ACQUISITION OF GEOGRAPHIC INFORMATION

FROM TELEVISION NEWS MAPS

by

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Thesis submitted to the Faculty of the

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Geography

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February 1988

Blacksburg, Virginia

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(ABSTRACT)

University students were shown simulated television newscasts and then tested on the news material to see if maps within the newscast aided learning world geographic information. Students were shown one of eight simulated newscasts, of three news stories. Each newscast contained maps, varying in complexity. There were five levels of complexity. One group viewed a simulated newscast with no maps, while other groups viewed simulated newscasts containing maps with 6, 10 or 14 variables per map. A control group saw no newscasts. The order of news story presentation was varied.

Students who viewed one of the newscasts did better than students who did not see one, and the average number of correct answers increased as the maps in the news programs increased in map complexity. However, the group viewing the most complex maps--the 14 variable maps, did

not perform better than those who saw the 10-variable maps.

ACKNOWLEDGEMENT

I would like to thank several people. My committee chairman, Susan Brooker-Gross, who in addition to advising me, also gave me the incentive to finish. Also, my first geography professor, Mr. Zimolzak, who gave me the excitement and enthusiasm for geography.

I would especially like to thank   , from whose dissertation the idea emerged to do this type of research.

My special thanks goes to my very dear parents, and   nd my husband   _   for their invaluable encouragement and moral support throughout the years.

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CHAPTER I

ACQUISITION OF GEOGRAPHIC INFORMATION

FROM TELEVISION NEWS MAPS

Television is one of the many communications media which use maps. Television maps are used for a variety of purposes such as political campaigns and advertising, but are most common in news broadcasts. Maps are used regularly on the evening network news, viewed by well over a quarter of the United States population (Caldwell, 1979). For most people the television news map may be the only map seen regularly. With such a large audience, it is important to examine the geographic information which may be acquired from the television news map. The television news map, if effective in teaching geography, could be an invaluable tool to combat the geographic illiteracy problem in the United States. By exploring what a viewer learns from these maps, we can design a television news map that may teach as well as serve as a backdrop in the broadcast.

According to Fine, the United States is becoming a nation of geographic illiterates (Fine; 1984). Our geographic illiteracy problem has attracted the attention of both the academic and other professional fields (Association of American Geographers newsletters; Annals,

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Association of American Geographers: Vol. 18, No. 1, Jan. 1983; Vol. 19, No. 9, Nov. 1984; Vol. 20, No. 1, Jan. 1985; and Vol. 20, No. 6, June 1985; the Philadelphia Inquirer; Feb. 1, 1984, and the Baltimore Sun; Oct. 21, 1984). Fine states that people do not realize the importance of interconnections and interdependence of places and peoples. Americans are ignorant of the location of countries and the relationships of these countries to the United States (Fine, 1984). Hill notes the lack of geographic literacy and prescribes that more emphasis should be placed on teaching world and regional geography, stressing the dynamics of the interdependence of places within the global system. Global issues related to resources, populations and economies should be taught along with place names and locations. The electronic news medium is one source of geographic information, which the population watches everyday.

Television news maps have to date made few apparent attempts into solving the geographic illiteracy problem. A clearly designed television news map may improve learning from television maps. However, we don't know what the learning potential of a typical television map is, since research has not focused on the ability of the television

map to communicate information clearly. My research evaluates the power of the television news map to teach as well as portray geographic information.

Maps used on television news broadcasts differ in many ways from other maps. First, television maps are viewed for a short time and cannot be referred to once the story has ended. Thus, the design and content of the television news map must be simple. A second unique quality of the television map is that the visual appearance will vary from one television receiver to another. Depending on its size and shape, each television screen will alter the size, shape, pattern and color of the original broadcast map. Finally, the television news map is always accompanied by a narrated story. McQuail found that verbal commentary helps structure perception and interpretation and directs the attention of the viewer to salient features of a map (McQuail, 1970).

Because of these unique characteristics, the television map presents unique research problems. Despite the fact that many people view television news maps routinely, there has been limited research devoted specifically to the television news map. Most of the existing literature is concerned with the map design for effective technical transmission (Lawler, 1973; Hill, 1981). Research on the clarity of communication, once effectively transmitted

remains to be done. My research focuses on two questions, what type of information may be learned and how much can be learned from the television news map.

Geographic information typically displayed on television maps includes location, direction, orientation and place names. No one has ever tested if these features being displayed are serving their purpose. Learning may be influenced by many variables, including whether the viewer does other activities while watching television news, the distance between viewer and the set, the design of the map and the format of the broadcast. The format includes the map placement in relation to the announcer, the extent to which the map is referred to by the narrator, the story accompanying the map and the amount of display time available for the map (Stauffer, Frost, Rybolt, 1983).

The quantity of information which can be communicated by the television news map has not been examined. For example, a very simplistic map may be all that can be effectively communicated with an ephemeral map. On the same note, it may be that a more complex map gives the viewer so much to assimilate that nothing is retained. Perhaps a less complex map may prove to be more effective in geographic learning. These statements and many others pertaining to the television news map need further study.

The purpose of this study was to examine if geographic learning is accomplished by viewing a television news map. The number of geographic variables which subjects can recall from a television news map within the context of a news program was examined. This study simulated a "real" broadcast as much as possible, controlling content variables and varying only the amount of information displayed on the news maps. This research explored how much information may be effectively communicated by a television news map.

CHAPTER II

CARTOGRAPHIC COMMUNICATION AND THE TELEVISION NEWS MAP

Previous research concerned with television news maps is almost non-existent. Caldwell (1979) has suggested that the simplicity and the ephemeral nature of the television news map is the reason for this deficiency. Television news maps are so deceptively simple that they may be overlooked by the viewer, as well as by research cartographers. Used only as background graphics to a news story, television maps become unobtrusive. Much like a television program, television maps have ephemeral qualities, which may also make the viewer unaware of consciously viewing the map at all (Worsley, 1970). A final explanation of the lack of cartographic literature on television maps may be that both television news and cartographic research are relatively recent developments (Caldwell, 1979). Television did not become popular until after World War II; national network news broadcasts were not even half hour segments until 1963; and emphasis on graphics has increased only in the last decade (Caldwell, 1979).

Even though cartography has been around many more years than television news, it hasn't been until the last thirty to forty years that cartographic research has made technical advances that enabled cartographers to go beyond simple pen and ink work (Stolle, 1979). These advances give cartographers time to research maps and map communication (Stolle, 1979). Cartographic theory and education have gone beyond the map as an end product to include the viewer in the processes of map making. The recent emphasis on communication between viewer and map has opened up a wide field for cartographic research. It is no wonder that television news maps, being new in themselves, have been little researched.

This literature review will briefly examine both cartographic communication and the design of television news maps along with the implications of these for learning geographic information.

Cartographic Communication

Cartographic communication theories have attempted to explain various processes that take place between the map and map reader. Such theories include information theory, cognition theory and modeling theory (Ratajski,

1973). Information theory focuses on the flow of information and the losses and the gains in that flow. Cognition theory examines cognitive processes to untangle the relationship between the information displayed and the viewing and retention of that information by the map reader. Modeling theory examines not only the flow of communication occurring, but also accounts for other variables which may influence the communication process.

An example of such a variable is noise. Noise is any interference with encoding/decoding the message of the map (Robinson and Petchinek, 1976; Guelke, 1976). "Noise" in television news map communication has many and varied guises: static in the electronic transmission of the image; viewer activities; whether the story is pertinent to the viewer (Deutschman, Barrow and McMillan, 1961), and the words and actions of the narrator of the broadcasts. Ratajski has demonstrated that "noise" lengthens the time of receiving the information, rather than causes the loss of information being transmitted (Ratajski, 1978). However, if noise increases the required time for communicating the information in television news maps, then the limited viewing time of television maps could interact with noise to decrease the information communicated.

Perloff, Wartella and Becker point out that the viewer does not comprehend very much from the television news because of the transmission and reception of the news (Perloff, Wartella and Becker, 1982). They note that the lack of cartographic communication between the television news viewer and the news map is due to the non-repetitive format of the map permitting no viewer participation. This situation is contrary to basic communication theories, which usually postulate the viewer feedback to the map maker.

There are human factors that influence the communication from the television news map to the viewer. Viewing an image requires comprehension, deciphering and some process of learning or memory. There are two types of memory: long term and short term; and two processes of memory: recognition and recall. Television maps deal with both long and short term memory and also with recall and recognition processes. Television news maps are usually repeated daily or weekly, allowing the viewer to store the original information, process it and later recognize part of the map or recall that the map was shown before. New information placed on a map will probably go into short term memory and unless reinforced either by another viewing or by intense interest by the viewer, will be forgotten.

Recall of television news is poor. Stauffer, Frost and
Rybolt demonstrated that television audiences do not recall
many of the news items displayed (Stauffer, Frost, and
Rybolt, 1983). Their subjects recalled an average of three
or fewer (out of 16) stories per broadcast. They also
found that the capacity of short-term memory is about seven
meaningful pieces of information, and that gender played no
significant role in recalling the number of news stories in
a broadcast, but age and education did influence the
results (Stauffer, Frost and Rybolt, 1983). Since the
average viewer does not recall much of the news program,
this may also effect the recall of television news maps.
One wonders if the television news map be better designed
to capture the almost non-existent attention of the
viewers.

Shimron studied the ability to learn positional
information from a map, which depends on the variable
viewing time, if the map is divided into themes and if a
text accompanies the map (Shimron, 1978). His results show
that if given enough time, a subject can learn any map and
if time is limited, certain map elements are learned first,
such as learning local connections between cities and
between a city and a topographic landmark. Shimron also
found that the viewers with restricted time limits could
locate cities in their proper spatial relationship as well

as the subjects with unlimited time. His study showed that the viewers with restricted viewing time (similar to television news map viewers) were able to locate the cities correctly (i.e. North, South of...) (Shimron, 1978). Second, he found that learning positional information is facilitated if the test subject can see the map segment by segment (unlike the television map) and finally, a text accompanying a map helps to organize and improve the acquisition of map information.

Research on recall of the news from television news viewers has shown that a picture adds little to the amount recalled from the narrative alone (Katz, Adoni and Parness, 1977). Although Findahl stated that the map aided recall of stories better than any other graphic used (i.e. picture of an event or an object) (Findahl, 1981). Stauffer, Frost and Rybolt point out that cued respondents (ones who knew they were being tested) recalled slightly more news items than their non-cued recipients (Stauffer, Frost and Rybolt, 1983). The results from their study showed that little difference exists between cued and non-cued respondents.

