

**ARTICULATING IN THE IN-BETWEEN REALM – A SYMBOLIC
SOLUTION TO THE INTERIOR ENVIRONMENT IN
CHINESE RESIDENTIAL CONTEXT**

By

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CHAPTER I

INTRODUCTION

Background

Advocated by Rapoport (1969) and Cooper (1974), the past three decades have seen substantial research directed toward the symbolic aspects of the built environment. In the residential context, houses are assumed to be selected, decorated, and renovated so that they are symbolically appropriate for their occupants. In other words, houses and their contents have been regarded as objects that symbolically express social classes, personality traits, aesthetic preferences, and personal histories of their occupants.

The present study was initiated to assess the possible symbolic association inherent in interior settings of a given residential environment, i.e., the public housing unit in today's China. Data from the study were used to investigate whether a Post-Modernist analysis of content symbolism can be supported. The presence of different articulations of the interiors in public housing units proposed for the Chinese should convey information about their housing preferences along three orthogonal dimensions: ritual behavior, aesthetic perception, and collective unconsciousness. Results from the investigation are anticipated to indicate that each alternative articulation of the given interior space is associated with a unique character attributed to the subjects, whenever the subjects actively or unconsciously evaluate the house interiors. House interiors may be regarded as having both intrinsic

articulated on the basis of *industrial iconography* (Venturi, 1972) all the way from space layout to construction materials, eliminate ornamental elements at most and thus elicit little affective responses, except imagination of *machines for living* as termed by Le Corbusier. Thus, the challenge confronting China today is to develop strategies and plans for new urban centers, neighborhoods, and housing types, which seek to satisfy both the functional and cultural needs for Chinese people with financial limitations.

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Figure 1. Advertisement for a high-rise residential complex. The illustrated floor plan is of a two-bedroom unit, which provides an area of some 58 square meters, or approximately 625 square feet for occupancy. Source: *Shanghai Evening News*, August 26, 2000.

In a residential environment that ignores the time-honored traditions, values, and family structure that have existed for thousands of years, it is difficult to develop an alternative prototype of occupancy on the basis of users' cultural needs. Furthermore, due to financial reasons, it is almost impossible to structurally remodel existing housing units, especially

their poor-looking facades. Most public residential units in China today, if not all, lack spatial distinctions between inside and outside in a hierarchy of transition zones from house to garden to street, which have been major characteristics of traditional Chinese houses. No more space is reserved for symbolic association other than the utilitarian requirement. Generally speaking, the forms of these residential units have been created “in terms of their perceptual qualities and at the expense of their symbolic meanings derived from association” (Venturi, 1966, p. 73).

However, it has repeatedly been reported that Chinese individuals prefer to be surrounded by an environment with certain symbolic attributes. Even for those living in an environment of high density such as Hong Kong, where concerns for a living space other than the utilitarian seem extremely luxurious to most inhabitants, the symbolic attitude towards environments still dominates (Jencks, 1987). In this case, one possible solution is to renovate residential interiors in order to re-establish a symbolic association in terms of the collective unconsciousness. As described by Rapoport (1982), in a highly urbanized society, symbolic meaning is basically located in the *semifixed-feature* realm*, which ranges all the way from the arrangement of furniture and other furnishings in interiors to advertising signs, window displays and the like in streets. In this case a particular *aesthetic complex* is developed internally to communicate social identity for the inhabitants. In other words, in a built environment that ignores any distinction in its exterior appearance, individuals’ personal traits and aesthetic preferences are primarily reflected through their

* Edward T. Hall (1966) has listed three types of space as the way to organize the activities of individuals and groups: Fixed-Feature Space, the space defined by constructive elements, such as solid walls, etc.; Semifixed-Feature Space, the space created by furniture; and Informal Space, the space determined by spatial experience, which includes a physical distance maintained among individuals when they encounter each other.

spatial involvement such as decorating interiors, selecting furniture, and so forth. Thus, one approach to explore the essence of housing preferences is directly related to the interior of the residential unit, if this unit is understood in the sense of *nonverbal communication* as termed by Rapoport (ibid.).

Purpose and Objectives

The overall purpose of this study is to explore the meaning of and preference for interior spaces, specifically the transitional and periphery spaces relative to the living room in a Chinese public housing unit. The ambiguous nature associated with the identified spaces is assessed in order to determine Chinese environmental orientation. The reason to focus on the living room per se is first due to the need to simplify the investigation; second due to the awareness that “more than any other part of the home, the living room reflects the individual’s conscious and unconscious attempts to express a social identity” (Laumann & House, 1970, p.190), since it is the space where the occupants are more guided by ostentation strategies, and hence more associated with behavior of consumption of symbols (Amaturo, Costagliola, & Ragone, 1987). In addition, in Chinese cultural context the living room is considered analogous to the heart. For instance, according to Feng Shui, an ancient Chinese art of placement, it is a space where the energy of the whole family is collected and dispersed. “The condition of the living room reflects the finances, status, and careers of its inhabitant” (Govert, 1993, p. 33) in terms of symbolic association.

The objectives of the study are listed as follows:

1. To develop alternative articulations of traditional Chinese interior spaces to serve as the stimuli in a questionnaire relative to content symbolism.
2. To review the research literature on interior spaces and elements articulated in a double-reading context in accordance with design vocabulary.
3. To determine symbolic associations inherent in given house interiors, specifically the intermediate space as identified in the living room area, in a Chinese ritual context.
4. To determine Chinese aesthetic preferences for interior environments, specifically spaces and elements articulated with certain degrees of ambiguity.

Hypotheses

It is anticipated that Chinese individuals prefer residential settings that have symbolic attributes consonant with their traditional ritualistic orientation and aesthetic preferences. In this sense, house interiors articulated in a double-reading context are more capable of reflecting traditional Chinese ritualistic orientation and aesthetic preference.

