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Analysis of the Visual Preference of Patterns in Pedestrian Roads

Kang, Eun Sung, Song, Hyeong Wook, and Kim, Hong Kyu

***Abstract*—**The purpose of this study is to analyze the visual preference of patterns in pedestrian roads. In this study, animation was applied for the estimation of dynamic streetscape. Six patterns of pedestrian were selected in order to analyze the visual preference. The shapes are straight, s-curve, and zigzag. The ratio of building's height and road's width are 2:1 and 1:1. Twelve adjective pairs used in the field investigation were selected from adjectives which are used usually in the estimation of streetscape. They are interesting-boring, simple-complex, calm-noisy, open-enclosed, active-inactive, lightly-depressing, regular-irregular, unique-usual, rhythmic-not rhythmic, united-not united, stable-unstable, tidy-untidy.

Dynamic streetscape must be considered important in pedestrian shopping mall and park because it will be an attraction. So, s-curve pedestrian road, which is the most beautiful as a result of this study, should be designed in this area. Also, the ratio of building's height and road's width along pedestrian road should be reduced.

***Keywords*—**Visual preference, streetscape, animation, simulation, pedestrian.

I. Introduction

THE purpose of this study is to analyze the visual preference of patterns in pedestrian roads. In this study, animation was applied for the estimation of dynamic streetscape.

In this study, the scope of the study was set up following. Six patterns of pedestrian were selected in order to analyze the visual preference. The shapes are straight, s-curve, and zigzag. The ratio of building's height and road's width are 2:1 and 1:1. Twelve adjective pairs used in the field investigation were selected from adjectives which are used usually in the estimation of streetscape. They are interesting-boring, simple-complex, calm-noisy, open-enclosed, active-inactive, lightly-depressing, regular-irregular, unique-usual, rhythmic-not rhythmic, united-not united, stable-unstable, tidy-untidy.

II. Build of Data and Basic Statistics

A. Build of Data

Type of pedestrian roads are stratight, s-curve, and zigzag. The ratio of building's height and road's width are 2:1 and 1:1.

E.S. Kang is Chief Researcher_Master Degree about Urban Planning with Yonsei University, Seoul, South Korea. (phone: +82-2-2123-3569; fax: +82-2-393-6298; e-mail: nost929@naver.com).

H.W. Song is Chief Researcher_Master Course in Yonsei University, Seoul, South Korea. (phone: +82-10-2615-7038; e-mail: shu0929@hanmail.net).

H.K. Kim is professor with Yonsei, University, Seoul, South Korea (phone: +82-2-2123-3569; fax: +82-2-393-6298; e-mail: kimhong@yonsei.ac.kr).

TABLE I
Animation Number

Animation's No	Shape of Pedestrian Roads	The Ratio of building's height and road's width
#1	Straight	2:1
#2	s-curve	2:1
#3	zigzag	2:1
#4	Straight	1:1
#5	s-curve	1:1
#6	zigzag	1:1

