景觀의 視覺的 質의 改善方案에 관한 研究

-漢江景觀을 中心으로-

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A Study on Methodology of Visual Quality Improvement of Landscape : The Case of the Han Riverscape

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抄 錄

本 研究는 景觀의 美的選好의 情報處理模型을 提示하고 LISREL 方法論을 使用하여 漢江景觀의 美的選好의 強化에 寄與하는 構造的 因子를 確認함으로써 漢江景觀의 視覺的 質의 改善方案을 提示하는데 그 目的이 있다. 이를 위해 漢江 景觀을 代表할 수 있는 典型的이고 視覺的으로 顯著한 40개의 景觀의 슬라이드를 120명의 被調査者에게 보여주고 美的評價, 選好, 可讀性, 複雜性, 統一性, 神秘性을 11等級의 尺度를 사용하여 測定하고 LISREL 分析方法으로 分析하였다. 景觀番號 30을 除外하고 模型의 全體的 適合度가 매우 높은 것으로 나타났다. 분석의 結果 景觀에 대한 美的 評價와 選好가 景觀의 美的選好를 妥當性있게 나타내는 變數로 確認되었으며, 統一性, 可讀性, 神秘性의 構造的 變數들이 景觀의 視覺的 質을 有意하게 強化시키는 因子로 判明되었다. 이 結果를 基礎로 하여 漢江 景觀의 視覺的 質을 改善하기 위한 方案을 提示하였다.

1. Introduction

Visual information processing is central to the human experience of a landscape. Therefore, identification of salient factors contributing to enhancement of aesthetic preference for the landscape has to be focused on information processing.

The major components involved in information processing are cognition and affect(Kaplan, 1988). To date there are two different perspectives on the interrelationship between cognition and affect. Current prevailing theories suggest the primacy of cognition over affect : affect is either on type of cognition(e. g, Bower 1981 : Isen et al, 1978) or an output of cognitive processing(e. g, Mandler, 1982 : Fiske, 1982 : Lazarus, 1982). In contrast with the primacy of cognition over affect, some theories suggest that affect is partly independent of cognition and that it has its own laws of functioning(e. g, Zajonc, 1980 : Tomkins, 1962) ; under a certain situation affect can precede cognition while under different circumstances cognition

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can determine affect or be independent. As such, associative linkage between cognitive and affective processes is to be further investigated in various situations.

In this context, this paper proposes a model for examining the relationship between cognitive and affective components in aesthetic preference for a specific riverscape and thereby indentifying factors that have significant influence on the enhancement of aesthetic preference. Yet there is insufficient agreement on how many relevant factors are to be included in the assessment of visual quality of a scene and on the consistency of involvement of fators in aesthetic preference across different scenes. Hence, this research also investigates which factor taps aesthetic perference more relevantly across different scenes using LISREL methodology.

2. Cognition and Affect in information processing

Information processing is fundamental to a person's sense of well-being because his proper functioning in the environment is dependent on that process. Well-being is implicated in the process in terms of valuation of attributes of the environment itself and outcomes of the functioning in the environment. As stated previously, both cognitive and affective components are involved in information processing.

Structurally, cognition is quite distinct from affect. Although both cognition and affect involve energy and information, cognition is laden with heavier information while affect with heavier energy. Generic cognitive structure is well represented by schemas which consist of associative networks of representation of prior experiences in the environment.

In contrast, affect is structurally diffuse(Lindsley, 1951) and hard to differentiate(Simon, 1982). Other structural features of affect are valence and intensity. Valence refers to the subjective value of utilities that environment or objects can offer to individuals. Each valence of specific affect is either positive or negative. Intensity is given to affective reactions by attention attributable to saliency of environmental stimuli. Overall the cognitive structure is more diverse, flexible and more specific than the affective structure.

Functionally, cognitive process deals with encoding, organization, reconstruction and retrieval of information whereas affective process is primarily engaged in valuation of information. Although cognition and affect are partly independent systems with distinct functional structural properties(Zajonc, 1980, Fiske, 1982), they interact with each other, cognition may create affect and affect can influence cognition.

