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A STUDY OF AESTHETIC FACTORS AND AESTHETIC RESPONSES OF THE INTERIOR ENVIRONMENT

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ABSTRACT

This is an "empirical aesthetics" study with the scope of the interior man-made environment. The purpose of this study is to explore the aesthetic factors of interior environment that contribute to the perception of a beautiful experience. The correlation analysis was applied. 40 pictures of interiors were selected from the "Interior" magazine as the measurement. A sampling investigation was conducted at three universities in Taiwan to 326 students from the departments of interior or space design and 339 students from other departments. The collected data was calculated and analyzed in aid of SPSS. Ten interior aesthetic factors were extracted, and these factors cumulated 55.032% explained variance. The aesthetic responses of the students from the departments of interior or space design and the students from other departments were significantly different in seven factors, but were not significantly different in the factors ranking the first and the last.

KEYWORDS: Empirical Aesthetics, Aesthetic Factor, Aesthetic Response

INTRODUCTION

Human are born with instinct to peruse aesthetic things. Artists and designers strive to keep people satisfied with various needs of beauty and aesthetics. Definitions to beauty and aesthetics vary subjectively. Everyone has different preference towards different characteristics and attributes. Therefore, research studies have been focused on aesthetics in order to understand it more in a systematical way.

While early research on aesthetics mainly concentrated on aesthetic perception of poetry, painting, and sculpture; current research focus widely includes urban, architecture, landscape, and interior professions that relate to environment design. Two major topics remain identical even though various viewpoints and disclosures from different professions. (1) To identify and understand perceptional experience factors that result in aesthetics or pleasure. (2) To understand the quality of creativity and appreciation of beautiful creatures. Research focuses on the two topics are distinctly different from each other. The first one refers to research on process of forming perception, recognition, and attitude which concentrates on empirical theory with psychological attributes. Aesthetics research of this type is classified as empirical aesthetics. The second one mainly includes research of aesthetics philosophy and creation process that focuses on normative theory with metaphysic and psychological analysis attributes. This type, on the other hand, is classified as speculative aesthetics. Past research relates to environmental aesthetics is mainly empirical aesthetics.

When it comes to empirical aesthetics research regarding the environment, most research studies would like to find out which environmental factors provide aesthetic perception. Correlation analysis is the most commonly used to

examine relations between two or more variables. Correlation analysis mainly uses object format or structure (aesthetic factor) as independent variable, while using human subjective perception of format or structure (aesthetic response) as dependent variable. Individual attribute is used as observed variable. Abundant research results can be found easily. Unfortunately, most research simply focus on natural environment or man-made exterior environment, such as urban, landscape, and buildings. Research regarding interior environment is relatively rare. Moreover, empirical research results show that professional designers tend to have preference distinctively different from the general public and often misjudge their preference (Devlin & Nasar, 1989; Groat, 1982; Nasar, 1989; Nasar & Kang, 1989). Therefore, this study hopes to find out (1) aesthetics factors that cause aesthetics response from the interior design viewpoint based on man-made interior environment, and (2) preference difference towards these aesthetic factors among design major and non-interior design major students.

LITERATURE REVIEW

Followings are discussion and disclosure of the four aspects relate to this study. The four aspects are interior environment, aesthetic factor, aesthetic response, and empirical aesthetics.

Interior Environment

The interior environment in this study represents the physical environment that interior designers work in which includes spatial planning (scale and model), furniture and decoration, wall and ceiling design, texture and color, lighting equipment and effect, window and door, etc. Exterior and main structure of building, clothing, and daily grocery are excluded.

Aesthetic Factor

Aesthetic factors are the components of the physical environment that cause aesthetic response mainly through human visual perception. Backer (1987) divided these components into three groups: (A) Ambient factor, i.e. temperature, humidity, air quality, noise, and scent. (B) Social factor refers to behavior, action, and number of users in the environment. (C) Design factor consists of functional factor and aesthetic factor. Aesthetic factor includes building, color, ratio, material, texture, style, format, and accessory. Aesthetic factor in this study is based on Baker's definition, since the research scope is limited to interior environment, building is excluded.