Recall is selective and occurs only if that person wants to remember an item (Katz, Adoni, Parness, 1977; and Gantz,1978). Watt and Sjej state that if relatively little is known about a subject, it is possible that more

information may be later recalled, because the information is new and of interest it is stored better (Watt and Sjej, 1981). If this is true, then news stories on geographic locations, which are unfamiliar to the viewer may be better recalled than stories of familiar places. Also, the stories that are already familiar to the viewer may add information to the viewer's memory and hence, the viewer will structure the new information based on their interest.

In examining recall of information, the duration of viewing and the quantity of information have also been shown to matter. Mackworth examined the recall of sets of digits, letters and the color or shape of names presented orally (Mackworth, 1964). She found that more items were recalled when the oral messages were presented faster, but recall of visual materials was better if the materials were presented slower (Mackworth, 1964). Relating her article to television maps, several ideas emerge. News stories and their maps are presented quickly. Mackworth found that more information is recalled if the oral presentation is quick, similar to that of a television news broadcast. The problem arises when Mackworth examined recall from visually presented materials; letters, digits, colors and shapes. Here, she found that visual materials are better recalled when presented slower, unlike the television map. Her

finding could prove significant to this study in that the more simple maps may be recalled better than the more complex maps because the viewer will have more time to assimilate them. Perhaps, the television news map needs to follow the research on recall; giving more time to the viewer and creating better designed maps to generate attention from the viewer.

Television maps are very similar to journalistic maps. Gilmartin states that journalistic maps are produced within very short deadlines, which affects the effectiveness of these maps (Gilmartin, 1985). Television maps are also created under similar deadlines. Gilmartin points out the purposes of the the journalistic map is to convey geographic information to the reader as well as adding visual interest to the text/story (Gilmartin, 1985). Again, this is very similar to the television map. One of the difference between the television map and the journalistic map is that the journalistic map may be referred back to, at the convenience of the reader.

There exists only very limited research on the impact of the value of journalistic maps or text book maps. Gilmartin quotes Edom (1976) in that graphics used by newspaper readers are read 3-4 times by more people than the news story without graphics (Gilmartin, 1985). This

would lend one to believe that the reader who views the news article with graphics is actually learning more, maybe because of repetition. Robinson and Levy found that 67% of a population read a newspaper, opposed to only 52% who viewed any television network (Robinson and Levy, 1986). They also found that watching television newscasts showed a negative relation to news information. These findings may relate to how much people actually learn from the maps used in either journalistic or television maps, although I have found no research that clearly links this conclusion. Gilmartin examines Baker and Popham's (1965) research who evaluated the value of the graphic used in texts (Gilmartin, 1982). Baker and Popham found that graphics, while adding higher viewing interest and enjoyment, do not increase learning (Gilmartin, 1982). Although Baker and Popham's findings are interesting, they do not deal specifically with maps. Gilmartin, on the other hand, did research the impact of maps within a text. She concluded that maps with a prose, did aid students in learning the content of the text. Can the television map, which is similar to other journalistic maps aid students in learning? The television map may key viewers in to watching the news, helping them to spatially orient themselves while listening to the news. Gilmartin showed

that memory for illustrations may be better than memory for words which would also have an impact on television news maps (Gilmartin, 1972).

In addition to examining the recall of the number of stories a viewer may remember, there is research pertaining to the recall capabilities of the viewer of slides which is applicable to television maps. Slides are often used for television graphics. Intraub examined memory and recall from subjects using slides (Intraub, 1980). The construction of the slide is very similar to that of the television graphic. A difference between the two is the slide may be referred back to, and is displayed usually for a longer period than the television news map. Because of these similarities: display time, construction, and an accompanied story, it is possible to examine the research concerning slides and relate it to television maps. Intraub examined the amount of recall for pictures using slides by varying the time between viewing the pictures. Recall was extremely good when sufficient time between pictures was allowed. Tversky and Sherman examined the length of time a slide was shown and the length of time between pictures (Tversky and Sherman, 1975). They too found that as time increased between the viewings, better recall occurred.

Petchenik pointed out that as cartographers we constantly try to understand the processes that exist between a map and its user (Petchenik, 1983). She argues that only through research will we gain a better understanding of our users and how complex the processes existing between the map and the user really are.

Design Characteristics of the Television News Map

Television graphics present unique problems in their reproduction and ultimately in their visual display. The map must follow certain design guidelines, which help compensate for the variations which occur in individual television receivers. The electronics involved in the display of an image will transform the image to some degree, as will the screen from which the map is viewed. No two images will ever appear identical.

Much of the literature on television news maps is devoted to these technical considerations (Hill, 1962; Homer, 1966; Lawler, 1973; Zavada, 1974; Zettle, 1976; and Caldwell, 1979). The map must be simple and clear, follow an aspect ratio of 4 (width) by 3 (height), stay within the scanning area of the camera and avoid certain patterns. Further, designers should remember that the television screen is distorted and will not project

straight lines and that colors must be compatible with their gray tone equivalent to facilitate both color and black-and-white reception.

Taking each technical consideration in turn, the map or image must be clear and easy to read, since the average time for viewing the image is 13.5 seconds (Caldwell, 1979). Zettle suggested that no more than ten words be displayed on a television news map (Zettle, 1976). This arbitrary number reflects both the limitation of the type and content of the map. The usual amount of information displayed on national network television news maps is two to three names or symbols (Caldwell, 1979). To obtain a clear picture, the map must follow an established ratio, known as the aspect ratio. A decision was established early in the television industry to have a 3 (height) by 4 (width) ratio for its graphics (Zavada, 1976). Within this aspect ratio is the scanning area, the area that the camera picks up and relays back to the monitor. It is a slightly smaller area within the aspect ratio. Boundaries or words placed outside the scanning area may be blurred or eliminated as the camera scans the map. A third guideline involves the technical limits of the screen. The screen is made up of dots which create the image of horizontal lines, known as a raster system. With these horizontal lines, certain

patterns should not be used least they create a moire effect. The moire effect is one in which the pattern seems to move, giving it more visual significance than is usually wanted.

Projection of straight lines on a television screen is thwarted by the screen's curvature. Grids are distorted, and measurements can only be estimated. This may be why grids are seldom used on a television news map, or it may be that graticules only create more confusion in viewing. However, maps without such graticules make it difficult to judge areas (Dahlberg, 1960). Grids and graticules are best left off the television news map because they usually become an unnecessary item and will make the map more cluttered. Also, the viewer would not be given enough time to read the latitude or longitude. The latitude and longitude will be lost on the perimeter of the viewers screen, due to the aspect ratio.

Colors must be considered when designing a television map. Certain television receivers cannot distinguish between colors that are close in hue or gray tones. The maximum variation between colors and gray tones must be considered in order to produce a map that is easily recognized.

The guidelines discussed in the previous paragraphs are similar to those of slide preparation. The same limitations of the television news map exist for slides: aspect ratio, simplicity, shading and pattern considerations (Flanders, 1976; Pratt and Rope, 1978). In creating a television news map it is a good idea to conform to the limitations of a slide, since slides are mostly used in the production of the television news graphics.

The problems associated with map preparation for the television screen make it apparent that maps must be tailored to the medium of television (Caldwell, 1979). There is still a wide gap concerning what we know about the role of the television map in creating a person's conception of the world. Examining how much acquisition of geographic information may be obtained from television news map, based on the number of variables on the map, is just one of the many unanswered questions concerning the television map that will be examined in this research.

CHAPTER III

METHODOLOGY

This study examined the amount of geographic information which may be acquired from television news maps. The main questions that this research will attempt to answer are: (1) How does the quantity of geographic information on a map affect the amount of geographic information recalled, and (2) what type of information is recalled? This study will attempt to determine how much and what type of geographic information can be learned from viewing television news maps in their typical broadcast context.

Evening television news broadcasts typically consist of two types--local and world news. Local newscasts report only briefly on world news situations, while world newscasts focus on national events and world problems. Knowledge of names and locations beyond local and even national areas is necessary to promote global geographic literacy. For this reason, world news maps will be examined in this study. For the purpose of this study, information pertaining to world geography relates to locating countries

within continents, locating cities and other features within countries, and spatial relationships--distance and direction--among features.

I will examine informational gain in television news maps within the context of a simulated news broadcast. The basic steps involved in my testing procedure are: 1) to show video tapes of a simulated news broadcast to sample audiences, 2) to ask geographic questions based on the newscast viewing, and 3) to analyze the number and type of correct answers to the questions. Within each of these broad steps there are many contextual--or "noise"--variables. As many of these will be controlled as possible.

Before these tests, various pre-tests were completed. These pre-tests yielded a design standard for the news maps in the testing phase, as well as a baseline set of geographic information.

Pre-test of World Knowledge

To assess prior world geographic knowledge, a pre-test was given to a group of university students. Twenty students in an introductory geography class at Virginia Polytechnic Institute and State University were given a questionnaire concerning placement of countries throughout

the world. All place names in the test were taken from the contents of a 1983 newspaper. Selected place names of a country or major city were circled and the students were asked to locate and label these on a world map. The results of this pre-test substantiate the findings on geographic illiteracy (Table 1). Based on this pre-test, I selected two countries: one that was relatively well known--Poland, and one that was unknown--Chad. Both the selected countries had relatively compact shapes, so that shape would not influence the results of my tests. This research project thus controls for the influence of shape on recall from the television news map. Finally, Chad and Poland represent locations on two continents, so that maps of one country would not portray the second country as well.

Design Study

Another prerequisite was to examine the design of the news map. The design guidelines reviewed in Chapter 2 are general, and would not, in themselves, duplicate typical television news maps. Color, lettering color, symbols and placement of the map all needed to be similar to a network news broadcast to simulate a familiar image. To determine how the average news map appears on the screen, a sample of the three major commercial networks' evening world

TABLE 1. RESULTS OF PRE-TEST OF WORLD KNOWLEDGE

Country	% Correctly Located	Country	% Correctly Located
Britain. . .	.88%	Bulgaria . .	.56
South Africa	.84	Zimbabwe . .	.52
Rome	.80	Nicaragua. .	.52
Japan. . . .	.76	Honduras . .	.52
China. . . .	.76	Pakistan . .	.52
Lebanon. . .	.76	Zaire. . . .	.48
Israel . . .	.72	Bangladesh .	.48
El Salvador.	.72	Venezuela. .	.44
Egypt. . . .	.72	Iran	.40
Poland . . .	.68	Ivory Coast.	.36
Iraq	.64	Libya. . . .	.32
Switzerland.	.60	Namibia. . .	.28
Hungary. . .	.60	Botswana . .	.28
Persian Gulf	.60	Nigeria. . .	.28
West Germany	.60	Ghana. . . .	.24
Sweden . . .	.56	Sudan. . . .	.16
Falklands. .	.56	Chad	8

newscasts was taken. All were viewed simultaneously, using three television receivers. A photograph was taken every time a map appeared on the world evening news during the week of 9 June through 17 June, 1983. From these photographs, typical colors of areas, lettering and placement of the news map in relation to the broadcaster were determined.