To accommodate the conceptual anticipations noted above, six interior vistas differing in view were constructed in black line drawings on the basis of a 2 x 3 factorial design, with one between factor and two within factors. The hypotheses were stated as follows:

Hypothesis 1

H₀: There is no significant difference among the subjects' preference ratings with regard to the interior vistas as illustrated in the six line drawings.

Hypothesis 2

a). H_0 : There is no significant difference among the subjects' overall preference rating applied to the two sets of design factors: Ritual Orientation and Visual Explicitness, which is incorporated into the interior vistas as being illustrated in the six line drawings.

b). H_0 : There is no significant difference among the subjects' overall preference rating applied to the first set of design factors: Ritual Orientation, which is incorporated into the interior vistas as being illustrated in the six line drawings.

c). H_0 : There is no significant difference among the subjects' overall preference rating applied to the second set of design factors: Visual Explicitness, which is incorporated into the interior vistas as being illustrated in the six line drawings.

Hypothesis 3

a). H_0 : For male subjects, there is no significant difference among their preference ratings on the bipolar adjective scale associated with the interior vistas as illustrated in the six line drawings.

b). H_0 : For female subjects, there is no significant difference among their preference ratings on the bipolar adjective scale associated with the interior vistas as illustrated in the six line drawings.

Definition of Terms

1. *Double-Reading Context* refers to a circumstance from which multiple meanings can be elicited. In most cases, a double-reading context is always rooted in human's past experience and aspiration (Graves, 1982).

2. *Gray Space* is an intermediate space between two different functional zones in a given built environment. A gray space is normally articulated as being free of a dualistic division – the absence or presence of a solid wall (Kurokawa, 1991).
3. *Industrial Iconography* refers to a design philosophy of which only the utilitarian concern of an object or event is addressed (Venturi, 1972).
4. *Ambiguity* can occur perceptually and/or associatively. At the perceptual level, “ambiguity regarding a form’s original identity will result if the portion removed from its volume erodes its edges and drastically alters its profile”(Ching, 1996, p. 52). From the associational perspective, ambiguity will result if multiple images or meanings are elicited or associated from an object or event via an individual’s or group’s aspirations.
5. *Articulation* refers to the manner in which the surfaces of a form come together to define its shape and volume. “An articulated form clearly reveals the precise nature of its parts and their relationships to each other and to the whole. Its surfaces appear as discrete planes with distinct shape and their overall configuration is legible and easily perceived” (Ching, 1996, p. 79).

Limitations

The respondents are limited to a random sample of Chinese living in Tulsa, Oklahoma and listed in one or more specified directories. As a result, the findings from the study are associated with that specific group, and not generalizable to all Chinese living in the United States.

CHAPTER II

LITERATURE REVIEW

Philosophical Basis

The most basic idea in Chinese philosophy, found in every one of its arts and sciences, is *yin* and *yang*. As interpreted by *I Ching*, literally “The Book of Change” dated as early as the 5th century B.C., *yin* and *yang* arise after the Tao, the single most fundamental one in abstraction that represented a metaphysical and cosmological ultimate.

Traditionally, the Chinese regard the Tao as the source that gives life and form to all material beings, yet which itself is utterly inactive and undifferentiated and therefore beyond description. The behavior of the Tao gives rise to *yin* and *yang*, the principles of basic complementarity, which in turn combine to generate all of the patterns and endless variations of nature. Being understood only in relation to each other, *yin* represents the principle of receptive nourishment and *yang* the principle of active generation. While *yin* is expressed as moon, valley, darkness, cool, female, and negative, *yang* is perceived as sun, mountain, brightness, warm, male, and positive, respectively.

Figure 2 illustrates the Tai Ji Map, the ancient symbol of *yin & yang*. It is an archetypal design representing unity within diversity. The circle denotes the ultimate source, half *yin* and half *yang*, each with the embryonic seed of the other growing within it. The S-shaped boundary between the two demonstrates that their borders are never fixed. In other words, it is a *mandala* - as literally translated from Sanskrit - the life circle

symbolic of the eternal potential. According to Arguelles (1972), the *mandala* is a “structural matrix through and from which flow a succession of changes, elemental forms, and primal surges, each surprising the other in an infinite variety of organic structures and impulses, crowned by the supreme attribute of reflective consciousness. Its flow, working through a relatively well-defined structure, is subject to the infinite process of growth and transformation by virtue of the ever-changing relationships, both internal and external to its basic structure” (p. 12). To understand *yin* & *yang* in a dualistic manner is not enough because the transformation between *yin* and *yang* is as significant as *yin* or *yang* itself. In fact, the transition between *yin* and *yang* illustrated by negative black and positive white in Figure 2 can be plotted into a gray value scale (Figure 3), which ranges from a maximum of white to a minimum of black, and vice versa. Because of the constant flux of *yin* and *yang*, like waves in the sea, transition becomes the primary attribute of the Tao. In this sense, it is not black and/or white but ambiguous gray that becomes a meaning-intensive zone, in terms of “the possibility of double readings within compositions” (Graves, 1982, p. 11). Here, the meaning of gray arises from its double nature: it is black and white at the same time. The characteristics of *yin* and *yang* manifesting the interactive gray in reference to the present discussion are listed, but not limited to, as follows (Govert, 1993):

1. *Yin* and *yang* always appear together, never without each other.
2. *Yin* and *yang* are in constant state of change and balance.
3. *Yin* and *yang* are not real; they are relative to each other.
4. At the height of *yin*, *yang* ascends and *yin* declines.
5. At the height of *yang*, *yin* ascends and *yang* declines.

6. *Yin* and *yang* appear as dynamic pairs of opposites.
7. *Yin* and *yang* compound each other, layer on layer.
8. Phenomena hide and play in the wake of *yin* and *yang*. (p. 7)

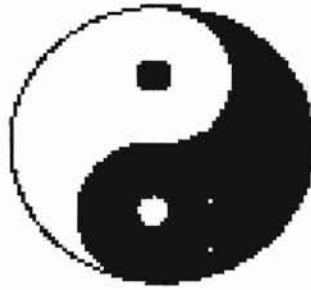


Figure 2. Tai Ji Map, a graphic representation of *yin* & *yang*.