The prevalent cognition models for affect suggest that affect is formed and expressed as a result of prior cognitive process(Fiske, 1982, Eckbald 1981, Schachter and Singer, 1962). The conceptual framework of this research is based on the cognitive paradigm that cognition precedes affect. It is assumed that aesthetic preference for a landscape results from cognition of overall structural aspects of the landscape. This is in line with the positions of Kaplan and Kaplan(1982) and Mandler(1982). The underlying rationale of the Kaplans' cognitive model is that cognitive procecessing of structural variables including legibility, complexity, coherence and mystery gives rise to environmental preference. This cognitive and mystery gives rise to environmental preference. This cognitive model of affect has been supported by many different studies (e. g., Brown and Itami, 1982, Hammitt, 1983, Woodcock, 1984, Gimblett et al., 1985). Mandler also suggests a cognitive basis of aesthetic evaluation and preference, that cognition is essential to the phenomenal experience of beauty and liking.

3. Landscape aesthetics and preference

Aesthetic evaluation and preference are an essential part of affect. Although aesthetic evaluation and preference tap different dimensions of affect, both share common characteristics of being evaluative variables, and they are partially overlapped.

The sense of beauty is related to our intuitive and emotional enjoyment and therefore to the value we give to it(Laurie, 1975). Thus, aesthetics is concerned with the perception of values(Santayana, 1955). The aesthetic value of a landscape is a function of its capacity to arouse pleasure such as aesthetic enjoyment and gratification(Beardsley, 1982) which result from intrinsic judgement of characteristics of the landscape which arouse pleasure to senses. For instance, there must be a degree of order and unity in formal and structural relationships among components of the landscape to produce a pleasurable aesthetic feeling.

Landscape preference is also related to the evaluation of structural variables of a landscape. It is a subjective evaluation resulting from information processing as to affordances of the landscape such as potential favorable uses and supportiveness for functioning in the landscape. What are referred in the process are schemas which consist of networks of representations about prior experiences of and expectations from the landscape.

Kaplan(1979) suggests that aesthetics is not antithetical to preference. It means that what is beautiful is also preferred. Based on the assumption of the beautiful being preferred, Berlyne(1971) asserts that identification of the beautiful provides the grounds for predicting what is preferred.

This study is based on the hypothesis that both landscape aesthetics and preference involve evaluative judgement of structural attributes of a landscape. Thus, it is assumed that aesthetic preference taps the interface between aesthetics and preference, that is, both aesthetic evaluation and preference are relevant indicators of aesthetic preference. This rationale is tested by LISREL methodology.

4. Conceptual framework

The underlying rationale of this article is based on the following assumptions.

1) Environmental aesthetic preference is an essential component of affect
2) Aesthetic preference is relevantly represented by aesthetic evaluation and preference.
3) Aesthetic preference is influenced by a cognitive information process involving evaluation of the affordances which structural variables of a landscape provide.
4) Aesthetic preference is a global factor resulting from an affective process involving aesthetic evaluation and preference for the landscape.
5) Cognition of structural attributes of the landscape is also global in that it taps the overall evaluation of structural attributes of the landscape.
6) Structural attributes of the landscape are relevantly represented by a set of structural variables of legibility, complexity, coherence and mystery.

The conceptual framework based on the previous assumption is illustrated by Models Ⅰ, Ⅱ and Ⅲ in Figure 1. The only difference between the three models is the number of indicator variables related to cognition of structural attributes of a landscape. Each of the Models Ⅰ, Ⅱ and Ⅲ has four(legibility, complexity, coherence, and mystery), three(legibility, coherence, and mystery) and two (legibility and coherence) indicator variables respectively. Structural Models Ⅱ and Ⅲ are nested in Model Ⅰ and Model Ⅲ is nested in Model Ⅱ. As such, Model Ⅲ is the most parsimonious model. The indicators

