
COGNITIVE MAPPING OF THE CITY CENTER: COMPARATIVE PERCEPTIONS OF DANGEROUS PLACES

by

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***Abstract:** Preconceived notions can affect the job performance of community service recruits. In this investigation, the knowledge and perception of relative safety of recruits being trained to patrol central Philadelphia are compared with actual locations and safety levels of these neighborhoods to determine which communities were not perceived accurately. Results demonstrate that knowledge of the area did not translate into perceptions of safety. Rather, preconceived notions of the ethnic composition of the neighborhoods translated into notions of relative safety. These faulty impressions need to be corrected before recruits are assigned to serve this community.*

The ability to store and access information about the environment generally is taken for granted. We also take for granted that our perceptions of the environment are correct. After all, we perceived them — that is, we saw, heard, touched, or smelled them. Or, we heard others we trust describe the environmental elements to us. Therefore, we feel we have a good idea of what varying places we have experi-

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enced either first or second hand are like. But do we?

There is a vast literature on how we perceive the environment centered in the multi-disciplinary field of environmental cognition. This focus can be traced back to cognitive psychology (Tolman, 1948), from which geographers developed much of their pioneering work (Downs and Stea, 1973; Golledge, 1976; Golledge and Spector, 1978; Gould and White, 1974; Lloyd, 1976). From geography, several environmental criminologists have applied this research to the study of crime and fear of crime (Brantingham et al., 1977; Carter and Hill, 1979; McPherson, 1978; Pyle, 1980). One of the key questions asked by these scholars is, How accurate are our perceptions of crime and how justified are our fears of crime (Pelfrey and Pelfrey, 1995)?

These are important questions since our behavior is governed not by what objectively exists in the environment, but by what we perceive to exist. Therefore, environmental perception governs our day-to-day behavior. For example, Pyle (1980) points out that lack of use of the shopping, cultural, and recreation facilities within central parts of Akron, OH by suburban residents may be due to an unjustified fear of crime. Not all parts of central Akron are high-crime areas, although most suburban residents perceive them as such. Pyle (1980) demonstrates that, objectively, certain suburban locations have a more serious crime problem than central Akron.

In a study of two neighborhoods in west Philadelphia, Mattson and Rengert (1995) demonstrated that residents perceived actual distances as longer in neighborhoods perceived as dangerous than in those perceived as safe. Since one of the determinants of whether we use a facility is perceived distance from the potential user, a desirable facility located in an environment viewed as dangerous (a public zoo) was not only underutilized because of the perceived danger, but also because of the inaccurately perceived distance from potential users. In fact, the perception of danger was so pervasive that objectively experienced problems did not add to the distance perception in the perceived dangerous neighborhood, but significantly increased perceived distance in the relatively safe neighborhood. In other words, bad experiences did not add to the perception of fear and distance in the neighborhood perceived as dangerous to begin with, while they did in the neighborhood perceived as safe. Quite clearly, the perception was more important than the objective reality in determining the use of the contrasting environments. This is just another example of the relationship between environmental perception and individual behavior, there are many more. This chapter illustrates how environ-

mental cognition and spatial behavior are related in conceptual terms. We begin with a discussion of the formation of mental maps.

MENTAL MAPPING

Golledge (1987) provides an extensive review of this field. He interprets the relationship between environmental cognition and spatial behavior as follows:

While rejecting environmental determinism as a major underlying theory, researchers admit that many behaviors are place specific — that is, behavior plans are devised not necessarily just on the basis of the nature of the currently occupied environment, but perhaps also on the image of other places with which one has to interact. This image is based on information previously obtained from both primary and secondary sources. Thus an arrival at a particular place is usually accompanied by some a priori expectations about the type of behavior that could take place in such a place.... Information from the "a priori given world" [is] mediated by sets of values, beliefs, and meanings that had both idiosyncratic and general significance and that heavily influence[s] the probability that a bit of information emanating from an element or thing was received, stored, and potentially used by people [p. 132].

Behavior, then, is the result not only of referencing past events, but also of expected outcomes. Therefore, interpretation of the environment is a function of social and cultural values and constraints. That is, emotion, fears, beliefs, prejudices, and misconceptions interact with the objective environment to form our image of the environment. This image of the environment is termed our "mental map."

The process of mental mapping consists of a set of operations designed to code environmental information in such a manner that it can later be decoded to allow spatial behavior to take place. The process of acquiring spatial knowledge is termed the "cognitive mapping process." The environmental information stored in memory is termed a cognitive, or mental, map.

The process of cognitive mapping has four elements: an actor, an external environment, a set of outputs from environment to actor called "environmental cognition," and a set of outputs from actor to the environment called "environmental response behavior." Therefore, spatial behavior cannot be explained in terms of stimulus and response alone. Rather, the environmental stimulus is recoded and re-

ordered in the mind in a way that is unique to the actor. Therefore, no two persons' mental maps of the same environment are exactly alike, and no two people can be expected to react to a given environment in exactly the same manner. However, there are generalities according to age, sex, ethnicity and regional characteristics (Golledge, 1987).

As the accuracy of mental maps vary, so also do individual behaviors depart from what one might objectively consider normal. Therefore, in order to understand relations between persons and environment, one needs to discover the information base on which behavior is overlaid. This study is an examination of how central Philadelphia is perceived by two groups: a class of cadets being trained to serve the city; and a class of students enrolled in a criminal justice class at Temple University in 1994. The image of central Philadelphia not only will effect how the public service cadets perform their job, but also how students, visitors, and residents make use of and behave within this environment. Both factors are of concern to those who have a stake in the economic and social viability of city centers in the U.S. Certainly, civic leaders and government officials have concerns for the future viability of central Philadelphia.