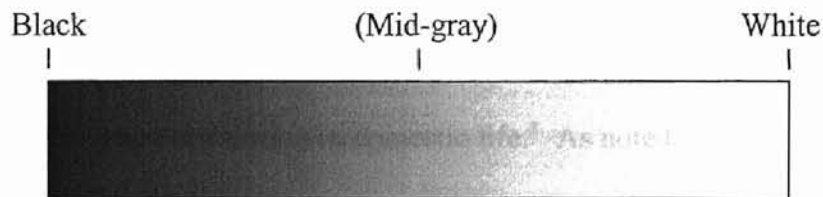


Figure 3. The illustration of the gray scale. Notice that the mid-gray is located half-way between black and white.

This meaning-intensive gray zone is widely found in either the visual arts or the built environment of traditional China. In the visual arts such as calligraphy and painting, the effectiveness of expression greatly depends on a dynamic relationship between ink brush and void space, which is usually achieved through a gradual variation in black tone against white paper background. Here, the void space is not nothingness, because “it

means or speaks as much as the lines” (Kurokawa, 1991, p. 109). In other words, like solid lines or masses, the void space is treated as the affordance of meanings within an organic composition as well. Thus, the gray zone, a transition between massive black and its white background, is greatly evaluated. In this sense, it is not difficult to understand why most of traditional Chinese paintings are executed in black and white instead of in colors. In the built environment, this principle is evidenced through unique housing units known as *siheyun*, or the four-in-one residential compound (Figure 4) found in northern China; and *shanheyun*, or the three-in-one residential compound found in southern China. Both *siheyun* and *shanheyun* are characterized by their symmetry order in layout and their significant concern for transitions. The symmetry order is manifested through the presence of a central courtyard as *yang* space and surrounding residential halls as *yin* space, in terms of their associative characteristics, or vice versa in terms of their structural configuration. To some extent, the symmetric characteristic in spatial layout collectively reflects Chinese ritual orientation in domestic life.* As noted by Baudrillard (1972), with regard to spatial layout and interior settings, ritual practices are found prevalently in the symmetry area, while rational practices are all confined to the asymmetry side. On the other hand, while a wall enclosure addresses family value with its emphasis on separation between public and private domains, a deep entry along with a central courtyard surrounded by a continued verandah, which connects residential halls thereafter, enhances the transition between interiors and exteriors. The courtyard, the focus and center of all

* The myth of Pan Ku, a Chinese version of the birth of the universe, tells that a material universe in geometric order was resulted from Pan Ku, the creator of the universe whose four limbs defined the directions of north, south, east and west. Manifested in residential context, the symmetry established from the intersection of these four cardinal directions has become a conventional mechanism to portray cosmic order on an earthly scale (China Foreign Study Group, 1982).

activities, is a public space where daily circulation of ideas among family members and most significant domestic events take place. Its presence reinforces the coexistence of *yin* and *yang*, and assures a sequence of *graduated privacy*, as termed by Nelson Wu (1963), which guides internal use of house interiors as well as interaction with those exclusive from the household. As described by Liu, this kind of articulation, namely, all residential halls being interconnected by covered verandahs or walkways, differs from the Western concept, which tends to “unite all functions under one roof” (Liu, 1989, p. 27).

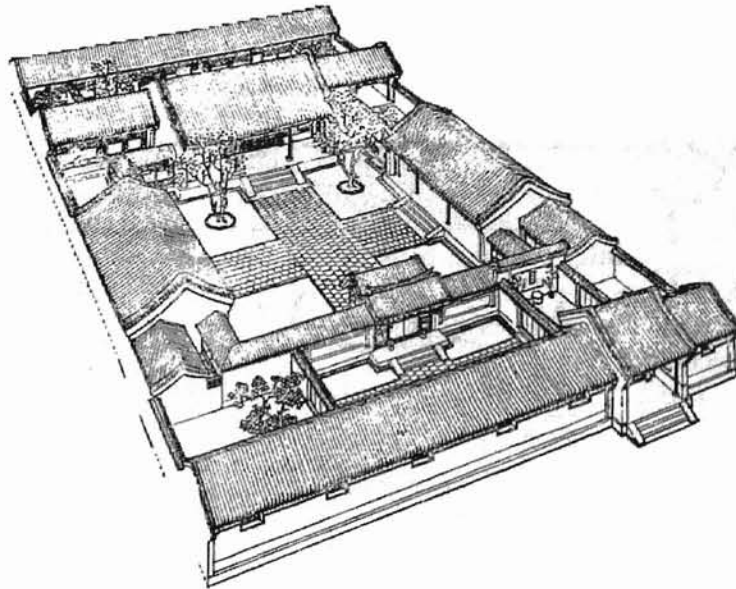


Figure 4. Four-in-One residential compound. Adopted from K. G. Knapp (1990), *The Chinese house: Craft, symbol, and the folk tradition*, page 12.

The carefully articulated transition zone between the public and private spaces is especially important in Chinese residential compounds, because it reflects a consistent internal demand for a balance between the opposites, or *yin* and *yang* in ritual context. Yilin Li, an avant-garde artist in China today, interprets standard aesthetic principles of

Chinese art by an art installation known as *Standard Series of Ideal Residence* (Noth, Pohlmann, & Reschke, Eds., 1994, p. 137), as shown in Figure 5. In this piece of artwork a symbol of walls is created from bricks and angle-irons collected at a demolition site. The interaction between opacity and transparency, the standard aesthetic principles of Chinese art as identified by the artist, is manifested by the surrounding space and break-through on the walls. Here, the break-through on the walls, if understood in terms of semiology, is exactly a metaphor of transition between inside and outside. It is ambiguous in form and function, because it is a void space but a portion of the wall itself as well.

