test. However, there did not appear to be a gender difference on the mapping task. Overall, the participants presented with the video of a furnished home sketched more accurate maps than did those who were presented with the video of the unfurnished home. This result suggested that men and women may rely on landmarks while performing spatial tasks. Even though men and women performed equally on mapping tasks the women displayed less confidence in doing so.

Geographic Research

Campus and Campus City Sites

Devlin and Bernstein (1995) conducted research on different types of way finding used by men and women. To measure the differences, Devlin and Bernstein used a computer to randomly assign participants to one of seven way finding conditions in a lounge in the university admissions building. The first condition consisted of 14 photographs of the campus tour; the second, of 14 photographs of the campus tour with general direction information; the third, of 14 photographs of the campus tour with a directional test that also had landmark references; the fourth, of nine screens (no campus photographs) which presented the same text as condition two; the fifth, of nine screens (no campus photographs)
and the same text as presented in condition three; in the sixth, a map of the campus with the tour route highlighted; and the seventh, a campus map with highlighted route in addition to all major landmarks being marked.

After the tour Devlin and Bernstein (1995) asked the participants to give a confidence rating (1=very confident to 5=not at all confident) regarding how confident they felt about finding their way to the tour destination. The participants were given a test consisting of 14 screens that contained photographs along the tour and two to three arrows the participants were to touch that indicated the direction one must proceed to reach the tour destination. The number of errors was recorded over the 14 screens. Overall, men made significantly fewer errors than women. Participants with pictures along with text or landmarks performed better overall. This indicated that supplemental information provided greater cues for both men and women participants.

Devlin and Bernstein (1995) concluded that men prefer “map only” or “map plus visual input” while women prefer “map plus visual plus written input” (p.36). This supported the notion that men prefer visual-spatial information and women prefer more linguistic-based information.

Harrell, Bowlby, and Hall-Hoffarth (2000) presented participants with scenarios involving providing a campus visitor with directions to a nearby destination. One scenario was simple and the other complex. The investigators then determined the visitors’ age, gender, and familiarity with the campus. After receiving this information the participants were asked to draw directions to that specified destination. The maps were analyzed and assigned points based on buildings and landmarks identified, cardinal indicators (oriented correctly according to n and s), directional arrows (direction the visitor should travel), supplemental directions (words written on the map to direct the visitor), and map completeness. Harrell et al. found that the men provided more cartographically correct maps than the women did although there was no difference in the use of landmarks or the labeling of buildings. Overall, the men took the visitors’ characteristics into account significantly more than the women did. The men provided more complete maps to the newcomers and
unfamiliar visitors; they also were more confident that their maps would lead the visitors to their desired destination.

Dabbs, Chang, Strong, and Milun (1998) had participants complete cognitive spatial tests, offer directions from local maps, and identify places on a world map in an effort to determine if there were gender differences in navigation strategy and geographic knowledge. Dabbs et al. (1998) found that men were better than women on spatial tests, but that there was no significant difference in object location memory. When giving directions, men were more abstract using distance in miles and n, s, e, and w information. Whereas women were more detailed, using landmarks and left and right-turns information. Men were also able to identify more international places than were women. Overall, Dabbs et al. found that there are indeed gender-related differences in spatial skills. This research supported the hunter-gatherer theory in that men were more knowledgeable than were women on more distant geographic sites.

Regional and National Geography

Although there has been a considerable amount of research that supports gender differences between men and women, uncertainties remain. Golledge, Ruggles, Pellegrino, and Gale (1993) studied route learning and found no difference between men and women. The first group of participants performed Psychometric tests. This consisted of the Hidden Patterns Test, Card Rotations Test, and Mental Rotations Test. The second group was given the Campus Route Learning test. In this group, participants were taken on a walk through an area of campus. On the first trial, the participants walked behind the researcher and were not given any instructions until the end of the walk when they were asked to sketch a map of the route. After the first trial, the participants were taken down the route two more times (intentional learning trials) and asked to draw the route after each trial. The third group participated in map learning. It consisted of an amusement park map and a Grand Forks map (a city map). Participants were to study these maps, remember eight locations, and then draw the maps. In the fourth group participants were to answer questions about local, national, and international place
locations they knew from prior experience. This group was divided into four subgroups: Santa Barbara distances (27 pairs of locations in the Santa Barbara area were collected in the Grand Forks maps), city cardinal locations (participants judged which of a pair of cities was either farther n or farther e), city/state ordinal distances (which city or state was closer in terms of distance), and city placements (participants were given an outline map of the world and a list of 15 cities and were asked to place a dot where each city was). The fifth group was asked to study the location and placement of objects and then to draw their placement and list their names. The sixth group performed a verbal spatial descriptions (route learning) task. After the third walk (group 2), participants were to verbally describe the route, talking into a tape recorder. The seventh and final group provided basic demographic information. Overall, a combination of all the task variables accounted for over 60% of the total variance enabling the investigators to correctly classify the majority of participants as men and women simply by their performance on the spatial tasks. This research suggested that, for the most part, men and women do differ on their spatial abilities and styles.

Beatty and Bruellman (1987) had participants learn the locations of 15 theoretical towns that were located on a map of three adjacent states. Participants were given 60 seconds to study the map; thereafter, four recall trials were administered, without the aid of a map for reference. Following the final recall evaluation, the participants were asked to remember the locations of the towns. Next, they were asked to locate 10 geographical features of U.S. geography and 30 U.S. cities on an outline map of the US and eighteen cities on an outline map of the North Dakota-South Dakota-Minnesota region. The participants also were asked to show which state each of the 30 U.S. cities were located in, and which of the U.S. states and Tri-state cities they had visited during their lives. For the remainder of the 45 minute retention interval, participants completed several different spatial tasks including a version of Piaget and Inhelder's water level problem and the Everyday Spatial Activities Test. Thereafter, all participants were given a delayed retention test of the locations of towns on the New Map Test. A small
subgroup received a second delayed retention test 48 hours later. Overall, the differences between men and women on the 45 minute retention test and the 48 hour retention test were negligible. Men performed more accurately than did women in locating U.S. cities and cities in the Tri-state region. Research on memory for sites on an unfamiliar map yielded no difference between men and women. The results were interpreted to suggest that the difference was not from different capacities for map learning or memory but due to men, as compared to women, paying more attention to maps.

Henrie, Aron, Nelson, and Poole (1997) had junior high students and undergraduates complete a survey. Henrie developed a test to assess their knowledge of geography which consisted of 100 multiple choice questions. Henrie found that men consistently outperformed women on a test covering map skills and physical, human, and regional aspects of geography. Men did better across all four areas. The difference increased with higher education levels and was significant even after accounting for several personal variables that might have explained the difference. This performance difference reflected a broad spectrum of geographic knowledge, arguing against attributing the gender gap to a single underlying factor such as map skills or spatial abilities.

Straub and Seaton (1993) performed research to attempt to find gender differences in knowledge of U.S. state names and locations. In the first experiment, participants were randomly assigned to a map-only condition or a map with name-aid condition. In the map only condition participants were given a blank map of the 48 contiguous states with only outlines of the state boundaries which provided information on the states’ size, location, and shape. They were then given 20 minutes to write the correct name within each state outline. Horizontal lines within the state outlines were provided (leader lines for the smaller states) to write the correct state name. In the map with name aid condition participants were given a alphabetized list of the state names (recall aid) and a map identical to the one presented in the map only condition. The participants in the map-only condition were able to identify significantly more states than the participants in the map with name aid condition. Moreover, men
outperformed women in their ability to label states outlined on a blank map.

In the second experiment, the participants were randomly assigned to a list-only condition and a list-with-map-aid condition. The list only condition entailed giving the participants a sheet of paper with 48 numbered blanks. The participants were then instructed that they had 20 minutes to write out as many of the 48 contiguous states as they could remember. The list with map aid condition was the same as the list only condition with the exception of the presence of an outline map of the 48 contiguous states to use as an aid for recall. No difference was found between men and women when they were asked to simply list state names from memory. Overall, Straub and Seaton (1993) assumed that the gender difference in the first experiment was a result of greater configurational geographical knowledge of the states (state outlines) in men and not a result of gender difference in state name knowledge.

International

Eve, Price, and Counts (1994) gave the Knowledge of Geography Test to high school and college students and discovered that men scored higher on questions regarding international sites. Men were able to match more landmarks with sites, names with sites, and were stronger on questions about international sites. The percentage of participants according to gender in the high performance group heavily favored men. Ninety percent of the participants in the performance group were men, and 9.1% were women.

Snyder, Harris, Ceravolo, and Bonner (1996) explored the difference of geographic knowledge according to handedness and gender. After completing the handedness inventory and the Vocabulary subtest of the Weschler Adult Intelligence Scale-Revised, participants were given a Modified-Gallup Geography Test. This test consisted of a blank outline map of the world that had 16 locations numbered on the map and those 16 locations names were listed below the map. Participants were to match the correct number with the location name at the bottom of the page. Snyder and et al. found that, overall, men significantly outperformed
women, and left handed women significantly outperformed right-handed women.

Cross (1987) studied several related factors of students’ place location knowledge. Geography students were surveyed and asked to locate 11 countries on a blank map of the world that showed political boundaries, major rivers, and lines of latitude. All of the countries that were used were considered to be prominent in world affairs: China, Cuba, Great Britain, El Salvador, Ethiopia, India, Iran, Lebanon, Poland, South Africa, and the Soviet Union. The participants were to indicate the location of the country by putting an x in the appropriate country’s boundary and then label the country. The survey consisted of the students’ class standing, their gender, major, travel and news magazine readership, and television viewing information. Cross found that the number of men who were able to locate 11 countries on a blank map was significantly higher than the number of women who were able to do so.

The previously mentioned study by Dabbs et al. (1998) supported the notion that men performed better on more distant sites than did women. He found that men located significantly more international sites than women.

Montello, Lovelace, Golledge, and Self (1999) had men and women respond to a number of spatial and geographic tasks over two separate sessions. Overall, men performed better than women on placing 15 world cities on an outline map of the world, on campus route distance estimates, and mental rotation. Women performed better than men on object location memory. However, no difference was found on other campus route learning tests and map learning distance tests. The research also suggested that there was no gender difference on self-rated exposure and knowledge of the campus, the city, the U.S., and the world. Overall, men outperformed women on tests that measure newly acquired spatial knowledge (what was learned during the trials) more so than on tests directed at existing or map derived knowledge.