CHANGING THE IMAGE OF CENTRAL PHILADELPHIA

Like many old East Coast cities, Philadelphians are concerned about their city center. Many feel it is not clean. There are many homeless people on the streets. Many users feel that it is no longer a safe place to work, shop, or entertain their friends. In fact, CIGNA insurance corporation has capitalized on this perception by offering a \$100,000 insurance policy to any businessperson in central Philadelphia to compensate him or her for assault, robbery, or kidnapping while not on the job (Wedo, 1994). Several long-time businesses closed, and many others were contemplating a move to a suburban mall (Liedman, 1991). In other words, central Philadelphia was losing its economic and social base.

Others feel that the city center can be revived. In the early 1990s, business and civic groups in central Philadelphia organized themselves and held many strategy sessions to identify solutions to their problems (Liedman, 1991). One of the foremost problems facing them was the perception that center-city Philadelphia was no longer safe. They wanted to change this perception by making it a cleaner, friendlier, and safer place that would attract customers, tourists and

businesses. The question turned on how to improve the quality of life in this area for day and nighttime users.

It was decided that one should not turn to the traditional source of community service — the police department — to reconstitute this area of the city. First, the Philadelphia police were already spread thin because of recent cutbacks eliminating 8,000 to 6,000 officers. Secondly, equity considerations argue against powerful business and civic organizations consuming more than their fair share of scarce police resources needed in other parts of the city. Finally, the police may not be the best vehicle for improving the overall quality of life in the city center. Community policing concepts are just beginning to diffuse through the Philadelphia Police Department, and not all officers embrace these concepts wholeheartedly.

The business and civic organizations decided to supplement the already existing police detailed to the city center with a private force of their own. In order not to confuse the private force with the Philadelphia police, private officers were termed "community service representatives." They would be a sort of para-police, calling in the city police in critical situations requiring immediate response and providing a uniformed presence that deters opportunistic street crime. The private force would be trained from the beginning to embrace a "problem-solving" approach in order to better the quality of life in center-city Philadelphia. This idea is not unique. There are several other public-private forces throughout the U.S. from Portland and Denver to New York and New Orleans (Liedman, 1991). The business and civic communities of central Philadelphia decided to fund this project with private monies contributed by their constituents. The training of these community service recruits is the focus of this analysis; their perception of central Philadelphia will be compared with that of a class of students at Temple University. In this manner, we gain insight into the perceptions of those hired to change the image of the city, and of potential users of the city. First, we will consider the importance of area perception to the community service recruits.

At the outset, it became apparent that the preconceived notions these community service recruits might have could affect their job performance, since effective community service entails an accurate, intimate knowledge of the community the officer is assigned to serve. The heart of modern community service is not only the effort, but the desire of a community service officer to become familiar with the special problems faced by the residents and users of their assigned

community. This accumulation of knowledge is an ongoing process that requires persistent interaction of the officer with the community.

Also important is the baseline the prospective community service officer is starting from. As has been well-documented in the psychology of dissonance and consonance (Festinger, 1957), preformed opinions of new recruits are often difficult to erase. Once a person has made up his or her mind about the characteristics of an area, it is more difficult to correct faulty impressions than to teach correct opinions in the first place. This is due to the fact that the faulty impressions may have reached a state of consonance that is difficult to erase. For example, if a person thinks of an area of the city as unsafe, this impression tends to persist and impact the manner in which public service representatives approach a problem situation located within that area.

Newman (1972) illustrates the manner in which perception can effect public service by the reaction of New York City police to two contrasting public housing projects located across a highway from each other. One is a high-rise public housing project, and the other is composed of three-story walkups. The police perceived the high-rise projects as dangerous. In answering calls for service in the high rise, the police were relatively authoritarian, which resulted in hostile responses from the residents. These hostile responses created greater perceptions of danger and more authoritarian responses on the part of the police. Thus, the police and the community were in a vicious cycle downward.

In the walkup projects, on the other hand, the residents had a positive relationship with the police. This resulted in friendly, cooperative encounters that produced more effective police work. Since the socioeconomic characteristics of the residents in the two projects were similar, the question of which came first, the chicken or the egg, arises. Clearly, if public service representatives have a preconceived notion of the relative safety of an area, it will impact their approach to community problems.

In any case, public service representatives must use care in clearly dangerous situations no matter where they are situated spatially. In a study of police officers killed in the line of duty, Davis and Pinizzotto (1993) noted that slain officers tended to use less force than other officers in similar circumstances, and often considered force only as a last resort. Slain officers were more service oriented and tended to gravitate toward the public relations aspects of law enforcement work. Since this is exactly the approach we wish the Philadelphia public service representatives to use, they must be real-

istic in evaluating areas and situations in their work and not base their reactions on faulty impressions.

Faulty impressions may arise from a variety of theoretical bases (Golledge and Stimson, 1987). The most important for our purposes is the principle stating that the less well-known an area is, the more likely it is that negative connotations are ascribed to it (Kaplan and Kaplan, 1982). For example, subjects nearly always rate their own cities as safer than other cities, and their own residential neighborhood as safer than less well-known surrounding neighborhoods (Mattson and Rengert, 1995). Therefore, the level of knowledge is believed to be an important determinant of the positive or negative perception of an area. The people assigned to train these community service recruits became concerned with their preexisting knowledge and perception of center-city Philadelphia.

A second basis of faulty impressions of the environment arise from how people are socialized, especially in their formative years. Early studies held that women are socialized to be more fearful of strange environments (Macoby, 1966). On the other hand, women are socialized to be less confrontational and more supportive in problem situations. More recent studies cast doubt on these early findings (Adler, 1975; Golledge et al., 1995). In either case, evaluations of the performance of women police officers in the Metropolitan Police Department of Washington, DC by The Police Foundation found that women officers were more likely than their male colleagues to receive support from the community, and were less likely to be charged with improper conduct (Bloch and Anderson, 1974). In New York City, female officers were perceived by civilians as being more competent, pleasant, and respectful, and their performance seemed to create a better civilian regard for police (Sichel, 1978). Since these are important considerations for our community service recruits, we decided to evaluate differences between male and female recruits in Philadelphia.