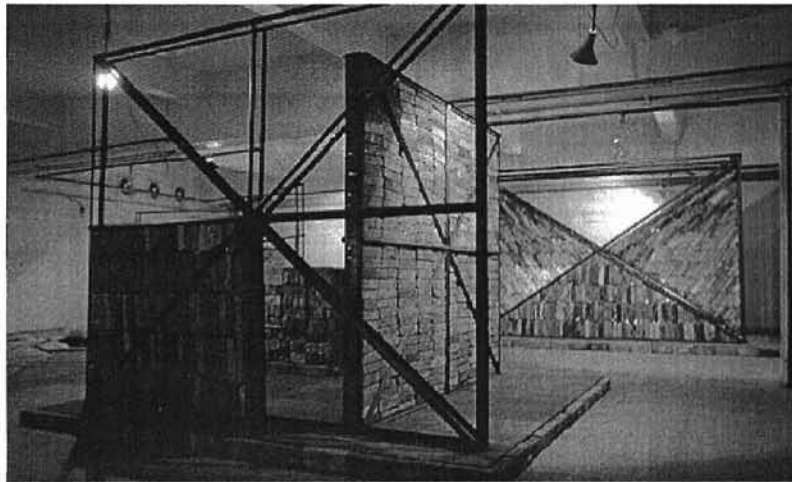


Figure 5. Standard Series of Ideal Residence. Installation. Yilin Lin, 1991. Adopted from J. Noth, et al. (Eds, 1994), China avant-garde: Counter-currents in art and culture, page 137.

In terms of its higher degree of ambiguity and multivalence, the transition zone speaks much more than the enclosure, the demarcation between inside and outside. The gate, the

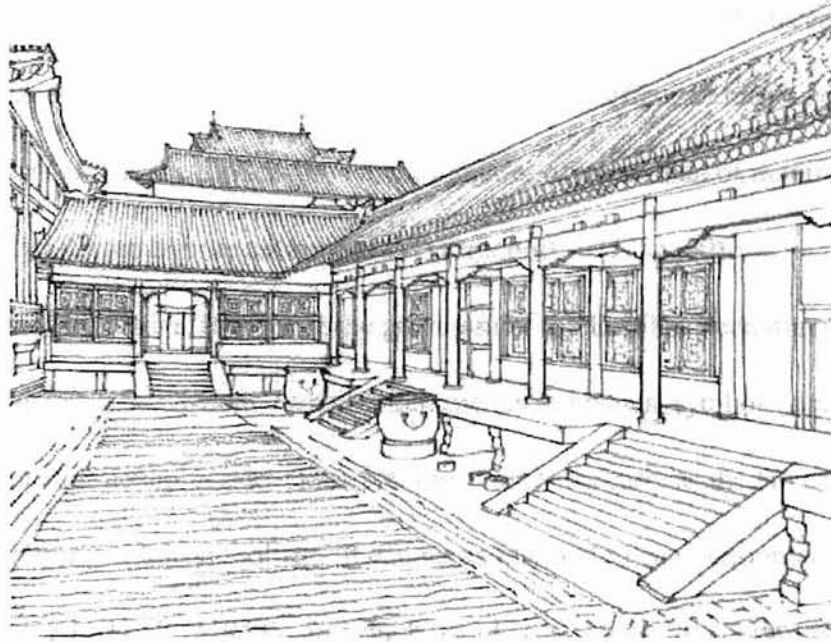


Figure 7. Private courtyard of the Imperial Palace, the Forbidden City, Beijing, China. 15th century. Notice the veranda, an elevated plane that defines a transitional space between the interior of the building and the outdoor environment. Adopted from F. D. Ching (1996, 2nd ed.), *Architecture: Form, space and order*, page 106.

Significance of Environmental Symbolism

In his study of the meaning of the built environment, Rapoport (1982) states that symbolism is central to all built environments. Here symbolism refers to meaning, a “nonverbal communication from the environment to people” (ibid., p. 178). Along with space, time, and communication, it is considered as one of the organizational elements when environments are being designed. According to Osgood, Suci and Tannenbaum (1957), “how a person behaves in a situation depends upon what that situation means or signifies to him” (p. 1). In other words, it appears that individuals react to an environment in terms of the meanings the environment has for them. Therefore, the whole concept of the

built environment is more concerned with its associational qualities. In this case, “environmental evaluation, then, is more a matter of overall affective response than of a detailed analysis of specific aspects, it is more a matter of latent than of manifest function, and it is largely affected by images and ideas” (Rapoport, 1977, p. 60).

As mentioned by Doczi (1981) that the greatness of the East has been manifested through its dedication to wisdom - which often speaks in images, symbols, and the like - one of the unique philosophies developed by the Chinese as early as the 5th century B.C. was that of environmental symbolism. It can be understood in an environmental orientation diagrammed by Kluckhohn (1953)*, by which people act as an inherent part of nature. Freedman (1971) believes that if a European and a Chinese are open to a beautiful landscape at the same time, the former may enjoy it from an aesthetic point, while the latter may react cosmologically. The reason is that for the Chinese, the viewer and the viewed interact, both being parts of some greater system. In this case, the Chinese have asserted “a human response to forces working in the cosmos” (p.122). In other words, with regard to a given environment, the Chinese tend to directly associate themselves with cosmos symbolism - one of the ways by which people associate themselves to nature. Here, the cosmos may be reflected in a microcosm at a whole range of scales, from an entire land down to a city, a village, a house, the space within a house, and the furniture in the space. In this sense, a city, a house, and even a piece of furniture may reflect “the shape in which the world is visualized” (Rapoport, 1969, p. 50).

* F. R. Kluckhohn (1953) mentions three general orientations to nature held by people in different cultures and at different times in history: (1) people as subjugated to nature, living at the mercy of a powerful and uncompromising nature; (2) people as over nature, dominating, exploiting, and controlling the environment; and (3) people as an inherent part of nature, trying to live in harmony with the environment. See also Altman, I & Chemers, M. (1981), *Culture and environment*, page 15.