Research by Zinser, Palmer, and Miller (in press)

Research by Zinser et al. (in press) focused on geographic site-name, associative memory of male and female college students
for locations of varying distance. They studied gender
differences in the recall of campus, regional, national, and
international sites.

In the first experiment, college students (74 women and 35
men, mainly middle class Whites) were to match listed names of
campus buildings and local cities with their locations on aerial
schematic maps. The campus schematic aerial map consisted of 13
major buildings of the university campus (represented by the same
rectangle). They were represented in their approximate
orientation and location to one another within a quadrant with
roads (labeled) as boundaries. Only one building was shown to be
located outside of the labeled perimeter. To create a map of the
12 major cities within a 100 mile radius of the campus, Zinser et
al. placed a blank sheet of paper over a highway map and placed a
dot over the city locations. A line that extended from the campus
city to the dot for each city was also drawn. The participants
were asked to match the campus buildings and local cities by
placing the letter near the city on the map next to the site names
listed on a second sheet. Two minutes were allowed for completion
of each task. The number of buildings and the number of cities
matched correctly were the dependent variables. The gender
difference for campus buildings was not significant. However, the
gender difference for cities was significant. Men were able to
match a significantly higher percentage of cities than did the
women.

In the second experiment, college students (191 women and 97
men, mainly middle-class Whites) were randomly assigned within
gender groups to three treatment conditions. The first condition
was the verbal memory condition. This condition consisted of a
sheet that included 50 lines on which participants were to list as
many of the 50 U.S. states as they could remember. It also
consisted of a second sheet of 25 lines on which the same
participants were to write as many of the U.S. cities they thought
had populations of over one million. The second condition was the
verbal spatial-aid condition. Under this condition the
participants were provided with an outline map that showed the
outline of the 50 U.S. states and a second outline map showing the
location of the 25 most populated cities. Again, the participants
were to write the names on the sheet. In the third condition, the spatial aid and verbal aid condition, all of city and state names were provided as well. The participants were simply to match the marked locations on the maps with the provided names of the states and cities. Participants were given five minutes to complete the states task and five minutes to complete the cities task. The performances of the men and women was compared under all three treatment conditions on the number of states identified, number of cities identified, miles traveled in state, miles traveled in the southeastern region, miles traveled in the nation, and on the participants’ confidence rating.

None of the gender differences were significant for the states measure. For the verbal memory condition, the gender difference on the number of cities listed correctly also was nonsignificant. However, there was a significant difference on cities for the verbal spatial-aid memory condition and the verbal and spatial-aids conditions, with men recalling more cities than women. For miles traveled in state, in the southeastern region, and in the nation, all tests were not significant, with the exception of the miles traveled in state measure under the spatial and verbal aid condition, which favored men.

In the third experiment, college students (74 women and 34 men, mainly middle-class Whites) were asked to match the world’s largest bodies of water and continents with their names, a map of countries with their names, and a map of the world’s largest cities with their names. The three maps were distributed in random orders within the gender groups to control for sequence effects. The three black and white outline maps were 15 continents/ major bodies of water/land masses (North America, South America, Africa, Asia, Europe, Australia, Antarctica, Indian Ocean, Atlantic Ocean, Pacific Ocean, Arctic Ocean, Caribbean Sea, Greenland, Red Sea, and the Mediterranean Sea), 15 countries (China, India, United States, Brazil, Russia, Japan, Nigeria, Mexico, Germany, Philippines, Indonesia, Pakistan, Bangladesh, Vietnam Nam, and Iran), the 15 largest international cities (Rome, Chicago, Mexico City, Paris, Los Angeles, Moscow, Rio de Ganeiro, London, Berlin, New York, Buenos Aires, Madrid, Tokyo, Calcutta, and Singapore. A uniform dot represented all of the locations of
the cities on the map. The participants were to match the marked locations with the site names listed below the map. They were not given a time limit. Men matched significantly more sites on all three maps than did the women.

**Statement of the Problem**

Although there have been studies on gender differences on geographic tasks, there have not been many studies on gender differences of geographic site-name associative memory. Associative memory is employed regularly in day to day living.

One purpose of this experiment is to investigate the geographic site-name associative memory of male and female college students for nearby to very distant sites. A second purpose of this research project was to replicate, refine, and extend research by Zinser et al. (in press). Methods were to be standardized. A standardized time limit of three minutes for each map was utilized. In the Zinser et al. (in press) studies different time limits were used across the maps. Sites will be added to the campus map to make the task more difficult to avoid the ceiling effect reported by Zinser et al. (in press). Zinser et al. (in press) also used unequal numbers of men and women participants. An equal numbers of men and women were to be recruited. Zinser et al. (in press) studied campus, regional, national, and international sites. A map of campus city sites was to be added, creating a more complete distance series of maps.

By studying the geographic site-name associative memory of men and women across maps varying in distance, one will be able to relate the findings to the hunter-gatherer hypothesis. The theory suggests that men will be more knowledgeable about more distant sites than will women.

**Hypotheses**

It was hypothesized that men would perform significantly better than women on geographic site-name associative memory tasks on maps of campus, campus city, regional cities, national cities and states, and international sites. Zinser et al. (in press) investigated the differences between men and women on campus, regional, national, and international levels and found
significant gender differences favoring men for cities and international sites. The campus buildings hypothesis was supported by Devlin and Bernstein (1995) and Harrell, Bowlby, and Hall-Hoffarth (2000). The campus city task and the regional cities hypotheses were supported by Beatty and Bruellman (1987) and Zinser et al. (in press). The national states and cities map hypotheses was supported by the results reported by Straub and Seaton (1993) and Zinser et al. The hypotheses that men would perform significantly better than women on the international bodies, countries, and international cities tasks was supported by the results reported by Snyder et al. (1996), Eve et al. (1994), and Zinser et al. (in press).

Moreover, it was hypothesized that men will rate their sense of direction higher than would women, that men would rate their familiarity of Johnson City higher than the women, and rate their ability to recall the names of places, like cities, and states, with the assistance of a map higher than would women. These hypotheses were supported by Zinser et al. (in press), Beatty and Bruellman (1987), Eve et al. (1994), Devlin and Bernstein (1995), and Harrell et al. (2000).
CHAPTER 2

METHOD

Participants
Approximately 114 college students from a southeastern U.S. university were recruited (64 women and 50 men) as participants. The participants were from upper level psychology (29), introductory psychology (52), and introductory criminal justice courses (33). Classes participated by availability. Depending on the instructor’s policy, many participants received very modest extra credit for participating in the study. No students younger than 18 years of age participated in the study.

The number of participants varied somewhat across map tasks (see Table 1) because some participants omitted a map.

Measures
The test booklet included eight schematic aerial maps. The maps specified 20 to 50 geographic sites each of which were represented by open squares (9mm) or dots (3mm). The sites were lettered alphabetically from left to right. One aerial map represented 20 major buildings of the university campus (Appendix A). All of the buildings were represented with the same open squares (9mm) and showed their approximate location to one another. The campus is situated on a ridge and the buildings generally were arranged in nonrectilinear fashion to one another. The map also showed the four major boundary roads of the campus (two were named) and a central flagpole that served as a central reference point. A second aerial map, represented 20 city locations (stores, buildings, parks, etc.) surrounding the university campus (Appendix B). The town locations were plotted by tracing a city map (obtained from the students’ course schedule) and were represented with open squares (9mm). The city map also included the major city roads. A third aerial map highlighted 20 cities and towns within 100 miles of the campus (Appendix C). The city locations were plotted by tracing a highway map and were represented with solid 3mm diameter dots. The regional cities map included the interstates and other major highways and the state boundaries to provide some orientation on
the location of the sites. A map of the U.S., obtained on-line from "The Learning Network", was used for the state and U.S. cities aerial maps. Only state boundaries were visible (Appendices D and E). Each of the 50 states was marked with a letter or a double letter. The second U.S. map was the same except dots were used to represent the location of the 25 most populated cities (Appendix E) of the U.S.. The 25 most populated cities were identified from information provided by the 2000 U.S. Census posted online. An international map obtained on-line from "The Learning Network" was used to create the remaining schematic maps. For these maps, letters were used to mark the geographic locations. One map specified 20 continents and major bodies of water (Appendix F), another 20 countries (Appendix G), and a third the 20 largest international cities (Appendix H).

A demographic questionnaire (Appendix I) was presented in advance of the maps. The items were presented in the following order: the participants' age, gender, school classification, present address, if they live on or off campus, if they have ever lived on campus, the length of time they have attended the University, confidence rating on sense of direction (presented before and after the maps), familiarity rating on the campus city, other locations they have lived, the distances they have traveled within the state, distance traveled outside the state but within the southeast, distance traveled outside the southeast but within the U.S., the number of trips made outside of the U.S., the international destinations visited, and the ability to recall names and places with the assistance of a map (presented before and after the maps).

Confidence ratings on sense of direction and ability to recall names and places with the assistance of a map also were presented before and after the maps to determine if confidence ratings changed after completing the maps. The sense of direction and the ability to recall names and places with the assistance of a map ratings scales also were presented before and after the maps.
Experimental Design

Men and women were compared on the following: the percentage of campus buildings they matched correctly with their name, the percentage of campus city sites matched with their name, the percentage of regional cities matched correctly with their name, the percentage of states matched correctly with their name, the percentage of U.S. cities matched with their name, and the percentage of international bodies, cities, and countries matched with their name. Independent groups t-tests were performed between men and women for all of the map measures and demographic questionnaire response measures, including years attended the southeastern university, number of places lived, miles traveled in state, miles traveled out of state but within the southeast, miles traveled outside the southeast but within the U.S., trips outside the U.S., and number of international destinations. An alpha level of p<.05 was set. Spearman rho correlations were calculated between all pairings of the site-name response measures and between the following demographic response measures: how good is your sense of direction pretest and posttest, rate yourself on your familiarity with Johnson City, TN, rate your ability to recall the names and places pretest and posttest, cities and states and the like, with the assistance of a map. All Spearman rho correlations also were calculated separately by gender.

