

# Public Place Preference : Design Guidelines and a Case Study Based on Evolutionary Theory

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## 광장설계지침과 진화이론을 이용한 광장선호분석 사례연구

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### 요 약

본 논문에서는 1) 지금까지 이루어진 광장선호연구를 토대로 광장설계시 이용될 수 있는 12가지 설계지침을 제시하며, 2) 광장선호를 진화이론의 틀에서 분석한 사례연구를 소개하고 있다. 12가지 광장설계지침은 1970년부터 지금까지 이루어진 광장행태연구들로부터 제시되었으며, 광장의 위치, 규모, 시각적특질, 활동, 미기후, 경계설계, 부공간설계, 동선설계, 식재설계, 휴식공간설계, 음식, 조형물설계 등에 관련된 고려사항을 포함한다. 광장선호를 진화이론에서 분석한 사례연구는 Appleton의 조망과 은신이론(prospect and refuge theory)을 분석의 틀로 이용하며, 3개 광장에서의 이용행태 관찰을 바탕으로 한다. 구체적으로 각 광장의 앉는 장소(sitting area)가 가지고 있는 조망(prospect) 특성과 은신(refuge) 특성을 분석하고 이러한 특성들이 사람들의 선택선호도(앉는 장소로서의)와 관련성이 있는가를 살펴보고 있다. 연구결과를 보면 광장의 성격이 완전히 공공적(public)일 경우만이 전반적인 선호행태가 조망(prospect)과 은신(refuge) 특질과 관련되고 반공공적(semi-public)이나 사적(private)일 경우에는 Appleton의 이론으로 선호행태 설명이 불가능함을 알 수 있다.

### I. Introduction

Before the emergence of behavioral interpretation of people's preferences, most research has heavily relied upon visual design principles and functional preconceptions without the sincere consideration of humans' behavioral mechanism. Such aesthetic principles as order, variety, unity, balance, and

rhythm have been mainly taken into account to describe the attractiveness of places. However recently, it has been conceived that the aesthetic experience of environment has psychological bases, and resides in the relationship between an individual and his or her environment. This conception initiated a new attempt to use people's behavior as a main indicator of preference responses.

Many behavioral research has focused on environment-behavior interaction in public places and suggested several design guidelines that would make public places more socially appropriate (Lyle (1970), Pushkarev & Zupan (1975), Cooper Marcus (1975-1988), Dornbusch & Gelb (1977), Whyte (1980), Joardar & Neill (1978), Linday (1978), Lieberman (1984), Mozingo (1984), Bosselmann et al. (1984), Chidister (1986), Crowhurst-Lennard & Lennard (1987), Gehl (1987), Francis (1987, 1989), and Cooper Marcus & Francis (1990)). The design guidelines were suggested on the basis of the common belief that public places are not just physical artifacts, but settings for human behavior, and therefore, should be designed to appeal people's psychological needs.

To summarize the guidelines, first, public places should be located to attract a variety of users, such as workers, tourists, and families (Chidister, 1986). Second, the size of a public place should be adequate enough to see events from any location in it. It was suggested that the the maximum dimension of a public place should be 70 to 100m(Gehl, 1987), or 125m(Lynch, 1960). Third, public places should provide attractive visual complexity through form, color, texture of various landscape elements (Joardar & Neill, 1978; Cooper Marcus & Francis, 1990). Fourth, public places should be designed to integrate diverse activities (Cooper Marcus, 1973-1988) and different users (Lyle, 1970; Dornbusch & Gelb, 1977; Whyte, 1980; Cooper Marcus, 1975-1988; Mozingo, 1984). Pushkarev & Zupan(1975) found that a public place was more actively used when there was wider entrance, when there was no noticeable level change between the sidewalk and the plaza, and when there was no barriers

ers or physical obstruction at the entrance of the plaza.

Fifth, a public place should be comfortable in terms of temperature, sun, humidity, and wind. People actively use public places from the temperature 13°C to 24°C(Gehl, 1987; Pushkarev & Zupan, 1975). Design considerations are required to provide various types of sitting areas with regard to sun/shade balance and wind effect. Sixth, in order to evoke a sense of invitedness and to naturally draw passers-by into a place, a public place should have smooth transitions from the pedestrians and have distinct boundaries at the same time(Cooper Marcus & Francis, 1990). Seventh, large public places should be divided into subspaces to offer more attractive appearance and private areas. Subspaces can be designed by level change, planting, construction, seating, etc.(Cooper Marcus, 1975-1988; Cooper Marcus & Francis 1990). Eighth, circulation pattern in public places should be designed to accomodate diverse users such as disabled persons, the elderly, children, and vendors (Cooper Marcus & Francis, 1990), as well as to provide direct access (Linday, 1978).