Aesthetic Response

Aesthetic response refers to wonderful mentally, physically, and behaviorally reactions result from environmental aesthetic factors. Nasar (1997) argued that aesthetic response consists of affective appraisal, physiological response, and behavior. Figure 1 indicates Nasar's explanation of the response process. Aesthetics originates from human, environment, and its interaction, while aesthetic response and building physical attribute have a probabilistic relation. Certain building physical attribute might trigger certain aesthetic response. Cognition plays a key intervening variable during its process. Aesthetic response varies from personality, social and cultural experience, intention, expectation, and subjective and objective viewpoints with all different probabilities. Nasar' sprobabilistic framework for aesthetics clearly explained the relation between aesthetic factor and aesthetic response based on interactionalism. Because interior environment is included in building, interior environment attribute is also a part of building attribute as well; this framework is suitable for this study.

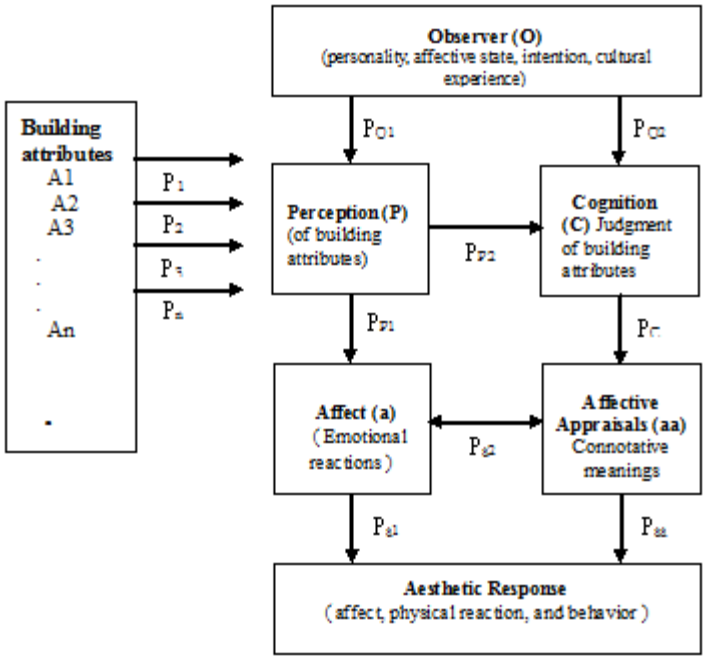

Figure 1: Probabilistic Framework for Aesthetics, Nasar (1997: 158)

Empirical Aesthetics

Berlyne's Aesthetics and Psychobiology in 1971 opened up the gate of empirical aesthetics research. Wohlwill (1976) expanded the research scope to daily man-made environment. Rapoport (1982) emphasized on importance of environmental meanings, while Ulrich (1983) pointed out cognitive orientation to natural environment based on psychological perspectives. Lang (1987) summarized cognition, evaluation, and meaning of design/planning altogether. Nasar (1987) provided a new development direction for the current urban environment design. The aforementioned are the main references used in this study regarding empirical aesthetics. As for empirical research, the research scope is the interior environment while relative disclosures are rare internationally and domestically. Hence, this study only adopts references relates to buildings. Empirical aesthetics is also divided into two aspects, as formal aesthetics and symbolic aesthetics (Lang, 1987).

- Formal aesthetics: based on Gestalt Psychology which stresses on relation between aesthetic experience and object form or structure itself. Variables of form or structure include, shape, proportion, rhythm, ratio, complexity degree, color, lighting, and shade (Lang, 1987), spatial syntax and spatial relation system (Groat & Després, 1991), complexity, incompatibility, ambiguity, marvel, novelty, and order (Wohlwill, 1976). These variables were classified as three categories by Nasar (1997), (A) Complexity, i.e. visual richness, decoration, and information ratio. (B) Order, i.e. unity, order, and clarity. (C) Spatial variable, i.e. openness, spatial arrangement, mystery.
- Symbolic aesthetics: concentrates on relation between aesthetic experience and context of form or structure. It suggests that aesthetics result from individual meaning perception of form or structure. Meaning perception has two explanations. Denotative meaning refers to one can tell the usage of an object by its name directly. Connotative meaning stands for signifying of an associative meaning in addition to the primary meaning. Symbolic aesthetics emphasizes on the overall perception process from denotative meaning to connotative

meaning. Nasar (1997) also sorted out three categories of these variables as (A) Natural or man-made, (B) Style, and (C) Knowledge structure.