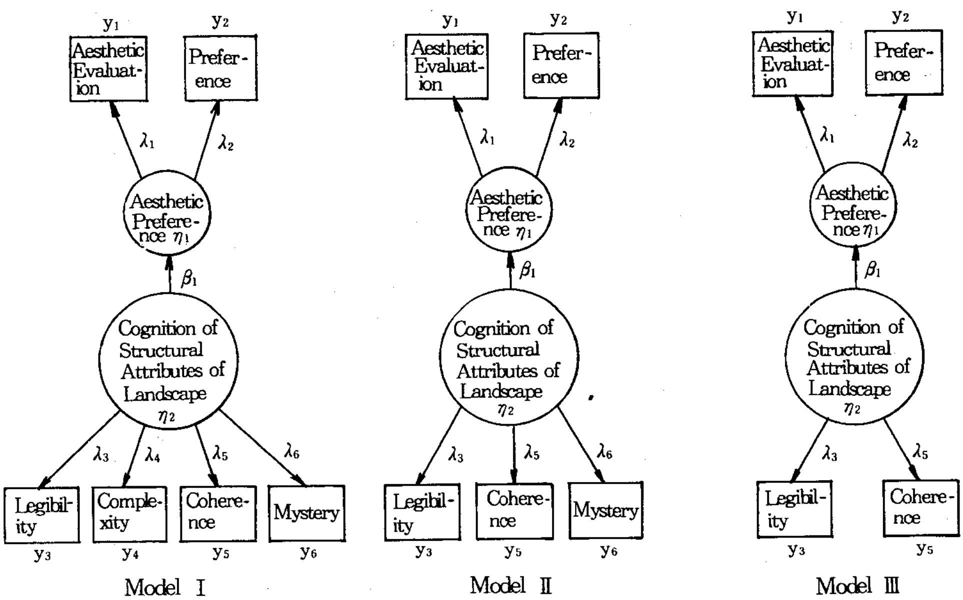


Figure 1. Cognitive–Affective Models of Aesthetic Preference

of aesthetic preference are identical across Models I, II and III : aesthetic evaluation and preference. The primary reason to employ the three different but nested models is that Model II had better overall fits to certain scenes than Model I and III and that Model III has better fits to some scenes than other models.

5. LISREL methodology and data

This research employs LISREL to test the models previously suggested. LISREL refers to a general statistical model for analysis of Linear Structural Relationships among quantitative variables(Sörbom and Jöreskog, 1981). It was introduced by Jöreskog(1973). This research used the accompanying computer program LISREL VI. It is an improved version to fit and test the structural equation model which specifies phenomena under study in terms of putative cause and effect variables and their indicators (Jöreskog and Sörbom, 1984). The variables in the structural equation may be observed measurements or latent variables. The LISREL or causal model consists of the measurement and structural equation models. The measurement model specifies how latent variables are measured in terms of oberved variables and is used to describe the measurement properties of the observed variables. The structural equation model specifies the causal relationships among the latent variables and is used to describe the causal effect.

The LISREL model employed in this research consists of two components ; One is the measurement model and the other is the structural equation model. As shown in Figure 1, the measurement model represents the relationship between observed variable(y_i) and latent variables (η_1 and η_2), and the structural equation model deals with the relationship between aesthetic preference (η_1) and cognition of structural attributes of a landscape(η_2).

The LISREL computer program estimates the unknown coefficient of the structural eqations and the covariance matrices of the residuals and measurement errors. The standard errors of all estimated parameters are provided along with the chi-square test of the fit of the model and structural hypothesis of model.

There are three advantages of using LISREL over other multivariate analysis methods : First, measurement error is allowed and calculated in LISREL, otherwise there is a risk of seriously misleading estimates of coefficients : Second, LISREL deals with latent variables or unmeasured variables : Third, it enables to test caual relations among variables.

This research deals with the landscape of the landscape of the Han River which flows through the central portion of Seoul. The river is a very large river of which the average width is approximately 1*km*. In the pilot study, whole landscape of both sides of the river photographed on color slides using a camera with a standard lens to acquire scenes seen by the naked eye. A panel of experts composed of 20 professional landscape architects selected 40 scenes from among the slides to represent relevantly salient and typical features of the riverscape. The criteria of selecting the scenes deemed to represent the riverscape were land use and visual characteristitics. Each expert was asked to choose 40 scenes which appropriately represent land uses around the riverscape and visual charaterisitics of each ladn use. And then 40 scenes were selected in order of the number of being picked up by the 20 experts. These 40 color slides were shown to 120 students of the Dept. of Landscape Architecture at Yeungnam University. Among the student, the number of freshman, sophomore and junior were 40, 38 and 42 respectively. x^2-test was used to exemine whether there is any significant statistical difference in ratings of the scenes between school years. Since there were no significant statistical differences in the ratings among each group of freshman, sophomore and junior, the data were merged into a single set for further analysis.