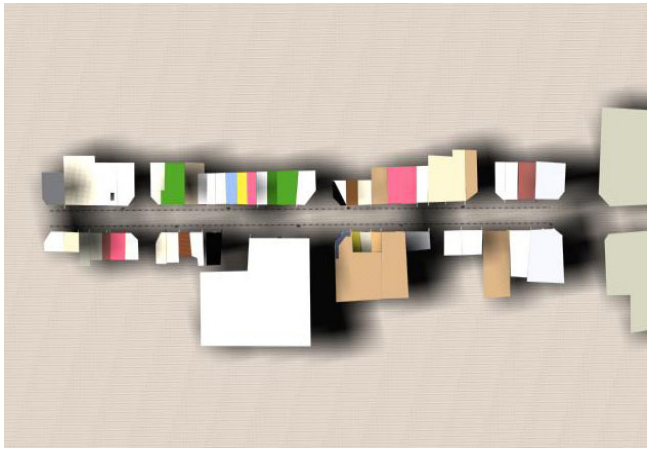

Fig. 2 (a) straight type's road

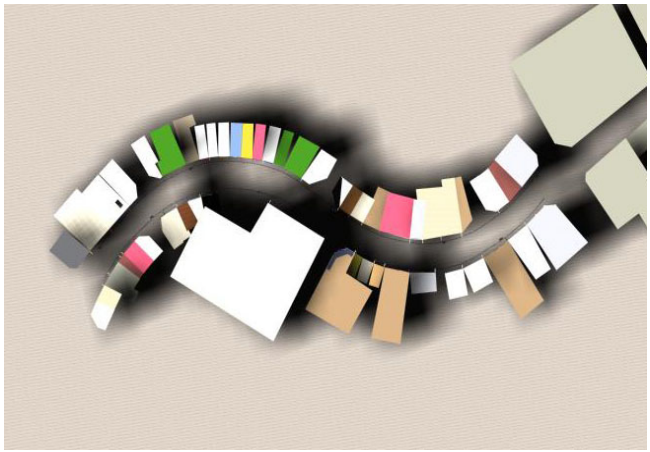

Fig. 2 (b) s-curve type's road

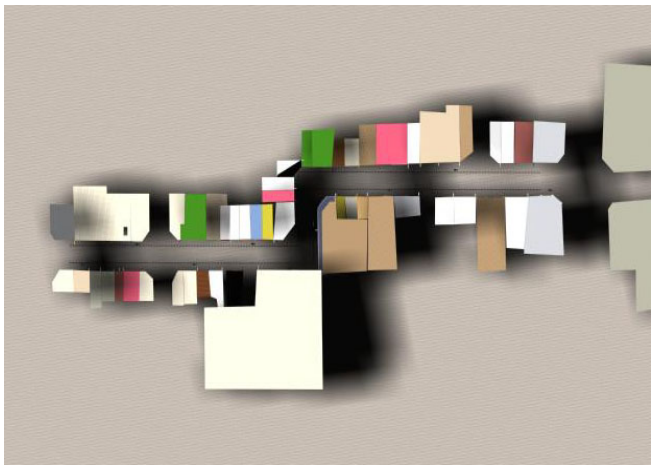

Fig. 2 (c) zigzag type's road

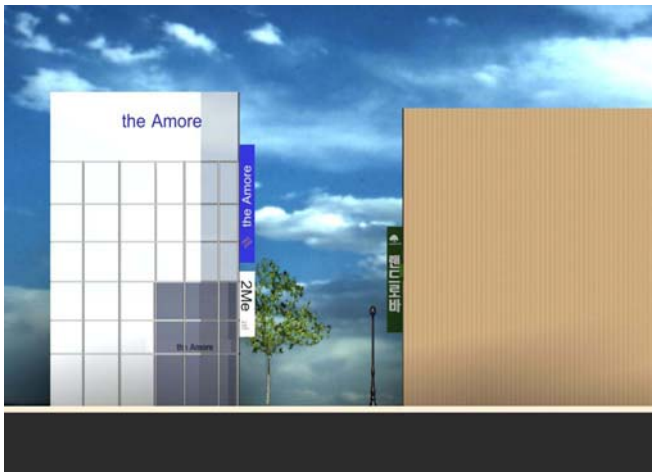

Fig. 2 (d) building's height and road's width(2:1)

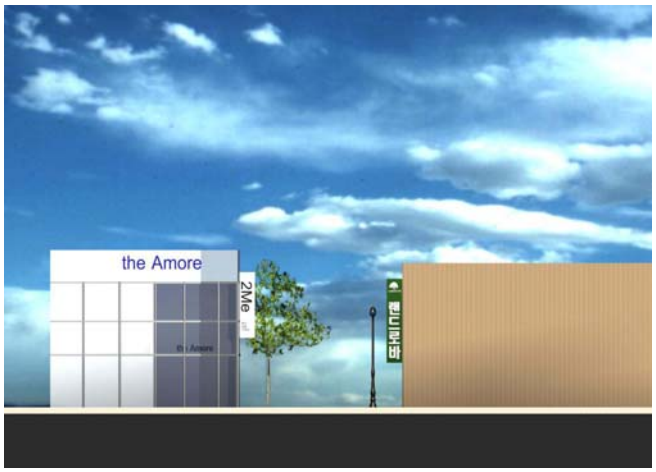

Fig. 2 (e) building's height and road's width(1:1)

