PERCEIVED SAFETY FROM CRIME IN THE OUTDOOR ENVIRONMENT

by

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ABSTRACT

Past research reports a number of environmental characteristics which can influence perceived safety in the outdoor public environment. Appleton's Prospect and Refuge Theory attempts to explain how the environment can affect people's feelings of perceived safety by its offering (or not) of the ability to see without being seen. According to Appleton, it is this ability which is the basis of all other activities and thus a place which offers a view and possible hiding places will be perceived to be attractive because it fulfils survival needs. The purpose of this research was to discover, first, which environmental characteristics people will name as being important when they are not prompted to consider any particular ones, and second, how those characteristics will affect feelings of perceived safety when presented visually and how they might interact with each other. Findings showed that subjects most often mentioned "light", "access to help", and "open space" as contributing to perceived safety in the outdoor environment. These three features can be seen to fit Prospect and Refuge Theory in that light and open space offer a good view and access to help offers unambiguous refuge. When tested in an experimental setting, the three features interact to create a number of possible environments some of which are considered to be safer than others. The situations which contained all three of the features (thus offered a balance of the values of each) were rated as being safer than situations which offered one or two of the features and compromised the other(s) and situations in which none of the three features was represented. Design implications and future research are discussed.

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INTRODUCTION

SECURITY - A BASIC NEED.

Since creation, humans have felt the need to protect that which they own. People work to acquire a family, a home, a living and in order to protect their lifestyle, they have set up elaborate systems of security. Early engineers had already learned to build defensively when they realized that their fort walls, built from small stones (which would hold up beautifully in inclement weather) could be felled with the simple prying out of a few stones (Decamp, 1963). New and improved walls were made from very large stones trimmed and fitted neatly together so that the sheer weight of each stone prevented the enemy from pulling them out. Another case to ponder is that of the Egyptian pyramids, scandalously overbuilt to protect the dead ruler and all of his or her possessions. While such drastic security measures are not regularly taken today, there are in use such complex security devices as alarms and video monitoring systems as well as guard dogs and high fences or simply locks. In short, whether we choose to install locks and alarms or to put up barricades, or to hire security guards, we all feel a basic need to protect ourselves and that which is our own from criminal attack.

For the most part, these security systems do their intended jobs but there is always the possibility that someone will find a weak stone and once that has been pried loose, the walls will crumble. Crime in its many forms functions to break down security measures and to invade. While complete elimination of every criminal activity is impossible, it is feasible to work for a significant reduction in crime. Since man first sinned, there have been justice systems which decide on appropriate punishments for criminal behaviour but there is

always the possibility of the criminal not being caught or not being convicted. As long as this possibility exists, there will be people willing to take the risk. A viable solution addressed by urban planners and law enforcement agencies is to design sites so as to increase risk of capture in a criminal act and thus make the behaviour less attractive. Before we address the issue of urban planning, however, we need to develop an understanding of how people and, more specifically, criminals act in their environments.

HUMAN BEHAVIOUR AND ENVIRONMENT

In the past two decades, there has been an increase in the interest given to the built environment as a motivator of behaviour and a number of programs have been instituted to study the relationships (Piombini, 1987). Included are Defensible Space (Newman, 1971), Environmental Design and Management (Dunn, 1982), and Crime Prevention Through Environmental Design (CPTED) (e.g. Stanley, 1977). The last venture has been the most comprehensive approach (Piombini, 1987).

Few would deny that the behaviour of human beings is in part dependent upon their environment. For example, we might find ourselves walking a little faster than usual if we are caught in a sudden rain storm or we get off the bus at the wrong stop and find that we are in a very dangerous part of town. In the early sixties, research was already discovering that the physical environment in which people must interact can have a powerful effect on their behaviour (Wilner, Walkley, Pinkerton, & Tayback, 1962; Schorr, 1963). Indeed, according to Stanley (1977), "there is a consistent and, hence, predictable relationship between human behaviour and the physical context or environment in which the behavior takes place"(p. 6). Furthermore, Robert Sommer (1969) theorized, among other things, that environments facilitated or thwarted the generation of

relationships and the quality of these relationships. Extending the work of prior researchers such as Stanley and Sommer to the present study, we can speculate that whether or not people develop a criminal-victim relationship or one of respect can depend to a large extent on the environment in which they interact.

How does the spatial arrangement of a site influence the residents of that area? Much research on site planning ignores the distinction between the physical variables of a site plan and the social variables which result from direct human interaction with the site. Furthermore, planning research's dependence on tradition has lead to the formulation and evaluation of sites according to criteria other than the possible impact on the social and psychological factors that make up an area (e.g., function, cost efficiency).

What we have been discussing has been generally labelled 'architectural determinism' - the premise that human behaviour is shaped by the built environment (Lee, 1972). If we accept this premise then we must ask ourselves should society build cities that will facilitate the natural growth of mankind or build to try and help mould behaviour into agreed forms? According to Lee (1972), urban planners seem to be trying to work on the latter option but have not applied their efforts to the business of analyzing the consequences of their work.

THE ROLE OF THE ENVIRONMENT IN CRIMINAL BEHAVIOUR

Lee Rainwater (1968) theorized that security is an important need to be satisfied in existent low income housing units. Without feelings of security, states Rainwater, the residents experience a general impotence to cope. It is important to realize that those harmed by crime include not only actual crime victims but also those whose movements are restricted by fear of crime.

It is known (or soon learned) by most city dwellers that there are certain places to avoid because of their dangerous nature due to high criminal activity. We are warned not to go into certain parts of town alone especially after dark when more of the criminal element is apparent. Gardiner (1976, 1978) carried out a number of case studies and found that the physical environment plays a role in criminal activity by influencing how and by whom the space is being used; there is a connection between the organization of the environment and the opportunity for crime. Once a neighbourhood has been criminally invaded, there can be conflict and eventually deterioration of the neighbourhood and of the social cohesion and morale of the inhabitants. Finally, we might find a mass exodus of those who can afford to live in the suburbs (Gardiner, 1976, 1978). Such was the case in the 1950's and 60's in many American cities with the result being an increase in the number of low-class and high crime neighbourhoods (Piombini, 1987).

Visibility has been stressed by earlier (Angel, 1968) as well as more recent research as being an important factor affecting the criminal vulnerability of a space. Tiffany and Ketchel (1970) studied banks and how the architecture may affect criminal behaviour. Their findings are noteworthy in that banks which were robbed more often had poor visibility both between the work stations and the tellers and from the outside of the bank, had lower lighting, and fewer doors to the outside. Archea (1985) also found visibility to be an important factor in bank design. Furthermore, Newman (1972,1980) reported that personal crimes occurred most often in places with limited chance of being seen. Archea reported a number of police set-up operations in which findings indicated greater tension and desire to leave the scene quickly in subjects who were forced to work in places which denied visual access to other rooms from which they could be seen and heard.

From these few examples, we can extract the following factors of environments that can increase vulnerability to crime: enclosed spaces that offer little surveillance from the outside, and places that provide an easy escape route for the criminal but not for the victim.

PIONEERS OF URBAN DESIGN APPROACHES TO CRIME PREVENTION

We must ask: What makes one environment more vulnerable to crime than another? Certain early planning efforts have come up with two designs that were theorized to provide a more secure space: the Urban Fortress and the Urban Village.

The Urban Fortress describes what Newman and others refer to as "target hardening". Basically, one bolts, locks and barricades oneself inside a fortress. An observation of wealthy neighbourhoods with their strong high fences and elaborate security systems, which allow entrance to no one without prior approval, provides a clear example of the Urban Fortress. The model is successful because it does work in dividing the citizen from the hostile world. There are many examples of the use of the Urban Fortress mentality throughout history (e.g., the cities surrounded by stone walls which were mentioned earlier).

Criticism of this model includes its assumption that the streets belong to criminals and are therefore out of reach and not cared for by the citizen. This mentality does nothing to alter street crime itself. In these neighbourhoods, there exists little care for and responsibility for others' property and almost no socializing (Moffatt, 1983) - quite a hostile world on the inside, as a matter of fact. According to other research (Jeffrey, 1977; Sommer, 1972; Skogan &

Maxfield, 1980) total community planning is what is needed rather than more locks and fences.

It has been theorized that such hard architecture as is emphasized in the Urban Fortress model leads to brutalization of the human being and that such dehumanization makes social control even more difficult (Jeffrey, 1977; Skogan and Maxfield, 1980). Furthermore, Krupat and Kubzansky (1987) found that a community may be architecturally designed to deter crime but might remain undefended because of lack of social cohesion. Finally, the model is expensive because of the gadgets that need to be purchased and because some neighbourhoods would require complete environmental change (Moffatt, 1983).