An eleven point scale ranging from 0=not at all, 5=neutral, 10=a great deal, was used to measure scene of beauty, preference, legibility, complexity, coherence, and mystery of each scene. Each scene was shown for 15 seconds. Before each scene was presented, the concepts of legibility, complexity, coherence, and mystery had been explained to the respondents as follows : Legibility refers to the ease of making scene and of orienting oneself in the landscape : coherence means the extent to which elements of a scene hang together : and mystery is defined as the degree to which more information may be gained by processing farther into the landscape.

Among 40 scenes Model I was applied to 23 scenes, Model II to 5 scenes, and Model III to 12 scenes. In LISREL, overall fit of a model to given data is tested by x^2 statistics [1], probability level[2], GFI[3], AGFI[4], and RMR[5], All overall fits of 40 scenes to given data were very good except for scene 30, which has a marginal fit. x^2 statistics and the probability level in Table 1 indicate the good fit of the models to the given data. GFI, AGFI, and RMR also suggust that the models are highly fit to the data. The results support the underlying rationale of the conceptural framework that cognitive processing of structural aspects of a given landscape determines the level of aesthetic preference for the landscape.

Table 1. Measures of Overall Fit of Models

Scene	x^2/(df)	P level	GFI	AGFI	RMR
Scene 1	0.09/1	0.769	1.000	0.996	0.008
2	2.99/8	0.935	0.992	0.978	0.031
3	11.67/8	0.167	0.969	0.919	0.067
4	0.04/1	0.843	1.000	0.998	0.004
5	0.78/1	0.377	0.997	0.967	0.022
6	7.13/4	0.129	0.978	0.917	0.053
7	10.65/8	0.223	0.972	0.927	0.047
8	0.03/1	0.865	1.000	0.999	0.004
9	0.83/1	0.362	0.997	0.965	0.022
10	0.02/1	0.900	1.000	0.999	0.002
11	0.91/1	0.339	0.996	0.962	0.015
12	10.57/8	0.227	0.974	0.931	0.051
13	0.20/1	0.657	0.999	0.992	0.008
14	11.15/8	0.194	0.971	0.924	0.055
15	2.87/1	0.171	0.992	0.923	0.021
16	6.99/1	0.537	0.982	0.952	0.045
17	15.05/8	0.058	0.959	0.893	0.069
18	1.27/1	0.260	0.995	0.947	0.020
19	5.13/8	0.743	0.987	0.965	0.037
20	9.71/8	0.286	0.975	0.935	0.045
21	3.78/8	0.877	0.990	0.973	0.033
22	7.38/8	0.496	0.980	0.946	0.052
23	7.80/8	0.454	0.978	0.943	0.047
24	6.48/4	0.166	0.981	0.928	0.039
25	1.40/1	0.237	0.994	0.942	0.022
26	0.16/1	0.688	0.999	0.993	0.008
27	3.11/4	0.540	0.990	0.962	0.029
28	0.80/1	0.370	0.997	0.976	0.018
29	4.48/4	0.345	0.985	0.942	0.018
30	11.88/4	0.012	0.970	0.912	0.054
31	15.18/8	0.056	0.056	0.894	0.070
32	9.48/4	0.050	0.970	0.887	0.442
33	10.41/8	0.238	0.974	0.932	0.045
34	8.71/4	0.069	0.973	0.897	0.035
35	1.28/1	0.258	0.995	0.947	0.023
36	13.72/8	0.089	0.963	0.904	0.067
37	3.45/4	0.486	0.989	0.959	0.032
38	1.28/4	0.864	0.996	0.984	0.018
39	14.69/8	0.065	0.963	0.902	0.056
40	8.31/8	0.404	0.977	0.941	0.045

In this research the component fit of given model was evaluated in terms of t−value of each estimated parameter. The t−value for a parameter is defined as the parameter estimate divided by its standard error. Parameters whose t−value are larger than two magnitude are normally judged to be different from zero. Parameters statistically significant at $\alpha=0.05$ are marked with astrisks (table 2).

β and λ coefficients in Table 2 are standardized. Being standardized, error terms of the variables are not shown in Table 2. The standardized coefficient in LISREL is analogous to the standardized regression coefficient. In case of λ_1, it gives the expected number of standard deviation units change in y_1 for a one standard deviation change in η_1.

The standardized λ_i indicates validity of each variable as a measure of a given latent variable. Thus it gives a means to compare the relative influence of β_1 parameter in Table 2 refers to the expected change of standard deviation units in η_1 (aesthetic preference) for a one standard deviation change in η_2 (cognition of structural aspects of a landscape).