This kind of environmental symbolism, manifested through the well-known theory of Feng Shui today, is particularly a ritualistic attitude towards site, orientation and features of the built environment. As defined by Rapoport (1969), ritual orientation of the house is “a function of cultural and religious attitudes rather than material factors” (p. 51). Even when the two coincide, as with the Feng Shui system in China, material factors (such as the concern for comfort) will have to give way if they are at odds with the religious aspects. Literally interpreted as *Wind and Water*, Feng Shui has been regarded as an art of placement characteristic of its manipulation of *qi* - the cosmic breath or the living energy generated from the interaction of *yin* and *yang*. The essence of Feng Shui is “a universe animated by the interaction of *yin* and *yang* in which an ethereal property known as *qi*...gives character and meaning to a place” (Knapp, 1990, pp. 54-55). However, it must be remembered that *qi* can be active or passive. In general, passive *qi* is one generated from a *yin*-dominated circumstance, while active *qi* from a *yang*-oriented environment. An environment with good Feng Shui is one that exhibits both *yin* and *yang* traits simultaneously and proportionally. If only spoken of at an elementary level – that is, by merely exemplifying either *yin* or *yang* characteristics - it would not be considered beneficial to its occupants. In this sense, the ideal result of the interaction of *yin* and *yang* is a balance between these two extremes. It can be logically perceived from a gray value scale, as shown in Figure 3, where variations between absolute black and white reflect degrees of the balance. It is for this reason that Feng Shui becomes an art of interaction. A Feng Shui manual, as noted by Knapp (1990), dictates how balance is achieved through site selection:

On a rock hill you must take an earthy site; on an earth hill you must take a rocky site. Where it is confined, take an open place; where it is open, take a confined

space. On a prominence, take the flat; where it is flat, take the prominent. Where strong comes, take weak; where weak comes, take strong. Where there are many hills, emphasize water; where there is much water, emphasize hills. (p. 56)

The desired degree of balance, however, is not only determined by the ratio between physical attributes characteristic of *yin* and *yang*. It must cooperate with many other non-physical factors such as household history and personal traits. For instance, if an individual is more inward-minded, i.e. more *yin*-oriented in personality, a physical setting with more *yang* characteristics would be appropriate to his/her situation. Therefore, in most cases, a mid-gray scale of the balance between physical features, referred to as half *yin* and half *yang* here, is not always necessary for a given built environment. In general, a slightly *yang*-dominated environment is more desirable than one of half *yin* and half *yang*, because *yang* is more associated with positive energy. According to Feng Shui, an ideal house site is the one whose four sides are guarded by the following formations: the Red Raven in the front, the Black Tortoise in the back, and the Azure Dragon and the White Tiger to the left and right, as illustrated in Figure 8. These four formations, whether natural or artificial, are complementary to each other, as the Red Raven denotes to the open and the Black tortoise to the close, and the Azure dragon refers to the high and the White Tiger to the low, respectively (Wong, 1996). An example is that even for a burial site, the house for the departed, a 3-2 ratio between *yang* and *yin* is normally required (Needham, 1956). This ratio, manifested through two kinds of site contours: the bold elevation as the Azure Dragon (*yang*) to the left and the uneven elevation as the White Tiger (*yin*) to the right of the burial spot, is described as follows (Freedman, 1971):

An ideal (burial) site is one which nestles in the embrace of hills standing to its rear and on its flanks... Those to the left, as the site faces its unshielded fourth side, are the Azure Dragon; those to the right are the White Tiger. The Azure Dragon is a beneficent force...which animates the hills and spreads itself in the approaches to the site. The White Tiger is a force of danger, which protects only as long as it is in complementary relationship with the Azure Dragon. Azure Dragon and White Tiger must be present in the right proportion. The former must be the higher of the two to ensure a proper balance of forces between them... They are opposite and complementary, co-operating, when they are in the correct ratio, to ensure the concentration of the (cosmic) Breaths.*

(pp. 122-123)

* Azure Dragon and White Tiger, standing respectively to the left and to the right of the site, are *yang* and *yin*. Where possible the site faces south, so that the Dragon and Tiger are to the east and west; and in the grammar of symbols of geomancy the eastern and western quarters of the heavens are the dragon and tiger respectively (Freedman, 1971, p. 123).

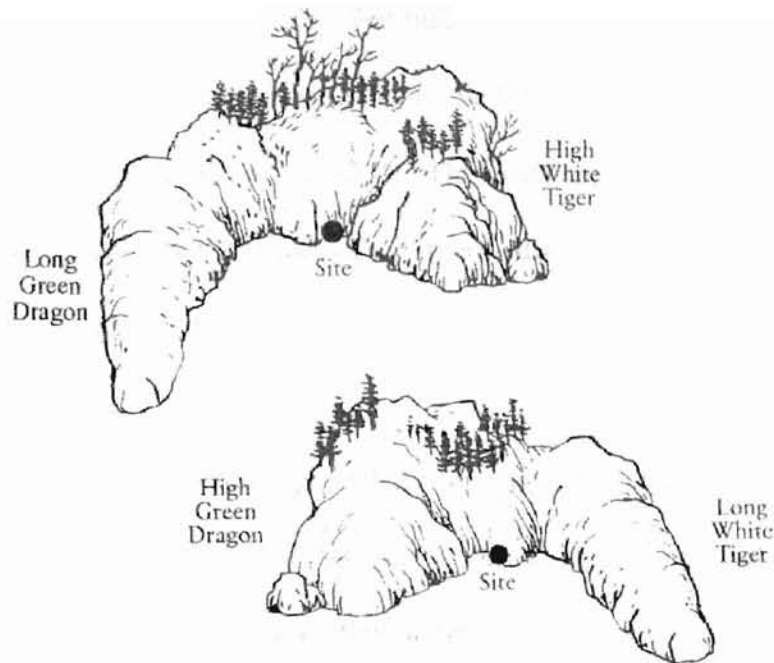


Figure 8. Relationship between the Green Dragon and White Tiger formations. If the Green Dragon is long, then the White Tiger must be high, and vice versa. Adapted from E. Wong (1996): *Feng-Shui: The ancient wisdom of harmonious living for modern times*, page 105.