Wilcoxon rank-sums test were calculated on the pretest and posttest sense of direction rating scale, on the sense of direction rating scale by gender, on the pretest and posttest ratings for the ability to recall names and places with the assistance of a map, and on the ratings of the ability to recall names and places with the assistance of a map by gender.

Mann Whitney U tests were calculated to compare men and women on the posttest ratings of sense of direction and on the posttest rating of ability to recall with the aid of a map.

Procedures

In the booklets, the maps were presented to each participant in a different random order to control for sequence effects. Prior to testing, the participants were told they would be given three minutes to complete each of the eight maps. The
participants also were instructed to identify the map sites in alphabetical order and not to proceed to the next map until directed to do so.

The participants first were asked to complete the demographic questionnaire, which included ratings of sense of direction and ability to recall names and places. Next, they completed the maps one at a time until all of the maps were completed. The presentation of each map was timed. At the end of each of the three minutes, the participants were asked to turn to the next map etc. After all of the maps were completed, the participants again rated their sense of direction and their ability to recall names and places with the assistance of a map. They were then informed

This completes the procedure of this experiment. Thank you for participating in the experiment. It is very important to the integrity of this study that you do not tell anyone anything about this experiment. Do you understand? We will need to test more people and it is important they not know anything about this experiment.

The participants were then asked, “Did you hear anything from anyone about this experiment?” They were then to circle “yes or no”. If the participants answered “yes”, they would have been asked what they knew about this project. None of the participants answered “yes” in this experiment. They were then instructed, “If you have any questions about this experiment, you may leave a message with the Psychology Department Secretary. We can answer any of your questions after data collection is completed.”
CHAPTER 3
RESULTS

Geographic Site-Name Recall
The numbers of geographic sites matched correctly were converted to percentages for all eight geographic site name recall tasks. The mean number of campus, campus cities, regional, national cities, national countries, world cities, world countries, world continents/bodies of water correctly matched, and years attended E.T.S.U. are presented in Table 1.

Table 1
Mean Percentages and Standard Deviations of Geographic Sites Matched With Their Names

<table>
<thead>
<tr>
<th>GENDER</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>t</th>
<th>p</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campus Male</td>
<td>49</td>
<td>34.29</td>
<td>28.14</td>
<td>1.69</td>
<td>p&gt;.05</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>62</td>
<td>25.89</td>
<td>24.17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campus Male</td>
<td>48</td>
<td>21.25</td>
<td>18.92</td>
<td>2.18</td>
<td>p&gt;.05</td>
<td></td>
</tr>
<tr>
<td>City Female</td>
<td>59</td>
<td>18.59</td>
<td>17.41</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional Male</td>
<td>50</td>
<td>30.20</td>
<td>20.97</td>
<td>2.18</td>
<td>p&gt;.05</td>
<td></td>
</tr>
<tr>
<td>Cities Female</td>
<td>63</td>
<td>22.46</td>
<td>16.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Male</td>
<td>50</td>
<td>53.08</td>
<td>20.36</td>
<td>4.00</td>
<td>p&lt;.05</td>
<td>.07</td>
</tr>
<tr>
<td>Cities Female</td>
<td>63</td>
<td>37.97</td>
<td>19.63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Male</td>
<td>49</td>
<td>33.59</td>
<td>12.62</td>
<td>1.81</td>
<td>p&gt;.05</td>
<td></td>
</tr>
<tr>
<td>States Female</td>
<td>63</td>
<td>28.95</td>
<td>14.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World Male</td>
<td>50</td>
<td>39.00</td>
<td>18.82</td>
<td>5.00</td>
<td>p&lt;.05</td>
<td>.10</td>
</tr>
<tr>
<td>Cities Female</td>
<td>63</td>
<td>23.49</td>
<td>14.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World Male</td>
<td>50</td>
<td>66.10</td>
<td>26.39</td>
<td>5.76</td>
<td>p&lt;.05</td>
<td>.13</td>
</tr>
<tr>
<td>Countries Female</td>
<td>62</td>
<td>38.79</td>
<td>23.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World Male</td>
<td>50</td>
<td>73.10</td>
<td>25.09</td>
<td>3.56</td>
<td>p&lt;.05</td>
<td>.05</td>
</tr>
<tr>
<td>Bodies Female</td>
<td>63</td>
<td>55.00</td>
<td>28.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years Attended Male</td>
<td>50</td>
<td>2.08</td>
<td>1.98</td>
<td>1.05</td>
<td>p&gt;.05</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>62</td>
<td>2.45</td>
<td>1.77</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Independent t-tests were performed between the women and men for all measures (see Table 1). Upon reviewing the means, it is apparent that the participants performed the best on the continents/bodies of water map. Men performed better than women on the campus map task; however, there was not a significant difference. The gender difference on the campus city map and on the regional cities measure also were nonsignificant. The gender difference on the national map (matching states) task was nonsignificant as well. However, the gender difference on the national cities task, favoring men, was significant, t(113) = 4.00 p < .05 $\eta^2$ = .07. Significant differences favoring men also were found for the world cities task, t(113) = 5.00 p < .05 $\eta^2$ = .10, world countries task, t(112) = 5.76 p < .05 $\eta^2$ = .13, and the world continents/bodies of water task, t(113) = 3.56 p < .05 $\eta^2$ = .05. Gender differences were non-significant on years attended the university, number of places lived, miles traveled in Tennessee, miles traveled outside Tennessee but within the southeast, trips outside the U.S., and number of international destinations.

Computations for the Wilcoxon rank-sum test on the pretest and posttest ratings of sense of direction and on the pretest and
posttest ratings of ability to recall names and places with the assistance of a map are displayed in Table 2. Sense of direction

Table 2
Wilcoxon rank-sum Tests (z scores) for Pretest Versus Posttest Rating Scales and Gender

<table>
<thead>
<tr>
<th>Test</th>
<th>Pre</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sense of Direction</td>
<td>114</td>
<td>6.64</td>
<td>2.0</td>
<td>-7.16</td>
<td>&lt;.05</td>
<td></td>
</tr>
<tr>
<td>Ability to Recall</td>
<td>114</td>
<td>6.21</td>
<td>1.99</td>
<td>-6.71</td>
<td>&lt;.05</td>
<td></td>
</tr>
<tr>
<td>Sense of Direction (Men)</td>
<td>114</td>
<td>7.06</td>
<td>1.89</td>
<td>-3.86</td>
<td>&lt;.05</td>
<td></td>
</tr>
<tr>
<td>Ability to Recall (Men)</td>
<td>114</td>
<td>6.84</td>
<td>1.90</td>
<td>-3.39</td>
<td>&lt;.05</td>
<td></td>
</tr>
<tr>
<td>Sense of Direction (Women)</td>
<td>114</td>
<td>6.31</td>
<td>2.03</td>
<td>-6.04</td>
<td>&lt;.05</td>
<td></td>
</tr>
<tr>
<td>Ability to Recall (Women)</td>
<td>114</td>
<td>5.73</td>
<td>1.94</td>
<td>-5.75</td>
<td>&lt;.05</td>
<td></td>
</tr>
</tbody>
</table>

pretest ratings were significantly higher than the posttest ratings. Pretest ratings of the ability to recall names and places with the assistance of a map were significantly higher than the posttest ratings. Men’s sense of direction pretest ratings were significantly higher than the posttest ratings. Rating of the men’s ability to recall with the assistance of a map pretest ratings were significantly higher than the posttest ratings. Women’s sense of direction pretest ratings were significantly higher than the posttest ratings. Women’s ability to recall with the assistance of a map pretest ratings were significantly higher than the posttest ratings.

The Mann-Whitney U tests performed between gender on the posttest rating scales are displayed in Table 3. Men performed
Table 3
*Mann Whitney U Tests (z scores) Between Gender for Posttest Rating Scales*

<table>
<thead>
<tr>
<th>GENDER</th>
<th>N</th>
<th>Mean</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sense of</td>
<td>Men</td>
<td>48</td>
<td>68.83</td>
<td>-4.09</td>
</tr>
<tr>
<td>Direction</td>
<td>Women</td>
<td>61</td>
<td>44.11</td>
<td></td>
</tr>
<tr>
<td>Ability to</td>
<td>Men</td>
<td>48</td>
<td>70.55</td>
<td>-4.60</td>
</tr>
<tr>
<td>Recall</td>
<td>Women</td>
<td>61</td>
<td>42.76</td>
<td></td>
</tr>
</tbody>
</table>

significantly higher than women on the posttest rating scales of sense of direction and the posttest rating scales of ability to recall with the assistance of a map.

Correlation Matrices

Spearman rho correlations performed between all map measures, are displayed in Table 4. Correlations of all pairings of the map

Table 4
* Spearman rho Correlations for All Map Percentages.*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Campus</td>
<td>___</td>
<td>.36**</td>
<td>.44**</td>
<td>.33**</td>
<td>.10</td>
<td>.31**</td>
<td>.32**</td>
</tr>
<tr>
<td>2</td>
<td>Campus City</td>
<td>___</td>
<td>.39**</td>
<td>.40**</td>
<td>.20*</td>
<td>.27**</td>
<td>.34**</td>
<td>.36**</td>
</tr>
<tr>
<td>3</td>
<td>Regional</td>
<td>___</td>
<td>.50**</td>
<td>.22*</td>
<td>.40**</td>
<td>.47**</td>
<td>.46**</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>National Cities</td>
<td>___</td>
<td>.46**</td>
<td>.59**</td>
<td>.64**</td>
<td>.61**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>National States</td>
<td>___</td>
<td>.31**</td>
<td>.45**</td>
<td>.49**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>International Cities</td>
<td>___</td>
<td>.82**</td>
<td>.74**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>International Countries</td>
<td>___</td>
<td>.79**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>International Cont./Bod.</td>
<td>___</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05  **p<.01
measures were significant with the exception of campus buildings and national states.

Spearman rho correlations between all map measures by gender are displayed in Table 5. For men, nearly all pairings of the map measures were significant. However, the campus buildings measure was no significantly correlated with the national cities measures and the national states measure. Also, the campus city measure was not significantly correlated with the national city measure, national states measure, and international city measure. Moreover, the regional cities measure was not significantly correlated with the national states measure. Finally, the national states measure was not significantly correlated with the international cities measure.