Data

In the following analysis, recruits being trained to serve center-city Philadelphia and a control group of students at Temple University are examined to determine whether their level of knowledge of this region of the city is indeed related to their perception of its relative safety. Data were collected during a training session conducted by one of the authors, and later in a classroom at Temple University. Data were of two types: (1) information on the knowledge the recruits and students possess of the location of important landmarks of cen-

ter-city Philadelphia; and (2) information on the perception the recruits and students have of the communities composing the city.

In order to record each student and community service recruit's knowledge of center-city Philadelphia, each was handed a base map of this area with the major streets recorded on it. The subjects also received a list of 32 major landmarks located within this area. Then they were asked to place a dot on the base map where they believed each landmark is located, and to number this dot with the corresponding number of each landmark. This resulted in a map of 32 dots corresponding to where the recruits and students believed each landmark to be located.

It is possible that recruits and students could have knowledge of the location of landmarks without having other knowledge of the area. For example, this knowledge could come from studying a map of central Philadelphia that depicts the major streets and tourist attractions (Golledge et al., 1995). In this case, the subjects would have map knowledge without the accompanying real-world experience of the area. In the present study, however, all the community service recruits and Temple students stated that they had been to the city center many times. It is the hub of public and private transportation in Philadelphia. There were no subjects without first-hand knowledge of this area. We have no information on the degree of map knowledge the subjects may have obtained. We are proceeding under the assumption that most spatial knowledge of the center of Philadelphia was obtained through observation of this environment rather than from maps or other printed materials.

The perception of center-city Philadelphia was recorded on a second base map. In this case, the map of the city is divided into 16 units of equal size. The recruits and students were asked to identify that unit or sub-area of the map containing the most dangerous neighborhood to walk through in the daytime, and to give it a score of zero. They were then asked to locate the safest neighborhood to walk through in the daytime, and to record a 10 for the sub-area contained within this community. Given these anchors, the recruits and students were then asked to scale all remaining 14 sub-areas between zero and 10 with regard to whether they were similar to the most dangerous or the safest neighborhoods in center-city Philadelphia.

This same scaling routine was used to gather information on where the subjects perceived various ethnic communities to be concentrated. They were asked to pick the area among the 16 possible that contains the greatest concentration of white residents and label

it a 10. They were then asked to pick the area that contained the smallest concentration of white residents and label it a zero. They were then asked to scale the remaining 14 areas between these two extremes, depending on whether they were more like the area with the greatest concentration or the least. This procedure was subsequently followed for black, southeast Asian, and Hispanic populations. Therefore, each subject had five maps, one of perceived safety and four of their perception of concentrations of ethnic populations. This information formed the basis of the cognitive maps we later constructed.

The Analysis

We begin with an examination of the relationship between knowledge of an area and its perceived safety using the data described above. Later in our analysis we will examine the relationship between the perceived location of various ethnic groups and perceived safety. In each case, we begin with the community service recruits and then repeat the exercise for the students at Temple University.

Knowledge of the area is assumed to be directly related to the ability of each recruit to accurately locate major landmarks on the base map, since there is no evidence that subjects had studied maps of central Philadelphia extensively. The level of knowledge is measured by determining how many inches on the map their plotted location is in a straight line from the actual location of each landmark. This measurement of error is summed over the 32 landmarks, and then divided by 32 to determine the average error per landmark for each recruit. This average error is our measure of the relative knowledge of each community service recruit of center-city Philadelphia.

The perception of relative safety is measured in a slightly different manner. Since each community service recruit is compared with all others, the first task is to determine the norm with which to make this comparison. In this case, the perceived level of safety is summed over all community service recruits for each sub-area and divided by 24 (the number of recruits) to obtain the average value for each sub-area in center-city Philadelphia. Then, the score each recruit placed within a sub-area has this average subtracted to obtain a measure of deviation from the mean for each neighborhood for each recruit. Finally, this deviation is summed over all sub-areas and divided by 16 to obtain the average deviation from the mean for each recruit. This average deviation is our measure of the relative perception of safety of center-city Philadelphia. The higher the score, the safer the recruit

perceives the overall city center to be relative to his/her fellow recruits.

Finally, we use nonparametric measures of statistical association due to the small sample size and since we cannot assume a normal distribution of the data. Spearman rank order correlation coefficients allow for the statistical test of association of whether a significant relationship exists between knowledge and perception of safety among the community service recruits. This analysis was repeated in a class of 34 students at Temple University and compared with the original analysis.

RESULTS

Table 1 lists the landmarks of center-city Philadelphia ranked in the order of how well-known their locations are to the community service recruits and students. Notice that the students were much less accurate in identifying the locations of these major landmarks than the recruits, even though we might assume that the students are much more likely to have studied maps of Philadelphia in their formal education at Temple University. This is an encouraging finding, since the level of responsibility is higher for the recruits who are hired to serve this area than the students who are potential consumers. Notice that City Hall is the best known landmark in center-city Philadelphia for both groups. Notice also that the two landmarks that are least known are religious centers. One might speculate that these subjects know government centers better than religious centers. However, it is surprising that the Police Administration Building ranked 21 out of 32 sites for the community service recruits. In general, centrally located sites were more accurately located than those found toward the edge of the map.

Figure 1 portrays the average perceived daylight walking safety of center-city Philadelphia by the community service recruits. Figure 2 portrays perceived daylight walking safety for the students. Isolines have been drawn to highlight the perceived relative safety of each area. This is one method of presenting a mental map by interpolating values between two sub-areas. For example, if two contiguous sub-areas have values of 3.5 and 4.5, respectively, then an isoline depicting the value of 4.0 is drawn an equal distance between the centers of the two sub-areas. Isolines depicting values of the nearest whole number are drawn on each map.