RESEARCH DESIGN AND STEPS

Research Method

- Data collecting. Collect and understand relative empirical aesthetics literature review and research results which can be used as the basis of this study.
- Expert meeting. Due to the insufficient research studies, this study invited five interior design teachers and five interior designers that are professionally trained and with at least five years of working experience to discuss variables of aesthetic factor that composes man-made interior environment and content of aesthetic response. In order to increase content validity of the research tool, the questionnaire was also reviewed by these experts.
- Correlation analysis. This study hopes to find out the correlation among individual attribute, aesthetic factor, and aesthetics response in man-made interior environment and tries to establish a set of behavior regulations relates to aesthetic response. Therefore, this study adopts correlation analysis to analyze test results from "man-made interior environment aesthetic factor chart"and "man-made interior environment aesthetic response chart".

Research Procedures

The research procedures of this study are: set up initial research format and chart/questionnaire based on literature reviews, finalize the initial chart after expert meeting, pilot test of initial chart, finalize official chart, conduct the survey, SPSS analysis of test results, and finalize research results and publish. This study used stratified sampling to sample its participants into interior designer and general public. According to Ghiselli et al., (1981) the amount of sample should be no less than 300, hence, the expected valid samples for each group are no less than 300, with a total valid samples of 600. Though plan, elevation, perspective view, picture, model, or slide display can be used as research tool for environmental aesthetics, majority of foreign studies indicated that participants response identically to the colored slides and pictures displayed as they were on site (Hershberger & Cass, 1974; Kaplan & Kaplan, 1989; Oostendorp, 1978; Seaton & Collins, 1970). Therefore, this study used computer graphics or modified colored pictures as the research tool. The contents of pictures were drafted based on literature analysis and finalized after expert meeting and pilot test.

Research Steps

- According to literature reviews, 10 key elements to interior environment were listed as follow, color, lighting, style, shape, proportion, rhythm, material, texture, furniture, and spatial composition.
- Two interior design graduate students selected out 500 real scene colored photos from Interior Magazine (1998-2003) based on the 10 elements, while two professional interior designers also picked out 383 photos on the equal criteria from the same magazines. 125 identical photos were selected in this step.
- 10 interior design college teachers were invited to select photos that best suit the 10 elements from the 125 photos. 40 photos were selected by more than six teachers in the end, the amount of photos for each element were not evenly distributed. These 40 photos were used as research tool to assess aesthetic factor and aesthetic response.

Individual attributes were categorized as major, gender, and grade; while major category was divided into two small groups, i.e. interior design major (iDM) and non-interior design major (niDM).

- Participants from Chung Yuan Christian University (CYCU), National Yunlin University of Science and Technology (YUNTECH), and Shu-Te University (STU) were grouped as iDM group (includes students from CYCU, YUNTECH, and STU) and niDM group (includes students from CYCU and STU). A power point file consists of these 40 photos was displayed in class to test aesthetic response. A brief instruction was given to the class before displaying all 40 photos with three second interval, so that participants would have a rough understanding and impression. Later, participants were asked to grade each photo subjectively with a 15 second interval. Likert scale was used to measure aesthetics level, from extremely attractive (5), attractive (4), neutral (3), unattractive (2), and extremely unattractive (1). Higher scores indicate more attractions to the participants. Questionnaires were collected immediately afterwards, with a total of 665 valid questionnaires.
- Conduct a reliability analysis of the survey tool. The Cronbach's α=.8347 stood for the overall reliability has great internal consistency. As for factor analysis, results from KMO and Bartlett's test indicated KMO=.837 with fine suitability, while chi-square distribution was 6827.059 (df=780), p=.000 with significance. It indicated that common factors in correlation matrix of population suitable for factor analysis. Factor extraction was conducted with principal component analysis and varimax orthogonal rotation led to 10 factors with eigen value higher than 1, which could explain 55.032% variance.
- Expert meeting was held. 10 experts with interior design master's degree, plus a minimum of seven years of interior design profession were invited to examine 10 factors extracted from step 5. Table 1 showed characteristics of each factor interpreted by the 10 experts.