For women, nearly all pairings of the map measures were significant. However, the campus buildings measure was not significantly correlated with the campus city measure, national

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campus</td>
<td>___</td>
<td>.52**</td>
<td>.52**</td>
<td>.23</td>
<td>.04</td>
<td>.40**</td>
<td>.41**</td>
<td>.35**</td>
</tr>
<tr>
<td>City</td>
<td>.20</td>
<td>___</td>
<td>.42**</td>
<td>.18</td>
<td>.15</td>
<td>.23</td>
<td>.38**</td>
<td>.39**</td>
</tr>
<tr>
<td>Reg.</td>
<td>.34**</td>
<td>.34**</td>
<td>___</td>
<td>.43**</td>
<td>.14</td>
<td>.48**</td>
<td>.50**</td>
<td>.52**</td>
</tr>
<tr>
<td>Nat. Cit.</td>
<td>.32**</td>
<td>.57*</td>
<td>.53**</td>
<td>___</td>
<td>.39**</td>
<td>.47**</td>
<td>.47**</td>
<td>.46**</td>
</tr>
<tr>
<td>Nat. States</td>
<td>.10</td>
<td>.19</td>
<td>.23</td>
<td>.44**</td>
<td>___</td>
<td>.28</td>
<td>.49**</td>
<td>.52**</td>
</tr>
<tr>
<td>Int. Cit.</td>
<td>.16</td>
<td>.31*</td>
<td>.31*</td>
<td>.54**</td>
<td>.26*</td>
<td>___</td>
<td>.79**</td>
<td>.60**</td>
</tr>
<tr>
<td>Int. Count</td>
<td>.16</td>
<td>.35**</td>
<td>.44**</td>
<td>.67**</td>
<td>.39**</td>
<td>.74**</td>
<td>___</td>
<td>.74**</td>
</tr>
<tr>
<td>Int. Con.</td>
<td>.26*</td>
<td>.37**</td>
<td>.34**</td>
<td>.62**</td>
<td>.42**</td>
<td>.72**</td>
<td>.74**</td>
<td>___</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01
states measure, international cities measure, and international countries measure. The national states measure was not significantly correlated with the campus city measures and the regional cities measure.

Spearman rho correlations performed between the campus buildings scores and ratings are displayed in Table 6. The campus

Table 6
Spearman rho Correlations for Campus Buildings Percentages and Rating Scales.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Campus Bldgs.</td>
<td>.22</td>
<td>-.19*</td>
<td>.12</td>
<td>.13</td>
<td>.11</td>
<td>.25**</td>
<td>.31**</td>
<td>-.11</td>
</tr>
<tr>
<td>2</td>
<td>Live on campus?</td>
<td>.74**</td>
<td>.31**</td>
<td>-.03</td>
<td>-.09</td>
<td>-.04</td>
<td>-.08</td>
<td>-.19</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Ever lived on campus</td>
<td>-.03</td>
<td>-.06</td>
<td>-.12</td>
<td>-.06</td>
<td>-.07</td>
<td>-.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Time attended university</td>
<td>.03</td>
<td>-.02</td>
<td>-.11</td>
<td>-.15</td>
<td>-.18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rating of ability to recall Pretest</td>
<td>.56**</td>
<td>.59**</td>
<td>.52**</td>
<td>.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Rating of sense of direction Pretest</td>
<td>.24*</td>
<td>.50**</td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Rating of ability to recall Posttest</td>
<td>.78**</td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Rating of sense of direction Posttest</td>
<td></td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>City, State lived</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05  **p<.01

measure was significantly correlated with the posttest ratings of the ability to recall and with the posttest ratings of sense of direction. Also, the ability to recall ratings were significantly correlated with the sense of direction ratings, with the ability to recall posttest, and with the sense of direction posttest. The sense of direction ratings were significantly correlated with ability to recall posttest ratings and with the sense of direction posttest. The ability to recall posttest ratings were significantly correlated with the sense of direction posttest.
Spearman rho correlations between the campus buildings scores and the rating scales by gender are displayed in Table 7. For

Table 7
Spearman rho Correlations for Campus Buildings Percentages and Rating Scales by Gender (Correlations for Men Above the Diagonal and Correlations for Women Below the Diagonal)

<table>
<thead>
<tr>
<th></th>
<th>Campus</th>
<th>Live</th>
<th>Ever</th>
<th>Time</th>
<th>Ability</th>
<th>Sense</th>
<th>Abil. P.T.</th>
<th>Sense P.T.</th>
<th>City, St.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Campus</td>
<td>___</td>
<td>-.16</td>
<td>-.04</td>
<td>.06</td>
<td>-.14</td>
<td>.11</td>
<td>.20</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>2 Live</td>
<td>-.26*</td>
<td>___</td>
<td>.74**</td>
<td>.31*</td>
<td>-.01</td>
<td>.04</td>
<td>.18</td>
<td>-.02</td>
<td>-.28</td>
</tr>
<tr>
<td>3 Ever</td>
<td>-.30*</td>
<td>.74**</td>
<td>___</td>
<td>.03</td>
<td>.01</td>
<td>.08</td>
<td>.10</td>
<td>.06</td>
<td>-.20</td>
</tr>
<tr>
<td>4 Time</td>
<td>.25</td>
<td>.30*</td>
<td>.20</td>
<td>___</td>
<td>.03</td>
<td>-.03</td>
<td>.07</td>
<td>-.10</td>
<td>-.10</td>
</tr>
<tr>
<td>5 Ability</td>
<td>.11</td>
<td>-.03</td>
<td>-.07</td>
<td>.10</td>
<td>___</td>
<td>.64**</td>
<td>.59**</td>
<td>.55**</td>
<td>.08</td>
</tr>
<tr>
<td>6 Sense</td>
<td>.27*</td>
<td>-.17</td>
<td>-.27*</td>
<td>.03</td>
<td>-.49**</td>
<td>___</td>
<td>.16</td>
<td>.52**</td>
<td>.14</td>
</tr>
<tr>
<td>7 Ability Post</td>
<td>.18</td>
<td>-.13</td>
<td>-.05</td>
<td>-.18</td>
<td>.52**</td>
<td>.22</td>
<td>___</td>
<td>.70**</td>
<td>-.30*</td>
</tr>
<tr>
<td>8 Sense Post</td>
<td>.28*</td>
<td>.05</td>
<td>-.09</td>
<td>-.12</td>
<td>.43**</td>
<td>.41**</td>
<td>.82**</td>
<td>___</td>
<td>-.07</td>
</tr>
<tr>
<td>9 City, St.</td>
<td>-.21</td>
<td>-.09</td>
<td>.15</td>
<td>-.22</td>
<td>.09</td>
<td>-.12</td>
<td>.03</td>
<td>-.12</td>
<td>___</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01

women, the campus measure was significantly correlated with the pretest ratings of sense of direction and with the posttest ratings of sense of direction. The ever lived on campus measure was significantly correlated with the sense of direction ratings. The ratings of ability to recall was significantly correlated with sense of direction, the posttest of ability to recall, and with the posttest sense of direction. The sense of direction rating pretest was significantly correlated with posttest of sense of direction. The posttest of ability to recall was significantly correlated with the posttest of the rating of sense of direction.

For men, the ratings of sense of direction was significantly correlated with ratings of ability to recall. The ratings of
ability to recall was significantly correlated with the posttest ratings of ability to recall. The posttest ratings of sense of direction was significantly correlated with the ratings of the ability to recall, sense of direction, and the posttest ratings of ability to recall. The city and state lived measure was significantly correlated with the posttest rating of the ability to recall.

Spearman rho correlations between the campus city scores and the rating scales are located in Table 8. The campus city map scores were significantly correlated the posttest ratings of sense of direction. The familiarity ratings were correlated with the rating of the ability to recall, sense of direction rating scale, and with the posttest ratings of sense of direction.

Spearman rho correlations between the campus city map scores
and rating scales by gender are displayed in Table 9. For women,

Table 9
Spearman rho Correlations for Campus City Percentages and Rating Scales by Gender. (Correlations for Men Above the Diagonal and Correlations for Women Below the Diagonal)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.City</td>
<td>____</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live</td>
<td>.15</td>
<td>__</td>
<td>.74**</td>
<td>.15</td>
<td>.31</td>
<td>-.01</td>
<td>.04</td>
<td>.18</td>
<td>.02</td>
<td>-.28</td>
</tr>
<tr>
<td>Ever</td>
<td>.10</td>
<td>.74**</td>
<td>____</td>
<td>.20</td>
<td>.03</td>
<td>.01</td>
<td>.08</td>
<td>.10</td>
<td>.06</td>
<td>-.20</td>
</tr>
<tr>
<td>Fam.</td>
<td>.20</td>
<td>.02</td>
<td>.00</td>
<td>____</td>
<td>.23</td>
<td>.34*</td>
<td>.38**</td>
<td>.13</td>
<td>.31*</td>
<td>-.14</td>
</tr>
<tr>
<td>Time</td>
<td>.14</td>
<td>.30*</td>
<td>.20</td>
<td>.28*</td>
<td>____</td>
<td>.03</td>
<td>-.03</td>
<td>.07</td>
<td>-.10</td>
<td>-.10</td>
</tr>
<tr>
<td>Ability</td>
<td>.17</td>
<td>-.03</td>
<td>-.07</td>
<td>.43**</td>
<td>.10</td>
<td>____</td>
<td>.64**</td>
<td>.59**</td>
<td>.54**</td>
<td>-.08</td>
</tr>
<tr>
<td>Sense</td>
<td>.26*</td>
<td>-.17</td>
<td>-.27*</td>
<td>.50**</td>
<td>.03</td>
<td>.50**</td>
<td>____</td>
<td>.15</td>
<td>.52**</td>
<td>.14</td>
</tr>
<tr>
<td>Abil. Post</td>
<td>.22</td>
<td>-.13</td>
<td>-.09</td>
<td>.10</td>
<td>.02</td>
<td>.52**</td>
<td>.22</td>
<td>____</td>
<td>.70**</td>
<td>.30*</td>
</tr>
<tr>
<td>Sense Post</td>
<td>.21</td>
<td>-.04</td>
<td>-.05</td>
<td>.09</td>
<td>-.12</td>
<td>.43**</td>
<td>.41**</td>
<td>.82**</td>
<td>____</td>
<td>-.07</td>
</tr>
<tr>
<td>City St.</td>
<td>-.14</td>
<td>-.09</td>
<td>.15</td>
<td>-.24</td>
<td>-.22</td>
<td>.09</td>
<td>-.12</td>
<td>.03</td>
<td>-.12</td>
<td>____</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01

the campus city measure and the ratings of sense of direction were significant. The familiarity ratings were significantly correlated with the ability to recall ratings and the ratings of sense of direction.