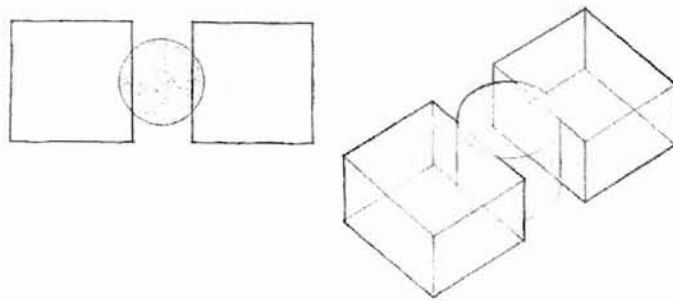
It is necessary to remember that, whenever in the case of selection of house sites, or articulation of house interiors, the positive *qi* is always generated from the interaction of *yin* and *yang*, not from *yin* or *yang* itself. This can be illustrated in Figure 9, where wispy layers of mist that partially cover a mountainside are an indication of the copulation of sky and earth energies. “Creative energy is born of this interaction and such locations are filled with power” (Wong, 1996, p. 131). Notice that there are no exactly defined boundaries associated with the interactive layer of mist. The layer is visually perceived as ambiguous. This suggests, in reference to *yin* and *yang* domains, the significance of a third spot in Chinese residential context. Interpreted in architectural language, such a

third spot can be an intermediate zone that links two spaces distant from each other, or a common bond that is residual in nature due to the forms and orientations of the two spaces being linked, as shown in Figure 10. The visual and spatial relationship between the two spaces depends on the nature of the intermediate zone with which they share a common bond. In a given house interior, intermediate spaces can be defined, but not limited to, as follows:

1. The foyer or the threshold space that connects inside and outside.
2. The pathway including stairs that links interior spaces as a whole.
3. In some cases, the living room that organizes other rooms around itself.

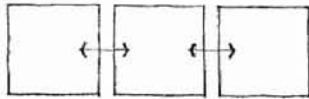


Figure 9. Mount Huang (part), hanging scroll, ink and color on paper. Liu Haisu, 1954. China Fine Art Museum, Beijing. Adapted from Yang, X., Barnhart, R. M., Nie, C., Cahill, J., Lang, S., & Wu, H. (1997). *Three thousand years of Chinese painting*, Plate 297. New Haven, CT: Yale University.



Two spaces which are separated by distance can be linked or related to each other by a third, intermediate, space.

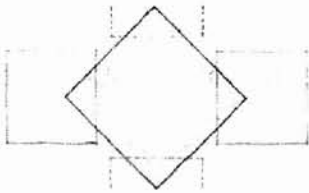
The intermediate space can differ in form and orientation from the two spaces to express its linking function.



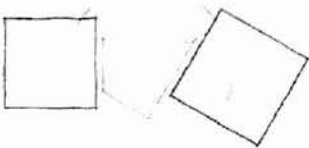
The two spaces, as well as the intermediate space, can be equivalent in size and shape and form a linear sequence of spaces.



The intermediate space can itself become linear in form to link two spaces which are distant from each other, or join a whole series of spaces which have no direct relationship to one other.



The intermediate space can, if large enough, become the dominant space in the relationship, and be capable of organizing a number of spaces about itself.



The form of the intermediate space can be residual in nature and be determined solely by the forms and orientations of the two spaces being linked.

Figure 10. Diagram for intermediate spaces. Adapted from F. D. Ching (1996, 2nd ed.), *Architecture: Form, space and order*, page 186.

The 3-2 ratio between *yang* and *yin* is only a rough guideline used to determine if a built environment is beneficial to its occupants. It varies depending on different

phenomena. Of importance here is that the positive *qi* is always generated from the third spot, an interactive zone resulting from proportionally distributed *yang* and *yin*.

However, for a given environment if there is too much *yang*, it will turn into *yin* and vice versa. In such cases, the negative *qi* will be generated due to the over dominance of *yang* or *yin*. In other words, the Chinese tend to involve themselves in a gray realm rather than a black or white domain. Here, the key point is the gray zone, an articulated in-between realm that sustains the identity of specific meanings. In this sense, one of the architectural missions is “to provide this in-between realm by means of construction, i.e. to provide, from house to city scale, a bunch of real places for real people and real things” (Eyck, 1962, p. 28).

To create a meaningful gray zone in a given interior environment requires identity of a set of dichotomous variables, such as solid and void, warm and cold, low and high, and so forth. These variables are not only determined at the perceptual level, but also from the associational perspective. Examples can be found in the practice of Feng Shui, by which such variables are intentionally manipulated through space layout and furniture arrangement. Here, most (if not all) interior physical attributes including architectural features, space layout, construction materials, etc., along with non-physical attributes such as masculine or feminine qualities determined by personal images and historic aspirations via psychological association, are categorized with respect to *yin* and *yang*. The result is a dynamic composition, in which the tension established by the two opposites is manifested. The effect of such a composition can be further understood through a discussion of an ancient Chinese ink-brush painting *Buddhist Patriarch and*

Tiger (Figure 11), of which Silbergeld (1982) indicates how Chinese artists have achieved the dynamic balance by manipulating complementary factors:

Chinese artists and critics were conscious of and sensitive to the dynamic forces of composition, but even more important to them was the principle of balancing those forces. Conditioned by the conceptual principles of *yin* and *yang*, Chinese artists habitually thought, wrote, and painted in terms of complementarity... Nothing is more conspicuous about a painting like *Patriarch and Tiger* than its balance of opposites – dark and pale, wet and dry, representing man and nature - all fused into a harmonious spiritual union. (p. 56)



Figure 11. Buddhist Patriarch and Tiger. Ink on paper. Shi Ke, early 10th century. Tokyo National Museum. Adopted from M. Sullivan (1999, 4th ed.), *The Arts of China*, Plate 8.12.