Table 1: Factor Characteristics

Factors	Characteristics
01	Regular style and bright colors
02	Concise stripe, steady hue and conventional texture
03	Natural lighting and visual penetration
04	Theme, common hue, insufficient depth in space
05	Design-featured furniture and decoration
06	Dramatic lighting effect and cool-toned texture
07	Simple hue, style and lighting change
08	A profound and dark, mysterious space
09	Pure background sets off a lively and diverse furnishings
10	Neo-classical furniture and accent lighting

RESULTS AND ANALYSIS

With a recall of valid 665 questionnaires, the followings are basic background of the participants.

- Academic major: 326 iDM students, and 339 niDM students (i.e. civil engineering, industrial engineering, sports and leisure, and electrical engineering, etc.)
- Gender: 327 males and 338 females.
- Grade: 126 freshmen, 152 sophomores, 206 juniors, and 181 seniors.

Followings are the results of questionnaire analysis via SPSS 17.0.

- The aesthetic level average of each factors in a descending order were: (1) Factor 03/ natural lighting and visual penetration (3.4947), (2) Factor 07/ simple hue, style and lighting change (3.4105), (3) Factor 02/ concise stripe, steady hue and conventional texture (3.3759), (4) Factor 01/ regular style and bright colors (3.3502), (5) Factor 05/ design-featured furniture and decoration (3.3083), (6) Factor 06/ dramatic lighting effect and cool-toned texture (3.2672), (7) Factor 10/ neo-classical furniture and accent lighting (2.9794), (8) Factor 09/ pure background sets off a lively and diverse furnishings (2.8940), (9) Factor 08/ a profound and dark, mysterious space (2.8605) , and (10) Factor 04/ theme, common hue, insufficient depth in space (2.6977).
- Significant difference between iDM and niDM students included Factor 01, 02, 04, 05, 07, 08, and 09; only Factor 04 p=.003 with significance, the rest p=.000. iDM students had significant preference on Factor 01, 04, 07 and 08, while niDM students preferred Factor 02, 05, and 09. Factor 03, 06, and 10 showed no major significance.
- Genders had certain difference on Factor 01, 02, 05, 08, and 09. Males preferred Factor 02, 05, and 09, while females favored Factor 01 and 08.
- Factor 01, 02, 05, 07, and 08 reached an average significance of .5 when it comes to grade. After multiple comparison analysis, significance of each factor by different grades as followed: On Factor 01, 02, and 08, sophomore showed higher average than freshman, junior, and senior; on Factor 05, sophomore demonstrated higher average than junior and senior; and on Factor 07, freshman was higher than junior, while sophomore expressed higher average than junior and senior.

CONCLUSIONS

In order to examine the relation between man-made environment physical attributes and human aesthetic response, this study conducted empirical research related to empirical aesthetics and examined possible difference among college students. This study used the conventional questionnaire and analysis with building space photos as its research tool. 665 valid questionnaires participated by college students were also used for analysis. Correlation analysis was the most commonly used method to analyze aesthetic experience. It included questionnaire and statistics analysis- the two conventional social science research methods- to explore relation between environment physical attributes and human aesthetic response. This study used the same experiment model with some adjustments in order to improve the research quality through more rigorous research design and examine process. In addition, it used multiple comparison analysis to narrow down question items and went through pilot test before finalizing the official questionnaire. Results from analysis were provided to experts to interpret attribute and characteristic of each factor. Finally, this study conducted the difference analysis resulted in the following conclusions.

- The top three factors all featured natural lighting, outdoor view, concise format, and regular shape, which indicated the natural and simple interiorenvironment was more preferable.
- Seven out of 10 factors had significance from iDM and niDM students. The result verified that professional designers tend to have preference distinctively different from the general public. Professional training to interior space design should concentrate more on this issue.

- As for the three factors (Factor 03, 06, and 10) that owned no major significance between iDM and niDM students, Factor 03 was relatively most attractive while Factor 10 was relatively the least attractive to the general public. The result showed consistency on attractive and unattractive despite professional interior design training.
- Sophomore students had the most distinctive viewpoints of aesthetics than other students. Freshman students came next, while junior and senior students showed no major preference. It is suggested that sophomore seems to be an important turning point regarding aesthetics education in college.

Not only this study found out aesthetic preference among genders, majors, and grades, but also it proved that professional designers had distinctive difference of aesthetic assessment from the general public, which needed more attention for further study.

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