For men, the campus city measure and posttest ratings of sense of direction were significant. The familiarity ratings were significantly correlated with the ratings of ability to recall, with the ratings of sense of direction, and with the posttest ratings of sense of direction.

Spearman rho correlations performed between the regional cities scores and rating scales are displayed in Table 10. The
Table 10
Spearman rho Correlations for Regional Cities Percentages and Rating Scales.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional</td>
<td>____</td>
<td>.10</td>
<td>.24*</td>
<td>.20*</td>
<td>.31*</td>
<td>.29*</td>
<td>.40**</td>
</tr>
<tr>
<td>Miles traveled in TN</td>
<td>____</td>
<td>.30**</td>
<td>.04</td>
<td>.07</td>
<td>-.01</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>Miles traveled in the South East</td>
<td>____</td>
<td>.13</td>
<td>.11</td>
<td>.15</td>
<td>.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of Ability to Recall Pretest</td>
<td>____</td>
<td>.56**</td>
<td>.59**</td>
<td>.52**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of Sense of Direction Pretest</td>
<td>____</td>
<td>.24*</td>
<td>.50**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of Ability to Recall Posttest</td>
<td>____</td>
<td>.78**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of Sense of Direction Posttest</td>
<td>____</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05 **p<.01

Regional cities measure was significantly correlated with the ratings of ability to recall, the ratings of sense of direction, the posttest ratings of ability to recall, and the posttest ratings of sense of direction.

Spearman rho correlations performed between the regional cities scores and rating scales by gender are displayed in Table 11. For women, the correlations of the regional cities measure

Table 11
Spearman rho Correlations for Regional Cities Percentages and Rating Scales by Gender. (Correlations for Men Above the Diagonal and Correlations for Women Below the Diagonal)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional</td>
<td>____</td>
<td>-.04</td>
<td>.20</td>
<td>.32*</td>
<td>.32*</td>
<td>.28</td>
<td>.48**</td>
</tr>
<tr>
<td>Miles TN</td>
<td>.18</td>
<td>____</td>
<td>.19</td>
<td>.11</td>
<td>.09</td>
<td>-.02</td>
<td>.07</td>
</tr>
<tr>
<td>Miles SE</td>
<td>.25</td>
<td>.37**</td>
<td>____</td>
<td>.41**</td>
<td>.17</td>
<td>.26</td>
<td>.24</td>
</tr>
</tbody>
</table>
and the ratings of sense of direction were significant. For men, the regional cities measure is significantly correlated with the ratings of ability to recall, with the ratings of sense of direction, with the posttest ratings of sense of direction, and with the posttest of ability to recall. The correlation of the miles traveled outside of Tennessee but within the southeast and the ratings of ability to recall was significant.

Spearman rho correlations between the national cities scores and rating scales are displayed in Table 12. The national cities

Table 12
Spearman rho Correlations for National Cities Percentages and Rating Scales.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nat. (city) Lived</td>
<td>____</td>
<td>.03</td>
<td>.23*</td>
<td>.11</td>
<td>.34**</td>
<td>.32**</td>
<td>.44**</td>
<td>.44**</td>
</tr>
<tr>
<td>Places Lived</td>
<td>____</td>
<td></td>
<td>.13</td>
<td>.11</td>
<td>-.14</td>
<td>-.03</td>
<td>-.17</td>
<td>-.09</td>
</tr>
<tr>
<td>Miles traveled in the South East</td>
<td>____</td>
<td></td>
<td></td>
<td>.43**</td>
<td>.13</td>
<td>.11</td>
<td>.15</td>
<td>.17</td>
</tr>
<tr>
<td>Miles Traveled in the U.S.</td>
<td>____</td>
<td></td>
<td>.11</td>
<td>.03</td>
<td>.10</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of Ability to Recall Pretest</td>
<td>____</td>
<td></td>
<td></td>
<td></td>
<td>.56**</td>
<td>.59**</td>
<td>.52**</td>
<td></td>
</tr>
<tr>
<td>Rating Sense of Direction Pretest</td>
<td>____</td>
<td></td>
<td></td>
<td></td>
<td>.24*</td>
<td>.50**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of Ability to Recall Posttest</td>
<td>____</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.78**</td>
<td></td>
</tr>
</tbody>
</table>

Table 11 (continued)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional</td>
<td>Miles TN</td>
<td>Miles SE</td>
<td>Ability</td>
<td>Sense</td>
<td>Ability P.T.</td>
<td>Sense P.T.</td>
</tr>
<tr>
<td>4 Ability</td>
<td>.07</td>
<td>-.06</td>
<td>-.16</td>
<td>____</td>
<td>.64**</td>
<td>.59**</td>
</tr>
<tr>
<td>5 Sense</td>
<td>.26*</td>
<td>.02</td>
<td>.02</td>
<td>.49**</td>
<td>____</td>
<td>.16</td>
</tr>
<tr>
<td>6 Abil. Post</td>
<td>.20</td>
<td>-.03</td>
<td>-.08</td>
<td>.52**</td>
<td>.22</td>
<td>____</td>
</tr>
<tr>
<td>7 Sense Post</td>
<td>.29*</td>
<td>-.04</td>
<td>.00</td>
<td>.43**</td>
<td>.41**</td>
<td>.82**</td>
</tr>
</tbody>
</table>

p<.05 **p<.01
Table 12 (continued)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Rating Sense of Direction Posttest</td>
<td>____</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05  **p<.01

measure was significantly correlated with the ratings of ability to recall, with the ratings of sense of direction, with the posttest ratings of ability to recall, and with the posttest ratings of sense of direction.

Spearman rho correlations between the national cities scores and rating scales by gender are displayed in Table 13. For women,

Table 13
Spearman rho Correlations for National Cities Percentages and Rating Scales by Gender. (Correlations for Men Above the Diagonal and Correlations for Women Below the Diagonal)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Nat. (city)</td>
<td>____</td>
<td>.28*</td>
<td>-.01</td>
<td>.04</td>
<td>.38**</td>
<td>.26</td>
<td>.32*</td>
<td>.40**</td>
</tr>
<tr>
<td>2 Lived</td>
<td>.00</td>
<td>____</td>
<td>-.09</td>
<td>.09</td>
<td>.16</td>
<td>.12</td>
<td>.08</td>
<td>.16</td>
</tr>
<tr>
<td>3 M.-SE</td>
<td>.31*</td>
<td>.27*</td>
<td>____</td>
<td>.31*</td>
<td>.41**</td>
<td>.17</td>
<td>.26</td>
<td>.24</td>
</tr>
<tr>
<td>4 M.-US</td>
<td>.13</td>
<td>.12</td>
<td>.47**</td>
<td>____</td>
<td>.29</td>
<td>.24</td>
<td>.23</td>
<td>-.03</td>
</tr>
<tr>
<td>5 Ability</td>
<td>.18</td>
<td>-.29*</td>
<td>-.16</td>
<td>-.04</td>
<td>____</td>
<td>.64**</td>
<td>.59**</td>
<td>.54**</td>
</tr>
<tr>
<td>6 Sense</td>
<td>.32**</td>
<td>-.11</td>
<td>.02</td>
<td>-.15</td>
<td>.49**</td>
<td>____</td>
<td>.16</td>
<td>.52**</td>
</tr>
<tr>
<td>7 Ability Post</td>
<td>.31*</td>
<td>-.22</td>
<td>.00</td>
<td>.17</td>
<td>.52**</td>
<td>.22</td>
<td>____</td>
<td>.70**</td>
</tr>
<tr>
<td>8 Sense Post</td>
<td>.32*</td>
<td>-.20</td>
<td>-.08</td>
<td>.10</td>
<td>.43**</td>
<td>.41**</td>
<td>.82**</td>
<td>____</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01

the national cities measure was significantly correlated with ratings of sense of direction, with the posttest ratings of
ability to recall, and with the posttest ratings of sense of direction.

For men, the national cities measure was significantly correlated with the ratings of ability to recall, with the posttest ratings of ability to recall, and with the posttest ratings of sense of direction. The correlation of miles traveled outside of Tennessee but within the southeast and the ratings of ability to recall were also significant.

Spearman rho correlations between the national states scores and rating scales are displayed in Table 14. The national states

Table 14
Spearman rho Correlations for National States Percentages and Rating Scales.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nat. (state)</td>
<td>____</td>
<td>-.04</td>
<td>.05</td>
<td>.15</td>
<td>.05</td>
<td>.05</td>
<td>.23*</td>
<td>.23*</td>
</tr>
<tr>
<td>Places Lived</td>
<td>____</td>
<td>.13</td>
<td>.11</td>
<td>-.14</td>
<td>-.03</td>
<td>-.17</td>
<td>-.09</td>
<td></td>
</tr>
<tr>
<td>Miles traveled in the South East</td>
<td>____</td>
<td>.43**</td>
<td>.13</td>
<td>.11</td>
<td>.15</td>
<td>.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miles traveled in the U.S.</td>
<td>____</td>
<td>.11</td>
<td>.03</td>
<td>.10</td>
<td>.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of Ability to Recall Pretest</td>
<td>____</td>
<td>.56**</td>
<td>.59**</td>
<td>.52**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating Sense of Direction Pretest</td>
<td>____</td>
<td>.24*</td>
<td>.50**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of Ability to Recall Posttest</td>
<td>____</td>
<td>.78**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating Sense of Direction Posttest</td>
<td>____</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05  **p<.01

measure was significantly correlated with the posttest ratings of ability to recall, and with the posttest ratings of sense of direction.