The design vocabularies associated with *yin* and *yang* qualities are listed in, but not limited to, the chart as follows:

	Yin	Yang
Associative Characteristics	cold	warm
	dark	light
	back	front
	soft	hard
	curved	straight
	rounded	angular
	low	high
	small	large
	ornate	plain
	horizontal	vertical
	floral	geometrical

Figure 12. Associative characteristics of *yin* and *yang*. Adapted from T. K. Collins (1996), *The Western guide to Feng Shui*, page 16.

In summary, masculine qualities are *yang* and feminine qualities are *yin*. Thus, built-up areas, sun-lit roofs, protruding structures and front elevations are *yang*, and void areas, shadowed eaves, set-back structures and rear elevations are *yin*. However, “when there is too much of *yang* in anything it will turn into *yin* and vice versa” (Lip, 1995, p. 63). For instance, when a built-up area is too large it will turn to be *yin*-dominated. Such a circumstance can be manifested in the Tai Ji Map (Figure 1 on page 10), in which the end point (or the maximum) of the white is the start point (or the minimum) of the black as well, and vice versa. Anything that is too *yin* or too *yang* is unbalanced and, accordingly, is undesirable. Therefore, it is of vital importance to manipulate *yin* and *yang* by balancing or

graying them within certain degrees, either in the perceptual level or from an associational perspective.

Manipulation of Yin & Yang

To manipulate *yin* and *yang* attributes in an architectural context, it is necessary to understand the perceptual and associational qualities of the built environment. In general, the perceptual aspect of a given built environment is determined by a series of physical cues (such as shapes, colors, textures, etc.), and the associational quality of a given built environment is concerned with subjective experience and aspiration. As described by Rapoport (1977), the distinction between perceptual and associational aspects of the built environment is partially based on “the existence of a hierarchy of levels of meaning associated with any object in the physical environment, which range from the concrete, through use and value to symbolic meanings” (p. 316). However, the distinction is one of degree rather than kind, because “perceptual and associational worlds are linked – the latter cannot exist without the former: the perceptual world is a necessary but not sufficient condition for the associational world” (ibid.). In this sense, a setting can only be seen as suitable for a specific activity and as having some meaning after it is perceived as a setting.

To balance *yin* and *yang* at the perceptual level and/or from the associational perspective involves a variety of geometric shapes, particularly those associated with symbolic meanings in a Chinese cultural context. These shapes, as commonly found through Chinese myth, philosophy, art, religion, and even personal mythology such as dreams, are archetypal graphic representations of the natural laws. “The shapes are included throughout ancient

architecture, thereby adding humanistic, spiritual, and geomantic qualities to buildings” (Lin, 1995, p. 48).

The very basic geometric shapes adopted through traditional Chinese houses are the square (or rectangle as its extension) and circle. In the theory of Feng Shui, it is believed that “roundness smoothes out harsh energy, and the rectangular and symmetrical shapes do not allow destructive energy to build up in restricted corner sections” (Wong, 1996, p. 152). In contrast, triangular shapes are especially undesirable, because destructive energy is normally generated from the sharpness of the shape. Altman and Chemers (1981) have noted that ancient Chinese “emphasized the rectangular quality of the world and designed their communities accordingly” (p. 1) due to their perception of the heaven as round and the earth as rectangular in shape. In this sense, the square moat and lattice-style fence that surrounds the perimeter of a building can be regarded as a modern manifestation of this ancient Chinese image of the universe (Kurokawa, 1991). Lin (1995) believes that along with the circle, the square is created because of the humanitarian factor, or human “unconscious spiritual need for order and balance” (p. 52). “The symbolic relationship between square and circle is that of human and divine, physical world and spiritual world, imperfect and perfect, qualities. The integration of square and circle is a metaphor for the equilibrium between earth and heaven” (Mann, 1996, p. 34).

Another concept, with regard to Chinese classic architecture, is that of space. In Chinese philosophy, a void space is not considered nothingness. It speaks as much as the solid mass. As the ultimate in visual abstraction, a void space contributes immeasurably to the suggestive quality of Chinese residential environment. One example is its application in Chinese garden design, where the empty areas between objects are

manipulated as carefully measured intervals for the viewer's imagination. These intervals establish expressive visual tensions within the garden and regulate its rhythms, like timing regulates the rhythm of a musical composition. Lao Tse, one of the most influential Chinese sages in 6th century B.C, evaluated the space in Dao De Jing ("The Nature of the Earth") as follows:

We put thirty spokes together and call it a wheel; but it is on the space where there is nothing that the utility of the wheel depends.

We turn clay to make a vessel; but it is on the space where there is nothing that the utility of the vessel depends.

We pierce doors and windows to make a house; and it is on these spaces where there is nothing that the utility of the house depends.

Therefore, just as we take advantage of what is, we should recognize the utility of what is not. (Ching, 1996, p. 33)

The above discussion suggests two sets of complementary factors as visual cues in Chinese residential context: square and circle, solid and void. With square and solid associated with *yang*, and circle and void with *yin*, a dynamic tension and rhythm can be established for a given house interiors at the perceptual level, and/or from the associational perspective. The dynamic tension, like one manifested in Chinese painting style, is evidenced in composition of geometric forms, swelling curves, triangular wedges, vertical blocks, and so forth. The dynamic rhythm, identified as the sequence of movements in given vistas, is perceived in time with "speeds (fast or slow), transitions (abrupt or

gradual), sequences (continuous or discontinuous), and intervals (regular or irregular) established by the structure of the work” (Silbergeld, 1982, p. 58).