The Urban Village model (a name coined by Gans, 1962), based on the ideas of Robert Park (1925), presents quite a different picture. Park believed that humans need interaction and the Urban Village model stresses social interaction as the basic need from which urban safety, cohesion, and functionality grow. The Urban Village mentality fingers social disorganization as the cause of crime. Current research (Taylor, Shumaker, & Gottfredson, 1985) has also found social and physical decay to be positively correlated with residents' perceptions of problems and with crime rates. Examples of the Urban Village include the many ethnic communities where poverty exists but does not stifle the lives of the inhabitants.

The Urban Village model is inexpensive to implement in that radical neighbourhood changes are not required (Piombini, 1987) but it can be criticized for its assumption that all neighbourhoods are homogeneous; it does not take into account the social diversity found in most modern cities. The Cognitive-Symbolic approach (Brower, 1965,1980; Appleyard, 1973; Craik and Appleyard, 1980) states that the physical elements that people read in the

environment are interpreted using the observer's own personal cultural or social assumptions. Therefore, everyone's perception of the environment will be slightly different. In a socially, culturally homogeneous neighbourhood, everyone might, indeed, interpret their surroundings in the same way but once their population becomes a little diverse with incoming strangers, then the Urban Village mentality falls apart. This was the case in the 1930's when immigrants began to move into the ethnic ghettos and the social fabric began to unravel. Another criticism is that the Urban Village model does not realize the physical changes that might be necessary in order for homogeneity to be achieved.

As Piombini (1987) points out, while the two models are very different and may, in fact be seen as opposites, the unifying thread is territoriality. In the Urban Fortress model, territoriality is enforced through the obvious show of ownership and hostility towards outsiders; in the Urban Village model, territoriality is enhanced through social cohesion and community. The models draw a relationship between the environment and human behaviour but neither addresses the root causes of crime or what types of environments might be more conducive to crimes.

Elizabeth Wood (1961), consultant to the Citizens' Housing and Planning Council, theorized that a site plan should be attentive to the differing needs of each individual and should try to foster a cohesive social structure. She concentrated on the housing design and management aspect of urban planning and theorized that high rise apartments should be designed to enhance the development of social structure and thus facilitate the creation of control and self-policing. She criticized current high rise designs because they seemed to be created to minimize the possibility of contact and communication and they provide little or no facilities for formal gathering.

Later researchers began to focus on testing the relationship between crime and environment (Boggs, 1965; Rainwater, 1968). One of these researchers, Schlomo Angel (1968) reported that the primary deterrent of crime was the presence of police and he theorized that even the threat of capture as evinced through surveillance and possible reporting by residents would deter crime. Angel proposed the Critical Intensity Zone which refers to the finding that crime takes place not when there are enough people present to invite crime but when there are not enough people present to survey the area. To correct this problem, Angel suggested alteration of pedestrian flow to eliminate the critical intensity zones. Angel put forward the "opportunity hypothesis" which states that criminal activity is at least in part related to the opportunity to commit crime and the costs and benefits involved. Angel coined the phrase "environmental protection" which was later to become the currently used Crime Prevention Through Environmental Design (CPTED).

Research that requires people to rate prechosen features of an environment shows a tendency to point to problematic physical features. In a study of safety on a university campus, Kirk (1988) found that while perception of a dangerous place is a combination of both the physical appearance of the place and of hearsay about previous activities, physical elements were more likely to be chosen as contributing to the overall danger of a place than were personal experiences there. In fact, the two factors most often chosen as making an environment frightening were 'poor lighting' and 'presence of places for attackers to hide'. James Hassinger (1985) conducted a similar study but found slightly different results. According to him, most people cited non-physical cues as their cause for fear (for example, many reported having heard through the media that the place was plagued by crime). However, Hassinger also reported that many respondents cited, as did those in Kirk's (1988) study,

'many hiding places for criminals' as being an unfavourable feature of the environment.

CRIME AND OPPORTUNITY

"By far, the greatest proportion of street crime and burglary is the result of opportunity rather than of careful and professional planning" (Law Enforcement Assistance Administration, 1974).

An important factor in the urban design approaches to crime prevention is that of how much a crime can be attributed to the criminal seeing the possibility to commit a crime and acting, so to speak, on the spur of the moment. In other words, is crime most often a function of opportunity rather than of psychological and social motivators or is it a combination of both? An opportunity to commit a crime may present itself in different ways: as low surveillance possibilities due to darkness or few people present (Boggs, 1965); or as indications that a victim is weak and unable to resist attack (Stanley, 1977). If it can be illustrated that opportunity plays a role in criminal behaviour, then environmental design approaches can have a great impact in crime reduction: it is possible to design an environment that will offer less opportunity for crime. Review of current literature seems to indicate that opportunity does, in fact play a significant role in the criminal act. For example, the National Institute of Law Enforcement and Criminal Justice (NILECJ) (1973) found that over 75% of criminal acts happened because of the victim's action or inaction presenting the offender with a chance to commit the crime. Finally, Angel (1968) theorized that areas of high crime are well known to the criminal, are easily accessible, are known to be areas where victims are plentiful and involve low risk of apprehension. Thus while there are crimes which are carefully planned acts, many take place because the opportunity presented itself to the criminal.

According to Piombini (1987), there are a number of factors which affect the connection between crime and opportunity. Some of the more key factors are, location, access, and time. Just how far will a criminal travel to commit a crime? Studies carried out in the 1960's and 70's (Turner, 1969; Phillips, 1972; Pyle, 1974) show that in large cities, the mean distance that a criminal would travel to commit a crime is between 1.66 and 2.20 miles. It would seem from these data that at least some criminals tend to stick close to home and thus it is apparent that they probably do not plan in detail where to go to commit a crime, but depend on the opportunity arising. In general, distance travelled depends on a number of factors such as age, race, and socio-economic status of the criminal as well as the nature of the crime.

EXAMPLES OF CPTED TECHNIQUES

In the 1970's, the Westinghouse National Issues Centre, with funding from NILECJ, commissioned four housing projects to demonstrate the effectiveness of defensible space concepts in areas other than just public housing projects. The four cities to receive CPTED redesign were Hartford, Connecticut, Fort Lauderdale, Florida, Minneapolis, Minnesota, and Portland, Oregon. The designs included a mix of design and management techniques which was yet untried (Dunn, 1982). The projects were aimed at all street crimes and burglaries. The results did show some positive changes (decrease in crime, increase in resident confidence) but because so many of the CPTED elements were involved in the design, it was difficult to interpret the findings.

The Hartford Project was another example of the implementation of CPTED but was considered to be far too expensive for what was gained. In short, the reduction in crime that did occur was more to be attributed to the residents' action than to the environmental design efforts. Another example is

the Housing and Urban Design (HUD) project, which in the 1970's began the Urban Initiatives Anti-Crime Program which was a 7 point program aimed at reducing crime and fear of crime. The program focussed on management of the environment. Eventually, 39 housing projects were chosen to take part in the Environmental Design Management (EDM) program but the project was terminated in 1981 due to lack of federal support.

Other CPTED efforts have included, in Britain, the Home Office Research Unit and the work of Clarke and Mayhew (1980) on redesigning the urban environment to reduce crime. In Canada, the town of Tumbler Ridge, B.C. was built with CPTED concepts in mind and the Solicitor General carried out an extensive study entitled, "The Environmental Design and Management (EDM) Approach to Crime Prevention in Residential Environments" (Dunn, 1982). Finally in Edmonton, Alberta, there exists a by-law which states that developments must be reviewed in terms of their provision of defensible space (as defined by Newman, 1972) and their effect on policing and safety (Dunn, 1982).

There are many other efforts at CPTED that need not be listed here, but the general conclusion to be drawn from all these is that there needs to be a more careful examination of exactly how the physical environment is affecting behaviour: which features are acting to create a safer place? Furthermore, management must be considered in environmental design: urban change itself is not sufficient. Also, each example of implementation of CPTED requires careful examination of the situation - the existing design, the types of crime taking place, and the residents. Finally, it has become apparent to me that researchers must examine the environmental features which the residents consider to be creating an unsafe environment since they who live in an area would know better than outsiders the changes that should be made.