Spearman rho correlations between the national states scores and rating scales by gender are displayed in Table 15. For women,
Table 15
Spearman rho Correlations for National States Percentages and Rating Scales by Gender. (Correlations for Men Above the Diagonal and Correlations for Women Below the Diagonal)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nat. (state)</td>
<td>____</td>
<td>.03</td>
<td>.04</td>
<td>.35*</td>
<td>-.03</td>
<td>-.03</td>
<td>.11</td>
</tr>
<tr>
<td>2</td>
<td>Lived</td>
<td>-.00</td>
<td>____</td>
<td>-.09</td>
<td>.09</td>
<td>.16</td>
<td>.12</td>
<td>.08</td>
</tr>
<tr>
<td>3</td>
<td>M.-SE</td>
<td>.03</td>
<td>.28*</td>
<td>____</td>
<td>.31*</td>
<td>.41**</td>
<td>.17</td>
<td>.26</td>
</tr>
<tr>
<td>4</td>
<td>Ability</td>
<td>.01</td>
<td>-.29*</td>
<td>-.16</td>
<td>-.04</td>
<td>____</td>
<td>.64**</td>
<td>.59**</td>
</tr>
<tr>
<td>5</td>
<td>Sense</td>
<td>.01</td>
<td>-.11</td>
<td>.02</td>
<td>-.15</td>
<td>.49**</td>
<td>____</td>
<td>.16</td>
</tr>
<tr>
<td>6</td>
<td>Ability Post</td>
<td>.19</td>
<td>-.22</td>
<td>-.08</td>
<td>-.17</td>
<td>.52**</td>
<td>.22</td>
<td>____</td>
</tr>
<tr>
<td>7</td>
<td>Sense Post</td>
<td>.15</td>
<td>-.20</td>
<td>.00</td>
<td>-.10</td>
<td>.43**</td>
<td>.41**</td>
<td>.82**</td>
</tr>
</tbody>
</table>

*=p<.05 **p<.01

the correlation of number of places lived measure with the ratings of ability to recall was significant.

Spearman rho correlations between world cities scores and rating scales are displayed in Table 16. The world cities measure

Table 16
Spearman rho Correlations for World Cities Percentages and Rating Scales.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>World (city)</td>
<td>Trips</td>
<td>Int. Dest.</td>
<td>Ability</td>
<td>Sense</td>
<td>Ability P.T.</td>
<td>Sense P.T.</td>
</tr>
<tr>
<td>1</td>
<td>World (city)</td>
<td>____</td>
<td>.33*</td>
<td>.36**</td>
<td>.23*</td>
<td>.15</td>
<td>.51**</td>
</tr>
<tr>
<td>2</td>
<td>Number of Int. Trips</td>
<td>____</td>
<td>.96**</td>
<td>.21*</td>
<td>.06</td>
<td>.18</td>
<td>.10</td>
</tr>
<tr>
<td>3</td>
<td>Number of Int. Destinations</td>
<td>____</td>
<td>.26**</td>
<td>.08</td>
<td>.23*</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Rating of Ability to Recall Pretest</td>
<td>____</td>
<td>.56**</td>
<td>.60**</td>
<td>.52**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rating Sense of Direction Pretest</td>
<td>____</td>
<td>.24*</td>
<td>.50**</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
was significantly correlated with the number of international trips, with the number of international destinations, with the ratings of ability to recall, with the posttest ratings of ability to recall, and with the posttest ratings of sense of direction. The correlation of the number of international trips and the ratings of ability to recall also was significant. Moreover, the correlation of the number of international destinations measure and the ratings of ability to recall was significant. Finally, the correlation of the number of international destinations measure and the posttest ratings of ability to recall was significant.

Spearman rho correlations between world cities scores and rating scales by gender are displayed in Table 17. For men, the

Table 17
Spearman rho Correlations for World Cities Percentages and Rating Scales by Gender. (Correlations for Men Above the Diagonal and Correlations for Women Below the Diagonal)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 World (city)</td>
<td></td>
<td>.19</td>
<td>.30*</td>
<td>.30*</td>
<td>.00</td>
<td>.40**</td>
<td>.30*</td>
</tr>
<tr>
<td>2 Trips</td>
<td>.34**</td>
<td></td>
<td>.93**</td>
<td>.13</td>
<td>-.11</td>
<td>.19</td>
<td>.02</td>
</tr>
<tr>
<td>3 Int. Dest.</td>
<td>.33*</td>
<td>.97**</td>
<td></td>
<td>.24</td>
<td>-.07</td>
<td>.26</td>
<td>.10</td>
</tr>
<tr>
<td>4 Ability</td>
<td>.01</td>
<td>.21</td>
<td>.23</td>
<td></td>
<td>.64**</td>
<td>.59**</td>
<td>.54**</td>
</tr>
<tr>
<td>5 Sense</td>
<td>.16</td>
<td>.16</td>
<td>.17</td>
<td>.49**</td>
<td></td>
<td>.16</td>
<td>.52**</td>
</tr>
</tbody>
</table>
Table 17 (continued)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>World (city)</td>
<td>Trips</td>
<td>Int. Dest.</td>
<td>Ability</td>
<td>Sense</td>
<td>Ability P.T.</td>
<td>Sense P.T.</td>
<td></td>
</tr>
<tr>
<td>6 Ability Post</td>
<td>.35**</td>
<td>.10</td>
<td>12</td>
<td>.52**</td>
<td>.22</td>
<td>____</td>
<td>.70**</td>
</tr>
<tr>
<td>7 Sense Post</td>
<td>.24</td>
<td>.05</td>
<td>.08</td>
<td>.43**</td>
<td>.41**</td>
<td>.82**</td>
<td>____</td>
</tr>
</tbody>
</table>

*p<.05 **p<.01

world cities measure was significantly correlated with the number of international destinations, with the ratings of ability to recall, with the posttest ratings of ability to recall, and with the posttest ratings of sense of direction.

For women, the world cities measure was significantly correlated with the number of international trips, with the number of international destinations, and with the posttest ratings of ability to recall.

Spearman rho correlations performed between the world countries scores and rating scales are displayed in Table 18.

Table 18
Spearman rho Correlations for World Countries Percentages and Rating Scales.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>World (coun.)</td>
<td>Trips</td>
<td>Int. Dest.</td>
<td>Ability</td>
<td>Sense</td>
<td>Ability P.T.</td>
<td>Sense P.T.</td>
<td></td>
</tr>
<tr>
<td>1 World (coun.)</td>
<td>____</td>
<td>.32**</td>
<td>.38**</td>
<td>.20*</td>
<td>.17*</td>
<td>.49**</td>
<td>.42**</td>
</tr>
<tr>
<td>2 Number of Int. Trips</td>
<td>____</td>
<td>.96**</td>
<td>.21*</td>
<td>.06</td>
<td>.18</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>3 Number of Int. Destinations</td>
<td>____</td>
<td>.26**</td>
<td>.08</td>
<td>.23*</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Rating of Ability to Recall Pretest</td>
<td>____</td>
<td>.56**</td>
<td>.60**</td>
<td>.52**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Rating Sense of Direction Pretest</td>
<td>____</td>
<td>.24*</td>
<td>.50**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Rating of Ability to Recall Posttest</td>
<td>____</td>
<td>.78**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Rating Sense of Direction Posttest</td>
<td>____</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05 **p<.01
The world countries measure was significantly correlated with the number of international trips, with the number of international destinations, with the ratings of ability to recall, with the ratings of sense of direction, with the posttest ratings of ability to recall, and with the posttest ratings of sense of direction.

Spearman rho correlations performed between the world countries scores and rating scales by gender are displayed in Table 19. For men, the world countries measure was significantly correlated with the number of international destinations, and with the posttest ratings of ability to recall. For women, the world countries measure was significantly correlated with the number of international trips, with the number of international destinations, with posttest ratings of ability to recall, and with the posttest ratings of sense of direction.

Table 19
Spearman rho Correlations for World Countries Percentages and Rating Scales By Gender. (Correlations for Men Above the Diagonal and Correlations for Women Below the Diagonal)

<table>
<thead>
<tr>
<th></th>
<th>1 World (coun.)</th>
<th>2 Trips</th>
<th>3 Int. Dest.</th>
<th>4 Ability</th>
<th>5 Sense</th>
<th>6 Ability P.T.</th>
<th>7 Sense P.T.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 World (coun.)</td>
<td>____</td>
<td>.24</td>
<td>.33*</td>
<td>.13</td>
<td>-.10</td>
<td>.31*</td>
<td>.24</td>
</tr>
<tr>
<td>2 Trips</td>
<td>.33**</td>
<td>____</td>
<td>.93**</td>
<td>.13</td>
<td>-.11</td>
<td>.19</td>
<td>.02</td>
</tr>
<tr>
<td>3 Int. Dest.</td>
<td>.34**</td>
<td>.97**</td>
<td>____</td>
<td>.24</td>
<td>-.07</td>
<td>.26</td>
<td>.10</td>
</tr>
<tr>
<td>4 Ability</td>
<td>.06</td>
<td>.21</td>
<td>.23</td>
<td>____</td>
<td>.64**</td>
<td>.59**</td>
<td>.54**</td>
</tr>
<tr>
<td>5 Sense</td>
<td>.31</td>
<td>.16</td>
<td>.17</td>
<td>.49**</td>
<td>____</td>
<td>.16</td>
<td>.52**</td>
</tr>
<tr>
<td>6 Ability Post</td>
<td>.36**</td>
<td>.10</td>
<td>.12</td>
<td>.52**</td>
<td>.22</td>
<td>____</td>
<td>.70**</td>
</tr>
<tr>
<td>7 Sense Post</td>
<td>.35**</td>
<td>.05</td>
<td>.08</td>
<td>.43**</td>
<td>.41**</td>
<td>.82**</td>
<td>____</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01
Table 20. The world bodies of water/continents measure was

Table 20
Spearman rho Correlations for World Continents/Bodies of Water
Percentages and Rating Scales.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>World (con/bod) Trips</td>
<td>____</td>
<td>.27**</td>
<td>.29**</td>
<td>.23*</td>
<td>.08</td>
<td>.48**</td>
<td>.40**</td>
</tr>
<tr>
<td>Number of Int. Trips</td>
<td>____</td>
<td>.96**</td>
<td>.21*</td>
<td>.06</td>
<td>.18</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>Number of Int. Destinations</td>
<td>____</td>
<td>.26**</td>
<td>.08</td>
<td>.23*</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of Ability to Recall Pretest</td>
<td>____</td>
<td>.56**</td>
<td>.60**</td>
<td>.52**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating Sense of Direction Pretest</td>
<td>____</td>
<td>.24*</td>
<td>.50**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of Ability to Recall Posttest</td>
<td>____</td>
<td>.78**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating Sense of Direction Posttest</td>
<td>____</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05  **p<.01

significantly correlated with the number of international trips, with the number of international destinations, with the ratings of ability to recall, with the posttest ratings of ability to recall, and with the posttest ratings of sense of direction.