In this LISREL model λ_2 (preference) and λ_3 (legibility) were constrained for identification purpose. It is a convention in LISREL methodology.

Among 40 scenes of the Han River, 23 scenes have a statistically significant β_1 parameter(Table 2). The necessary condition of statistical significance of β_1 parameter is the good component fit of indicator varibles of η_2 (cognition of overall structural attributes of a landscape) as shown in Table 2. It supports the underlying rationale of this study, that cognition of structural attributes of a landscape determines aesthetic preference for the lands-cape.

Since the standardized λ_i refers to validity of measurement, it provides the basic of comparing validity of indicator variables of each latent variable. Table 2 shows that among the four structural variables, coherence has

Table 2. Standardized Estimates of Parameters

parameter / Scene	β_1	λ_1	λ_2	λ_3	λ_4	λ_5	λ_6
Scene 1	0.906	0.304	0.968[a]	0.219[a]	–	0.446	–
2	1.252	0.606*	0.760[a]	0.266[a]	0.022	0.328*	0.206
3	0.466*	0.593*	0.904[a]	0.385[a]	−0.187	0.640*	0.319*
4	0.305	0.706*	0.700[a]	0.826[a]	–	0.288	–
5	1.231	0.482	1.031[a]	0.308[a]	–	0.285	–
6	0.943*	0.588*	0.900[a]	0.289[a]	–	0.434*	0.386*
7	0.703	0.642*	0.773[a]	0.134[a]	−0.180	0.741	0.317
8	1.150	0.770*	0.624[a]	0.163[a]	–	0.337	–
9	1.418	0.503*	0.960[a]	0.288[a]	–	0.245	–
10	0.590	0.916*	0.633[a]	0.383[a]	–	0.584*	–
11	0.486*	0.772*	0.766[a]	0.540[a]	–	0.608*	–
12	0.852*	0.674*	0.870[a]	0.421[a]	−0.185	0.597*	0.488*
13	0.710*	0.773*	0.671[a]	0.540[a]	–	0.445*	–
14	0.915*	0.720*	0.839[a]	0.582[a]	−0.002	0.353*	0.154
15	0.544*	0.816*	0.845[a]	0.322[a]	–	0.856*	–
16	0.806*	0.720*	0.871[a]	0.385[a]	−0.002	0.733*	0.248*
17	0.894	0.573*	1.090[a]	0.178[a]	0.045	0.434*	0.429
18	1.054	0.797*	0.766[a]	0.277[a]	–	0.132	–
19	0.822	0.655*	0.672[a]	0.146[a]	−0.149	0.442	0.489
20	0.807*	0.747*	0.783[a]	0.404[a]	−0.034	0.473*	0.425*
21	0.920*	0.834*	0.766[a]	0.502[a]	0.134	0.543*	0.324*
22	1.502	0.754*	0.849[a]	0.233[a]	0.016	0.411*	0.232*
23	1.012	0.852*	0.651[a]	0.168[a]	0.023	0.478	0.383
24	0.911*	0.763*	0.858[a]	0.533[a]	–	0.613*	0.619*
25	0.514*	0.994*	0.643[a]	0.500[a]	–	0.573*	–
26	0.893	0.955*	0.638[a]	0.300[a]	–	0.461*	–
27	0.316	0.984*	0.529[a]	0.429[a]	–	0.903*	0.343
28	0.769*	0.921*	0.590[a]	0.424[a]	–	0.504*	–
29	0.850*	0.707*	0.719[a]	0.432[a]	–	0.433*	0.248
30	0.885*	0.853*	0.684[a]	0.487[a]	–	0.625*	0.451*
31	0.932	0.991*	0.524[a]	0.194[a]	0.122	0.341	0.341
32	0.806*	0.681*	0.876[a]	0.306[a]	–	0.617*	0.662*
33	0.865*	0.793*	0.699[a]	0.674[a]	−0.230	0.642*	0.302*
34	0.853*	0.802*	0.871[a]	0.546[a]	–	0.729*	0.383*
35	1.168	0.636*	0.868[a]	0.246[a]	–	0.384*	–
36	0.627*	0.661*	0.810[a]	0.298[a]	−0.320	0.914*	0.348*
37	0.865*	0.798*	0.811[a]	0.357[a]	–	0.523*	0.482*
38	0.731*	0.808*	0.814[a]	0.197[a]	–	0.774*	0.597*
39	0.962*	0.791*	0.717[a]	0.365[a]	−0.015	0.663*	0.360*
40	0.790*	0.868*	0.761[a]	0.283[a]	−0.009	0.741*	0.570*

* : significant at $-\alpha=0.05$

a : constrained variable

a greater varidity than any other indicators of η_2 (cognition of overall structural attributes of a landscape) except for scene 5, 9, 13, 18, 19 24, and 32. This means coherence is the most valid measurement of η_2 among the four indicators.