Table 1: Major Landmarks and Error in Their Location

Landmarks	Cadets	Students	Weighted Mean
City Hall	0.26	0.30	0.28
Gallery Shopping Plaza	0.50	0.70	0.62
Hahneman Hospital	0.98	1.50	1.31
Penns Landing Stage Area	0.89	1.60	1.34
Independence Hall	0.54	1.90	1.39
Chinese Arch	0.81	1.80	1.47
Academy of Music	0.73	2.00	1.62
Betsy Ross House	1.05	2.20	1.72
Philadelphia Community College	1.37	1.80	1.72
Franklin Institute	0.87	2.40	1.77
Police Administration Building	1.46	2.00	1.78
Jefferson Medical College	0.99	2.40	1.82
Reading Terminal Market	1.00	2.50	1.88
Main Branch of the Free Library	0.88	2.60	1.89
Rittenhouse Square	0.95	2.80	2.03
Hershey Hotel	0.83	3.00	2.10
Society Hill Towers	1.53	2.50	2.10
Art Museum	1.13	2.90	2.17
Cathedral of St. Peter and Paul	1.14	2.90	2.17
Ben Franklin Bridge	2.30	2.30	2.30
Jefferson Hospital	2.20	2.40	2.32
Academy of Fine Arts	1.53	2.90	2.33
Natural Science Museum	1.32	3.20	2.42
Logan's Circle	0.98	3.50	2.46
Masonic Temple	0.88	3.70	2.53
TLA Cinema	2.19	3.20	2.78
City Tavern	1.79	3.80	2.97
Ben Franklin Museum	1.92	3.90	3.08
Graduate Hospital	2.03	3.90	3.13
Washington Square	2.48	3.90	3.31
Friends Meeting House	3.43	3.70	4.60
Christ Church	4.74	4.50	4.60

These maps are similar to contour maps used to illustrate elevation on topographic maps. Notice that the map of the community service recruits is much simpler than the map for the students. Yet, there is general agreement between the two groups that central Philadelphia is safest in the middle and becomes less safe toward the