The results of this testing are as follows:

(1)   The mean number of maps per newscast were ABC, four; CBS, three; and NBC, three.

(2)   All maps were placed near the left shoulder of the broadcaster.

(3)   All maps had an off white border.

(4)   Sixty-six of sixty-eight maps used white lettering.

(5)   NBC was the only network to use another form of symbolization other than a dot. They used soldiers as symbols during one evening's broadcast.

(6)   The average number of names per map equalled 1.45 for ABC, 1.28 for NBC and 2.0 for CBS. These total to sixty-eight maps, including those with only the country names

Forty-two maps incorporated at least two
geographic names.

(7)   The main country was yellow-orange or
yellow. Twenty-eight of the forty-two maps
with more than one place listed were yellow
or yellow-orange in color.

Eight of sixteen surrounding countries were
green. The next most common color for
neighboring countries was light brown, (3
instances). Water was always light or dark
blue.

My study used these observations in the making of the
maps for the simulated news broadcast; namely,
yellow-orange for the main country, blue for the water,
green as the surrounding country, and white for the
letters.

CONSTRUCTION OF MAPS FOR THE VIDEO

After administering the pre-test questionnaire and
watching the news to obtain map standards, the maps and
video newscasts were constructed. The maps for this
project followed the general guidelines discussed in
Chapter 2, and duplicated the most common network news
maps.

In addition, there are also electronic considerations for television. They are (1) no extensive white or red areas and (2) use a little more space between letters than is usually taught in cartography. The colors white and red are not used extensively because white will "stand out" on television giving the impact of more importance. Red is not easily transmitted electronically and also red will not be portrayed as a true red, but more of an orange-red. The colors used in this project were yellow-orange (Zipatone #2735) for the main country, dark green (Zipatone #2638) for the background, blue (Zipatone #2585) for the water, light green zipatone for a country of lesser importance, and white for all the lettering. Although the maps were to be projected on a color monitor for testing, I evaluated the gray tones on a monochrome monitor, to have the same criteria as network maps which must be distinguishable on a black and white receiver and to minimize problems with any colorblind test subjects. I judged the tones to be easily distinguishable from each other and therefore satisfactory for this project. The map size was 24" by 18" to conform to the 4 by 3 ratio. The map information was centered within the 24" by 18" frame to allow for the scanning range. (See Appendix 4 for photographs of the maps used).

The 24" by 18" map was then photographed as a slide, which would then be fed into a slide machine at the appropriate time in the simulated newscast.

Again, there are no clear standards for either lettering size or type for television news maps. Graphic artists in the field usually go by "whatever looks good". Wilson and Brockemuehl recommended 1/10th inch to 1/25th inch the picture height as the minimum type size (Wilson and Brockemuehl, 1976). They suggested a formula to figure the type size: $P = 1.7x$; P = size of the letters in points; and x = the long side of the original format in inches.

Using this formula for the present study, it becomes $P=1.7 \times 24$ or $P=40.8$. The smallest lettering size should be 40.8 point. No guidelines examined have addressed the largest point size. This study used 36 point lettering for the smallest letter size, just below the recommended size. The type was helvetica medium.

NUMBER OF VARIABLES ON THE NEWS MAPS

In Caldwell's research, the average number of names seen on a television news map was two (Caldwell, 1979). The results from my own pretest viewing of the three major networks were similar to Caldwell's, with a mean of 1.6

names per map. Zettle suggests 3 to no-more-than 10 names per television graphic (Zettle, 1976). This study will test a range of names (i.e. 2 to 5) on the news map.

Katz states that the median number of stories recalled from a thirty minute broadcast was two (Katz, 1977). Newman stated that the average number of stories recalled from television news was 1.2 of 19.8 (Newman, 1976). Combining these studies with my preliminary pre-test viewing study, I decided on three stories. The three stories were Poland, Chad and Australia. Australia was only used as a buffer or opening statement, whereas Poland and Chad were used for several reasons. These countries were chosen because of the earlier geographic pre-test, their relatively similar, compact shapes and their location on separate continents. I didn't want to use countries from the same continent due to the possibility of a student having previous knowledge of a particular continent.

Each map tested in this study contained between two and five names. In addition to the names, other variables placed on the maps: colors, an inset map, and symbols. There were between six and fourteen variables, including the names, per map.

The communication effect of the number of cartographic items on a television news map has not been tested. This study ranged from a very simple map displaying only two

names, and proceed to a more complex map containing six words (five names). All viewing sessions (news programs) had the colors orange (the primary country), green (background), and blue (the river) displayed. The letters and countries were outlined in black, so that the colors would be distinct from one another and not "bleed" together. In addition to these colors, the 6-variable map contained only two words; the 10-variable map contained five words plus an additional color (light green for the secondary country), and the 14-variable map contained everything from the previous sessions plus another word and an inset map. The inset map contained the outline of the countries within the continent: the primary country was shaded in and a border was placed around the inset map.

A total of nine groups of viewers were tested (Table 2). One group was given only a questionnaire, to act as a control or baseline group, and exposed to no additional information. The remaining eight groups each saw one of eight simulated news programs. Each program contained three news stories. The topics of the stories were Australia's drought; the labor organization, Solidarity, in Poland; and Chad's military problems. The Australia story served in all cases as an introduction and no map accompanied the story. This story did have a

TABLE 2. DESCRIPTION OF THE VIDEO SESSIONS

News Program #	Did students see a simulated news program?	How many variables on the map?	Order of the story.
0	no	----	----
1	yes	no map	acp
2	yes	no map	apc
3	yes	2 names (6 variables)	acp
4	yes	2 names (6 variables)	apc
5	yes	4 names (10 variables)	acp
6	yes	4 names (10 variables)	apc
7	yes	5 names (14 variables)	acp
8	yes	5 names (14 variables)	apc

*acp refers to Australia (a), Chad (c) and Poland (p)
**Variables represent any bit of information portrayed on the map. These "bits" of information include names, colors, and borders. For example, the most complex maps contained 6 words, 5 colors, plus an inset map.

graphic which contained only words. Maps were prepared for the Poland and Chad stories. The verbal messages in the viewings were exactly the same.

The order of the stories concerning Poland and Chad were alternated to test if order made any difference in recall of geographic information from the television news map.

CREATING THE VIDEO

The simulated newscasts in their entirety consisted of a "newscaster" reading the news stories, illustrated with the appropriate maps. The stories used for this broadcast came from Newsweek and Time magazines (See Appendix 1). Writers from the Virginia Polytechnic Institute and State University Department of Communications Studies edited the magazine version into a script suitable for television news. While Katz stated that the average length of a news story is one minute or less, the news stories in this project were somewhat longer--one and a half minutes each (Katz, Adoni, Parness, 1977). During the appropriate news story, the map or graphic slide was shown for 16 seconds on the television screen. Again, this is slightly longer than the average of 13.5 seconds that a map is shown on the network newscasts (Caldwell, 1979). I displayed the

map/graphic for one second at a position behind and adjacent to the left shoulder of the broadcaster, for 14 seconds full screen and then again for one second, behind the broadcaster's left shoulder for one second, before it disappeared from the screen.

To simulate a real news broadcast, a white male actor was hired to imitate a news broadcaster. The opening scene played music similating a busy news room and then cut to the actor who began to read the news program. At the end of the program he stated his name, thanked his viewers for watching "World News Tonight" and told them to have a pleasant evening--all similar to a real evening news program.

SHOWING THE VIDEO

Each news program was shown to a different group of students. Nine introductory classes at Virginia Polytechnic Institute and State University were selected. The classes consisted of one Introduction to Geography class, four Sociology classes, two History classes, one English and one Communication Studies class. I introduced myself to each class, told them what they would see and thanked them for their cooperation (Appendix 2). The broadcast lasted approximately 3 minutes and forty seconds.

After viewing their news segment the students were asked a series of questions (Appendix 3). They did not know before viewing the video that they would be asked any questions. The questionnaires had been kept hidden up to this point so as not to inform the students they were to be tested. Also, no mention of geography or places was made so as not to influence the students viewing participation. After all tests were collected, I explained why I was doing this test and what I expected to find.

VIEWING SITUATION

The video tapes present one type of controlled environment. There were, however, variables in the viewing situation which could not be completely controlled. These variables can affect the resolution of the image, and thus the potential for perception and consequently, learning. These variables include optimal viewing locations and the surrounding environment. Optimal viewing location includes the distance from the screen and the angle that a viewer sits from the television. McVey argued for an optimal viewing distance of no more than twelve screen widths, and no less than four screen heights, since individual dots and lines of the screen raster disappear at a distance of four times the screen height (McVey, 1970).

Wilson, in contrast, suggested the distance from the screen should be no more than six times the width of the screen (Wilson and Bockemuehl, 1976). Zettle further suggested that the television image is best seen within thirty degrees to the right or left of the screen (Zettle, 1976). Other aspects of the viewing environment include various features within the viewing room, particularly the lighting within the room. The brighter the room, the less contrast of the image and the lower the image's brightness.

In the testing of this project the optimal conditions were not uniformly met. Although students were told to move within the optimum location they often did not. This situation parallels real-world viewing contexts, when the viewer is not always sitting in the "optimal area". In this study, one class was held in a small auditorium. The video was shown at the lower level and the students sat on higher levels. All other videos were shown in flat-floored classrooms, but in many classes there were 31 to 36 students, too many to permit optimal seating for all relative to the receiver.

Questions

The questionnaire consisted of specific questions pertaining to the video and a background information segment (Appendix 3). Certain questions could only be

answered if the viewers had seen the more complex maps
(Table 3). For example, question 10 asked the students to
name a particular river in Chad. Only news programs 5,6,7
and 8 contained either the 10-variable or 14-variable maps
with the river's name, so I would expect those subjects to
do better than those who saw either no map or a map without
the river's name (1,2,3,4). Most of the questions asked
the students to name a city, continent or river. The
questions pertaining to direction gave the students compass
directions.

A second portion of the questionnaire asked the
students some background questions (Appendix 3). These
questions consisted of asking the students their age, sex,
number of times the student watched the news, type of
television (black, white or color) and their college level.
This information will be averaged per session to explore
the possibilities of other conditions influencing the
results. For example, if students who saw no news broadcast
(news program 0) did poorly, can their performance be
attributed to the lack of information, or to some anomaly
in the group's composition?