Legibility and mystery are next to coherence in magnitude of validity which indicates the measurement of cognition of structural atributes of a landscape(η_2). On the other hand, complexity is not a good indicator of η_2. When considering other indicators simultaneously, no on parameter of complexity (λ_4) is statistically significant, that is, there is no significant relationship between complexity and cognition of structural attributes of a landscape. This is contrary to most results of research that deals with the bivariate relationship between aesthetic preference and complexity not only in experimental settings but also in nonexperimental settings.

To date, however, the relationship between aesthetic preference and complexity is still inconclusive. Berlyne's (1960, 1971) inverted U−relationship between aesthetic preference and complexity was supported by Eysenck(1968), Dorfman(1965) and Vitz(1966), while, Reich and Moody (1970) reported that there is a positive linear relationshop between pleasantness and complexity. Kaplan et al., (1972) also found a positive value of complexity, when landscape is separated into urban and rural, preference within categories generally increases with complexity. However, other studies were unable to find any systematic relationship between aesthetic preference and complexity(Wohlwill, 1968, Rabinowitz and Coughlin, 1970, Zube et al., 1974)

Both aesthetic evaluation(λ_1) and preference (λ_2) are valid indicators of aesthetic preference. It supports the assumption of this research that both aesthetic evaluation and preference relavantly indicate the dimension of aesthetic preference.

6. Conclusion

This research has identified the cognitive−affective structure of aesthetic preference for a landscape employing LISREL methodology. The significant findings with regard to the structure of aesthetic preference are as follows.

1. Aesthetic evaluation and preference are equally valid indicators of aesthetic preference.
2. Cognition of structural attributes of a landscape is appropriately represented by a set of the combination of structural variables including legibility, coherence, and mystery ; and
3. Aesthetic preference for a landscape results from

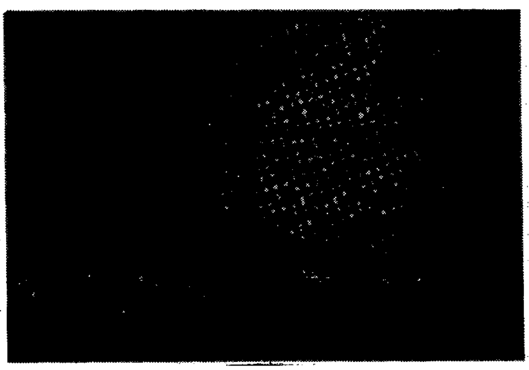
cognition of the overall structural atttributes of the landscape.

Among the three indicators of overall cognition structural attributes of landscape, coherence is the most valid indicator and legibility and mystery are the next valid indicators. Contrary to the result of experimental research that found a significant relationship between aesthetic preference and complexity, there is no systematic relationship between aesthetic preference and complexity. The primary reason for no significant relationship between aesthetic preference and complexity is that as illustrated in Figure 2, the ordinary landscape seen around the Han River is not as complex as stimuli manipulated in the experimental setting. Within the limited range of complexity of the riverscape, there is no significant relationship between aesthetic preference and complexity.

The overall component fits of the model support the underlying rationale of the research that comprehension of structural attributes of a landscape determines aesthetic preference for the landscape. As such, in the information processing of an ordinary landscape, cognition precedes affect.