TABLE II
PSYCHOLOGICAL SENCE OF CHANGE ABOUT BUILDING HEIGHT AND WIDTH

Building's height(H) / Road's width(W)	Psychological sense of change
H/W ≥1	Psychological pressure occurs. Complete wound closure. For the height of the building cannot be recognized.
1/2 ≤ H/W ≤ 1	You can feel the balance and stability. Vanishing Point and the distance can be recognized.
H/W = 1/3	Emphasize the symbolism of the pedestrian roads. Can feel a sense of closure in the lowest rate.
H/W ≤ 1/4	Recognize the sense of emptiness and exposure. Building as a boundary exists.

B. Survey for the Evaluation of Landscape

Items asking the feel of a landscape are interesting-boring, simple-complex, calm-noisy, open-enclosed, active-inactive, lightly-depressing, regular-irregular, unique-usual, rhythmic-not rhythmic, united-not united, stable-unstable, tidy-untidy.

TABLE III
PSYCHOLOGICAL SENSE OF CHANGE ABOUT BUILDING HEIGHT AND WIDTH

Survey Object		Survey Paper numbers	Recovery Survey Paper
Student	Major	50	40
	Non-major	50	47
ordinary person		50	43
Total		150	130

III. BASIC STATISTICS ANALYSIS

TABLE IV
GENDER RATIO OF INTERVIEWEE

		Man		Woman		Total
		Interviewee (people)	Rate (%)	Interviewee (people)	Rate (%)	Interviewee (people)
Stu-dent	Major	21	16.2	19	14.6	40
	Non-major	30	23.1	17	13.1	47
ordinary person		27	20.7	16	12.3	43
Total		78	60.0	52	40.0	130

TABLE V
OCCUPATION RATIO OF INTERVIEWEE

		interviewee(people)	Rate(%)
Student	Major	40	30.8
	Non-major	47	36.2
Ordinary Person	Office Worker	21	16.1
	Self-employed	12	9.2
	Professional	3	2.3
	Official	2	1.5
	Housewife	4	3.1
	Unemployed	1	0.8
Total		130	100.0

TABLE VI
COMPARISON OF AVERAGE LANDSCAPE EVALUATION

Animation No.	#1	#2	#3	#4	#5	#6
Shape Height : Width	Straight 2:1	s-curve 2:1	Zigzag 2:1	Straight 1:1	s-curve 1:1	Zigzag 1:1
Landscape Beautifulness	5.5	6.3	4.3	6.6	7.3	5.5
interesting-boring	4.4	2.7	3.7	3.6	2.8	3.6
simple-complex	3.1	4.5	4.2	2.9	4.3	4.1
calm-noisy	3.0	4.0	3.6	2.8	3.5	4.0
open-enclosed	4.6	4.2	5.4	2.4	2.4	4.2
active-inactive	5.0	2.6	3.9	4.1	2.4	3.7
lightly-depressing	4.4	2.9	4.6	3.3	2.4	4.3
regular-irregular	2.7	4.1	3.7	2.9	3.8	4.0
unique-usual	5.4	3.4	3.9	4.3	2.8	3.8
rhythmic-not rhythmic	5.4	2.7	4.5	4.3	2.6	4.3
united-not united	2.7	3.9	4.0	2.7	3.4	4.2
stable-unstable	2.9	3.8	4.4	2.5	3.2	4.2
tidy-untidy	3.0	3.7	4.1	2.3	3.2	4.2