Ninth, a public place should have enough amount of sitting space (Lyle, 1970; Linday, 1978; Whyte, 1980) and various seating types in location, style, orientation, construction material, shape, size, and arrangement (Joardar & Neill, 1978; Miles et al., 1978). Tenth, planting produces lots of beneficial effects in public places, including visual and olfactory satisfaction, screening visual exposure, reduction of wind speed, and psychological relief (Joardar & Neill, 1978; Ulrich, 1983; Ulrich & Parsons, 1990, Cooper Marcus & Francis, 1990). Thus, designers should consider planting as the most essential element

of public place design. Eleventh, public arts (sculptures, status, fountains) should be designed to produce positive affects such as delight, amenity, fantasy, joy, and sociability (Cooper Marcus & Francis, 1990). It was suggested that public arts with symbolic association with legend, history, or mythology could appeal to general public's interest and positively attract them (Crowburst-Lennard & Lennard, 1987; Joardar & Neill, 1978). Twelveth, eating makes public places socially live and active, especially in public places used intensively in lunch hour (Whyte, 1980; Cooper Marcus & Francis, 1990). Thus, eating opportunity should be provided in a public place through vendors and outdoor restaurant.

These twelve guidelines are very useful and practical tools for physical designers. As mentioned, the guidelines were emerged from the behavioral research that observed people's use pattern in public places. Although all of the behavioral research were excellent in interpreting people's preference behavior in terms of design characteristics of public places, they did not have theoretical basis. Theoretical approach to the expressed preference behavior is very important because theories could provide logical explanation on both why and how people prefer certain places over others. It may be said that behavioral research associated with theoretical background could not only reveal the hidden mechanisms underlying the observed preference behavior, but also enhance and deepen our knowledge on man-environment interaction.

Given this point of view, a case study was conducted to interpret people's preference behavior in the frame work of evolutionary theory of landscape preference

(Appleton's prospect and refuge theory). The study confirmed some of the twelve design guidelines summarized above. It also revealed that Appleton's theory can partly explain public preference behavior. Next section of this paper explains the details of the case study.

## II. A Case Study: Evolutionary Approach to Public Place Preference

This case study builds on the fact that current behavioral research lack the theoretical base for the expressed preference behavior. Humans' preference behavior is interpreted as one of environmental adaptation or evolution (Appleton, 1975; Orians, 1980, 1986; Kaplan & Kaplan, 1982; Ulrich, 1983; Wohlwill, 1983; S. Kaplan, 1983, 1987). This interpretation argues that common evolutionary adaptations have predisposed humans to prefer those landscape types that represent favorable opportunities for safety and biological survival.

According to this notion, some environmental features had been categorized as aesthetically positive because they promoted survival during evolution (Orians, 1986). Appleton(1975) insists that this categorization has been genetically transmitted to modern humans. Therefore, those features still control aesthetic responses even though their survival functions have long since disappeared. The central theme of evolutionary theory is that some environmental features that were once favorable to survival or ongoing well-being during evolution continue to be perceived aesthetically, and thus give humans aesthetic pleasure. Consequently, all human respond favorably to such landscape features without conscious thinking or rea-

soning.

Landscape of "prospect and refuge" proposed by Appleton (1975) is the representative type of such landscapes. Since prospect and refuge theory is closely related to the visual quality of the physical environment associated with safety, it has been argued that the mechanism underlying the theory still influences modern human's preference behavior even though its functional importance (evolutionary survival) has ceased.

### 1. Prospect and Refuge Theory

The "prospect-refuge" theory relates landscape preference to the evolutionary aspect of biological and behavioral sciences. The conceptual basis of the theory is that behavioral mechanism has been inherited, underlying expressed preferences, and makes humans feel aesthetic pleasure in finding landscape features which offer the opportunity to secure a biological survival or safety.

Appleton suggests the opportunity to see (prospect: visual connection) without being seen (refuge: visual cutoff) as the fundamental requirement for biological survival. Prospect (the ability to see) is symbolized by any feature, object, and situation which "directly facilitates observation or indirectly suggests an opportunity to extend the field of vision" (Appleton, 1975, p. 84). Refuge (the ability to hide) is displayed by any feature, object, and situation which "actually offers, or symbolically suggests an opportunity to hide or to shelter" (Appleton, 1975, p. 85).