PROSPECT-REFUGE THEORY

Purcell and Lamb (1984) state that in environmental research, the "how" and "why" of landscape perception have been overlooked while planners and architects concentrate on the "what". Perhaps the limited success of some design techniques is a reflection of designers' interest in only what elements are present, not how they are perceived or why they are perceived the way that they are. Appleton's Prospect - Refuge Theory attempts to break environments into constituent parts and address the question of "why" (and by implication "how") landscapes can differentially affect behaviour. While a number of authors have made reference to Appleton (e.g., Abello, Bernaldez, & Galiano, 1986; Herzog, 1989; Herzog & Smith, 1988; Nasar, 1983) or have studied selected factors of his theory (Ruddell & Hammitt, 1987) few have actually tested his premises themselves. An exception is a paper by Clamp and Powell (1982) which set out to "make a study of some central concepts of the theory" (p. 7). The study attempted to recreate the physical environment through the use of slides projected onto screens and asked judges to rate the scenes as to prospect, refuge, and aesthetic quality. The findings did not support Prospect - Refuge Theory. However, I hesitate to emphasize this finding since the researchers utilized only four subjects (two of whom were the authors) in the study and thus had little power.

In his book, The Experience of Landscape (1975) (reviewed by Bergman, 1978; Lewis, 1976; Morgan, 1978; Paterson, 1976; and Tuan, 1976), Appleton, drawing on the philosophy of John Dewey (1929, 1934), introduces Habitat Theory, which draws a connection between the aesthetic pleasure that one feels in an environment and the ability of that environment to meet biological needs. In other words, if a place is capable of sustaining our survival needs

(food, water, shelter), then we will instinctively feel that it is an appealing place. Prospect-Refuge Theory builds on Habitat Theory by postulating that the ability to see (prospect) without being seen (refuge) is basic to all our biological needs - it is the key to all other behaviours. For example, one cannot hunt successfully if one cannot see one's prey and one cannot survive if one cannot hide from one's predators. If this is so, then there should be a connection between this ability (to see without being seen) and one's perception of safety and consequently the aesthetic pleasure one feels in an environment.

Appleton states that it is in an organism's best interest to be able to see its prey or predator without being seen itself. Once this is achieved, the actual catch or escape is possible. Indeed, even shelter-seeking behaviour can be interpreted as taking refuge (from an inanimate hazard). Appleton does not assess all landscapes similarly but rather thoroughly examines each aspect of each landscape he discusses. He theorizes that by inspecting each environmental situation, one can break it down into good and/or bad elements and thus can predict the effect that such a place will have on the observer. While one could argue that individual variability in perceptions of landscapes might confound any attempt to define general features of landscapes, Kaplan (1973) asserts that all humans possess and use similar information processing mechanisms and should have similar cognitive responses to scenes. Appleton's theory is useful only if one assumes that an observer's perception of safety in a place is in fact related to the actual safety of the environment. One can make this assumption with confidence since Taylor et al. (1985) found a correlation of r=.62 between subjective perception of crime related problems in a site and actual problems as reported in police records. Appleton's theory is similar to the findings of the many other researchers mentioned earlier in that

they and he both have found that 'visibility' and 'hiding places' are important environmental features to be considered in the assessment of safety.

Appleton defines a hazard as any of a variety of animate or inanimate entities which can threaten inhabitants. In the modern world, hazards are more often symbolic than real. For example, something may initiate feelings of danger without being immediately life threatening. In short, Prospect-Refuge Theory states that the environment which allows good visibility and hiding places will be perceived to be safe and thus will be perceived as attractive to the senses. Weakness in one aspect (either prospect or refuge) can be compensated for by strength in the other. Research has found that places that are high in prospect and refuge are indeed rated as more aesthetically pleasing than those without prospect and refuge (Nelson, Loewen, & Silverman, 1989).

Appleton's theory regarding aesthetics is restricted, I believe, to the natural setting since we as civilized human beings no longer depend completely on nature for our survival and thus might no longer feel attracted to places because of their fulfilment of survival needs. Scenes which would be classified as aesthetically pleasing would most likely be those which current fashion dictates as being such (e.g., pastoral scenes or those containing unique architectural structures). I do speculate, however that Appleton's theory as it relates to perceived safety can be extended to the urban setting.

In more detail, Appleton's 'prospect' may be defined as follows. Prospect is the allowance of vision in a given setting and, first and foremost, vision requires light. The passage of light to the eye can be reflected from any feature along the passage. An observer can then see landscape features. The observers themselves reflect light, and therefore they will be visible to any other inhabitant of the landscape. In the search for prospect and refuge, the

inhabitant seeks to maintain the passage of light in all directions except from him/herself to the landscape in general.

Furthermore, Appleton defines a *direct prospect* as one which can be seen from the present viewing position; an *indirect prospect* is one which can only be assumed to be seen from another viewing position. An *horizon* is defined by Appleton as "the edge of an impediment to the line of vision" (p. 89) and furthermore, "such an edge invariably invites the suggestion that the impediment may not be . . . as effective beyond the point where it appears to end" (p. 89-90). The best prospect is one which offers an open panoramic view from the current viewing position.

As light is to prospect, so darkness is to refuge. When one is in darkness, one is out of sight. If a hazard is inanimate, we require a shelter; if animate, a hiding place. As do prospects, refuges can vary in accessibility and efficiency. Swartz (1987) discusses the concept of inversion, which is apparent after dark. When there is no light or only local sources of light, then that which was prospect becomes refuge and vice versa. An example of this is a cave in which there is a fire after dark - the cave in daylight is a refuge because one can be hidden and the outside of the cave is a good prospect position but at night the cave interior provides prospect because it is a place where one can see (a local source of light) but it is no longer a refuge from an animate hazard since it very clearly illuminates the presence of an inhabitant. In short, in daytime, the outside of the cave is the prospect and the inside provides the refuge but at night the opposite is true. "Instead of a landscape of refuges set within the wider prospect, we have limited or 'constrained' prospects set within an infinite refuge" (Swartz, P. 349).

The issue of degraded neighbourhoods is important in the previous theories discussed (e.g. CPTED, Defensible Space) and so it is in Appleton's

Prospect-Refuge Theory. In fact, deteriorated views by their disorganization and apparent decline of social structure decrease the ability to recognize the presence of hazards and thus indicate vulnerability. "The impoverishment of prospect values in the constructed environment has been accompanied by a decay in refuge values" (Swartz, 1987, p. 351). Swartz remarks that apartment buildings enhance refuge decay by emphasizing close proximity to strangers, and dependence on them not to harm or hinder egress. All of these factors act to make the so popular apartment building inadequate as a refuge.

An interesting twist on the prospect-refuge concept is that if an area contains wide open space (thus excellent prospect) then it is by definition relatively devoid of refuge. Conversely, if one is occupying a refuge (is hiding) then one's view will most likely be restricted. Must prospect and refuge then be seen as opposing poles on a continuum? I believe that refuge, if it is to be used in a modern definition, should include not only the possibility of hiding should the need arise, but also simply access to help in the form of some sort of human contact. Thus "real refuge" would be used to refer to an unambiguous sanctuary; prospect must then refer to the ability to see relatively far around oneself while always having the refuge in sight. Perhaps the environment which will be perceived as being safest will be not one which contains unlimited prospect and refuge but rather a satisfactory combination such that there is enough prospect to see the surroundings but not so much that there is no refuge visible.

A "real refuge" can also act as a prospect point in that buildings with windows allow an outsider not only a place to go in case of emergency but also provide a surveillance factor; any altercation could be viewed from the windows. Considering this, a final feature to examine is that of the ambiguous refuge: that which is a refuge for an observer can act as a hazard if it houses enemies. As

was found in the Hassinger (1985) studies, people often saw "places to hide" as a negative feature of the environment rather than a positive one. It would seem that when people see a hiding place they don't seem to say, "there is a place I can hide" but rather, "someone could be hiding there". Thus in order for a refuge to be perceived as safe, it must be interpreted as being protective rather than hazardous.

Review of the work on perceived crime and environmental characteristics has shown that many have tested specific environmental features and how they might be perceived (e.g. prospect and refuge, light, other people) but there has been very little examination of the global question of the environmental situation. Important features of the physical environment may include the time of day in which the scene is observed, the arrangement and type of objects in the scene, and the number of other people present and their relationships to each other and to the observer. According to Nelson et al. (1989), daytime is perceived to be a safer time than night, theoretically because daytime provides more light than night by which to view the surroundings. Furthermore, it has been found that hearsay about what goes on after dark in a particular place can greatly reduce feelings of safety (Hassinger, 1985; Lewis & Salem, 1988). Thus one can theorize that light will be important in two ways: first because of the prospect it provides and second because of the bad reputation which lack of light has in relation to crime.