Figure 1: Average Perceived Daylight Walking Safety of Cadets

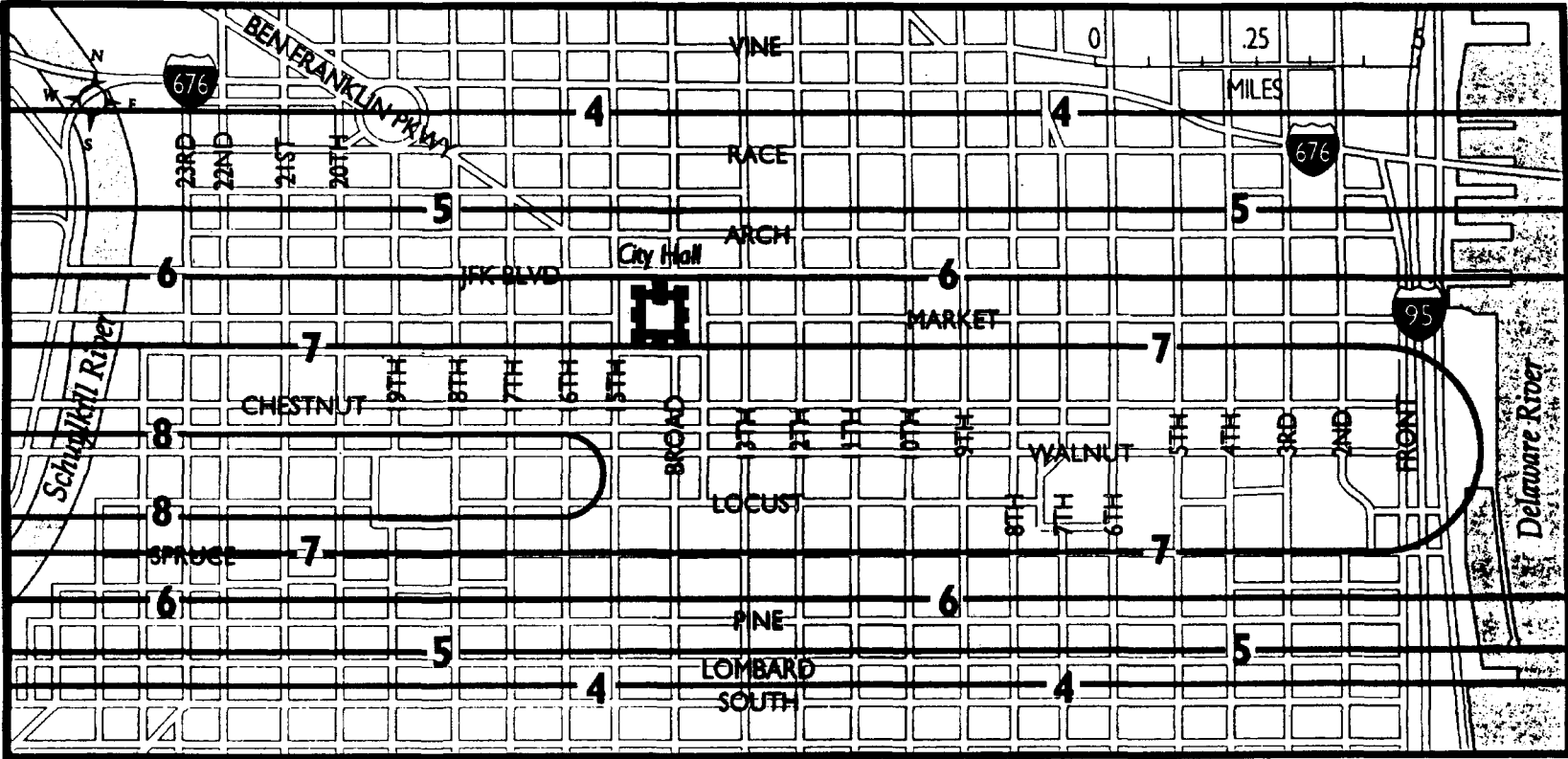
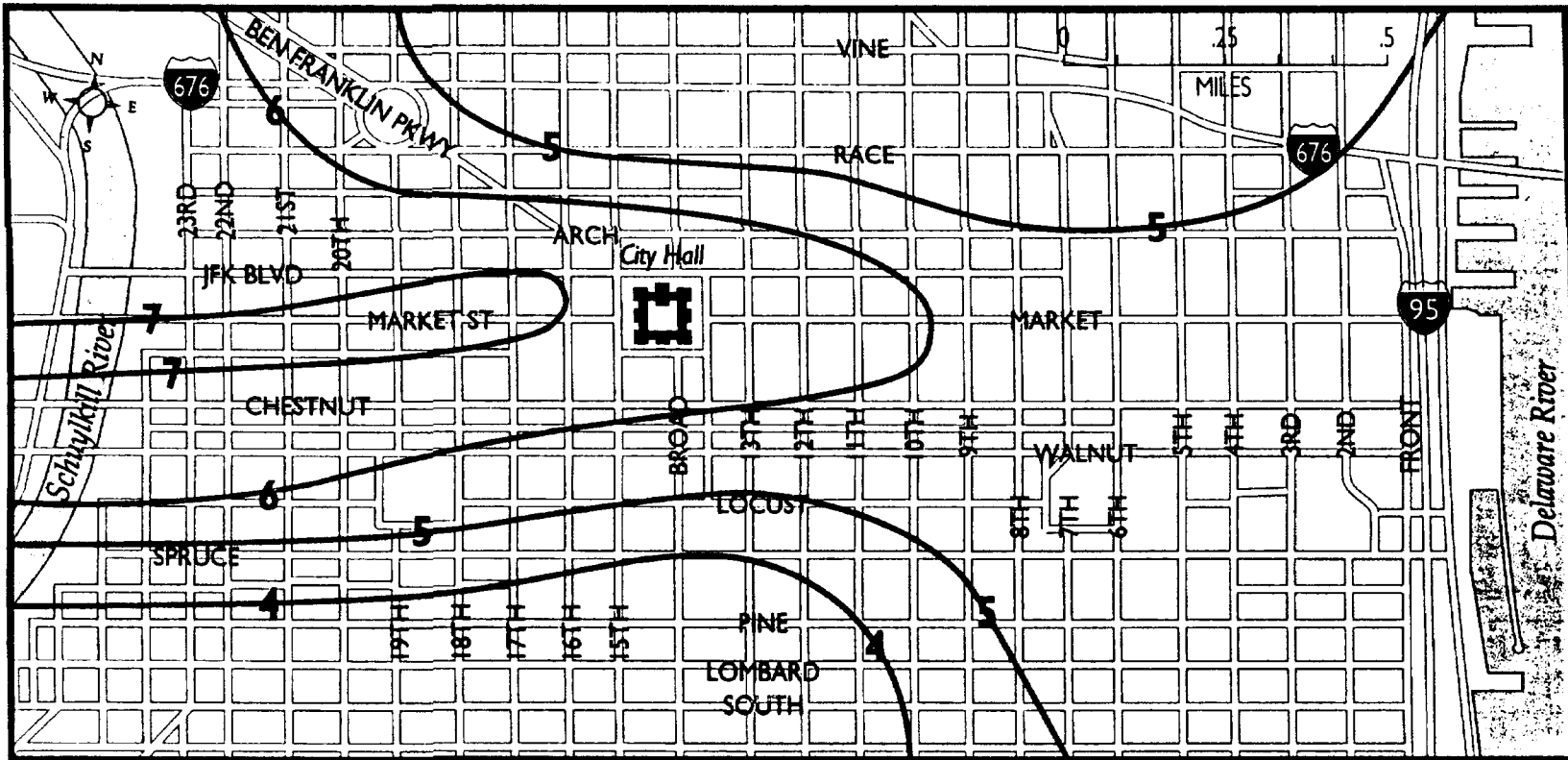


Figure 2: Average Perceived Daylight Walking Safety of Students



edges of the maps. Table 2 lists the deviation of each recruit's safety perception from the average of the entire group summed over all sections of center-city Philadelphia. Table 2 also lists the average knowledge of the location of the landmarks for each recruit, as measured by a straight line from the plotted locations to the actual locations. The ranks of each recruit on each measurement are also given in Table 2. Table 3 portrays this information for the students.

**Table 2: Knowledge and Perceived Danger —
Cadet Data**

Recruit	Perceived Safety	Rank	Knowledge of Landmarks	Rank
1	-.68	10	.43	2
2	-24.68	24	1.06	18
3	-12.68	21	.65	3
4	4.32	9	.90	12
5	20.32	3	1.76	21
6	-6.68	15	1.91	22
7	-8.68	16	2.20	23
8	-11.68	20	.80	9
9	-9.68	17	.38	1
10	-13.68	22	.79	8
11	-.68	11	.98	15
12	26.32	1	1.18	19
13	-3.68	12	1.01	16
14	-14.68	23	.94	13
15	14.32	4	.78	7
16	-4.68	13	.64	5
17	5.32	7	.65	6
18	7.32	6	.80	10
19	-10.68	19	3.17	24
20	5.32	8	1.06	17
21	23.32	2	.95	14
22	-6.68	14	.88	11
23	-9.68	18	.62	4
24	13.32	5	1.43	20