The symbolism of prospect and refuge is related to the major elements in the landscape, such as surface, light & darkness, scale, and the ease of movement. Surface

configuration represents both prospect and refuge: convex surfaces suggest prospect, whereas concave surfaces imply refuge. Light is essential to see, and is closely related to prospect. Darkness facilitates hiding from exposure and is concerned with refuge symbolism.

Appleton insists that prospect and refuge must work in combination within the context, because the two concepts are mutually complementary in the real world. The ability to see is more enjoyable when there is a sense of safety from a hidden hazard. Refuge is more valuable when it has a clear visual connection to surroundings. Appleton created the term "edge of wood" to explain the important function of the balance between seeing and hiding. Edge of wood means the integration and differentiation between two opportunities where the whole composition of the landscape is achieved by prospect and refuge halves.

### 2. Method of the Study

This study attempts to observe people's preference behavior and to explain it in terms of prospect and refuge quality of physical environment. Preference behavior was defined as approach behavior, that is, a selection of an area to sit. Study procedure consists of four steps; 1) selection of public places; 2) development of prospect and refuge criteria; 3) analysis of the selected public places in terms of the developed prospect and refuge criteria; 4) observation. These four study procedures are explained in detail below.

#### 1) selected public places

First, three public places were selected in

downtown Seattle, Washington. They were the pacific North-Bell Plaza, the Waterfall Garden, and the 3rd & Spring Plaza.

The 3rd & Spring Plaza was 24 hour open to the public, had a direct access from the street, and was surrounded by a restaurant, grocery store, candy shop, and book store. On the other hand, the Waterfall Garden was a semi-public and surrounded by a wall. It had limited opening hour and was accessible only by two entrances. The Pacific North Bell Plaza was a private plaza. Although it was 24 hour open to the public, it was not frequently used after 5:00 p.m., when the office hour is closed.

2) development of prospect and refuge criteria

Second, several criteria were developed for prospect and refuge quality on the basis of Appleton's theory. Prospect is the ability to

see and implies anything for improved visibility. In this study, visual attraction and aesthetic quality were used as prospect criteria. Visual attraction was defined as a presence of natural elements (vegetation, water) or dominant feature. Asthetic quality was defined by two elements: width of a view (by the number of other visible sub-area) and visual depth (by the number of visual zones; foreground, middleground, background). Prospect quality was analyzed in terms of four degrees: high, medium, low, and no prospect (Table 1).

Refuge is the ability to hide from the visual exposure to surroundings. Refuge symbolizes an absence of hazard and a sense of privacy and hiding. The degree of recess and the degree of enclosure were used as refuge criteria in this study.

Table 1. Prospect Quality

main criteria	sub criteria	quality measurement			
		high	medium	low	no prospect
visual attraction	occupancy of nature	over 2/3	1/3-2/3	below 1/3	no nature
asethetic quality	depth of a view (# of visual zones)	3 zones	2 zones	1 zones	
	width of a view (# of visual area)	the value depends on a site stiation			

Table 2. Refuge Quality

main criteria	sub criteria	quality measurement			
		high	medium	low	exposure
degree of recess	distance form the center of the area	at the edge	between the edge and the center	around the center	on the street, or on the entrance
degree of enclosure	number of enclosed side	3-4 sides	2 sides	1 side	no side
	quality of enclosing elements	surface	screen	object	

Degree of recess or seclusion was defined as the distance from the center of the area. Degree of enclosure was defined by two elements: 1) number of enclosed sides; and 2) quality of enclosing elements (surface, screen, object: surface is high in refuge symbolism whereas screen is medium and object is low). Like the prospect quality, refuge quality was categorized by four degrees: high, medium, low, and exposure (Table 2).

### 3) analysis of the three plaza in terms of prospect and refuge quality

Next, every sitting area in each of the selected public places was analyzed by the developed criteria. The 3rd & Spring Plaza was divided into 16 sitting areas. The prospect and refuge quality of each of the 16 areas is shown in Figure 1. The Waterfall Garden consisted of 6 sitting area. The prospect and refuge quality of the Waterfall Garden is illustrated in Figure 2. The PNB Plaza was divided into 19 sitting areas. The prospect and refuge quality of the PNB Plaza is shown in Figure 3.

Photos 1-5 illustrate five important views from the three plazas.

### 4) observation

Last, the investigator observed people's choice of sitting area and listed the number of users on the map. In order to obtain valid data, observation was carried out in every 10 minutes for four hours during use peak time (from 11:00 am to 3:50 p.m.). Table 3 shows the observation schedule and the weather condition.