Features in a scene can be arranged so as to provide good lighting or bad, a good view or lack thereof, presence or absence of possible hiding places and possible escape routes. This is where Appleton's Prospect-Refuge Theory becomes relevant. According to him and others (Hassinger, 1985; Kirk, 1988) a scene that provides good lighting and surveillance and that allows for the possibility of a hiding place or means of escape and disallows for the possibility

of a hiding place for an enemy will be rated as being safer than those which provide none or only some of these features. Furthermore, an environmental concept which the Kaplans (Kaplan, 1987; Kaplan & Kaplan, 1978, 1982) identify is "mystery". A place that has mystery maintains interest and involvement in a setting. In the same way, Appleton describes mild hazards as evoking interest while extreme and immediate hazards evoke fear. Thus one can define perception of mystery as running along a continuum with perhaps "mildly mysterious" places being perceived as interesting and even exciting and "highly mysterious" places being perceived as dangerous. Indeed, Herzog and Smith (1988) found decreased preference for environments high in mystery. Examples of places high in mystery included urban alleys and narrow canyons. According to Appleton's theory, these places would be lacking in both prospect and refuge and thus potential hazards would seem far too immediate and extreme for the place to be merely curiosity evoking.

The social aspect of the environment poses an interesting set of possibilities. How will the presence of other people affect one's feeling of safety? This issue will not be addressed in this study, which focuses on the physical environment. I am aware that one cannot completely ignore the fact that people interact with other people in their environments, but I believe that the study of the social characteristics of the environment and how they relate to perception of crime would make an interesting study all on its own.

In summary, there are a number of environmental features which the literature has shown to be important to perceived safety from crime. Included are visibility (Angel, 1968; Appleton, 1975; Hassinger, 1985; Kirk, 1988; Newman, 1971); a means of hiding or access to aid for the potential victim (Appleton, 1975; Hassinger, 1985; Kirk, 1988; Newman, 1971); lack of physical decay (Appleton, 1975; Baumer, 1978; Fried, 1982; Shumaker & Taylor, 1983;

Swartz, 1987; Taylor, et al., 1985), presence of nonthreatening people (Nelson, et al., 1989); and a general feeling of communality in a place (Brown, 1985; Newman, 1971). While each of the researchers has found his or her particular feature to be significant, there has been relatively little work done on trying to integrate the theories. Furthermore, some of the environmental conditions identified by researchers conflict. For example, there is the problem of the hiding place. Some researchers found that places with hiding spots were considered to be safe but others found that such places were perceived as unsafe. This is the issue of the ambiguous refuge. As I mentioned earlier, the refuge needs to be examined more closely in terms of the impression that it has on the viewer. If one were to ask people which environmental features make them feel safe from crime, they would probably consider a number of the above mentioned items.

HYPOTHESES

Because many of the previous studies have identified either prospect or refuge or both as being important features of a safe environment, I hypothesize that they will be the environmental features which will be most often cited as indicators of safety by people who are not forced to choose alternatives. However, as mentioned earlier, refuge must be redefined to encompass only those places which offer unambiguous refuge. Furthermore, I postulate that scenes which offer a balance between prospect and refuge will be rated as safer than those with more of one value at the expense of the other, or with very little of either. Of the two variables I hypothesize, based on the research which shows that more crimes take place at night, that prospect will be cited the more important: a scene which lacks light automatically introduces a criminal

element. Finally, I hypothesize that male and female subjects will rate scenes differently with men rating places on average as safer than women.

Phase 1:

METHOD

Subjects: 55 male and female (20 and 35 respectively) subjects were recruited from an undergraduate psychology class. The mean age was 21.3 and ranged from 19 to 41.

Procedure: Subjects were approached in their classroom. They were told that the researcher was interested in finding out what the public opinion was regarding environmental features and safety from crime. Subjects were told that they were under no obligation to participate and could leave if they so desired. They were also told that their answers would be anonymous and that no one subject would be identifiable in any way. Those who chose to participate were asked to list features of the outdoor environment that they believed could make it safe from personal crime. There was a time allowed for questions regarding the exact issue about which they should be thinking. They were given as much time as was needed to finish; most students took approximately 15 minutes. Afterwards, the researcher gave a debriefing in which subjects were informed as to the general purpose of the experiment. The data were coded by the researcher according to the frequency with which features were cited. The result of this coding was a frequency table containing environmental features and the number of subjects who cited those particular ones. Five other judges were asked to code the data by the same method and the six judges' ratings were analyzed nonparametrically using Kendall's Coefficient of Concordance. This test assesses the degree of agreement

between judges in the ranking of variables. In short, a high or significant value of 'W' could be interpreted to mean that all of the judges are applying the same standard in ranking the objects under study (for more information see Kendall, 1948).

RESULTS

The judges' coding showed that 3 environmental features are mentioned more frequently than any of the others. Kendall's Coefficient showed significant agreement between the judges [$w(4) = .888$, $p < .001$]. This gives me confidence to report that the most frequently mentioned environmental features were 1) light (either daylight or artificial light if necessary) - cited by 42 out of 55 subjects, 2) open space (no places for "the enemy" to hide) - cited by 30 out of 55 subjects , and 3) access to real refuge (any kind of "safe harbour" should one need it) - cited by 24 out of the 55 subjects. See Table 1 for a more complete list of the items mentioned by subjects.

DISCUSSION

As I thought, subjects when asked to list spontaneously features of the environment that make it safe from crime, most often consider items which can be seen to fit Prospect - Refuge Theory. First of all, light which was cited as the most important feature in the environment is the major component of prospect according to Appleton. But light is more important than simply its provision of visual capacity: in modern society, people are aware that more crimes take place at night. This knowledge tends to make people feel less safe at night than during the day.

Second, open space contributes to both prospect and refuge in that a wide open area is, by definition, relatively devoid of obstacles and thus must offer a good view. Furthermore, a wide open area will not contain any

ambiguous refuges - no "hidey" places as one subject put it. There must be a trade off, though, since an environment which does not offer refuge to one's enemy will not offer refuge to oneself, either. But it would seem that subjects prefer an environment devoid of refuges altogether over one which contains ambiguous refuges.

Third is what I have called real refuge or access to refuge that is relatively unambiguous. Examples might include residences or any type of structure which appears to be open to the public. Some subjects also cited a social feature: 'others present', which may be seen as a form of access to help but will not be considered any further since it is the physical features in which I am most interested. Access to real refuge can be seen as completing the ideal refuge that was begun with the open space feature. A perfect refuge would be one which offered safety or aid should one need it but which did not contain ambiguous hiding places such as any form of vegetation which might house animate hazards.

So, in summary, when asked to name features of the outdoor environment that contribute to perceived safety, subjects will most often identify the following three items: light, open space, and access to real refuge. Light provides prospect and a situation in which it is believed that less crimes take place. Open space provides both prospect and lack of ambiguous refuge. And access to real refuge provides a safe harbour should one need it.

Phase 2: This phase of the experiment was designed to test the effect of the three environmental features named in Phase 1 on perceived safety. This is a 2 x 2 x 2 x 2 design which tests the extent of perceived safety that is felt in the presence or absence of each of the features and the effect that the sex of the observer has on the ratings.

METHOD

Subjects: 100 undergraduate students (45 men and 55 women) (different from the first) were recruited from the Spring session of an undergraduate psychology course. The mean age was 20.6, range from 18 to 43.

Materials: The three environmental features from Phase 1 can be combined in eight different ways (i.e., light + open space + access; light + open space but no access; light + access but no open space, etc.). Thus 16 slides were chosen to visually represent each of the 8 categories (2 slides per category).

These 16 slides were chosen by the researcher and then were shown to 5 judges who were trained as to the three features for which they would be rating the slides: light (presence or absence), open space (presence or absence), access to real refuge (presence or absence). The slides were presented in random order and the judges were asked to rate each according to whether or not they believed the feature to be present. Through this process, some of the slides were shown to be ambiguous with regard to the presence or absence of particular features and the judges freely gave opinions as to whether or not the slides were "good" representations of the categories. After a few trials with new slides replacing the ambiguous ones, I received 100% reliability in ratings among the judges on the final 16 slides. The eight categories and a brief description of their representative slides can be found in Appendix A.

The questionnaire used to assess perceived safety in the scenes consisted of a 5 point scale ranging from not at all safe (1) to very safe (5). The complete questionnaire is found in Appendix B. The questionnaire was tested on a group of 7 people (5 women, 2 men) who rated the slides and then gave their

opinions as to how well the questionnaire gave them a chance to voice their feelings of safety. The results of these data showed agreement with the hypotheses. The raters agreed that the 7 point scale should be abandoned for the more efficient 5 point scale.