TABLE 3. QUESTIONS/NEWS PROGRAMS

Viewers who saw the correct answer on a map were in news program numbers:	Question #	Content
7-8 only	5,6	location of continent
	14,15	direction of cities
	22,23	location on continent
5 - 8	9,10	name of river
	16,17	bordering country
3 - 8	7,8	name of capital
	18,19	city location
	20,21	river location

Analysis

I compared the number of correct answers for subjects who saw the various newscasts in my study. Comparisons were made between the group of students who did not see the simulated news programs and all other groups who did see the news programs, as well as among "levels" of map information. Pairwise comparisons show whether geographic learning is enhanced by news maps, and whether the quantity of information on news maps affects learning.

Several types of statistics were applied to the data to determine the significance of this study. A question by question analysis used a difference of proportion test. The chi-square test was used to see if question performance varied with the newscast seen, and a t-test examined the specific information levels to see if a difference exists between the news programs shown to the viewers. These results are presented in the next chapter.

CHAPTER IV

RESULTS

Analysis of the test questions is in two parts. The first looks at the background questions, and the second part examines the questions pertaining to the news broadcast. The results examine the number and percentage of correct answers. Comparisons were made between the group of students who didn't see the map and all other groups who saw a news broadcast containing maps. These comparisons show if any geographic knowledge is learned from (1) a news broadcast and (2) a news broadcast with maps. Further, the type and amount of information learned from maps displaying differing amounts of information was analyzed.

Classroom Composition

The group averages on the background information questions were similar. The modal subject watched world news on television one or two times a week, or never; most do not watch other news programs; and most students do other activities while watching the news. The majority did have access to color televisions and very few were colorblind. Therefore, the use of color in the maps should be both familiar and appropriate. The average age range

was 20 to 22; and most of the students were sophomores, juniors or seniors (Table 4). While men outnumbered women, in all viewing groups, the ratio ranged from almost equal to seven times more men than women.

Most of the students had had no geography classes and most had not seen any news concerning the situation with Chad. A week prior to my test, the United States almost became involved between a conflict with Chad and Libya. This conflict was seen on the television news at least every night for one week prior to my testing. The earlier pre-test (described in Chapter 3) found that only eight percent of the students had known where Chad was located. If a student had watched the news consistently during the week prior to my test he or she may have had greater knowledge of Chad than the pre-test subjects. As it were, a significant percentage had seen the broadcasts on Chad, ranging among the groups from 36 to 56 percent. However, in all but one viewing session, the ones who had not seen it outnumbered the ones who did. This news coverage, then, diminishes the familiar/unfamiliar dichotomy in my choice of countries minimally.

Since the groups of subjects were relatively homogeneous, any significance difference that appears when analyzing the data may be attributed to the differences in

TABLE 4. BACKGROUND QUESTION RESULTS

QUESTIONS	NEWSCAST VIEWING SESSIONS %								
1. How often do you watch the news?	0	1	2	3	4	5	6	7	8
*never	33	33	29	28	30	16	27	21	16
*1-2	60	47	42	41	30	64	64	46	58
*3-4	7	11	10	14	30	16	9	29	16
*5-6	—	5	16	17	10	—	—	4	4
*7+	—	—	—	—	—	—	—	—	4
2. Other world news?									
*yes	33	25	26	17	15	12	—	21	25
*no	67	72	71	83	85	84	100	79	75
3. Other activities?									
*yes	60	81	71	76	65	68	64	83	79
*no	33	11	23	24	20	24	27	8	37
4. Type of television.									
*color	27	56	52	52	50	60	55	62	71
*bl./wh	67	39	42	48	45	28	45	33	21
5. Color-Blind?									
*yes	7	5	3	—	—	4	—	—	8
*no	93	92	97	100	100	92	100	100	92
6. Are you:									
*male	67	56	65	59	55	48	73	54	88
*female	33	42	35	41	45	44	27	46	12
7. Mean age:	22	20	22	20	22	20	20	20	21
8. College level:									
*fresh	—	5	3	3	—	4	—	4	4
*soph	40	11	10	41	5	28	45	33	42
*junior	40	33	29	31	45	40	36	38	21
*senior	20	50	55	21	45	24	18	25	33
*grad	—	—	3	3	5	—	—	—	—
*other	—	—	—	—	—	—	—	—	—

TABLE 4.(cont.)   BACKGROUND QUESTION RESULTS

Questions	Newscast Viewing Sessions %								
9. % with any geog. classes	0	1	2	3	4	5	6	7	8
*0	33	69	87	83	70	80	100	79	83
*1-2	53	25	10	14	30	12	—	12	17
*3-4	7	3	—	3	—	4	—	8	—
*5-6	7	—	—	—	—	—	—	—	—
*7+	—	—	3	—	—	—	—	—	—
10.Have you been watching the news about Chad?									
*yes	53	36	39	38	55	40	27	45	42
*no	47	61	61	62	45	56	73	54	58

Note: The percentages may not add up to 100% because some of the students did not answer all the questions.

viewing the newscasts, and not to the age or experience of students in those sessions.

The amount of geographic learning which a viewer could learn from a television map was determined by a series of questions asked after the viewing of the newscasts. The questions elicited information pertaining to the news broadcasts, and were designed to answer what types of information is learned from television news maps?.

I analyzed the data in two ways. First, I looked at the mean number of correct answers per session (Figure 1). As the maps increased in complexity, the average number of right answers also increased, until the 14-variable map was viewed. News programs 7 and 8 contained the 14-variable map, which may prove too complex a graphic for the television viewing. Figure 1 also shows that the order of the news stories played no role in overall learning geographic information from the television news map. The odd numbered sessions were all shown in the same order: Australia, Chad, Poland: they didn't do any better or worse than the even-numbered sessions (Australia, Poland, Chad).

An analysis of variance tested the number of correct responses to see if more variation exists between the viewing groups than within them. The null hypothesis, that no difference exists between the sessions, was not rejected (Table 5), so that the sessions in general seem to
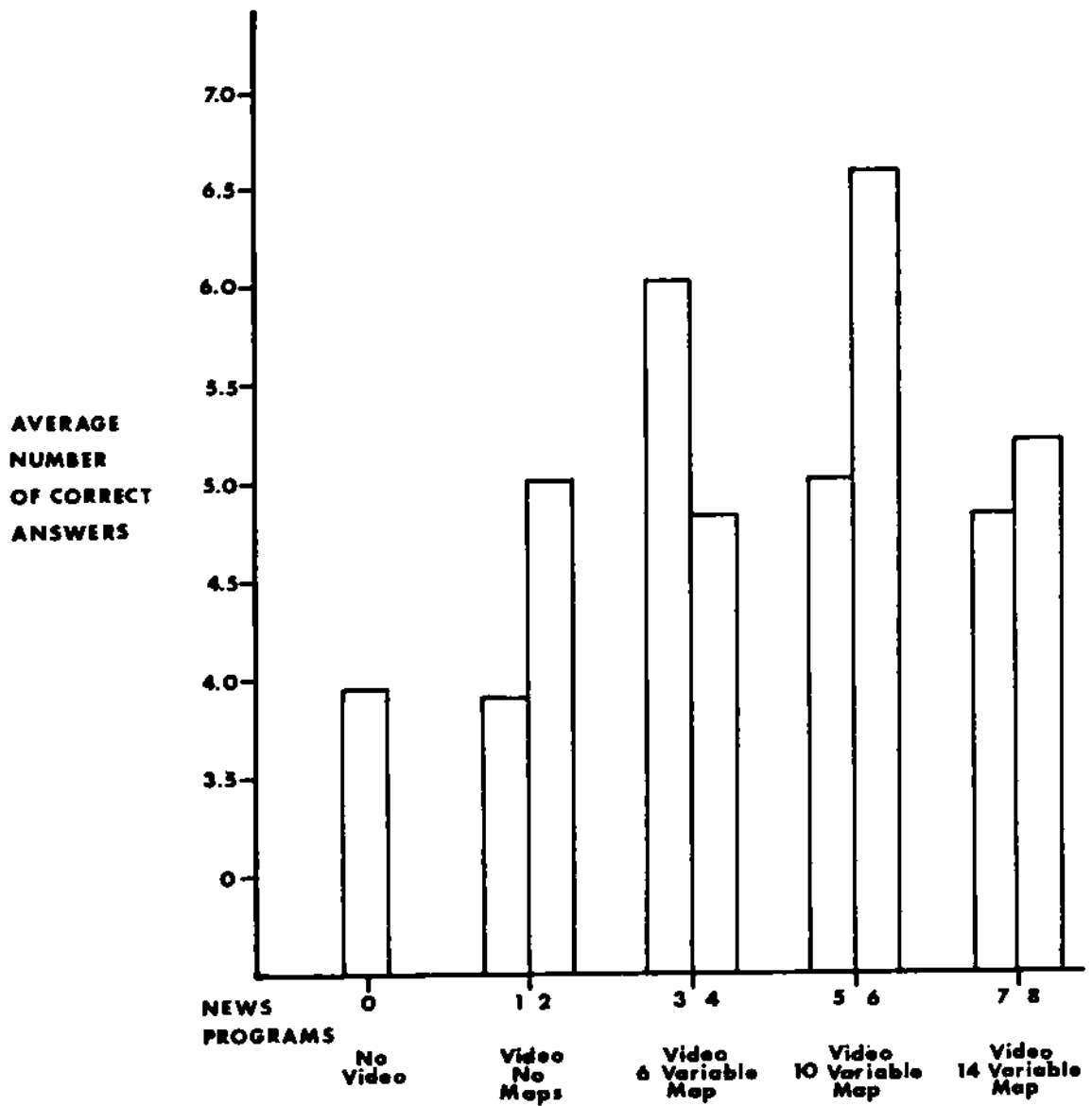
Figure 1. Average Number of Correct Answers Per News Program

TABLE 5. ANALYSIS OF VARIANCE

	Variance estimate	Degrees of Freedom
Within Sample	38.41	206
Between Sample	17.13	8

F ratio = .445
Critical value .10 = 2.29
Critical value .05 = 2.93

play no role in the number of correct responses. However,
it may be that particular sessions do perform differently
from other particular sessions.

A pairwise t-test compared the total number of correct
answers in each session against every other session. The
direction of the test specified that more information on a
television news map leads to more geographic learning. For
example, in news program 1 there were no graphics
presented, while news program 3 contained a very simple
map. Is the introduction of a map in a television news
broadcast significant to the correct response on the
questionnaire? If the television map can be used to help
a person learn world geography, then viewers of news
programs 3,4,5,6,7 and 8 should do better than those who
saw no map (viewing sessions 0,1,and 2).