## 3. Result & Discussions

### 1) 3rd & Spring Plaza

Table 4 shows the observed preference orders of the 16 sub-areas and their prospect-refuge quality in the 3rd & Spring Plaza. Table 4 illustrates that the best preferred areas (G, N, A) had better prospect-refuge balance. Least preferred areas (J, H, E, D, I, P, C) mostly had low quality for either prospect or refuge. Although the sitting area B (high prospect and high refuge) was second-

Table 3. Observation schedule and weather condition

3 sites	observed day	weather condition	temperature(F)	
			high	low
3rd & Spring plaza	1987. 10/23	very sunny	57	42
	1987. 10/27	cloudy	54	42
	1988. 5/19	sunny	64	48
	1988. 5/24	sunny	65	43
Waterfall garden	1988. 3/14	sunny	56	36
	1988. 3/15	sunny	58	33
	1988. 5/18	cloudy	59	46
	1988. 5/25	sunny	66	45
PNB plaza	1987. 10/20	sunny	69	42
	1988. 10/22	sunny	57	40
	1988. 5/20	sunny	70	47
	1988. 5/23	sunny	59	43

- ※H:High M:Medium L:Low
- P:Prospect R:Refuge
- ex) HP/HR:High-Prospect & High-Refuge
- :BENCH
- ◉ ◈ :COLUMN
- ▨ :PLANTER
- ▬ :TABLE