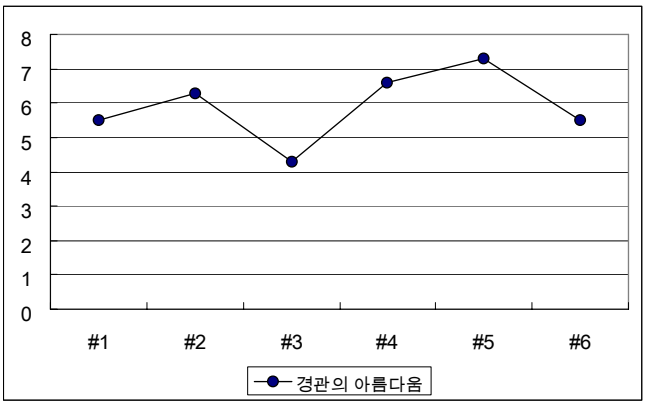

Fig. 3 (a) Comparison of Average Landscape Evaluation

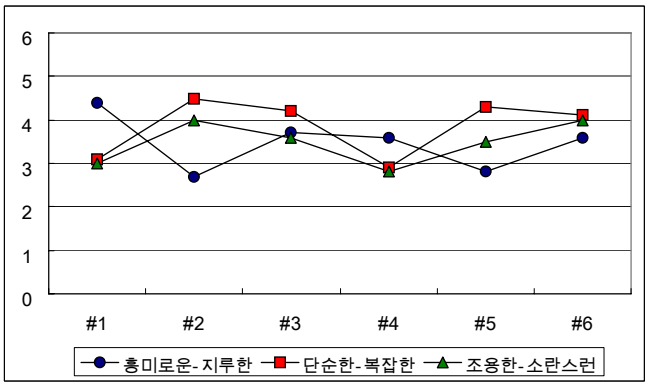

Fig. 3 (b) Comparing the Landscape Feelings of each Animation I (interesting-boring, simple-complex, calm-noisy)

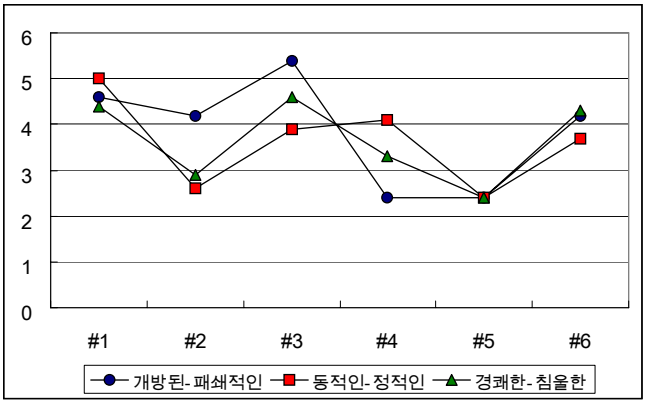

Fig. 3 (c) Comparing the Landscape Feelings of each Animation II (open-enclosed, active-inactive, lightly-depressing)

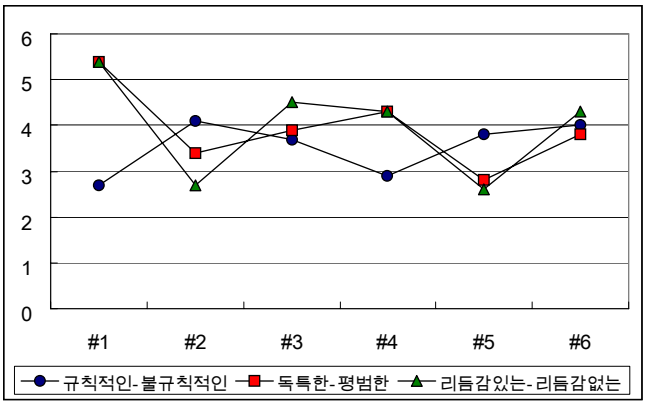

Fig. 3 (d) Comparing the Landscape Feelings of each Animation III (regular-irregular, unique-usual, rhythmic-not rhythmic)

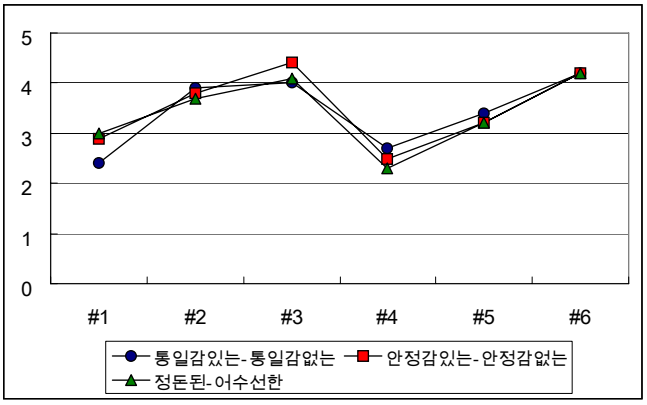

Fig. 3 (e) Comparing the Landscape Feelings of each Animation IV (united-not united, stable-unstable, tidy-untidy)