A two-tailed t-test was used. If the calculated
statistic was significantly negative, then a particular
newscast interfered with the learning processes. The
results of this test show that the null hypothesis (Table
6) was rejected for only two pairs of news programs.
Program 6 against program 0 and program 6 against program
1 were significant at the 0.10 significance level. In both
these programs, viewers of program 6 had more correct
answers than in the other sessions.

TABLE 6. PAIRWISE COMPARISON OF INDIVIDUAL
        NEWS PROGRAMS

	0	1	2	3	4	5	6	7
8	.77	.81	.10	-.35	.25	.08	-.009	.26
7	.54	.59	-.14	-.62	0.00	-.18	1.50	
6	*2.34	*2.46	1.04	.34	1.40	1.07		
5	.68	.73	.02	-.43	.17			
4	.52	.56	-.14	-.60				
3	1.07	1.11	.44					
2	.63	.67						
1	-.03							

* = rejected the null hypothesis at the .10 significance level

Why did viewers of program 6 do better than all the other groups including those who saw the same newscast in another story order (program 5)? Why did news program 1 do as poorly as news program 0 and much lower than news program 2, its counterpart? A possible answer may be the number of people who viewed the news segment. News program 6 contained the fewest number of students, while news program 1 the most. Students in news program 0, of course did poorly because they did not view a simulated broadcast.

When comparing news programs which varied only by story order (1+2, 3+4, 5+6, 7+8), groups with the fewer number of people usually did better than its counterpart (Table 7). This result relates to the optimal viewing angle and distance for watching television (Wilson and Bockemuehl, 1976, and Zettle, 1976). No significant difference can be seen within paired programs, implying that the order of the stories does not matter.

Since the order of the stories does not matter, groups viewing similar news programs will be combined. If the similar programs are combined--1+2, 3+4, 5+6 and 7+8, and averaged, (see Figure 2). the number of correct answers per group of similar programs increased as the graphics became more complex, then decreased for news programs 7 and 8. Should this decline in scores prove significant, the

TABLE 7. QUANTITY VS. QUALITY

Program	Order of stories	No. of students	Mean Score	Assessment
0	—	15	3.8	poor
1	acp	36	3.8	poor
4	apc	20	4.75	fair
7	acp	24	4.75	fair
2	apc	31	5.03	good
5	acp	25	5.08	good
8	apc	24	5.29	good
3	acp	29	6.03	best
6	apc	11	6.63	best

* assessment based on grand mean (4.79)

COMBINED NEWS PROGRAMS
% Correct
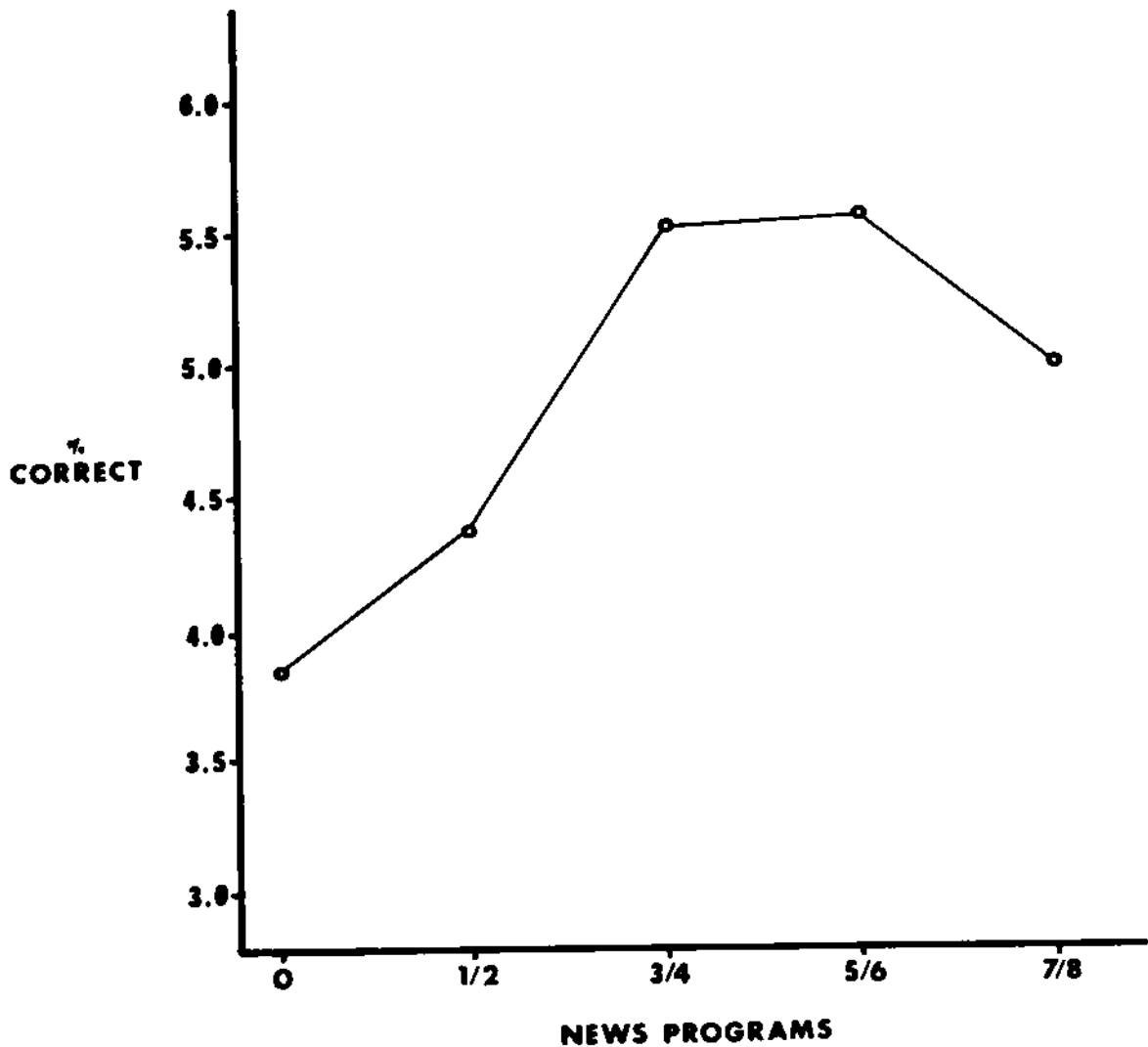
Figure 2.   Combined News Programs - Average Number of Correct
Answers

explanation would lie in the complexity of the maps in programs 7 and 8. Due to the complexity of programs 7 and 8, the viewer had very little time to digest all the information presented on these maps, perhaps leading the viewer to information overload. Information overload may be defined as too much information in too little time, diminishing retention of any information given. The viewer would have very little time per map item, and be less able to recall the map information at a later time.

Pairwise comparisons of combined programs show that all the experimental programs do better than the control program (news program 0), rejecting the null hypothesis on the positive side, at the 0.10 significance level (Table 8). However, all other results stayed within the critical value and the null hypothesis of no difference was not rejected. If we examine only the sign of the results, we find that students who viewed the 14-variable map, news programs 7 an 8, performed worse than those who saw a less complex map (i.e. 7/8 against 3/4 or 7/8 against 5/6). More information is not always better: fourteen variables on a news map may be too complex.

This test result also showed that the news programs containing no map (programs 1 and 2) did just as well as those with a map (programs 5 through 8). This implies that the null hypothesis is correct and there is no difference

TABLE 8. T-TEST: SIMILAR NEWS PROGRAMS

News Programs	0	1/2	3/4	5/6
7/8	*5.70	.49	-.36	-.37
5/6	*3.90	.89	.02	
3/4	*2.66	.81		
1/2	*3.60			

* = rejected the null hypothesis at .10 significance level

between the programs, although a televised news broadcast is better than no news broadcast. This finding supports Katz, Adoni and Parness in that recall of television news from viewers show that a television picture adds little to learning (Katz, Adoni and Parness, 1977). The t-test showed that a difference exists between program 0 and the other programs.

The preceding analyzes total performance; however similar averages can conceal differences in the type of information gained. Analyzing each question may reveal other differences between the sessions in type of information retained.

Question by Question Analysis

The chi-square statistic was used to examine the number of right/wrong answers per question, among the combined programs. The null hypothesis states that no difference exists between the combined programs for the individual questions. The alternative hypothesis states that a difference does exist between the questions.

The number of right and wrong answers per program was compared for each question (Table 9). Eight out of sixteen questions rejected the null hypothesis at the .10 significance level. Five of these eight were questions

TABLE 9. CHI SQUARE

COUNTRY	TOPIC	QUESTIONS	CHI SQUARE	ANSWER CONTAINED ON MAPS IN PROGRAMS
Chad	which continent	5	2.18	7-8
Poland	" "	6	*10.46	"
Chad	capital	7	*34.28	3-8
Poland	"	8	*19.51	"
Poland	river location	9	7.46	5-8
Chad	" "	10	1.99	"
Chad	direction between cities	14	2.90	7-8
Poland	" " "	15	*9.15	"
Chad	bordering country	16	*10.66	5-8
Poland	" "	17	*18.71	"
Chad	city location	18	3.24	3-8
Poland	" "	19	*11.07	"
Chad	river location	20	*12.78	3-8
Poland	" "	21	2.82	"
Chad	location on continent	22	6.86	7-8
Poland	" "	23	1.25	"

*Significance level at .10 level, x = 7.78

about Poland, three were of Chad. Does a pattern exist? By examining the sessions and the questions that rejected the null hypothesis within these sessions, perhaps a pattern will arise.

Questions 5 and 6 asked the students to list the continent on which Chad (question 5) and Poland (question 6) were located. Question 5 showed no significant difference among the programs while question 6 rejected the null hypothesis of no difference. Approximately 75% answered number 5 correctly for all the sessions, whereas, the response for question 6 was more variable among the programs answers. News programs 7 and 8 were the only programs to contain an inset map, yet three quarters of all viewing groups correctly answered the question, the inset map may not have been needed to help the student locate Chad within Africa. Programs 7 and 8 had so much information on them, students may not have had time to learn the information on the inset map. Previous knowledge of the continents, based on the pre-tests referred to in Chapter 3, may have resulted in the inset maps not being necessary, or of little additional information to the students.

Questions 7 and 8 asked the students to name the capitals of Chad and Poland, respectively. Both questions rejected the null hypothesis. A larger percentage of

students answered question 8 correctly (Poland), yet for both questions, the answers varied among the sessions. If Examining the percentage of correct answers, we see that programs 3 and 4 did the best. Programs 3 and 4 contained the simplest graphics listing only the names of the country and its capital. For this particular question, the programs that contained only the information needed had the most correct answers.