Spearman rho correlations performed between the world bodies of water/continents scores and rating scales by gender are displayed in Table 21. For women, world bodies of
Table 21
Spearman rho Correlations for World Continents/Bodies of Water Percentages and Rating Scales by Gender. (Correlations for Men Above the Diagonal and Correlations for Women Below the Diagonal)

<table>
<thead>
<tr>
<th></th>
<th>1 World (con/bod)</th>
<th>2 Trips</th>
<th>3 Int. Dest.</th>
<th>4 Ability</th>
<th>5 Sense</th>
<th>6 Ability P.T.</th>
<th>7 Sense P.T.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 World (city)</td>
<td>____</td>
<td>.14</td>
<td>.20</td>
<td>.09</td>
<td>-.16</td>
<td>.20</td>
<td>.18</td>
</tr>
<tr>
<td>2 Trips</td>
<td>.32*</td>
<td>____</td>
<td>.93**</td>
<td>.13</td>
<td>-.11</td>
<td>.19</td>
<td>.02</td>
</tr>
<tr>
<td>3 Int. Dest.</td>
<td>.30*</td>
<td>.97**</td>
<td>____</td>
<td>.24</td>
<td>-.07</td>
<td>.26</td>
<td>.10</td>
</tr>
<tr>
<td>4 Ability</td>
<td>.18</td>
<td>.21</td>
<td>.23</td>
<td>____</td>
<td>.64**</td>
<td>.59**</td>
<td>.54**</td>
</tr>
<tr>
<td>5 Sense</td>
<td>.20</td>
<td>.16</td>
<td>.17</td>
<td>.49**</td>
<td>____</td>
<td>.16</td>
<td>.52**</td>
</tr>
<tr>
<td>6 Ability Post</td>
<td>.44**</td>
<td>.10</td>
<td>.12</td>
<td>.52**</td>
<td>.22</td>
<td>____</td>
<td>.70**</td>
</tr>
<tr>
<td>7 Sense Post</td>
<td>.39**</td>
<td>.05</td>
<td>.08</td>
<td>.43**</td>
<td>.41**</td>
<td>.82**</td>
<td>____</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01

water/continents measure was significantly correlated with the number of international trips, with the number of international destinations, with the posttest ratings of ability to recall, and with the posttest ratings of sense of direction.
CHAPTER 4
DISCUSSION

Review of Results

The hypotheses for gender differences on site name recall for campus buildings, city locations, regional cities, and national states was not supported. The findings of no difference on the campus map task was consistent with the research by Zinser et al. (in press). In the present study, men performed better than women on the campus city map task and on the regional city map task, but the differences were not significant. Men did perform significantly better than women on the national cities map task. This result also was consistent with the research by Zinser et al. (in press).

The hypotheses that men would outperform women on the three world map tasks were verified. Men were able to match significantly more of the international cities, countries, continents/bodies of water than were the women. This result again was consistent with results obtained by Zinser et al. (in press).

The pretest ratings in the present study of sense of direction were significantly higher than the posttest ratings of sense of direction. The pretest ratings of the ability to recall names and places with the assistance of a map were significantly higher than the posttest ratings of the ability to recall names and places with the assistance of a map. Also, men’s pretest ratings of sense of direction were significantly higher than their posttest rating of sense of direction. Women’s pretest ratings of sense of direction were significantly higher than their posttest rating of sense of direction. Also, men’s pretest ratings of their ability to recall names and places with the assistance of a map were significantly higher than their posttest rating of their ability to recall names and places with the assistance of a map. Women’s pretest ratings of their ability to recall names and places with the assistance of a map were significantly higher than their posttest rating of their ability to recall names and places with the assistance of a map.

Men’s posttest ratings of sense of direction were significantly higher than women’s posttest ratings of sense of
direction. Men’s posttest ratings of ability to recall names and places with the assistance of a map were significantly higher than women’s posttest ratings of their ability to recall names and places with the assistance of a map.

**Interpretation of Results**

The gender difference for the campus buildings measure was not significant. This result was consistent with research performed by Zinser et al. (in press). Harrell, Bowlby, and Hall-Hoffarth (2000) found that men provided more cartographically correct maps but also reported no gender difference on labeling buildings on a map. McGuiness and Sparks (1983) found no gender difference on the number of buildings omitted from the campus map. In their research, men included more roads and paths and misplaced buildings less often than women did, but women were more accurate in their sense of distance in the placement of buildings.

As Zinser et al. (in press) concluded experience may have played a major role in men and women performing equally on the campus map task. Supporting this conclusion were the findings that there was no difference on time lived on campus and school classification, a finding comparable to those obtained by Beatty and Troster (1987). Both men and women had very extensive experience with campus buildings. Consequently, men and women might have known the campus equally well. It is conceivable that if the experience level had been different the results might have been as well.

No significant gender difference was obtained on the campus city map task. Not finding a difference may have been a result of the campus city map having been too difficult. Both men and women participants scored a very low percentage (men M=21.25 and women M=18.59). These data suggest that a floor effect prevailed on the city map task. Thus, additional research needs to be conducted to eliminate the floor effect on the campus city task.

No significant difference was found on the regional cities task. This result conflicted with the results obtained by Beatty and Bruellman (1987) and Zinser et al. (in press). Using a very similar map and method Zinser et al. found that men correctly identified a higher percentage of cities than women did. Beatty
and Bruellman found that men were more successful in locating cities but their location was the North Dakota/South Dakota area. The discrepancy between the results may have been a product of map differences. Zinser et al. used fewer cities: Thus, the present map probably was more difficult resulting in a floor effect; men scored a mean percentage of 30.20 and women a mean percentage of 22.46.

No significant gender difference was obtained on matching the U.S. states and their names. The hypothesis that men would perform better than women was not confirmed for this task. The results obtained were similar to those of Zinser et al. (in press). However, the results conflicted with some of the results of Straub and Seaton (1993). The first experiment performed by Straub and Seaton was very similar to this research. In their first experiment, for their map-only memory condition (state outlined map provided only) and for their map and name aid memory conditions, they reported that men were superior in their recall of the names of the states. The procedure used in the second study was somewhat different from the procedure used in this research. However, the results obtained in their second experiment were similar to those obtained in the present study. In their second study, for their list names only memory condition, similar to the Zinser et al. (in press), and their list name and map aid memory condition, also similar to the Zinser et al. (in press), no gender difference was found. The differences in the results of the first experiment, of the Straub and Seaton study, and the Zinser et al. study (in press), and the current study may have been the differences in procedure.

A significant gender difference was found on matching U.S. cities and their names. This was consistent with research by Zinser et al. (in press). They found a gender difference favoring men under verbal spatial-aid memory and the spatial-aid and verbal-aid conditions under the U.S. cities task. Current results were also consistent with results obtained by Beatty and Bruellman (1987). Beatty and Bruellman asked participants to locate 30 U.S. cities on a blank outline map of the United States. Participants also were asked to show in which state each of the 30 U.S. cities were located. Men performed more accurately than did women in
locating U.S. cities. Thus, the U.S. cities gender difference has attained a degree of reliability.

The hypothesis that men would outperform women on all three world map matching tasks also was confirmed. This result was comparable to findings by Cross (1987), Dabbs et al. (1998), and Zinser et al. (in press). The results obtained from matching world cities was comparable to results obtained by Montello et al. (1999) and Zinser et al. (in press). The results obtained from matching continents/bodies of water was comparable to results obtained by Zinser et al. (in press). Thus, the world geography measures also have attained a level of reliability.

The lack of gender differences on experience measures (number of international trips and number of international destinations) suggests that gender difference on the world map tasks was not a product of travel experience. Cross (1987) and Zinser et al. (in press) also found no difference in travel experience and site name location memory. Beatty and Bruellman (1987), Eve et al. (1994), Devlin and Bernstein (1995), Henrie et al. (1997), and Dabbs et al. (1998) also reported travel experience was not a factor when men outperformed women on geographic tasks.

In the present study, men also were more confident in their sense of direction and geography skills. This was consistent with results obtained by Zinser et al. (in press), Beatty and Bruellman (1987), Eve et al. (1994), Devlin and Bernstein (1995), and Harrel et al. (2000).

A possible explanation for pretest confidence ratings for sense of direction and ability to recall names and places with the assistance of a map being significantly higher than posttest ratings is the difficulty of the geographic tasks. After completion of the geographic tasks participants may not feel as confident about their sense of direction and their ability to recall names and places with the assistance of a map. The same could be said for why the pretest confidence ratings were significantly higher than the posttest confidence ratings obtained within gender.

With men rating their posttest confidence ratings higher than did women, it is plausible to assume that women were affected more adversely by the tasks than the men. With men performing
significantly better than women on the matching U.S. cities, matching international cities, matching international countries, and matching international continents/bodies of water tasks it is conceivable that their poorer performance lowered their posttest confidence ratings to a greater extent.

Even though there was no significant difference on travel experience, there was some indication that there were a higher number of significant correlations between the map and experience measures for women than men for world countries and for world continents and bodies of water, similarly reported by Zinser et al. (in press). Thus, women may rely on travel experience for learning geography more than men.