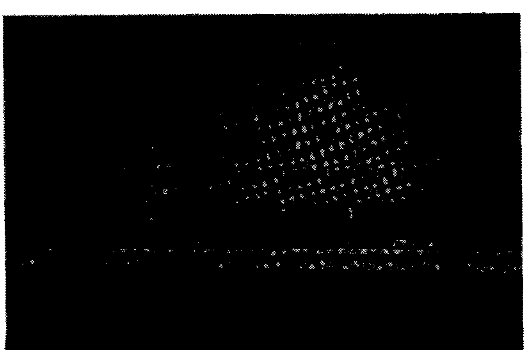
This research also identified two limiting factors inherent in the visual structure of the Riverscape that should be considered in deciding the improvement methods : One is that the visual dimension of the Riverscape far exceeds human scale primarily due to the width of the river of which average is approximately over 1 km and the other is that because most of the observation points are just opposite side of the view verticality and horizontality become major dimensions of the scenes.

The aformentioned three components of the visual aesthetic quality, i. e, coherence, legibility and mystery along with the limiting factors inherent in the riverscape provide guidelines for establishing strategic methods to improve visual quality of the riverscape. The ways to enhance coherence are suggested as follows : (1) it is necessary to avoid industrial land uses that are not visually compatible with the nature of the riverscape such as a power plant and a power transmission site ;
(2) it is required that natural skyline of mountain ridges in the background not be broken by the vertical dimension



Scene 21

Scene 24



Scene 28

Scene 38

Figure 2. Typical Scenes of the Han River

of buildings built around the edges of the riverscape when seen from major vantages ; (3) introduce buildings with similar size and form around the Riverscape ; and (4) plant trees massively along the Riverside and in front of tall buildings as much as possible.To heighten legibilty, it is suggested to introduce a landmark with a clear form in place where there is contrast with its background and where spatial prominence can be endowded and not to exceed five major components which comprise a scene. A sense of mystery can be increased by enhancing the degree of visual depth effect around the riverscape in terms of enclosing certain units of the landscape with trees and shrubs.

NOTES

1) The x^2 statistics along with associated degrees of freedom evaluates the statistical significance of the whole model. Small x^2 values correspond to good fit.
2) The probability level of x^2 is the probability obtaining a x^2−value larger than the value actually obtained given that the model is correct. The higher the probability of x^2, the closer the fit H^0 to the ideal fit of H^1.
3) Jöreskog and Sörbom(1984) have proposed a summary of fit that they refer to as the goodness of fit index (GFI). It indicates the relative amount of variance and covariance explained by model. A convenient characteristic of GFI is that it is relatively robust against departure from normality.
4) One drawback of GFI is that the statistical distribution is unknown. This means that confidence intervals or significance testing is not typically feasible. Another potential problem with GFI is that it does not adjust for the degrees of freedom of the model. To correct for this problem Jöreskog and Sörbom(1984) have proposed an adjusted goodness of fit index(AGFI) that considers the degree of freedom.
5) The root mean square residual (RMR) is a measure of the average of the residual variance and covariance. The smaller RMR indicates the better fit.

REFERENCES

1. Berlyne, D. E. (1960) *Conflict, arousal, and curiosity.* New York : McGraw−Hill
2. Berlyne, D. E. (1971) *Aesthetics and psychobiology.* New York : Appleton−Century Crofts
3. Beardsley, M. C. (1982) *The aesthetic point of view : Selected essays.* lthaca, New York : Cornell University Press
4. Bower, G. H. (1981) Mood and memory. *American Psychologist, Vol. 36* : 129−148
5. Brown, T. J. and ltami, R. M (1982) Landscape principles study : Procedures for landscape assessment and management−Australia *Landscape Journal. Vol. 1* : 113−121
6. Dorfman, D. (1965) Aesthetic preference as a function of pattern information. *Psychological Science. Vol. 3* : 85−86
7. Eckbald, G. (1981) *Scheme theory : conceptual framework for cognitive−motivational processes.* New York : Academic Press
8. Eysenck, H. J. (1968) An experimental study of aesthetic preference for polygon figure, *Journal of General Psychology, Vol. 79* : 3−17
9. Fiske, S. T. (1982) Schema−triggered affect : Applications to social perception. in M. S. Clark and S. T. Fiske(eds.) *Affect and cognition : the 17th annual Carnegie symposium on cognition.* Hillsdale, N. J. : Erlbaum
10. Gimblett, H. R., Itami, R. M. and Fitzgibbon, J. E. (1985) Mystery in an information processing model of landscape preference. *Landscape Journal, Vol. 4,* Madison, Wisconsin : University of Wisconsin Press : 87−95
11. Hammitt, W. E. (1983) Assessing visual preference and familiarity for a bog environment. in R. C. Smardon(ed). *The future wetlands : Assessing visual−cultural values.* Totowa, N. J. : Allanheld, Osmun Publishers, Inc.
12. Isen, A. M., Shalker T. E., Clark, M. S., and Karp, L. (1978) Affect, accessibility of material in memory and behavior. A cognitive loop? *Journal of Personality and Social Psychology, Vol. 36* : 1−12
13. Joreskog, K. G. (1973) A general method for estimating a linear structural equation system. in A. S. Goldberger and O. D. Duncan (eds.). *Structural equation models in the social science.* New York : Seminar Press