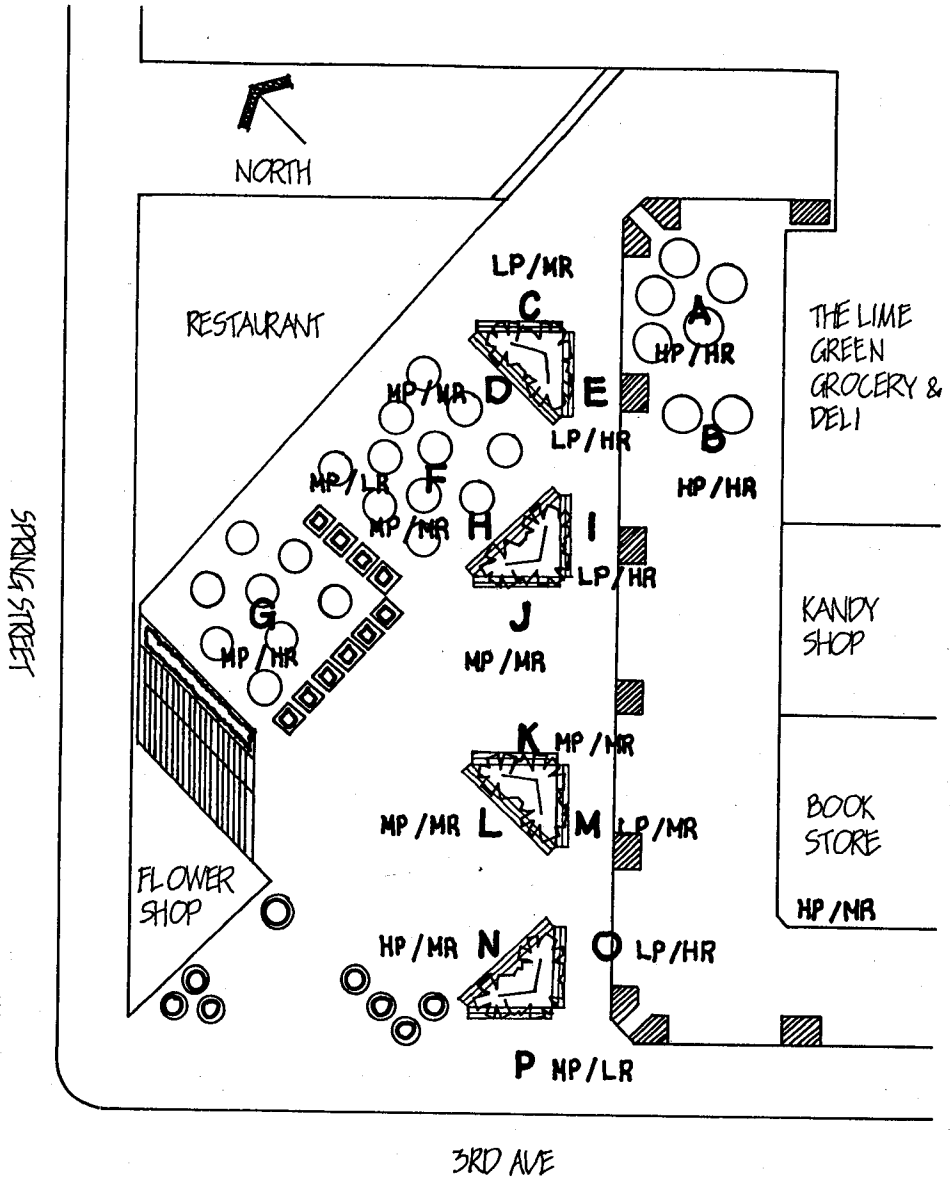


Figure 1. Prospect & Refuge Quality in the 3rd & Spring Plaza

- ※H:High M:Medium L:Low
- P:Prospect R:Refuge
- ex) HP/HR : High-Prospect & High-Refuge
- ⊗ :BENCH
- ⊙ :PLANTER
- ▬ :SMALL TABLE & CHAIRS

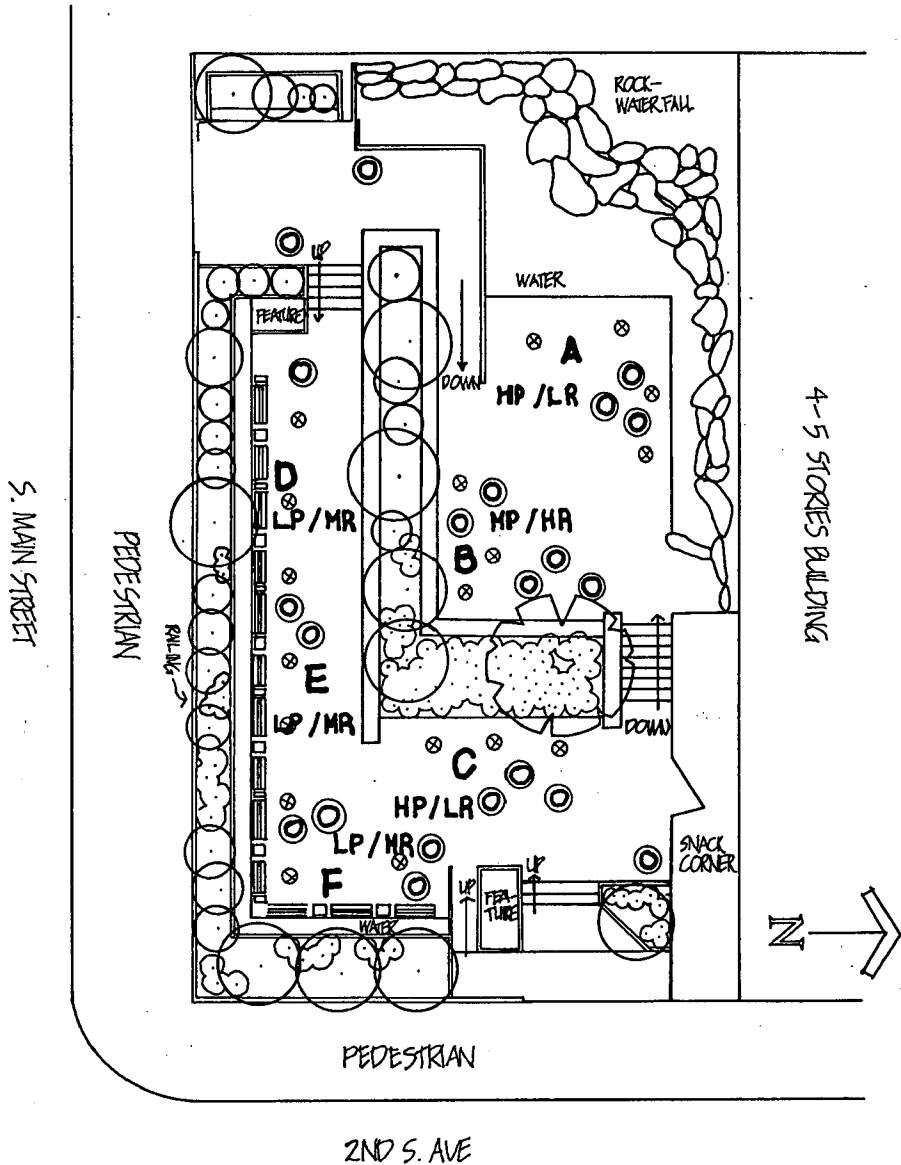





Figure 2. Prospect & Refuge Quality in the Waterfall Garden



※H:High M:Medium L:Low E:Exposed  
 P:Prospect R:Refuge  
 ex) LP/ER:Low-Prospect & Exposed-Refuge