Procedure: Subjects were assembled in a classroom when the researcher entered and introduced the experiment . The subjects were allowed to read the brief information sheet which described the study and the credits given for participating (in this case 1/2 credit was to be given since the experiment took approximately 20 -30 minutes). Subjects were told that they were free to leave if they so desired but none did. Subjects were asked to sign an agreement to participate form if they wanted to participate. All subjects signed the form and participated. Then they were instructed as to how to rate the slides using the 5 point scale. There were no questions pertaining to the general directions. Subjects were shown a sample slide which contained a scene with no buildings, scattered trees, and a winding path along a field (it was not like any of the experimental slides) so that they could practice rating. The subjects then rated all 16 slides which were projected in random order through a slide projector onto a screen at the front of a darkened room. Each slide was presented for 30 seconds followed by a 10 second interslide interval during which the subjects viewed only a blank screen.

After the study was over, the researcher gave a debriefing in which she informed the subjects as to the general purpose of the experiment. The subjects were given a written copy of the debriefing and when they handed in their questionnaires, were given a participation credit form and were thanked for participating in the study.

These data were analyzed using a split plot ANOVA with sex as the between variable and light, open space and access as the within variables. Multiple t-tests using a bonferonni correction were run as follow-up analyses (corrected alpha level = .001).

RESULTS

An initial set of t-tests showed that there were no significant differences on ratings of the two versions of each category (average p=.46). I then computed a mean score for each category using the responses to the two slides which represented each category. Table 2 shows the ANOVA summary table. From the table we can see that all four of the main effects were significant at $p < .001$ and that a number of the interactions were significant. Figure 1 shows graphically the main effect findings and Table 3 shows the means and standard deviations of the significant main effects.

According to the findings regarding sex, it would appear that men in general rate most scenes to be safer than do women. The main effects for features show that situations depicting the presence of each feature (light, open space, or access to real refuge) are perceived to be safer than situations depicting their absence. For example, scenes in which there is light are rated to be safer than scenes in which there is no light. A noteworthy finding is the greater difference between the light / no light situations than between either the open space / no open space situations or the access / no access situations. The presence of light produces a higher mean safety rating than the presence of either open space or access and the absence of light produces a lower mean safety rating than the absence of either other feature.

I will now describe each of the interactions in turn. First are the sex by feature interactions. The ANOVA results showed that for each of the features,

both men and women rated the presence of the feature significantly safer than the absence. The sex by light interaction is illustrated in Figure 2a. Both men and women rated the presence of light to be safer than the absence [$t(44) = 22.11$, $p < .001$ for men and $t(54) = 23.95$, $p < .001$ for women]. The difference between male and female ratings in the "light present" situation was significant [$t(98) = 4.56$, $p < .001$] but in the "light absent" situation, it failed to reach the stringent bonferonni corrected significance level [$t(98) = 2.00$, $p > .001$]. Thus, although both men and women perceive themselves to be more safe in the "light present" situation than in the "light absent" situation, men appear to experience a greater drop in perceived safety when there is no light resulting in similar ratings between sexes. In summary, men appear to be advantaged in terms of perceived safety in situations involving light but the sexes feel equally unsafe in situations in which there is no light.

There appears to be a similar pattern in the sex by open space interaction. Figure 2b shows that once again there is a difference between the sexes' ratings in the "open space present" situations [$t(98) = 4.33$, $p < .001$] and no significant difference in the "open space absent" situations [$t(98) = 2.20$, $p > .001$]. Thus men perceived themselves as safer than did women in the "open space present" situations but had no advantage in the "open space absent" situations. Both sexes rated the "open space present" situation as significantly safer than the "open space absent" situation [$t(44 = 13.57$, $p < .001$ for men and $t(54) = 10.54$, $p < .001$ for women].

The sex by access interaction (Figure 2c) shows a different pattern. That is, the "access present" situations showed no significant difference between the male/female responses [$t(98) = 2.12$, $p > .001$] and the "access absent" situations showed a significant difference [$t(98) = 4.31$, $p < .001$]. It appears that while men and women rated "access present" situations as significantly

safer than "access absent" situations [$t(44) = 5.13$, $p < .001$ for men and $t(54) = 10.83$, $p < .001$ for women], men do not experience as great a drop in overall perceived safety from the presence to the absence of access to real refuge.

In summary, the interactions involving sex of the observer showed that when either light or open space is present, men perceive significantly greater personal safety than do women but when either of these features is absent, men experience a greater drop in safety perception than do women resulting in no significant difference between the sexes' ratings. The opposite is true in situations involving access. Here, men and women perceived similar safety in the situations where there was "access present "and it was the "access absent" situations which differentiated the ratings with women experiencing less perceived safety than men.

The other two two-way interactions both involve light: light by access (Figure 2d) and light by open space (Figure 2e). Both of these interactions exhibit similar patterns. There is a significant difference between ratings of "access present" and "access absent" in lighted situations [$t(99) = 12.61$, $p < .001$] and between ratings of "open space present" and "open space absent" in lighted situations [$t(99) = 15.99$, $p < .001$]. Similarly, there are significant differences between the presence and absence of each feature in unlit situations [$t(99) = 4.38$, $p < .001$ for access; $t(99) = 7.00$, $p < .001$ for open space]. In all situations, the presence of the feature access or open space was rated as significantly safer than its absence. Furthermore, the presence of light produces significantly higher safety ratings than its absence. Light interacts with each feature in that when it is absent, the differences between ratings of presence and absence of the other features are not as great as when light is present.

There were two three-way interactions in the study: sex by light by access and light by open space by access. I will now address each of these in turn. First of all, in the sex by light by access interaction, the situations which produced significant differences between the sexes were, "light + access" [$t(98) = 3.71$, $p < .001$], "light + no access" [$t(98) = 4.00$, $p < .001$], and "no light + no access" [$t(98) = 3.62$, $p < .001$]. The situation, "no light + access" did not produce significantly different ratings [$t(98) = -.31$, $p > .001$]. In short, the men's ratings in each situation were significantly higher than the women's except in the situation in which there was no light but access. It is interesting also to note that the general pattern of means for the two groups was different. For men, the situation in which there was light but no access was perceived to be safest followed by the "light + access" situation , then the "no light + access" situation and finally the "no light + no access" situation. The women's pattern was different: they found the "light + access" situation to be safest followed by the "light + no access", "no light + access", and "no light +no access" situations. It would seem from these results that men generally perceive scenes in which there is access to be less safe than those in which access is absent (the "light + no access" situations were rated highest and the "no light + access" was not rated significantly differently from the "no light + no access" situations [$t(44) = .36$, $p > .001$]). Women, on the other hand, follow the predicted pattern in their ratings considering scenes with access to be safer than scenes without.

The three-way interaction involving light, open space, and access is interesting in that it shows how the three variables work together. First of all, the pattern from highest to lowest safety as indicated by the ratings is as follows:

Category	Mean	SD
1. Light + open space + access	4.33	.60
2. Light +open space + no access	3.34	.91
3. Light + no open space + access	3.02	.78
4. Light + no open space + no access	2.42	.74
5. No light + open space + access	2.03	.75
6. No light + open space + no access	1.82	.89
7. No light + no open space + access	1.63	.68
8. No light + no open space + no access	1.27	.54

The interesting points to note are that situations in which there are all three features are rated as significantly safer than all other situations ($p < .001$ in all cases), and when there is none of the three features present, the ratings are significantly lower than all other situations ($p < .001$ in all cases). Further t tests showed that all of the situations were significantly different from each other with the exception of 2 & 3, 5 & 6, and 6 & 7. Moreover, the pattern of ratings tends to follow the predicted pattern in that the scenes which contained a balance of the three features were rated as the safest .

DISCUSSION

Looking at the general results from the ANOVA, we can see that men feel safer in most outdoor environments than do women. This was the expected finding since women are the more vulnerable half of the species and confirms the findings of prior work in the area (e.g. Leach, Lesiuk & Morton, 1986). While there are more reported general crimes against men, there are more sexual assaults and indecent assaults against women (Statistics Canada, 1985) than against men. Furthermore, assaults on women tend to be more severe since

women have less power to defend themselves than men do. Thus it is understandable that women would perceive themselves to be less safe in most situations than would men.

The main effects for features also came out as was predicted. Those areas with light, with open space and with access to real refuge were rated as safer than those without light, open space, or access respectively. This finding merely confirms the Phase 1 data that these three features are important to perceived safety in the outdoor environment. Things become more interesting when we examine the interactions of the features with sex and with each other.