Questions 9 and 10 asked the students to name the rivers that ran through Chad and Poland. River names were introduced on programs 5 and 6. For question 9, the highest percentage of correct answers cam from programs 5 and 6. Both questions failed to reject the null hypothesis implying that no difference exists among the programs for these particular questions. The percentage of correct answers shows that hardly anyone answered them correctly.

Questions 14 and 15 asked the students to give the direction from one city to another. Only programs 7 and 8 were given the information to answer this question, since only that map contained both city names. For question 14 (Chad) I failed to reject the null hypothesis, while I rejected the null for question 15. Overall, all groups performed poorly. Question 15 (Poland) also did poorly among students who saw programs 0 through 4, but better in programs 5 through 8. Programs 7 and 8, which contained

the correct answers to question 15, did have the highest percentage of correct answers. Based on the pre-tests (Chapter 3) students knew more about Poland than Chad. Because of this, the students in programs 7 and 8 may have had an easier time remembering and storing this piece of information about the direction of one city to another in Poland than in Chad.

For both questions 16 and 17, I rejected the null hypothesis of no difference. These questions asked the student to name the country that bordered the primary country discussed in the broadcast (i.e. Chad or Poland). The students who saw no video (program 0) were asked the name the country that was located southeast of either Chad or Poland. The programs that had the highest percentage of correct answers were programs 5 and 6. These programs were the first ones to contain the name of the country in question.

Questions 18 and 19 asked the students to name the city that was located on a particular river. These questions should have been answered by students who viewed programs 3 through 8 because all the maps contained the city on a river. Question 18, dealing with Chad, actually had a higher percentage of correct answers than question 19, its

Poland counterpart. Question 18 failed to reject the null, largely because everyone did fairly well in answering this question.

Questions 20 (Chad) and 21 (Poland) required the students to circle the direction of the location of the river within the country. Question 20 rejected the null hypothesis and 21 failed to reject it. For question 20, programs 3-8 did better than programs 0-2. Since maps were included in broadcasts 3 through 8, students are apparently learning non-labeled geographic information

Both questions 22 and 23 failed to reject the null hypothesis. These questions asked the students to shade in the location of Chad or Poland within the given continent. The only programs to provide the necessary information were 7 and 8, yet programs 7 and 8 did not do as well as the other programs. This result implies that either the inset map was not needed and was one of the pieces of a complex map that ended up being "too much" information for the students to retain or, that the design or placement of the inset map within the graphic did not generate learning.

Overall, no consistent pattern could be determined, yet individual questions dealing with direction, physical geography and place names led to a higher percentage of correct answers in the programs which contained those answers, but fewer other elements.

Questions which referred to Poland rejected the null hypothesis more frequently than questions concerning Chad. Fewer students knew much if anything about Chad before the test, resulting in overall poorer answers. Students had more prior knowledge on Poland, if they are well represented by the pre-test groups (Chapter 3; pre-tests), and hence answered more questions correctly. Of the programs that failed to reject the null, many were because all the programs answered poorly. The chi-square analysis examined the number of correct answers to each of the questions for each program. The difference of proportions test will examine each question by viewing session.

Difference of Proportion Test

The difference of proportion test examines the percentages of correct answers for a particular question, against two combined news programs. The results determine if a particular question is answered by certain programs better than other programs (Table 10). The null hypothesis states that no difference exists between the programs. One observation reveals that none of the groups tested for questions 5, 10, 21 or 23 rejected the null hypothesis. Students performed relatively the same on these questions regardless of the newscast viewed. Five questions; 5, 10, 18, 21 and 23, failed to reject the null hypothesis.

TABLE 10.   DIFFERENCE OF PROPORTIONS

QUESTIONS	7/8-5/6	7/8-3/4	7/8-1/2	7/8-0	5/6-3/4
5	- .21	.25	1.25	.16	.44
6	*-1.84	1.02	1.28	*2.11	*2.63
7	- .66	*-3.37	*2.50	- .88	*-2.60
8	- .59	*-2.50	*1.84	0.00	*-1.76
9	*-1.96	- .58	- .31	c/d	1.50
10	0.00	0.00	- .58	c/d	0.00
14	.86	.01	-1.66	.54	- .85
15	.46	*2.02	*2.04	*1.85	1.48
16	-1.15	.04	1.50	1.62	1.22
17	*-2.88	.50	.13	1.24	*3.36
18	- .47	-1.11	*-1.71	- .91	- .55
19	*1.85	.69	.31	*2.85	-1.24
20	0.00	- .97	*2.16	1.62	*-8.93
21	.35	.93	.15	- .53	-1.25
22	- .09	*-1.97	.22	-1.09	*-1.73
23	- .72	- .09	.10	.47	.63

TABLE 10. (cont.)   DIFFERENCE OF PROPORTIONS

QUESTION	5/6-1/2	5/6-0	3/4-1/2	3/4-0	1/2-0
5	1.50	.27	.90	.007	- .60
6	*2.76	*3.19	.12	.86	.80
7	*2.80	- .36	*5.71	1.57	*-3.00
8	*2.27	.43	*4.31	*1.89	-1.19
9	*2.15	c/d	.60	c/d	c/d
10	- .52	c/d	- .58	c/d	c/d
14	*-1.92	0.00	*-1.68	.54	1.25
15	1.41	*1.67	- .21	.96	1.02
16	*2.74	*2.21	1.52	1.64	1.02
17	*3.27	*2.96	- .41	.97	1.21
18	-1.06	- .52	- .53	.20	- .14
19	*-1.68	*1.66	- .43	*2.45	*2.74
20	*2.05	1.61	*3.17	*4.81	.74
21	.81	.10	- .84	.25	.74
22	.30	- .98	*2.35	.27	-1.29
23	.87	.97	.21	.54	.42

Critical values range from 1.66 and 1.67 for .10
c/d = can't do: everyone got it wrong
* = failed to accept the null hypothesis

Question 5 asked the students to name the continent where Chad is located, and seventy-five percent of all the students got this right, regardless of the newscast viewed. Question 10 asked the students to name the river, referenced in the broadcast, which runs through Chad. All groups did very poorly on this question. Question 21 asked the students to state in which portion of Poland, the river (Vistula) is located. Very few students got this question correct. Question 23 asked the students to shade in the country that represents Poland. About 45% of the students in each program got this right. The uniformity of performance in these news programs means that the map information made little difference.

The remaining questions rejected the null hypothesis, but no determination could be made from the students answers as to why. Only one evaluation was made with regard to the questions which rejected the null hypothesis. Questions 7 and 8 asked the students to name the capitals of Poland and Chad. Table 10 shows that both questions show significantly different performances between programs 7-8 and 5-6. The sign (+,-) almost always appeared the same for both questions when the null hypothesis was rejected. No other significant pattern emerges from the difference of proportion test.

A final examination (Table 11) compares the questions, the program the question was directed against and which news program actually got it right. For example, news programs 3 through 8 all contained the map information needed to answer questions 7 and 8: the capitals of Chad and Poland. Viewers of programs 3 through 8 should have had higher scores on this questions than groups 0 through 2, as indeed they did. The 6-variable map in programs 3 and 4 produced the highest scores, and the second highest scores came from the 10-variable map programs, 5 and 6. Although the complexity of the map increased, students still could learn the name of the capital. Had viewers of programs 7 and 8 performed best, I could have concluded that more information is better. Instead, the map complexity appears to decrease correct responses, with viewers of 7 and 8 scoring third highest.

The questions that were answered by the appropriate programs were 7, 8, 16, 17 and 20. These questions asked the student to name the capitals of Chad and Poland, name an adjoining country and estimate the location of a river within Chad.

Summarizing these findings, I conclude that the television news map did aid in geographic learning. Overall, the students did see and learn some geographic information from the television news map, although the same

TABLE 11. QUESTIONS DIRECTED TOWARDS PARTICULAR NEWS
PROGRAMS

Question	Who should be able to answer the question	Programs with highest score	Second highest score
*5	7-8	7-8	3-4
6	7-8	5-6	7-8
*7	3-8	3-4	5-6
*8	3-8	3-4	5-6
*9	5-8	5-6	3-4
10	5-8	no one	no one
14	7-8	1-2	7-8
*15	7-8	7-8	5-6
*16	5-6	5-6	7-8
*17	5-6	5-6	7-8
18	3-8	1-2	0
*19	3-8	7-8	1-2
*20	3-8	3-4	7-8 and 5-6
*21	3-8	7-8	1-2
22	7-8	3-4	0
23	7-8	5-6	3-4

* = Questions that scored highest in news programs which
contained the answers

programs were not always consistent. The students who saw a simulated newscast did better than the group which saw no broadcast. Some viewers learned names, physical geography, and direction. Viewers also distinguished between colors, (i.e. the location of a river). Questions which were specifically designed for a particular program did fairly well for the program which was designed to answer that question. For example, the direction of one city to another was learned in the program which contained this information. This information was usually lost when the map became too complex. Sessions whose main function was to introduce a city name did very well on the questions that only wanted the name of that city. This result could imply that television news maps would be more effective (i.e. learned) if they were designed only for the purpose of the story being reported. Because of the speed with which we get our news, this may be an impossibility, but still one that deserves research. Finally, the 14-variable map used in this study, probably contains too much information for an individual to comprehend given the limited viewing time. Although at times however, the 14-variable map served its purpose.

CHAPTER V

CONCLUSION

Television news maps are very different from other types of maps. Maps are used to provide visual interest and variety. They change daily and possess unique qualities which make them difficult to research. Millions of people view these maps everyday, yet there is very little research concerning their design or the communication capabilities to the viewer.

My research has explored the amount of geographic information viewers learn from television news maps. I found that students do learn from the maps used in news broadcasts. Also, smaller groups learn more than larger ones. Map information, such as names of capital cities, and the distinction between colors of countries and a river is learned by the news viewer. I also found that 14-variable maps may be too complex for the news viewer, due to the limited time available to present the map on television news. Another finding was that the order of the stories made no difference to learning map information. Finally, based on my preliminary study (Chapter 3), the television news map could be improved. Currently, the news

map contains an average of 1.45 to 2.0 names per map, yielding no "spatial" information. I found that the average viewer could distinguish between colors and learn more than one name. Given the time restraints with which the news map is under, I would recommend using at least 3 names and 4 colors per map.

The problems encountered with this type of testing are numerous. Questions such as what guidelines should be used to create a television map, what information may be learned and what factors influence learning, all had to be answered. There are also technical problems, outside the map makers control: the transmission of the newscast or the individual television receiver yielding a map that appears different for every set.