Evolutionary Theory

The gender differences found in the present study for national cities and international sites with the lack of gender differences in travel experience and higher confidence ratings by men is consistent with the role of nature over nurture. It may be that men are more prepared than women to learn, recall, and perform geographic tasks. Preparedness theory (Seligman, 1970) describes behaviors as being genetically influenced. In preparedness theory, if an organism is prepared or well-suited to perform a task, little or no learning or practice is required to perform the task. Preparedness may have been a factor in the results obtained in this study.

The present results also are consistent with the hunter-gatherer theory (Silverman & Eals 1992). This theory suggests that men possess a superior sense of direction in the outdoors due to their hunter heritage, and women have superior memory for things closer to home due to their gatherer heritage. Men also may have an advantage over women in learning and recalling distant geographic sites, like cities and international sites, because of their ancestral heritage.

Because no difference was obtained for nearby sites on the campus map task support of the hunter-gatherer theory was not obtained in this report. It is possible, however, that the campus map task did not test the hunter-gatherer theory. More specifically, naming campus buildings may not properly test
support for the hunter-gatherer theory. Campus buildings are perhaps learned equally by men and women, although women may be more prepared to learned these sites. Additional research needs to be done with nearby sites, say, within buildings.

Learning Theory

The lack of gender difference on the experience measures including years attended the university, number of places lived, familiarity with the campus city, miles traveled in state, miles traveled out of state but within the southeast, miles traveled out of southeast but within the U.S., number of trips outside the U.S., and number of international destinations suggest that there should be no gender differences on campus map tasks, campus city map task, regional map task, and national map task (matching states).

As stated previously with preparedness theory (Seligman, 1970), one can overcome any lack of preparedness or unpreparedness. This may account for the lack of gender differences on the campus buildings task, campus city task, regional cities task, and national states task. Due to their extensive experience with the university campus, campus city, region, and states women or men may have overcome their deficits through extensive practice (Zinser et al., in press). It is conceivable that men are less prepared to learn nearby sites than women but learned them as well because of ample opportunity to learn them. In turn, it is also conceivable that women are less prepared to learn distant sites than men and did not learn them as well because of lack of access and interest.

It is conceivable that the disparity in the national map tasks was a product of women having had more practice at matching U.S. states than U.S. cities. Women, through extensive practice and memorization could have overcome any disadvantages they may have had with learning the states.

Limitations of Current Study

All participants performed poorly on the campus buildings, campus city, and regional cities tasks. This may have been a product of a floor effect. With scores converted to percentages
the mean score for the campus buildings map task for men was 34.29% and the mean score for women was 25.89%. The mean score for the campus city map task for men was 21.21% and the mean score for women was 18.59%. The mean score for the regional map task for men was 30.20% and the mean score for women was 22.46%.

The standard deviations obtained on the measures national cities measure, world cities measure, world counties measure, and world continents/bodies of water measures were high. This will reduce the chances of significance and increase the chance of a Type II error. Conversely, the high significant deviations for the campus, campus city, regional cities, and national states tasks with raise the chance for a Type I error.

The large number of t-tests that were performed also increased the chance of making a Type I error. t-tests were performed on the mean number of campus, campus city, regional, national cities, national states, world cities, world countries, and world continents/bodies of water correctly matched. Due to the high number of t-tests, there is an increased risk of obtaining a false significant difference.

Only college students were used in this study. Therefore, inferences on gender differences on site-name recall of geographic sites varying in distance can only be made on the college student population. It is not possible to make inferences on the overall population because random samples of the general population were not obtained.

Suggestions for Future Research

To more effectively measure site name recall of the campus buildings and campus city map tasks it is imperative to create less difficult maps. These maps appeared more complex than any of the other maps used. This may have accounted for the possible floor effects. It is possible that if the participants were given more time, both men and women may have scored a higher percentage on the tasks. One possible solution would be to simplify the maps making them more similar to the other maps in the study. Reducing the number of campus buildings and campus city sites to be matched will simplify the maps greatly. This change may give a more accurate measure of gender differences of site name recall of the
campus buildings and campus city map tasks.

To more effectively measure site name recall of the national states map task experience with the U.S. map needs to be studied. It might be productive to have participants name or match a blank outline state map based solely on the states shapes. The absence of the blank U.S. map as a whole should give a more accurate measurement of site name recall on the U.S. states map task.

Another suggestion would be to conduct a study of gender differences with respect to recall of apartment contents and location presented by way of a video to determine if women would do better with nearby sites, similar to research by O’laughlin and Brubaker (1998). This would extend the distance series further to closer sites, giving a clearer picture on gender differences and evolutionary theory.

Conclusions

The gender differences reported on geographic site-name associative memory favoring men is consistent with evolutionary theory, but as mentioned previously, both men and women benefit from learning and practice. Thus, all of the differences could have been a product of experience, although the experience measures did not suggest this. This study as well as previous studies suggest that men frequently perform better on geographic sites than do women, especially on more distant sites. Men also are more confident in their sense of direction.
REFERENCES


Directions
In the diagram each lettered box represents one of the buildings listed below.

Assume you are standing at the flag pole near the Burger King.

Please match up the names with the building by placing the corresponding letter in the space provided beside the names. Do so in alphabetical order.

Brooks Gym  Waf Pickel Hall (Education)  Rogers-Stout (Social Sciences)
Adelphia Center  Information and Public Safety  Sam Wilson Hall (Business)
Old Library  Shenod Library  J.P. Culp Student Center
Cibraph Hall (Math)  John P. Lamb Hall (Health)  Hutcheson Hall (Geography)
University School  Wilson Wallace Hall (Technology)  College of Medicine
Eulasson Hall (English)  Dodset Hall (Administration)  Brown Hall (Science)
Mini Dome  Carnegie Hotel
Appendix B

Campus City

In the diagram each lettered square represents one of the locations listed below. Please match up the names with the locations by placing the corresponding letter in the space beside the name. Suggestion: Find sites in the list you know first.
In the diagram each lettered dot represents one of the cities listed below.

Please match the names with the cities by placing the corresponding letter before the names. Do so in alphabetical order.

___ Knoxville  ___ Rogersville  ___ Morristown  ___ Asheville  ___ Marion
___ Hickory  ___ Boone  ___ Kingsport  ___ Jonesborough  ___ Lenoir
___ Mountain City  ___ Spruce Pine  ___ Abingdon  ___ Bristol  ___ Elizabethton
___ Norton  ___ Newport  ___ Erwin  ___ Greeneville  ___ Gatlinburg
In the diagram each letter or letter pair represents one of the states listed on the next page. Please match the names with the states by placing the corresponding letter or letter pairs before the names on the next page. Do so in alphabetical order. Responses on next page.
In the diagram each lettered dot represents one of the cities listed below.

Please match up the names with the cities by placing the corresponding letter before the names. Do so in alphabetical order.

____ San Diego  ____ Los Angeles  ____ Phoenix  ____ El Paso  ____ Dallas
____ San Antonio  ____ Baltimore  ____ Columbus  ____ Milwaukee  ____ Detroit
____ Nashville  ____ Denver  ____ New York  ____ Austin  ____ Indianapolis
____ Seattle  ____ Washington  ____ Chicago  ____ Jacksonville  ____ San Francisco
____ Memphis  ____ Boston
In the diagram each lettered dot represents one of the bodies listed below. Please match up the names with the body by placing the corresponding letter in the space provided beside the names. Do so in alphabetical order.

North America  Great Lakes  Australia  Artic Ocean
South America  North Sea  Antarctica  Caribbean Sea
Africa  Gulf of Mexico  Indian Ocean  Greenland
Asia  Hudson Bay  Atlantic Ocean  Red Sea
Europe  China Sea  Pacific Ocean  Mediterranean
In the diagram each lettered dot represents one of the countries listed below.

Please match up the names with the countries by placing the corresponding letter in the space provided beside the names. Do so in alphabetical order.

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_____ China  _____ New Zealand  _____ Japan  _____ Indonesia
_____ India   _____ Spain    _____ Nigeria  _____ Pakistan
_____ United States  _____ Canada  _____ Mexico  _____ Bangladesh
_____ Brazil   _____ Argentina _____ Germany  _____ Vietnam
_____ Russia   _____ England   _____ Philippines  _____ Iran
In the diagram each lettered dot represents one of the cities listed below.

Please match up the names with the cities by placing the corresponding letter in the space provided beside the names. Do so in alphabetical order.

___ Seoul ___ Mexico City ___ Lima ___ New Delhi
___ Mumbai (Bombay) ___ Moscow ___ Bangkok ___ London
___ Karachi ___ Tokyo ___ Rio de Janeiro ___ Beijing
___ Shanghai ___ Istanbul ___ Bogotá ___ Cairo
___ Jakarta ___ New York ___ Sao Paulo ___ Teheran
Appendix I

Demographic Questionnaire

Please fill this form out completely. If you have any questions raise your hand and we will try to assist you.

Age ______ Gender (circle one) M F Class (e.g., Freshman) _____________

Present Address (city, State) _____________________________

Do you live: On-Campus or Off-Campus? (circle one) On-Campus Off-Campus

Have you ever lived on Campus? (circle one) Yes No

How long have you attended ETSU? (months, years) ______________________

How good is your sense of direction?

1 2 3 4 5 6 7 8 9 10
very poor very good

Rate yourself on your familiarity with Johnson City, TN.

1 2 3 4 5 6 7 8 9 10
not familiar very familiar

Where have you lived? (Cities, States, and Number of Years)

City State Years

1. _______________________________________________________________________
2. _______________________________________________________________________
3. _______________________________________________________________________
4. _______________________________________________________________________
5. _______________________________________________________________________

About how many miles a year do you travel, drive, etc. within the state of TN? __________
About how many miles a year do you travel, drive, etc. outside of TN but within the southeast? __________

About how many miles a year do you travel, drive, etc. outside the southeast but within the United States? __________

How many trips have you made outside of the United States? __________

List the International destinations visited below.

1. ____________________________________________________________

2. ____________________________________________________________

3. ____________________________________________________________

4. ____________________________________________________________

5. ____________________________________________________________

Rate your ability to recall the names and places, like cities and states, with the assistance of a map.

1 2 3 4 5 6 7 8 9 10 
very poor very good
VITA

Joshua S. Godsey

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Date of Birth:  October 7, 1977  
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Marital Status:  Married

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