The sex by light interaction shows that men in "light present" situations perceive greater safety than do women but when there is no light, the responses are not significantly different from each other. This implies that the women in this study had more stable responses to the environment; while their safety ratings did significantly lessen in the "light absent" situation, the degree of decline was not as dramatic as that for the men. Thus it would seem that in situations involving light, the men experience greater variability in environmental safety responses than the women.

The sex by open space interaction showed almost a mirror reflection of the sex by light interaction with the significant difference between sexes' responses in the "open space present" situation, and the significant decrease in male responses to the "open space absent" situation to produce no significant differences between sexes' ratings. As with light, men and women perceive open space as advantageous to safety and the lack thereof to be disadvantageous. However, men appear to feel the lack more keenly resulting in a dramatic change in perceived safety. Finally, both sexes feel less safe in situations with neither light nor open space. Upon reflection, I realized that in daylight situations or in open space environments, both sexes would be able to

utilize their powers of escape if the need arose (with women's powers being less than men's). However, after dark, the sense on which humans most rely -- vision -- is taken away and in enclosed areas the possibility of flight is negated, leaving inhabitants to cope using their remaining abilities. Thus while women feel the need to always be cautious regardless of the environmental situation, men seem to perceive that they can utilize certain advantageous environmental features.

The sex by access interaction shows an interesting change in the pattern. It would seem that men do not view the access factor as increasing safety in the outdoor environment as well as do light and open space. In the access situations, males do not perceive any more safety than do females. This may indicate a certain discomfort about utilizing the type of help represented in this study. While women may have no qualms about asking for help in a dangerous situation, men may prefer to fend for themselves. This proposition is supported in the males' perceived safety in the "open space present" situations. Perhaps they would rather have an area in which to run from danger rather than one in which they would have to solicit help. While this may be true, it is important to keep in mind that there was a significant difference between males' ratings of "access present" versus "access absent" so while they do not seem to value this type of refuge as highly as they do open space they do recognize the refuge possibility. Furthermore, one must remember that both sexes rated the presence of each feature to be safer than its absence. Thus if environments were to be designed in order to utilize these design features, they would offer a place which was perceived to be safer from crime for both sexes than places which do not consider these features.

In both the light by access interaction and the light by open space interaction, the presence of the feature is rated as significantly safer than its

absence. Light interacts with these features in such a way that when it is absent, there is a decrease in the differences between ratings of "feature present" versus "feature absent". This could be due to light being such a strong indicator of safety that when it is absent, the ratings of safety decrease overall and the presence of another feature is not as influential as it is when light is present. In general, however, according to these interactions, the features access and open space show a strong effect; people tend to rate situations with access to help and with open space to be significantly safer than situations without either.

The sex by light by access interaction shows that access is not a very powerful safety cue for men. This finding is similar to that found in the sex by access interaction. Indeed, they would prefer to find themselves in a situation in which there was light but no access over one in which there was light and access. In short, when there is no light, the addition of access does not significantly increase ratings of perceived safety. Thus according to these findings in light situations the addition of access produces no advantage for men using the environment while it does provide some safety for women.

Finally, I would like to address the three way interaction involving the three environmental features. The very fact that this interaction was significant indicates that the three features do, in fact, work together to produce perceived safety or lack thereof. Indeed, as was shown by the general pattern of means, the situations in which all three features are together, are rated as significantly safer than any of the other possible combinations of features. Thus scenes in which there is light, open space, and access to real refuge are perceived as safer than scenes in which only two, one, or none of the features is offered. This is a finding which would please Appleton, no doubt: it confirms a part of the Prospect - Refuge Theory in that places which contain prospect and refuge will

be perceived to be safer for the inhabitants. Furthermore, it upholds the hypothesis that the balance of prospect and refuge will be rated as safer than maximum of either. While these results do support prospect-refuge theory, they also introduce the idea of a true refuge - one which unambiguously offers protection. However, in this study, it would seem that this type of refuge did not produce as strong results as I had hoped. Indeed, according to the interaction results, situations in which there is "light + open space + no access" and "light + no open space + access" were not rated as significantly different from each other. It would seem that in situations in which there is light, the presence of either open space or access is perceived to be safer than situations in which there is neither but one is not perceived to add any more safety than the other. Therefore, in lighted situations, the presence of access or open space is perceived to add safety to the place.

Furthermore, situations in which there is "no light + open space + access" are not rated as being any safer than situations in which there is no access. In turn, those places in which there is "no light + open space + no access" are not rated as significantly different from places in which there is "no light + no open space + access". So when light is absent, but open space is present, the addition of access does not give any advantage. Also, when light is absent, situations with either access only or open space only are rated equally low.

This interaction also confirms the hypothesis that light is the most important feature of the three. All of the situations in which there was light were rated as safer than those in which there was no light. Furthermore, they confirm the hypothesis that situations with a balance of light, open space, and access will be rated as significantly safer than other situations and those with none of the three features will be rated as significantly less safe than any of the others. In general, the results from this interaction followed the predicted pattern with the

disappointing exception that access and open space, as they were represented in the interaction, did not strongly affect responses.

GENERAL DISCUSSION AND CONCLUSIONS

Overall, these findings confirm that the environment does play a role in perceived safety from crime: the specific arrangement of features in a scene do appear to affect the feeling that one will have toward it. Now the general question: how do these results add anything to the current body of research? The Phase 1 results show that of all the environmental features researched, three stand out as being important: light, open space and access to real refuge - in decreasing order of importance. That is, if asked what makes a place safe from crime, people will most often cite these three features. Other features mentioned by earlier researchers were also cited by subjects (e.g., lack of physical decay, good community, target hardening) but not as frequently as were these three.

The next question is, when people are given explicit situations involving the three features, how will they perceive them? In other words, will the forced choice situations produce similar results as the free response? Furthermore, how will the three features act together? The first of these questions was answered by the main effect findings for the three features. The presence of light or open space or access was perceived as safer than the absence of each respectively. From these results, we can conclude with confidence that these three features are important to perceived safety , and we can also conclude that as subjects indicated in Phase 1, light is the most powerful of the three features.

The second question was answered through all of the interactions. Basically, the three features together create a situation in which safety is perceived as greatest followed by light and open space, then light and access

and finally light alone. Situations in which there is no light are rated as less safe than lit ones with the pattern of open space and access interacting in the same way. In an unlit situation, the other two features appear to become more salient.

The general conclusion to be drawn from this is that, within the contrived laboratory setting with its obvious limitations, the environmental features, light, open space, and access to real refuge stand out as important to perceived safety from crime. Responses to interactions with the actual place might produce different results based on sounds, weather conditions, etc. but I still believe that a similar pattern would emerge. There are a number of variables which have been excluded for the sake of internal validity such as other people present, the climate, the exact design characteristics of the structures in a scene. These variables were excluded at the expense of external validity. This study represents a small but firm step forward in the examination of the influence that the environment has on perceived safety from crime. The other variables mentioned need to be examined in detail as well in order to develop a clear picture of the environmental situation which is perceived to be safe from violent crime. Furthermore, the environmental characteristics reported by other researchers (i.e. the Urban Fortress or Village, the communality ideal, etc.) are also important to consider. However, keeping this in mind, the response to the environmental features studied here can give a certain amount of guidance in design implications. For example, it is obvious from this study and others that light is a strong indicator of perceived safety. One implication of this is that increasing the amount of artificial light after dark could lead to more places being considered safe from crime. This may seem unreasonable since one cannot hope to illuminate every corner of a city. However, it is possible to increase illumination in areas which are used regularly by the public (i.e., bus

shelters, parking lots). The strategic use of extra illumination in target places may create a greater feeling of safety for the user.

Another issue related to the use of light is that of visibility. People might feel more comfortable interacting in a place which can be seen from other places. Bus shelters might be placed where there are businesses with windows or residences from which any altercation could be viewed. Parking lots or parkades could incorporate strategically placed security booths or buildings nearby. It is my belief that the incorporation of indicators of surveillance could increase perceived safety.

While access to real refuge and open space were not considered, in this study, to be as important as light in making a place seem safe from crime, their presence was rated as producing a safer situation than their absence. Therefore, a public area might benefit from the addition of a building open 24 hours (i.e., a store) or perhaps an emergency phone. Open spaces could also be used strategically. For example, a bus stop that is on the side of the road as opposed to being set back from the sidewalk would allow a person the chance to survey his/her surroundings while occupying the space. Many public spaces are built with economy and convenience in mind and might benefit from consideration of their offerings in terms of perceived safety.