 :BENCH  
 :COLUMN  
 :SITTING TABLE

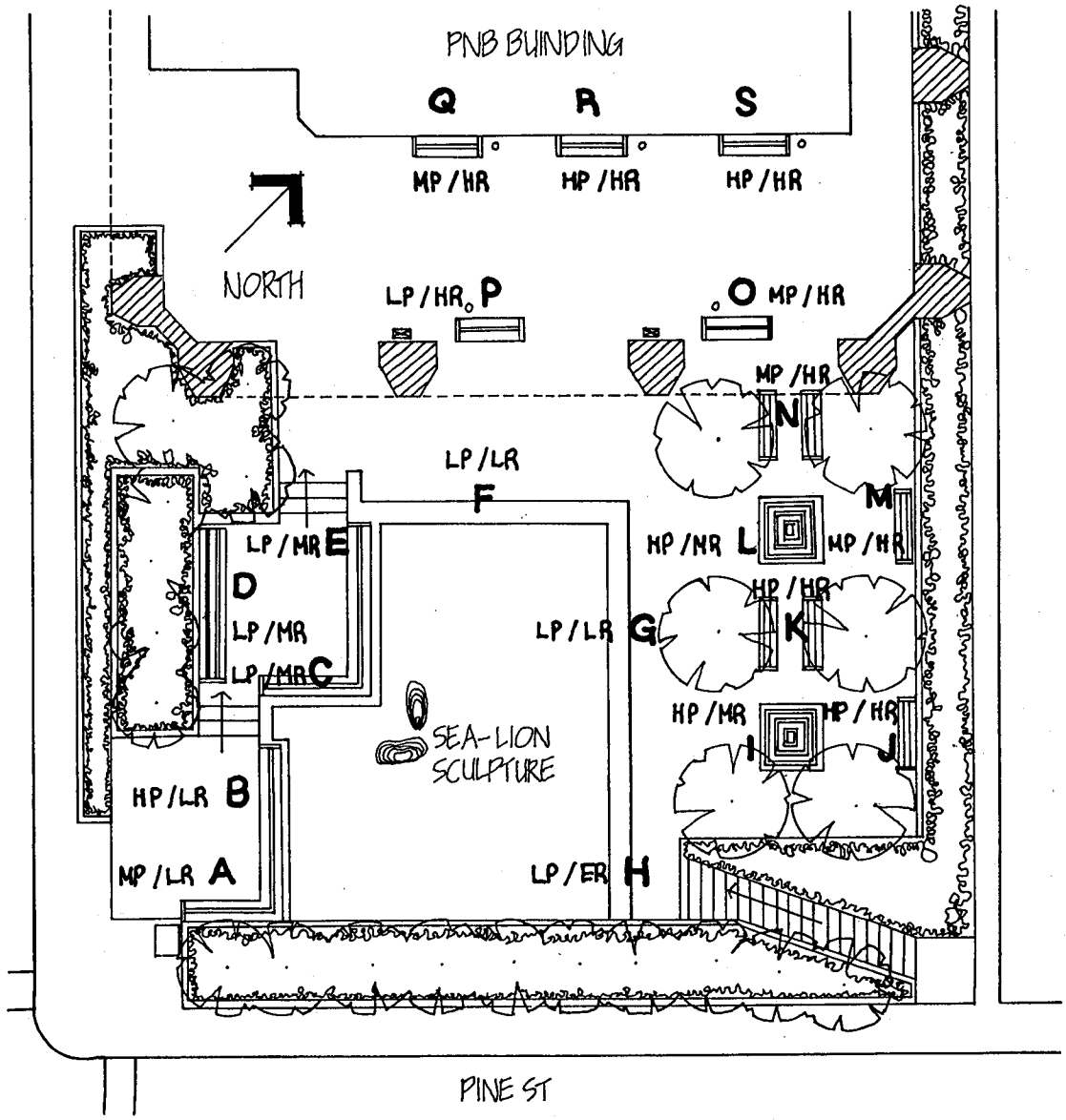


Figure 3. Prospect & Refuge Quality in the PNB Plaza



Photo 1. View from Area B in the 3rd and Spring Plaza  
(Area B has High-Prospect and High-Refuge quality)