**Table 3: Knowledge and Perceived Danger —
Student Data**

Student	Perceived Safety	Rank	Knowledge of Landmarks	Rank
1	1.18	17	2.92	13
2	-3.82	21	3.39	10
3	2.18	16	1.87	24
4	17.18	4	2.85	15
5	24.18	2	2.28	20
6	16.18	5	4.88	2
7	-29.82	34	5.15	1
8	-14.82	29	3.34	11
9	-.82	20	2.26	22
10	15.18	6	2.74	17
11	-6.82	24	4.04	6
12	-5.82	22	3.41	9
13	-13.82	28	1.26	31
14	14.18	7	2.26	21
15	20.18	3	1.58	28
16	-29.82	33	2.39	19
17	-15.82	30	1.89	23
18	-12.82	26	3.01	12
19	30.18	1	2.88	14
20	6.18	13	1.51	29
21	-13.82	27	3.90	7
22	10.18	10	.79	34
23	13.18	8	2.63	18
24	11.18	9	1.68	27
25	-16.82	31	4.07	5
26	-6.82	23	1.85	25
27	6.18	12	1.17	32
28	2.18	15	4.22	3
29	.18	18	1.33	30
30	-.82	19	1.80	26
31	-18.82	32	3.71	8
32	9.18	11	1.13	33
33	-9.82	25	4.09	4
34	4.18	14	2.76	16

As can be seen at the outset, our initial proposition that the better known the center of Philadelphia is to a community service recruit or to a student, the safer he/she will perceive the area does not hold up for either group. A Spearman rank order correlation produces a coef-

ficient of knowledge of .112, which is not significant (.611) for the community service recruits, and -.332 which is significant at the .055 level for the students. For this group of recruits and students, relative knowledge of the city center does not translate into perceived safety. In fact, the relationship is inverse for the Temple students. The better they know the area, the less safe they perceive it to be. Since this finding runs counter to previous research (Mattson and Rengert, 1995), we must ask why this is the case. Could it be that the city center is indeed dangerous, and the more familiar one is with that danger, the more accurately they perceive it? This question could be addressed by scaling the actual crime occurring within the 16 center-city areas between zero and 10, and testing whether those recruits and students who have the most accurate knowledge of the location of major landmarks also have the most accurate knowledge of the relative safety of different parts of the center-city.

In this analysis, we scaled only the violent crimes of robbery, assault, homicide, and rape — crimes that instill the most fear in users of the center-city. This was accomplished by dividing the center-city into 16 areas of equal size, and counting the number of these crimes (unweighted for severity) that occurred in each area in 1992. These values were divided by the largest value evident, so that the area with the highest number of violent crimes has a value of 1 and all other areas are measured by the proportion they are of this value. These numbers were then subtracted from 1 so that the highest crime area has the lowest value (zero), as is the case when the recruits and students scaled the areas. The numbers were then multiplied by 10 so that the possible range is zero to 10. This resulted in a range of values from zero to 8.4, with five values above the midpoint of five and seven values below. In other words, it is nearly a normal distribution with few areas clustering about any value. Center-city Philadelphia is not a uniformly dangerous or safe area, there is considerable variation between sub-regions.

A Spearman rank order correlation coefficient is calculated using the following variables. The first variable is the deviation when the actual level of safety is subtracted from the perceived level of safety for each recruit or student, and the absolute values summed over the areas to provide a measure of how far from reality each recruit or student views the various sub-areas in either a positive or a negative direction. The second variable is the difference resulting when the actual locations are subtracted from the perceived locations for the 32 landmarks of center-city. When the two variables are ranked across all recruits, the Spearman rank order correlation coefficient is

.336, which is significant at the .109 level for the community service recruits, and a -.330 correlation coefficient which is significant at the .057 level for the students. In neither case, do we find a highly significant relationship between knowledge of the city center and the accuracy of perceived safety of the area. Again, in the case of the students, the relationship is in the opposite direction from that expected.

Finally, we ask if we can identify by personal characteristics who is most likely to accurately identify the location of landmarks; and who is most likely to rate center-city Philadelphia as safe or unsafe. In other words, is there a type of recruit or student who does not know the city center but rates it as a safe area or vice versa? Past research is not consistent on this topic. For example, early psychological research held that women tend to have poorer spatial skills than men (Macoby, 1966). However, more recent geographic investigations find no statistical differences in spatial skills based on sex. In fact, some evidence points to a higher performance overall by geographically trained females on spatial tasks (Golledge et al., 1995). Therefore, we are not sure whether to expect the females or the males to be more accurate in locating landmarks in central Philadelphia on a base map.

Our results are as contradictory as the results of previous studies. When we summed the distance that each male recruit had plotted the location of major landmarks from their actual locations and divide by the number of male recruits, we obtain an average value of 1.48 inches. When we compute the mean for the ten women recruits, it is a slightly larger 1.63 inches on average. For the control group of students, the respective values for men are 2.77 inches and for women 2.51 inches on average. So the women are slightly less knowledgeable and/or accurate in locating major landmarks in center-city Philadelphia than their male counterparts for the community service recruits, but the opposite is true of the control group of students.