Finally, according to Lindberg, Garling, and Montgomery (1989), one's preference for a particular place does not always correlate highly with choice of a place. Choice to use an environment is based on many variables including necessity, length of stay, availability of alternate areas in which to carry out the desired activity. Thus people may choose to utilize an environment which they would not prefer because seeking the preferred place expends more energy than using the unpreferred for a short period of time. However, by designing public places which by their very nature are conducive to perceived safety, I

believe that it might be possible to narrow the gap between preferred and chosen environments.

FUTURE RESEARCH

Like most research, this project brought up more questions than it answered. This is an exciting situation in that I can now see a plan of research unfolding that might, in the end, be influential in the planning of public places. It would be ideal to study all of the other variables not studied here, but I must start with something manageable. The next study that I would conduct would centre on the issue of the social situation in an outdoor environment. It would be interesting to know how the presence of other people (strangers) could change perceptions of safety. Whether one feels safer with one other person, two other persons, or three or more others; how the sex of the observer and that of the other people might affect perceptions; whether the appearance of the others would alter an observer's perception of safety; and how an observer's perception of safety might change if he or she were at a scene and others approached as opposed to approaching an already populated place. These studies could give an interesting look at how people perceive others in terms of providing or removing safety from crime; they would not aid in the issue of designing for safety because it is difficult to know or control who is going to utilize a given place at a given time. The social aspect of the environment could, however, give a more realistic picture of how places are perceived; studies of urban spaces would have to qualify their findings keeping in mind that the social environment might change perceptions of the environment.

Another interesting study might examine how the climate affects perception of safety from crime. I am aware of some work in progress in which the researcher has created computer drawn scenes of a bus shelter and has

manipulated only the weather condition. These pictures will be shown to subjects who will rate them for perceived safety from crime and for aesthetic value. It will be interesting to find out if people feel that they would be safer in certain weather conditions rather than others. I would speculate that people might feel safer from crime in harsh winter conditions simply because there might be less people out in the streets and those who are out are probably more concerned with getting to their destinations as quickly as possible that they are with "hanging about" and making trouble!

Other studies might examine whether natural elements add or detract from perceived safety; and whether making a place more open to surveillance might make a person feel safer. All of these studies would produce interesting insight into the human perception of safety from crime in the outdoor environment and could prove influential in the design of public places.

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Table 1 - Environmental Features Listed as Contributing to Safety from Crime and the Mean Number of Subjects who Cited them (averaged across the 6 judges)

Feature	# of Ss cited by (N=55)
Light	42
Open space	30
Access to help	24
Presence of safe people	17
Target hardening*	12
Sense of community	10
Arms control	7

* target hardening is used to refer to any behaviour undertaken to secure oneself or one's belongings (e.g., installing locks, carrying weapons)

Table 2 - Anova Summary Table

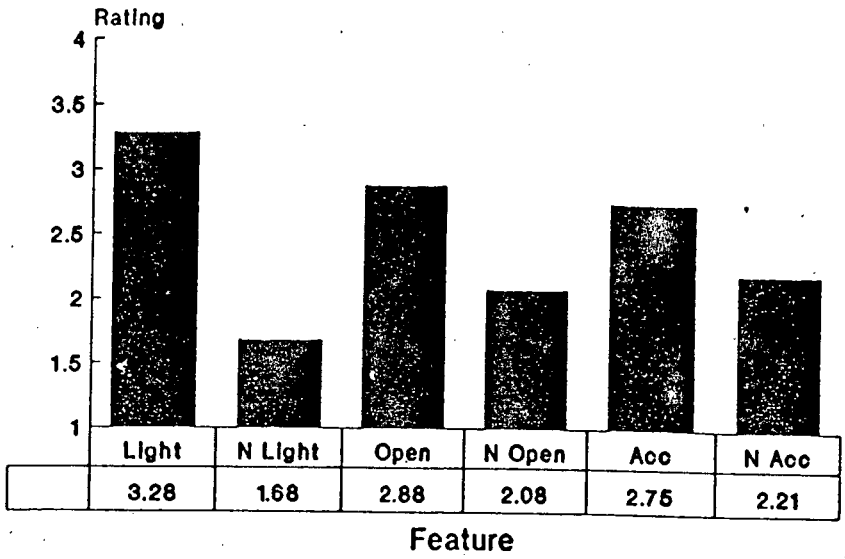
Source of Variation	SS	DF	MS	F	P
sex	20.96	1	20.96	14.57	.001
light	511.29	1	511.29	1065.78	.001
opensp	128.77	1	128.77	288.29	.001
access	54.97	1	54.97	119.91	.001
sex by light	3.45	1	3.45	7.19	.009
sex by opensp	3.19	1	3.19	7.14	.009
sex by access	4.08	1	4.08	8.90	.004
light by opensp	19.52	1	19.52	41.52	.001
sex by light by opensp	.44	1	.44	.94	.334
light by access	13.88	1	13.88	43.67	.001
sex by light by access	1.44	1	1.44	4.53	.036
opensp by access	.83	1	.83	2.49	.118
sex by opensp by access	.25	1	.25	.74	.393
light by opensp by access	3.66	1	3.66	18.52	.001
sex by light by opensp by access	.00	1	.00	.01	.933

Table 3 - Means and Standard Deviations of Significant Main Effects

Feature	Mean	SD
Males	2.66	.39
Females	2.33	.45
Light	3.28	.55
No light	1.68	.49
Open space	2.88	.57
No open space	2.08	.46
Access	2.75	.43
No access	2.21	.59

Figure 1. Main effects

a. Safety Ratings by Feature



b. Safety Ratings by Sex

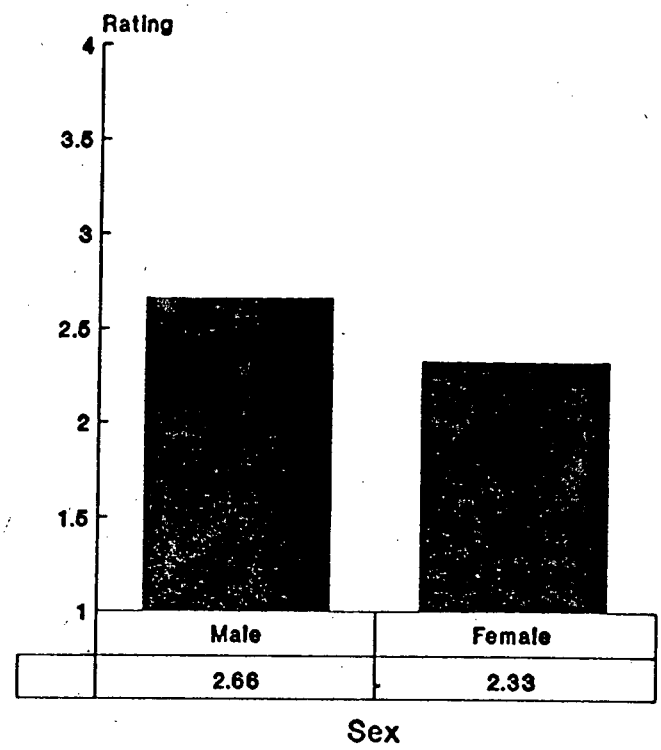
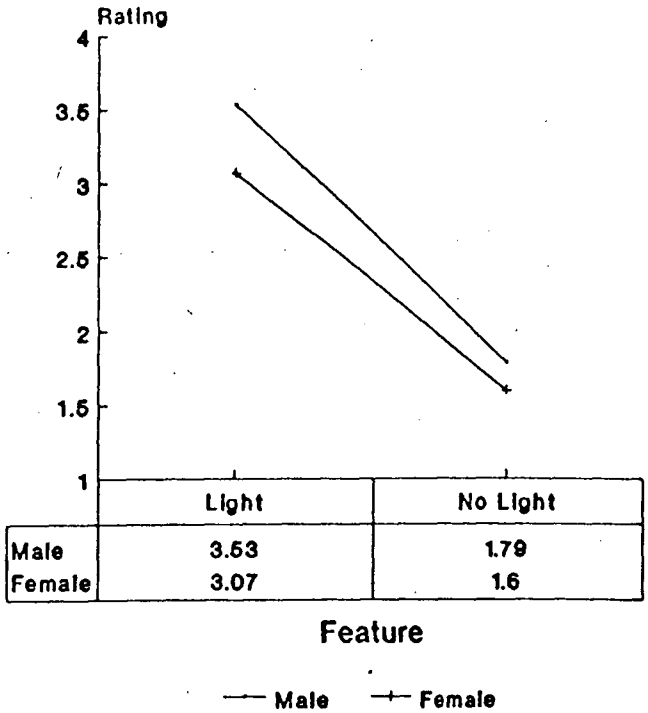
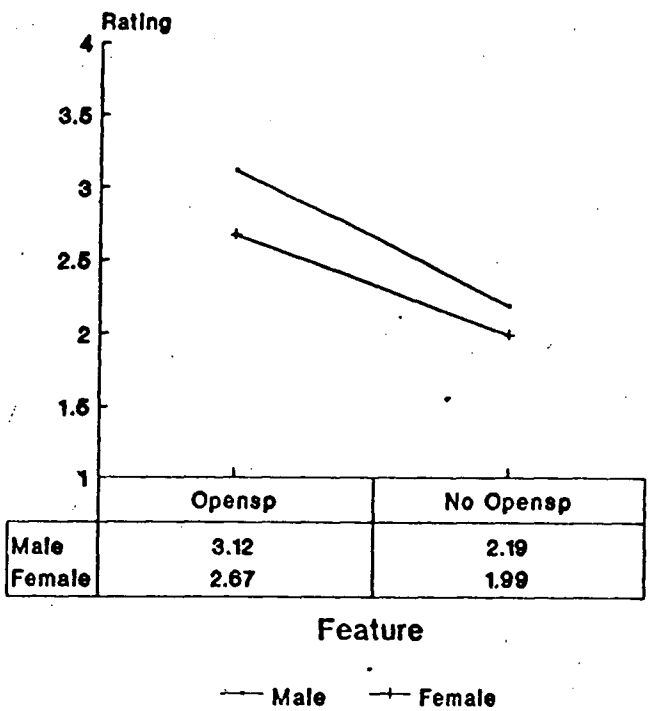