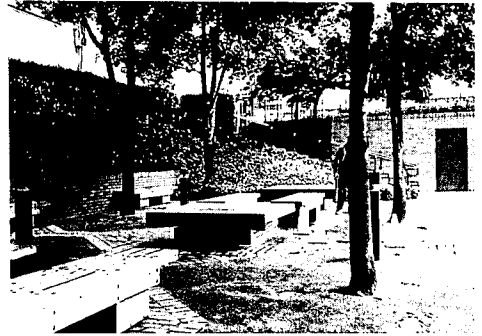


Photo 4. View from Area O in the PNB Plaza  
(Area O has Medium-Prospect and High-Refuge quality)



Photo 2. View from Area C in the Waterfall Garden  
(Area C has High-Prospect and Low-Refuge quality)



Photo 5. View from Area H in the PNB Plaza  
(Area H has Low-Prospect and Exposed-Refuge quality)

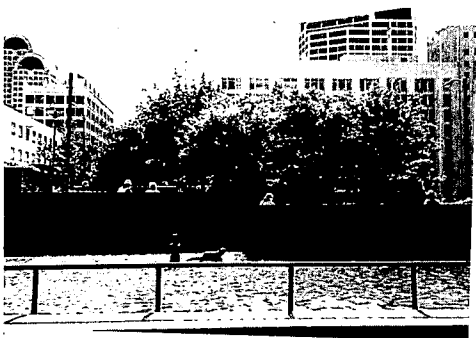


Photo 3. View from Area I in the PNB Plaza  
(Area I has High-Prospect and Medium-Refuge quality)

ly preferred, the result generally showed that people enjoyed the areas with good prospect-refuge balance, where they could maintain a visual channel to other place with a sense of safety.

The results also showed that perceived space definition had an impact on people's preference behavior. Although Areas A and B had the highest prospect-refuge balance, they were not as much preferred as were other areas with lower balance of prospect and refuge. The reason for this results can be attributed to the spatial locations of Area A and B. The two areas were under the ar-

Table 4. preference order and prospect-refuge quality in 3rd &amp; spring plaza

observed preference order (persons, %: person/total)	sitting area	prospect	refuge
1 (175, 15.3%)	G	medium	high
2 (171, 15.0%)	N	high	medium
3 (108, 8.5%)	A	high	high
4 (98, 8.6%)	K	medium	medium
5 (96, 8.4%)	F	medium	low
6 (90, 7.9%)	L	medium	medium
7 (72, 6.3%)	B	high	high
8 (66, 5.3%)	O	medium	medium
9 (66, 5.8%)	M	low	medium
10 (44, 3.9%)	J	medium	medium
11 (43, 3.8%)	H	medium	medium
12 (29, 2.5%)	E	low	high
13 (27, 2.4%)	D	medium	medium
14 (25, 2.1%)	I	low	high
15 (25, 2.1%)	P	medium	exposed
16 (7, 0.6%)	C	low	medium

cade and were perceptually separated from the plaza by columns. It is quite reasonable to say that this locational characteristic made people consider the areas as separate from the plaza and influenced use behavior.

Besides, the results confirmed the importance of sunlight and short access in public place design. The best preferred area(G) had the longest exposure to the sun within the plaza. Especially in the afternoon, it drew many users. Short and easy access from the street attracted more people. For instance, Area K and D had the same prospect-refuge balance. However, area K was a lot closer to the entrance and used more frequently than was area D.

## 2) Waterfall Garden

Table 5 shows the observed preference orders of the 6 sub-areas and their prospect-refuge quality in the Waterfall Garden. The table shows that preference had a positive relationship to the quality of prospect, whereas it had nothing to do with refuge quality. It also shows that both best (A) and

least (C) preferred sitting areas had the same balance (high and low) between prospect and refuge.

Given the design characteristics of the Waterfall garden, this result is quite understandable. As mentioned, the Garden was surrounded by a wall and therefore, provided a perfect sense of safety. During the observation, it was found that the use of the Garden was greatly influenced by two prospect factors, sunlight and the waterfall. The observed preference order was A-B-F-D-E-C, and the visibility to the waterfall decreased according to the same order. This evidences that people's preference was increased according to the increased effect of waterfall. For instance, sitting area A (high prospect and low refuge) was a suntrap and closest to the waterfall, whereas sitting area C (high prospect and low refuge) had neither sunlight nor a visual access to the waterfall.