14. Joreskog, K. G. and Sorebom. D. (1984) *LISREL VI : Analysis of structural relationships by maximum likelihood, instrumental variables and least squares methods.* Mooresville, Indiana : Scientific Software, Inc.

15. Kaplan, S. (1979) Perception and landscape : Conception and misconception, in G. H. Elsner and R. C. Smardon(eds.), *Proceedings of our National Landscape : A conference on applied technigues for analysis and managerment of the visual resource.* Berkeley : U. S. Department of Agriculture, Pacific Southwest Forest and Range Experiment Station

16. Kaplan, S. (1988) Where cognition and effect meet : A theoretical analysis of preference. in J. L. Nasar (ed.), *Environmental aesthetics : Theory, research, and application.* New York : Cambridge University Press

17. Kaplan, S. and Kaplan, R. (1982) *Cognition and environment : Functioning in an uncertain world.* New York : Praeger

18. Kaplan, S., and Kaplan, R., and Wendt, J. S. (1972) Rated preference and complexity for natural and urban visual material, *Perception and Psychophysics, 12* : 254

19. Laurie, I. C. (1975) Aesthetic Factors in visual perception in E. H. Zube, R. O. Brush and J. Fabos(eds.), *Landscape assessment : Values, perceptions and resources.* Stroudsburg, PA. : Dowden, Hutchinson & Ross, Inc.

20. Lindsley, D. (1951) Emotion, in S. S. Stevens(ed.), *Handbook of experimental psychology.* New York Wiley

21. Lazarus, R. S. (1982) Thoughts on the relations between emotion and cognition. *American Psychologist. 37* : 1019−1024

22. Mandler, G. (1982) The structure for value : Accounting for taste. in M. S. Clark and S. T. Fiske(eds.). *Attect and cognition : the seventeenth annual Carnegie Symposium on cognition.* Hillsdale, New Jersey : Lawrence Erlbaum Associates.

23. Rabinowitz, C. B. and Coughlin, R. E. (1970) *Analysis of landscape characteristics relevant to preference.* Regional Science Research Institute Discussion Paper No. 38, Philadelphia

24. Reich, J. and Moody, C. (1970) Stimulus properties, frequency of exposure and effective responding. *Perception of Motor Skills, 30* : 27−33

25. Schachter, S., and Singer, J. E. (1962). Cognitive, social and physiological determinants of emotional state. *Psychological Review, 69* : 379−399

26. Santayana, G. (1955) *The sense of beauty : Being the outline of aesthetic theory.* New York : Dover Publications

27. Simon, H. (1982) Comments. in M. S. Clark and S. T. Fiske (eds.). *Attect and cognition : the seventeenth annual Carnegie symposium on cognition.* Hillsdale, New Jersey : Lawrence Erlbaum Associates

28. Sorebom, D. and Joreskog, K. G. (1981) The use of LISREL in sociological model building. in D. J. Jackson and E. Borgatta (eds.), *Factor analysis and measurement in sociological research : Multi−dimensional perspective.* Beverly Hills, CA : Sage Publication

29. Tomkins, S. S. (1962) *Affect, imagery, and consciousness : Vol. 1. The positive affect.* New York : Springer

30. Vitz, P. O. (1966) Preference for different amounts of visual complexity. *Behavioral Science, 11* : 105−312

31. Woodcock, D. M. (1984) A functionalist approach to landscape preference. *Landscape Research, 9* : 24−27

32. Zajonc, R. B. (1980) Feeling and thinking : Preferences need no inferences. *American Psychologist, 35* : 151−175

33. Zube, E. H., Pitt, D. G. anc Anderson, T. W. (1974) *Perception and measurement of scenic resources in the southern Connecticut River Valley.* (Publication No. R−76−1). Amherst, M. A : University of Massachusetts, Institute for Man and the Environment