This project controlled the map and the setting as much as possible. The maps were created from the pre-tests; the geographic knowledge test, watching the news for a week, and the guidelines given by Zettle, Hill Lawler and Caldwell. Individual bits of information placed on the map were selected from these findings, yet because of the limited research available on these maps, there is no concrete evidence that says these findings are how a television news map should be created.

Two out of four statistics stated that the addition of a television map into the newscast makes no difference in

learning geographic information. I did find the students
who at least had a broadcast did better than the students
who had no broadcast. I also found that for this study, the
order of the stories made no difference in how much
geographic information is being retained.

Even though statistically there was no difference among
the news programs with graphics and the news programs
without graphics, the percent of correct answers increased
as the programs became more complex. Also, even though
statistically no pattern could be determined with the
students who were introduced to programs containing more
complex graphics, they did answer a few of the more
difficult questions correctly. Caldwell stated that
through her study, she hoped that a better designed map,
one that was designed for a specific purpose in mind would
be generated by the television map makers. A well designed
television news map would then be more beneficial to the
map viewers. Based on my findings I would agree with
Caldwell, in that, my test subjects did answer the more
difficult questions some of the time. If the television
news map was designed to specifically portray an idea
given in the news story the viewer may learn more.

Another result from this project was that the smallest
class of students did better than all the other programs.
This could be the result of several factors. First, the

smallest class viewed program 6, which contained the 10-variable map. Generally, this 10-variable map got a fair amount of correct answers for the program (i.e. program 5 showed the same maps and still did fairly well, even though the number of students was greater). The difference between programs 5 and 6 was the number of students. McVey suggested an optimal viewing angle and distance from the television set (McVey, 1970). The smaller class size enforced these rules, if only by coincidence, and yielded the highest percentage of correct answers. This may not be conclusive or highly significant, but this finding could apply to professors and/or professionals who give briefings. If the instructor wants the audience to learn what is being displayed, he/she should be aware of the optimal viewing angle and distance from the television monitor.

The results of my study on the amount of geographic information acquired from television news maps furthers the research that is needed in this medium. Other areas in this field which still need research include the aspects of color used in the maps, lettering sizes, what is the best type of symbolization to use (i.e. circles or stars), or does gender or age have anything to do with how much geographic information is learned from the television news map? Gantz found that the television news viewer who

watched the news to gain information actually recalled more than those who were "casual" viewers (Gantz, 1978). Cartographic research is also needed to determine how much the "casual" (vs. the "non-casual") viewer is learning from the news maps. What impact does seeing the content of the same map over a period of time have on learning? Perloff, Wartella and Becker found that recapping television news stories enhances recall, but does this finding apply to the news maps (Perloff, Wartella, Becker, 1982)? Almost any cartographic literature previously performed on paper maps could be tested on the television news map.

My results are similar to Gilmartin's, in that maps do make a difference in learning geographic information (Gilmartin, 1982). Gilmartin's study dealt with print media maps, and mine with television news maps.

Robinson and Levy point out that there is no reward for journalists to portray the most "educational" journalism, even though research may be available to help them (Robinson and Levy, 1986). This concept is also true for the television news map. There is no reward for the "map maker" to teach with these maps, just a deadline to get the map on the air. There is no incentive for the map maker to try to make the map in the best possible design to advance the learning of their viewers. I would hope that if

television graphics were more "cartographically sound"--using optimal colors, the right size lettering, the appropriate symbols, etcetera, then the viewing public may prefer to watch the network with the more "correct" graphics.

There is a definite need for more active research in this medium for cartographers. By "active" research I mean that research is needed using videos, slides, and real or simulated news programs. Research is needed concerning the best colors to use, optimal letter sizes and colors, appropriate symbols, how many maps to use, or even, where to place the news map for optimal viewing and possibly learning. As cartographers, this field has an unlimited research capability.

My study furthers the existing research on television news maps. I examined the amount of information which may be learned from these maps. Because of the large number of viewers, the television news map has the potential to enhance our learning capabilities if designed properly. These maps have had limited research pertaining to them and if more research is accomplished with the television news map, we may be able to use them to promote learning and a better understanding of our world.

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Appendix 1

The following script is the exact words used by the actor in the simulated news broadcast. The map/graphic was shown exactly 1 second behind the news broadcaster, 14 seconds full screen, and then 1 second behind the broadcaster again before it was removed from the camera. Each story is approximately 60 seconds in length.

AUSTRALIA: approximately 60 seconds

The great drought of 83 drags on throughout the world. Many countries are still awaiting badly needed rains. But, for Australia their drought has finally come to an end. Eastern Australia has been thirsting through the worst drought throughout its history.

One estimate of the damage is seven and a half billion dollars, which has led Australia's national newspaper to state: "the drought is not just a rural catastrophe--it's a national disaster."

(slide)

Australian farmers were hit the hardest... selling sheep for as little as a dime. Hay is going for five times its normal price, and more than one-hundred-thousand sheep and cattle have been killed in order to stretch the limited water supply.

Residents have not escaped the effects either. In Melbourne, twenty-four-thousand homes have been damaged by dry earth cracking under them. The government has ordered stiff fines for those caught wasting precious water.

But most Australians are responding by helping their neighbor. Citizens in Sydney are sending lawn clippings to feed starving sheep. And the government is going to double its spending for drought relief during the next five years.

For now, Australia is one of the few countries to receive the needed rains. For other countries, such as Brazil, South Africa and the Phillippines, the weathermen say no relief is in sight.

<u>POLAND</u>: approximately 60 seconds

Running street battles erupted across Poland yesterday, as tens of thousands of Poles staged pro-solidarity rallies in honor of May day, the international worker's holiday.

(slide)

In Gdansk, the birthplace of solidarity, fifteen thousand demonstrators gathered near the Lenin shipyards. When they attempted to march to Lech Walesa's apartment, they were met with riot police and water cannons. At least one protester was reported killed.

In Warsaw, an estimated ten thousand people chanted solidarity slogans and passed out leaflets proclaiming, "Solidarity will win". While across the Vistula River, government guns launched a May Day salute.

According to reports, the solidarity underground intended the demonstrations to embarass the government. General Jaruzelski and other polish dignitaries were hosting May Day ceramonies for hundreds of visiting Czechoslavakian delegates who could easily see the demonstrators clash with

police. Lech Walesa, leader of the outlawed solidarity trade union, was kept under close watch by the authorities and could not be reached for comment.

CHAD: approximately 40 SECONDS

After two years of fighting, the civil war in Chad quickly ended yesterday.

(slide)

Two thousand troops from the rebel stronghold city of Ati advanced on the capital city of N'Djamena. Government troops hastily retreated, leaving president Goukouni stranded. Goukouni fled into exile by crossing the Chari River into neighboring Cameroon.

The new leader of Chad is former defense minister Hissene Habre. His first task is to reconcile the ten private armies battling for supremacy in Chad, a nation long known for its ethnic chaos.

The two major rivals are northern Muslims and southern Christians. They've been fighting since Chad gained its independence from France in 1960.

Even as Habre, who is Muslim, was forming his new government, southern Christians were threatening to secede from Chad.

APPENDIX 2

The following statement was made before the viewing:

"My name is Sherry Perry. I am a graduate here at Tech. You will see a brief news broadcast and I would appreciate your cooperation during this time. Please move to the center of the room, as close to the television receiver, so you can see clearly".

After the newscast, I stated:

"You have just seen a news broadcast. The following questions refer to this broadcast. Please take your time and answer all the questions to the best of your ability. Once you have completed a page, do not return to it--so, think about each answer before continuing. You will have 20 minutes to complete all the questions. Remember, you are not graded on this, simply do the best you can".

APPENDIX 3

QUESTIONS ASKED TO ALL STUDENTS WHO VIEWED
THE NEWS PROGRAMS 3 THROUGH 8

You have just seen a simulated news broadcast. The following questions refer to this broadcast. Please take your time and answer all questions to the best of your ability.

Once you have completed a page, <u>DO NOT</u> return to it—so think about each answer before continuing. You will have 20 minutes to complete all the questions.

1. How many stories were covered on the broadcast you just saw? _____

2. Please name the major countries which were discussed during the boradcast: _____

_____

_____

3. Please number the countries in the order that you saw them in the boradcast.   Chad _____
                                        Australia _____
                                        Poland _____

4. Please give a brief description (one work answer, a phrase, or one or two sentences) of:
        Poland: _____
        Australia: _____
        Chad: _____

5. Chad is located within what continent? _____

6. Poland is located within what continent? _____

7. What is the capital of Chad? _____

8. What is the capital of Poland? _____

9. In reference to the broadcast you have just seen, what river runs through Poland?
        ___ The river's name was _____
        ___ I don't believe there was a river referred to in the broadcast.

10. In reference to the broadcast you have just seen, what river runs through Chad?

    __ The river's name was _____

    __ I don't believe there was a river referred to in the broadcast.

11. What type of graphic appeared with Chad? (place an X in only one box)

    __ words only

    __ diagram

    __ chart

    __ map

    __ photo/film

    __ picture of the president of Chad

    __ no graphics

    __ I don't remember any graphics

12. What type of graphic appeared with Poland? (place an X in only one box)

    __ words only

    __ diagram

    __ chart

    __ map

    __ photo/film

    __ picture of the president of Chad

    __ no graphics

    __ I don't remember any graphics

13. What type of graphic appeared with Australia? (place an X in only one box)

    __ words only

    __ diagram

    __ chart

    __ map

    __ photo/film

    __ picture of the president of Chad

    __ no graphics

    __ I don't remember any graphics

14. If you were in N'Djemena and wanted to go to Ati, which direction would you travel? (assume that North is always at the top of any map)

  (circle only one)   N,E,S,W,NE,SE,NW,SW
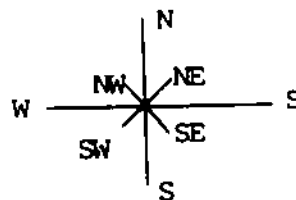
15. If you were in Gdansk and wanted to go to Warsaw, which direction would you travel? (assume that North is always at the top of any map)
(circle only one)   N,E,S,W,NE,SE,NW,SW
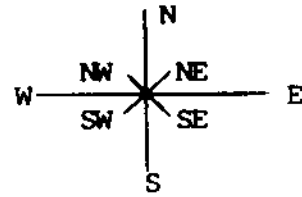
16. What country referred to in the broadcast, borders Chad? _____