From this result, it is suggested that once people feel that a sense of safety is secured in a setting, their preference behavior is

Table 5. preference order and prospect-refuge quality in Waterfall Garden

observed preference order (persons, % : person/total)	sitting area	prospect	refuge
1 (303, 36.7%)	A	high	low
2 (168, 20.4%)	B	medium	high
3 (140, 17%)	F	medium	low
4 (94, 11.4%)	D	low	medium
5 (63, 7.6%)	E	low	medium
6 (57, 6.9%)	C	high	low

Table 6. preference order and prospect-refuge quality in PNB plaza

observed preference order (persons, % : person/total)	sitting area	prospect	refuge
1 (256, 14.9%)	F	low	low
2 (238, 13.4%)	E	low	medium
3 (197, 11.1%)	Q	medium	high
4 (159, 8.9%)	R	high	high
5 (138, 7.8%)	B	high	low
6 (126, 7.1%)	D	low	medium
7 (101, 6.1%)	S	high	high
8 (97, 5.4%)	C	low	medium
9 (85, 4.8%)	G	low	low
10 (74, 4.2%)	P	low	high
11 (50, 2.8%)	M	medium	high
12 (49, 2.7%)	K	high	high
13 (46, 2.6%)	J	high	high
14 (37, 2.1%)	O	medium	high
15 (32, 1.8%)	N	medium	high
16 (28, 1.6%)	I	high	medium
17 (27, 1.5%)	A	medium	low
18 (17, 0.9%)	L	high	medium
19 (6, 0.3%)	H	low	exposure

majorly directed to acquire strong prospect quality (eg. the waterfall in this case).

### 3) PNB Plaza

Table 6. shows the preference orders of the 19 sub-areas and their prospect-refuge quality in PNB Plaza. The results shows interesting preference patterns. The best preferred areas (F, E) had poor combination of prospect (low) and refuge (low or medium)

quality. Areas with best prospect refuge balance (K, J) were not preferred. It was observed that the best used areas (F, E, Q, R) were the best suntrap in the plaza and people's sitting behavior tracked the sun light. People also preferred the areas close to the main entrance from the building. It seemed that people were not concerned about either refuge or prospect values.

This result reflects the important aspect of private open space. As mentioned, PNB

Plaza is a private place of Bell company and does not have any strong prospect feature in it. Most users were the employees of the building, and they knew each other. Naturally, they could regard the plaza as their backyard to rest. This atmosphere provided a strong sense of safety. It was also observed that the plaza was used mostly during lunch hours (from 11:30 am to 1:00 p.m.). Since most users of the plaza stayed in the building until the lunch hour, it is understandable that they preferred the sunny areas close to the main entrance.

From this result, it is suggested that when a plaza is private and there is no strong prospect element, preference behavior is patterned to secure other things (sunlight, accessibility in this case).

To summarize the results, it was found that use patterns in public places were generally related to the opportunities to see without being seen. The need for refuge was more immediate and important in selecting sitting areas. However, it should be pointed out that the importance of prospect and refuge symbolism depends on the character of a public place, such as the nature of a place (whether it is public, semi-public, or private), the type of main users, and an absence or presence of strong prospect quality, etc. Specifically, when a place is wide open and public, people try to secure refuge, whereas people is more directed to prospect and other factors when there is a strong sense of safety. It shows the importance of safety in people's use pattern.

### III. Conclusion

From 1970 in U.S.A., many researchers tried to find out what physical and social as-

pects of public places attract people and observed people's behavior in public places. The twelve design guidelines discussed in this paper are based on such research. Observed behavior is an expressed psychological responses to physical and social environment. In order to more fully understand the observed preference behavior, it is essential to study the underlying psychological mechanism. However, no research has been done to investigate such relationship.

The case study reported here was carried to find out whether people's preference behavior is related to human being's evolutionary adaptation to environment (prospect and refuge theory). The results of the case study show that Appleton's prospect and refuge theory can be partly used as a theoretical explanation of public place preference when the open space is completely open to public.

Besides, the results reveal the other design considerations similar to the twelve guidelines. For example, it was found that public place design should provide other factors, such as sunlight, easy accessibility, and clear space definition. Short and easy access from the street attracts more people and naturally causes active uses. As found in the 3rd and Spring Plaza (Areas A and B), if users do not perceive sitting areas as part of the open space, they do not use the areas in spite of the good opportunities of prospect and refuge. Thus, every sitting area should be designed as part of a public place.

In conclusion, two suggestions are proposed. First, the twelve design guidelines summarized in the introduction are good tools for physical design of public places, thus, should be used as design criteria. Second, more research should be performed to find out the underlying psychological process

for the expressed preference behavior. The theoretical frame for this kind of research can be selected from the two major preference theories: evolutionary and cultural theory.

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