IV. LANDSCAPE PREFERENCE ANALYSIS

The SBE(Scenic Beauty Estimation) method uses standard value(Z-score) to correct differences of estimation from personnel distictions(Daniel & Boster, 1976). SBE is a equally-spaced values that can only compare relative values but cannot express absolute values of landscapes(S.B. Lim, Landscape analysis, 1996). The reliability and validity of the SBE method has been proved by several follow-up studies(Im,

1986). This study used the SBE method to estimate landscape beautifulness of each 6 animations.[1], [2].

TABLE VII
SCENIC BEAUTY ESTIMATION VALUE OF EACH ANIMATION

Animation No.	#1	#2	#3	#4	#5	#6
Shape Height : Width	Straight 2:1	s-curve 2:1	Zigzag 2:1	Straight 1:1	s-curve 1:1	Zigzag 1:1
SBE	71.65	111.94	0.00	128.45	156.67	71.60

TABLE VIII
VARIANCE ANALYSIS OF EACH ANIMATION'S LANDSCAPE ESTIMATION

SOURCE	Variance	the degree of freedom	Average variance	F
Beautifulness	699.19	5	139.83	51.19
Residual	2114.20	774	2.73	
Total	2813.39	779		
interesting-boring	271.59	5	54.31	28.85
Residual	1456.83	774	1.88	
Total	1728.43	779		
simple-complex	285.71	5	57.14	34.34
Residual	1287.88	774	1.66	
Total	1573.60	779		
calm-noisy	162.02	5	32.40	18.51
Residual	1354.97	774	1.75	
Total	1516.99	779		
open-enclosed	976.02	5	195.20	102.77
Residual	1470.12	774	1.89	
Total	2446.14	779		
active-inactive	634.77	5	126.95	71.26
Residual	1378.89	774	1.78	
Total	2013.67	779		
lightly-depressing	512.93	5	102.58	67.79
Residual	1171.24	774	1.51	
Total	1684.17	779		
regular-irregular	226.73	5	45.34	25.36
Residual	1383.70	774	1.78	
Total	1610.43	779		
unique-usual	499.29	5	99.85	57.73
Residual	1338.62	774	1.72	
Total	1837.92	779		
rhythmic-not rhythmic	801.02	5	160.20	89.46
Residual	1386.02	774	1.79	
Total	2187.05	779		
united-not united	270.871	5	54.17	32.50
Residual	1290.12	774	1.66	
Total	1560.99	779		
stable-unstable	381.80	5	76.36	42.85
Residual	1379.13	774	1.78	
Total	1760.93	779		
tidy-untidy	347.46	5	69.49	36.46
Residual	1474.92	774	1.90	
Total	1822.38	779		

V. CONCLUSION

The pedestrian road, which is s-curve and 1:1 ratio of building's height and road's width, is the most beautiful of the six patterns pedestrian road as a result of analysis with SBE(scenic beauty estimation) method. Twelve adjectives pairs were divided into two groups as a result of the factor analysis. One of them was called「tidy」, and the other was called「rhythmic」. The tidiest pedestrian road is of straight and 1:1 ratio of building's height and road's width. The most rhythmic pedestrian is of s-curve and 1:1 ratio of building's height and road's width. In regard of dynamic streetscape,「rhythmic」is more important than「tidy」.

Dynamic streetscape must be considered important in pedestrian shopping mall and park because it will be an attraction. So, s-curve pedestrian road, which is the most beautiful as a result of this study, should be designed in this area. Also, the ratio of building's height and road's width along pedestrian road should be reduced.

REFERENCES

[1] Daniel & Boster, Measuring landscape esthetics: The scenic beauty estimation method. USDA Forest Service Research Paper RM-167, 66p, 1976.
[2] S.B. Lim, Landscape analysis, 1996.