17. What country referred to in the broadcast, borders Poland? _____

18. Does N'Djhemena, or Ati lie along the river in Chad?
   __ N'Djemena
   __ Ati

19. From the broadcast, does Gdansk or Warsaw lie along the river in Poland?
   __ Gdansk
   __ Warsaw

20. Estimate which portion within the country of Chad, the river is located.
(assume that North is at the top, and circle only one answer)
   N, E, S, W, NE, SE, NW, SW

21. Estimate which portion in the country of Poland, the river located. (assume that North is at the top, and circle only one answer)
   N, E, S, W, NE, SE, NW, SW

22. On the map below, please shade in the location of Chad.

23. On the map below please shade in the location of Poland.

BACKGROUND INFORMATION

1. How often do you usually watch television world news (not local news)?
___ never watch world news
___ 1 -2 days a week
___ 3 -4 days a week
___ 5 -6 days a week
___ 7   days a week

2. Do you usually watch other world news programs? (for example, morning news programs) ___yes ___no

3. Do you do other activities while watching the news? ___yes ___no

4. Which type of television do you usually watch:
___ color television
___ black and white television

5. Are you color blind? ___yes ___no

6. Are you: ___male ___female

7. How old are you? _____

8. What college level are you? _____freshman
_____sophomore
_____junior
_____senior
_____graduate
_____other

9. How many college geography classes have you had?
_____ 0
_____ 1 - 2
_____ 3 - 4
_____ 5 - 6
_____ 7+

10. Have you been watching any news coverage on Chad recently? _____yes _____no

---

QUESTIONS ASKED TO THE GROUPS WHO DID NOT SEE ANY
NEWS PROGRAMS: 0 THROUGH 2

1. Chad is located within what continent? _____

2. Poland is located within what continent? _____

3. What is the capital of Chad? _____
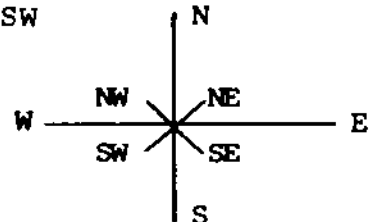
4. What is the capital of Poland? _____

5. If you were in N'Djemena and wanted to go to Ati, which direction would you travel? (assume that North is always at the top of any map)
 (circle only one)   N,E,S,W,NE,SE,NW,SW
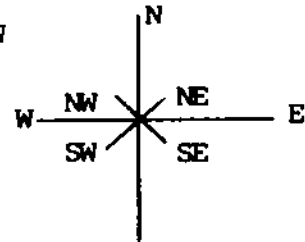
6. If you were in Gdansk and wanted to go to Warsaw, which direction would you travel? (assume that North is always at the top of any map)
 (circle only one)   N,E,S,W,NE,SE,NW,SW

7. What country lies along the south-western border of Chad? _____

8. What country lies along the south-western border of Poland? _____

9.   Does N'Djemena, or Ati lie along the Chari river in Chad?
        __ N'Djemena
        __ Ati

10.   Does Gdansk or Warsaw lie along the Vistula river in Poland?
        __ Gdansk
        __ Warsaw

11.   Estimate which portion within the country of Chad, the Chari river is located.
(assume that North is at the top, and circle only one answer)
      N, E, S, W, NE, SE, NW, SW

12.   Estimate which portion in the country of Poland, the Vistula river located. (assume that North is at the top, and circle only one answer)
      N, E, S, W, NE, SE, NW, SW

13.   On the map below, please shade in the location of Chad.

14.   On the map below please shade in the location of Poland.

BACKGROUND INFORMATION

1. How often do you usually watch television world news (not local news)?
___ never watch world news
___ 1 -2 days a week
___ 3 -4 days a week
___ 5 -6 days a week
___ 7   days a week

2. Do you usually watch other world news programs? (for example, morning news programs) ___yes   ___no

3. Do you do other activities while watching the news? ___yes ___no

4. Which type of television do you usually watch:
___ color television
___ black and white television

5. Are you color blind? ___yes ___no

6. Are you: ___male   ___female

7. How old are you? _____

8. What college level are you? _____freshman
_____sophomore
_____junior
_____senior
_____graduate
_____other

9. How many college geography classes have you had?
_____ 0
_____ 1 - 2
_____ 3 - 4
_____ 5 - 6
_____ 7+

10. Have you been watching any news coverage on Chad recently? _____yes   _____no
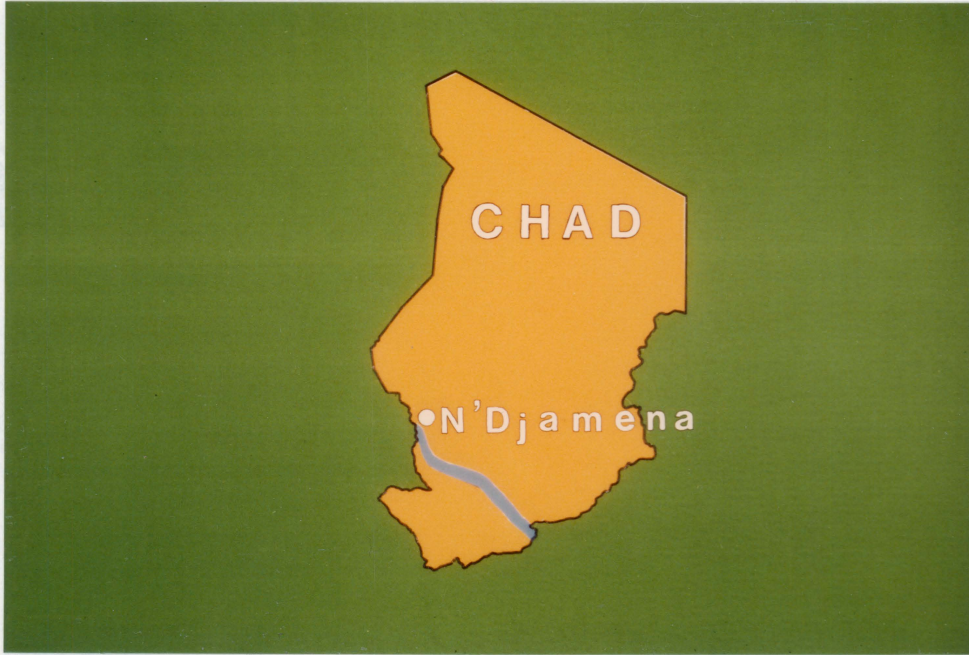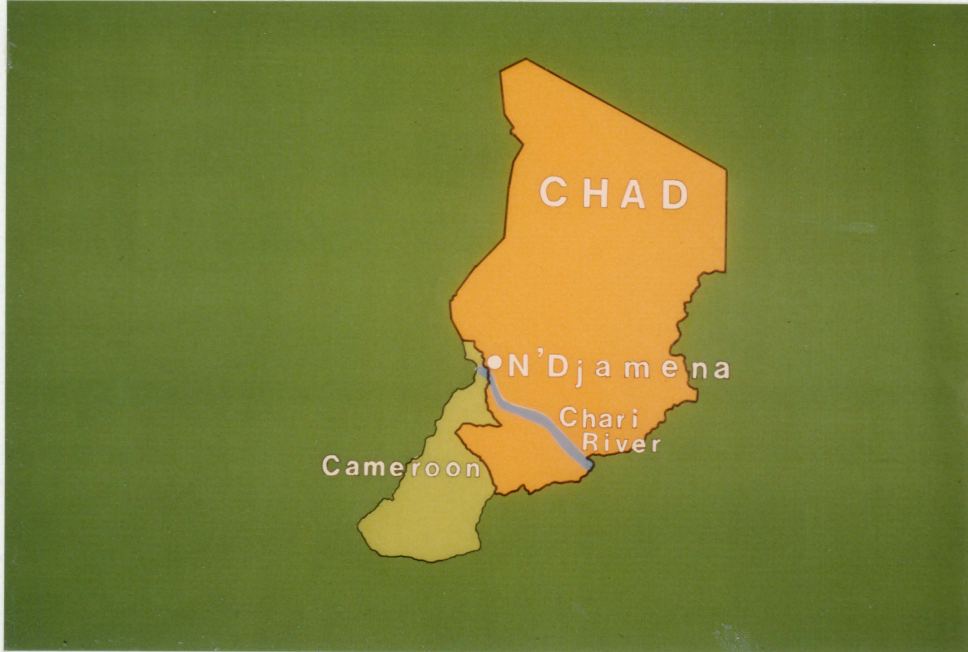
APPENDIX 4

Buffer Graphic
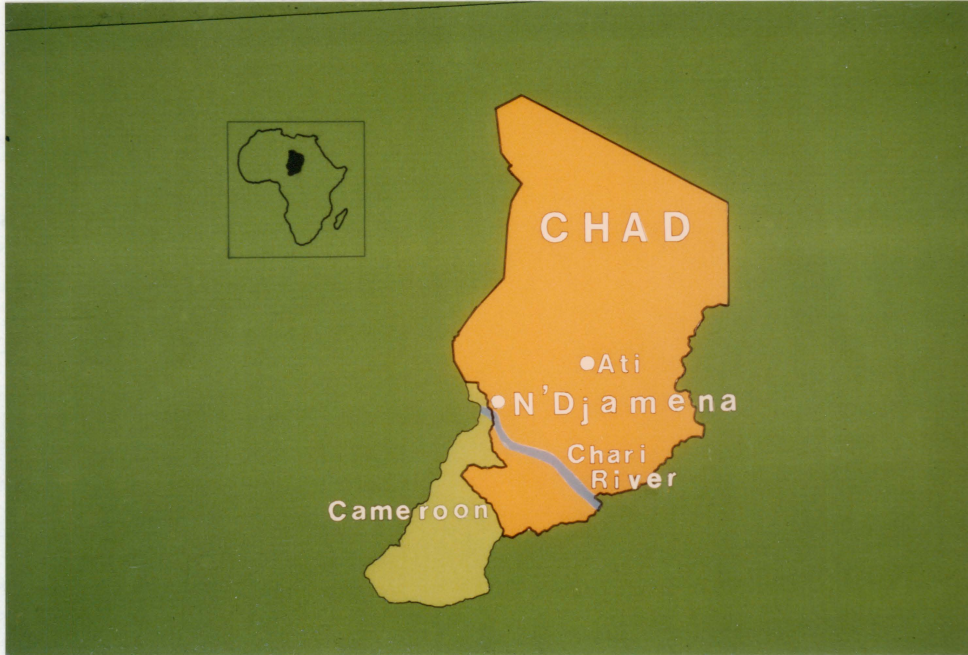
APPENDIX 4

Maps used in News Programs 3 and 4 (6 variable map)

APPENDIX 4

Maps used in News Programs 5 and 6 (10 variable map)

APPENDIX 4

Maps used in News Programs 7 and 8 (14 variable map)