Figure 2. Interactions

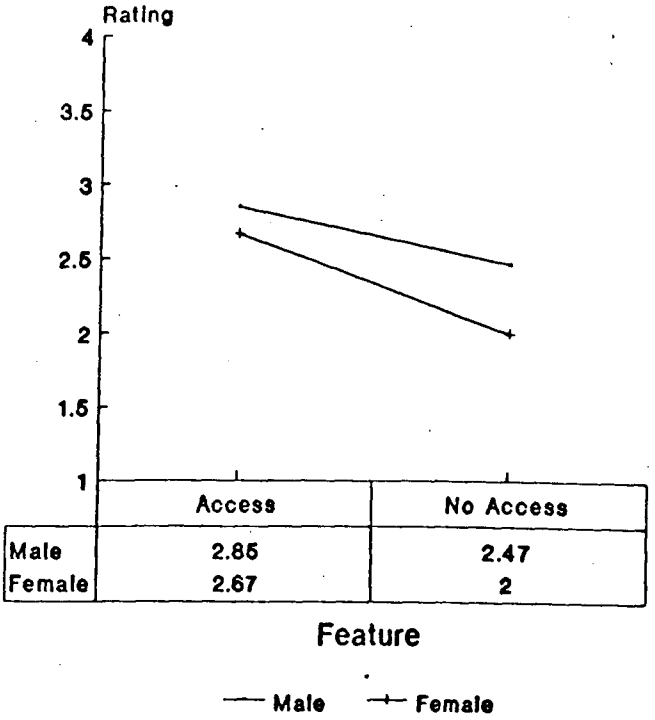
a. Sex by Light



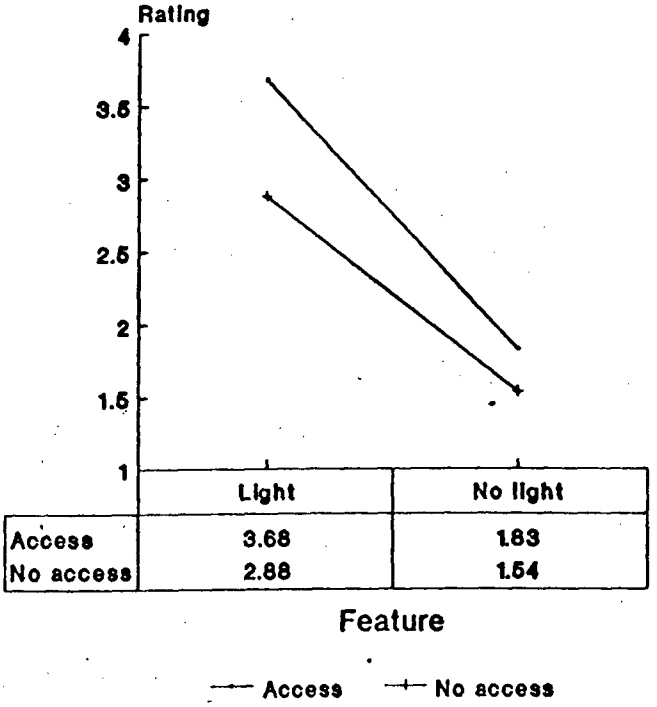
b. Sex by Open Space



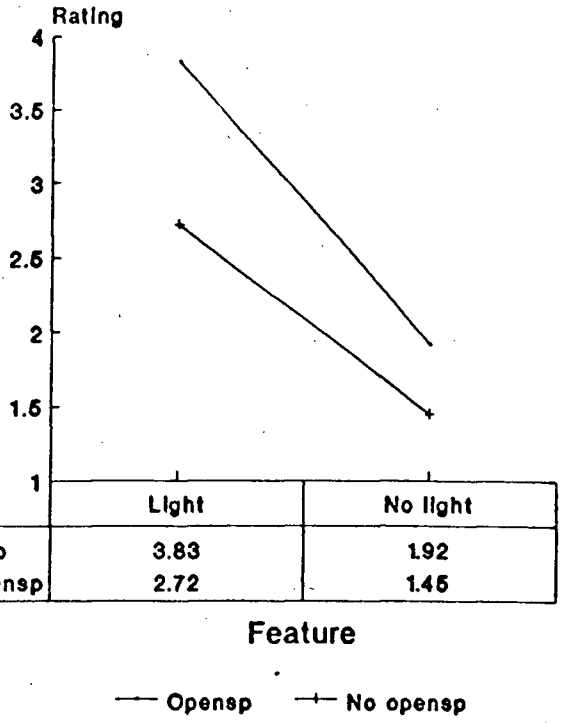
c. Sex by Access



d. Light by Access



e. Light by Open Space



	Light	No light
Opensp	3.83	1.92
No opensp	2.72	1.45

Appendix A - Eight Categories and the Slides Chosen to Represent Each

1. *Light + open space + access.* (L O A)

   slide i: a midday scene depicting an expanse of grass with a large public building in the background.

   slide ii: a midday scene depicting an expanse of grass with a series of shops in the background.

2. *Light + open space + no access.* (L O NA)

   slide i: a daylight scene of wide open space with no buildings present. There is grass on the ground, no other vegetation is visible and there are hills in the distant background.

   slide ii: similar to above but with brown ground cover and a different arrangement of mountains in the distance.

3. *Light + no open space + access.* (L NO A)

   slide i: a daylight scene which places the viewer in a narrow street with buildings on either side. The street bends around a corner so that the viewer cannot know what is further up the street. The buildings on either side are residences.

   slide ii: similar to the one above but with a different street and buildings.

4. *Light +no open space + no access.* (L NO NA)

   slide i: a daylight scene in which there is a narrow road that bends out of sight and there are stone walls on either side and some trees.

slide ii: a daylight scene depicting a narrow trail through the woods that bends out of sight . There are wooden handrails on either side of the trail.

5. *No light + open space + access.* (NL O A)

slide i: a nighttime scene depicting a wide expanse of grass and houses visible in the background.

slide ii: similar but with a different arrangement of houses.

6. *No light + open space + no access.* (NL O NA)

slide i: a nighttime scene in which there is a wide expanse of land with no structures or vegetation present and mountains in the distance

slide ii: similar but with a different configuration of mountains.

7. *No light + no open space + access.* (NL NO A)

slides i & ii: same as in category #3 but with no light present.

8. *None* (none of three features). (NONE)

slide i: a nighttime scene in which all that is visible is the trees that are close by.

slide ii: similar but there are shrubs instead of trees.

Appendix B - Questionnaire Used in the Study

sex: M / F
(please circle)

ENVIRONMENTAL SAFETY STUDY

Please rate all of the slides that you will see in the following manner:

If you were to enter the scene shown on the screen by yourself, how **safe from crime** do you think you would be?

Slide #

1.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

2.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

3.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

4.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

5.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

6.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

7.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

8.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

9.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

10.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

11.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

12.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

13.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

14.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

15.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe

16.

1	2	3	4	5
not at all safe	a bit safe	neutral	very safe	extremely safe