Next we consider feelings of safety during the daytime. When we sum their mean deviation from the average perceived safety level, we find a surprising result in the case of the community service recruits. The average deviation from the mean for the 14 male recruits is -39.20, the average deviation for the 10 female recruits is +19.88. In other words, the women recruits perceived center-city Philadelphia to be much safer than their fellow male recruits. The magnitude of the difference is a surprising finding. In the case of the students, the average deviation from the mean for the 22 males is -2.2, the average deviation for the 12 females is 24.6. In this case, we find that the students support the findings based on the community service re-

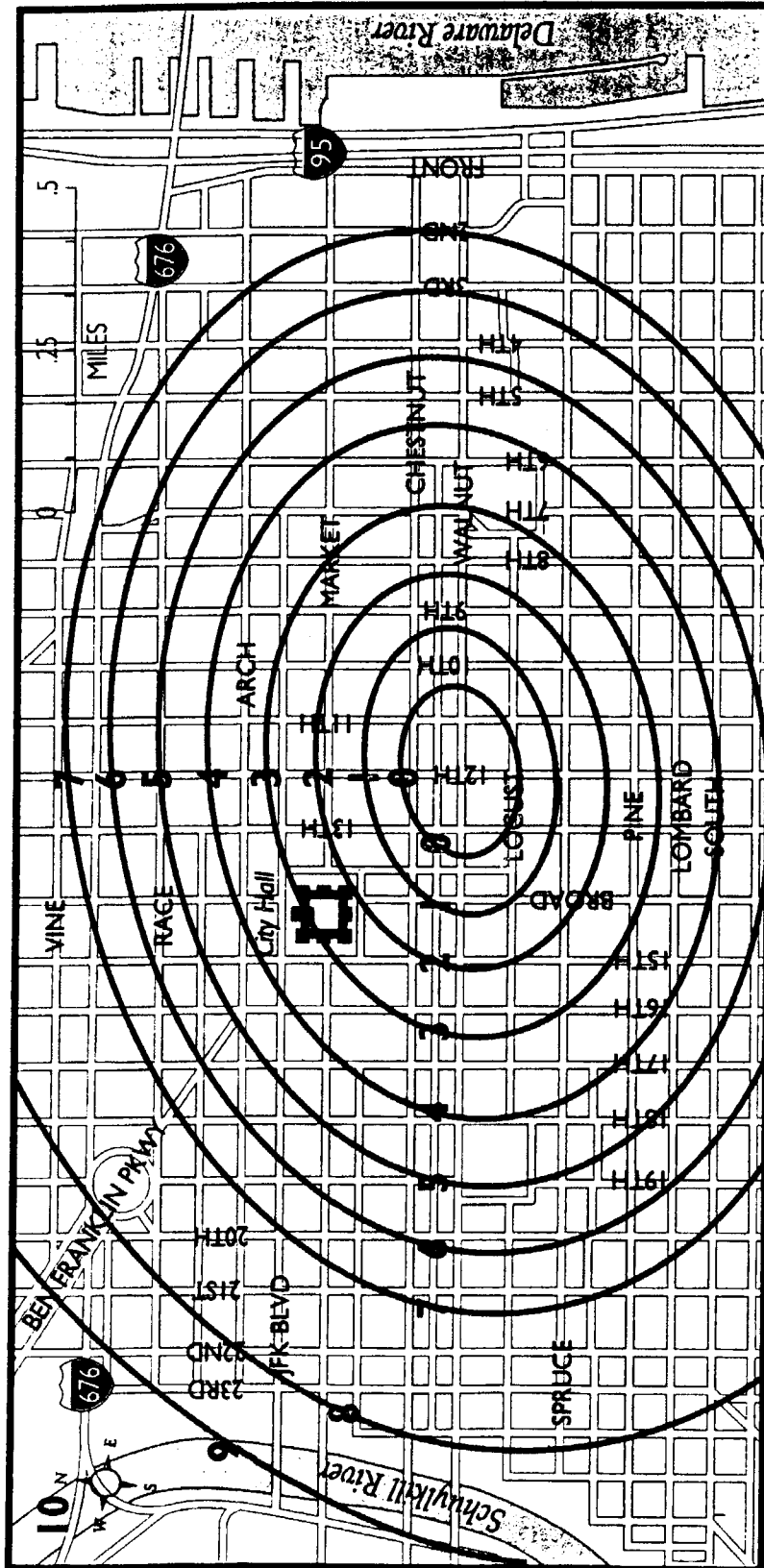
cruits in that the females perceive central Philadelphia as safer than the males. If the perception of safety on the part of the female recruits translates into less authoritarian behavior, they may be able to function more satisfactorily as community service agents. On the other hand, if the center city is an unsafe area perceived more accurately by the males, the female recruits may be in a very vulnerable position.

This proposition is difficult to test. Some evidence is provided by observing how accurately the men and the women recruits and students estimated the actual relative crime rates of each of the 16 locations in central Philadelphia. The actual violent offenses are scaled between zero for the most dangerous location and 10 for the safest location.. Then, these values can be subtracted from each recruit's and student's perceived level of safety for each location. These absolute values are then summed over the 16 locations and divided by 16 to obtain an average value for each recruit and student. This will be a measure of how accurately each recruit and student estimated the actual safety level of each center-city location. If the male community service recruits and students are more accurate in this exercise than the female recruits and students, then we might argue that they have a better knowledge of the relative safety level of the city center as a whole and the greater care they are expected to exercise may be justified.

Since there is considerable variation in the violent offenses between sections of the center city, the question turns on who can most accurately identify this variation — the men or the women. The results do not demonstrate much difference between the men and women recruits. When the actual safety level is subtracted from the perceived safety level, the mean absolute deviation is 46.76 for the women recruits and 45.55 for the men recruits. The men are a bit more accurate in perceiving the safety level than the women. But the difference is too small to be significant. In the case of the students, the values are 85.58 for the women and 84.50 for the men; again, no significant difference. In other words, neither the men or the women are very accurate in identifying the relative level of safety in center-city Philadelphia. The question now turns on which areas are causing the errors in the recruits' and students' perceptions of relative safety.

Three maps were constructed in which the isolines of the perceived and of the actual safety are portrayed (Figures 1 to 3) to partially answer this question. Notice that there are extreme differences between Figures 1 and 2 and Figure 3. The community service recruits and students perceived the center of the city to be the safest,

Figure 3: Actual Violent Crime in Central Philadelphia



with a ridge of decline in either direction away from the center of Philadelphia. In actuality, violent crime in Philadelphia is spatially arranged as a "hot spot" centered just to the southeast of the center of the city. In other words, the community service recruits and students incorrectly perceived crime to increase toward the edge of the city center where low-income residential areas begin. In reality, violent crime decreases in these directions. In fact, the safest area in the center city is the Logan Circle area to the far northwest of the city center — an area the community service recruits rated as one of the least safe in the center-city.

The reason there is so much variation between perceived and actual safety in the case of these recruits and students may revolve around a conceptual problem. What they may have been scaling is "potential safety" rather than "actual safety." In other words, an area may be relatively safe in actuality because people avoid the area. Both routine activity theory (Cohen and Felson, 1979) and Jacobs' (1961) critical intensity theory of land use explain that a potential victim must be present for a crime to take place.

We are left with the question of whether an area is unsafe if people avoid it, so few if any crimes take place there. In actuality, it is not unsafe if people avoid the area so that no crimes take place, but it is potentially unsafe if one were to wander into the area. Therefore, the actual safety level is lower in parts of the city center that are heavily utilized; actual safety is higher in areas less used. What we are missing is a measure of the "population at risk." Again, is it safe if no one goes into an area? This does not seem to be the case: the most heavily used part of Philadelphia is the central section of the city center that has the highest number of violent crime incidents. We do not know the relative crime *rates* since we have no measure of the relative use of each sub-area. In other words, we have no measure of the population at risk of violent crime.

A better approach may have been to ask each recruit and student where the most violent crime occurs rather than where the safest areas in the central city are located. As long as we have no statistics on how many people use each area of the city center so that we can measure the population at risk, we cannot compute an accurate measure of the actual safety level of each area. We are left with a measure of how much violent crime takes place, and of the recruits' and students' perceptions of where it is the most and least safe to walk in the city center. With regard to potential safety, the recruits and students may be more accurate than the violent crime statistics.

On the other hand, perceived safety may not be an accurate measure of the risk of violent crime. A perceived unsafe area may not be an area within which violent crime is likely to take place. For example, when people first visit the observation deck of the Empire State Building in New York City, they tend to be fearful. The fear may not be a rational response to the actual safety of standing on this spot. Likewise, the outer regions of the city center may be perceived as unsafe because of the proximity of a lower income minority community a few blocks away. This fear also may not be rational and could negatively impact how the community service representatives respond to problems within the surrounding neighborhoods. This is a serious issue, since city officials want the community service recruits to treat all residents and all neighborhoods in center-city Philadelphia in a manner that is fair and not tainted by preconceived notions of their relative safety.

This issue can be tested using additional data collected during the training sessions. In order to measure how accurately each recruit estimated the location of ethnic populations in central Philadelphia, each was asked to scale a map of center-city Philadelphia divided into 16 equal-sized areas between zero and 10 with respect to which area contained the highest proportion of black households. The recruits were then asked to assign a 10 to the area they believed to contain the highest proportion of black households and a zero to the area they believed to contain the lowest proportion of black households. Then the other 14 areas were scaled between zero and 10, depending on whether the recruit believed it to be most like the highest or the lowest rated neighborhood. The same task was completed for white, Hispanic, and southeast Asian populations.

The issue now is whether perceived safety is related to where the recruits believed different ethnic groups to be located. This issue can be tested by estimating Spearman rank order correlation coefficients between perceived daytime walking safety and perceived ethnic population concentrations.

Table 4 lists the correlation coefficients when perceived daytime walking safety is correlated with the perceptions of where ethnic communities are concentrated in center-city Philadelphia for the cadets. Table 5 lists the same data for Temple students. Notice that there is general agreement between the cadets and the Temple students. Perceived safety is positively correlated with the perceived concentration of the white population, and negatively correlated with the concentration of ethnic minority populations. The southeast Asian population is weakly negatively correlated and very insignificant sta-

tistically. Only the perceived concentration of the white population was correlated positively with perceived safety. These findings highlight an issue in police training: if police are to obtain community cooperation, they cannot let preconceived faulty notions of the relative safety of a neighborhood impact their approach to localized problems. If police behave in an authoritarian manner because they perceive black and Hispanic neighborhoods to be dangerous, they will initiate the vicious cycle downward described earlier, as the residents will respond hostilely to this approach. Trainers of recruits must develop techniques to instill a realistic perception of danger rather than one based on the easy preconceived notions of who lives in a particular community.

Table 4: Correlation Coefficients Between Ethnic Communities and Perceived Safety by Cadets

Variable	Coefficient	Significance
White	.8511	.000
Black	-.5596	.058
Hispanic	-.7825	.003
Southeast Asian	-.3363	.285

Table 5: Correlation Coefficients Between Ethnic Communities and Perceived Safety by Students

Variable	Coefficient	Significance
White	.5928	.016
Black	-.4161	.109
Hispanic	-.7060	.002
Southeast Asian	-.2167	.420

The ethnic characteristics of the recruits (over half of whom were black or Hispanic) made no difference in how they perceived safety in the various ethnic communities. This point is highlighted by the No-

vember 27, 1993 statement of leading black civil rights leader, Jesse Jackson, as quoted by Glastris and Thornton (1994:38): "There is nothing more painful for me at this stage in my life than to walk down the street and hear footsteps and start to think about robbery and then look around and see it's somebody white and feel relieved. How humiliating."

The perception of the characteristics of different ethnic groups seems to permeate most members of society, including community service recruits. For their own safety, police must use care in dangerous confrontations. For effective community policing, police must not base their perceptions of safety on the ethnic composition of a neighborhood. Otherwise, the community cooperation so necessary in modern community policing will not be forthcoming; the coproduction of safety between the community and the police will be short-circuited.

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