House Interior: A Link between Form and Life Patterns

The analysis of symbolism in the built environment is concerned with a variety of phenomena and has proceeded from diverse theoretical frames. In terms of Post-Modernism, a given environment associated with symbolic contents is fundamentally rooted in conventions. Figure 13 illustrates the ecological model of environmental symbolism, in which the importance of culture in understanding the meanings of the built environment is emphasized. In other words, the planning and decoration of home interiors is intimately related to residential experiences, and personal aspirations and preferences, which can be the foundation of unconscious or symbolic factors. In this sense a symbol, with its connotation of ambiguity in form and content, can be a mediator used to promote “richness of meaning over clarity of meaning” (Venturi, 1966, p. 29), because it yields multiple levels of meanings among elements with varying values.

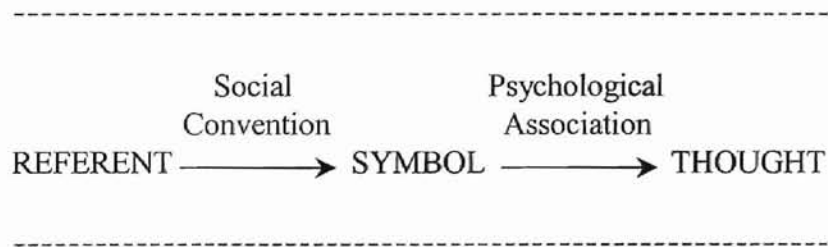


Figure 13. Ecological model of environmental symbolism. Adopted from J. Gibson (1966), *The sense considered as perceptual systems*.

In terms of this analysis, a given residential unit, particularly its interior settings, may be regarded as a collection of memories, associations, and responses to a large social milieu. Malner and Vodverka (1992) believe that, in comparison to civic architecture, “domestic architecture, particularly in its interior dimension, is a far more accurate barometer of the current values and beliefs of a particular people” (p. 5). The reason is - in terms of what Mumford (1938) has described as “the more shaky the institution, the more solid the monument”^{*} (p.434) - that civic architecture is more a suspected cultural statement, which usually conveys an incorrect message about a certain state of affairs. This is particularly true in Chinese residential context. For instance, in the case of *siheyun*, as shown in Figure 4, the front entrance usually open onto a courtyard, which is shielded from the street. The result is to place the entire architectural emphasis on interior effect. This establishes a clear transition “from the noisy public domain to the quiet private one, and from the relatively plain, simple, and restrained exterior to whatever richness and luxury exist inside” (Rapoport, 1969, p. 66). In this case, a house - particularly its interiors - shows and provides “most clearly the link between form and life patterns”, as well as “the best way of relating the whole system of house, settlement, landscape, and monumental buildings to the way of life” (p. 10).

From Formal Aesthetics to Symbolic Aesthetics

To work with the built environment from the symbolic perspective requires a good understanding of symbolic aesthetics. Rapoport (1977, 1982) believes that while designers

^{*} Patrick Geddes has noted that the perfection of the architectural form does not come until the institution sheltered by it is on the point of passing away. See L. Mumford (1938), *Culture of Cities*, page 434.

tend to place the emphasis on formal aesthetics issues, the lay public appreciates the environment mainly in terms of its symbols and its affordances for activities. Compared to formal aesthetics, which focuses on the structure of forms for their own right, symbolic aesthetics deals with human responses to the content of forms (Lang, 1988). In other words, it deals with associational quality of the given object or event. Goodman (1988) has mentioned that a building would not be considered as *a work of art* unless “it signifies, means, refers, symbolizes in some way” (p. 36), since all works of art are experienced physically and associatively. This suggests that, beside its physical presence, a building can be evaluated in terms of its associational qualities.

Formal aesthetics, if understood in architectural context, is rather a concern about *industrial iconography*. It deals with denotative meanings of the *machine*, which literally communicates notions of technical and utilitarian attitude towards the built environment. However, as described by Broadbent, Bunt and Jencks (1980), “The significant form is an abstraction of physical form which includes some of its features - those which refer to the meaning or symbolism - and excludes the rest” (p. 283). In this sense, all shared elements and organizations in architecture, including constructive ones such as walls and columns that perform the role of support and vertical enclosure, and space-forming ones such as beams, arches, vaults, domes, and other structural forms that span and enclose in the horizontal dimension, “can only be fully understood when viewed as a result of a combination of elements, spatial form and experience, and specific historical and cultural settings” (Barrie, 1996, p. 42), although they are usually regarded as component parts only.

In architectural context, symbolic aesthetics is concerned with the associational qualities of the built environment. According to symbolic aesthetics, humans experience their built environment through mediating content variables. These variables relate to but are not defined solely by physical attributes. They can be ritual-based, as manifested through specific space layout or furniture arrangement; or aesthetic-based, as represented by given structural organization. As indicated by Lang (1987), content variables can have both denotative meaning, which refers to the recognition of the objects; and connotative meaning, which refers to inferences about the quality and character of the objects. In the present study, symbolic aesthetics refers to the latter set of meanings. In particular, it refers to favorable connotative meanings associated with the content of the formal organization. This symbolic aesthetics depends on a cognitive process in which the individual recognizes a denotative meaning, the content of the formal structure, and infers a connotative meaning about it. Here, connotative meanings refer to “associative values and symbolic content that are subject to personal and cultural interpretation” (Ching, 1996, p. 374).

The above discussion can further be referenced by Graves (1982), whose idea about *standard architectural form* and *poetic architectural form* is of particular interest here. According to Graves’ analysis, the standard form is associated with architectural internal language determined by pragmatic, constructional, and technical requirements, whereas the poetic form is responsive to issues external to the building. Here, poetic forms in architecture are sensitive to “the figurative, associative, and anthropomorphic attitudes of a culture” (p. 11), and thus represent cultural and symbolic attitude towards the built environment. “A significant architecture must incorporate both internal and external expressions” (ibid.), because the components of architecture are not only derived from

pragmatic necessity but also evolved from symbolic sources. Modern architecture, in terms of its symbolization of the machine, is only an internalized reading rather than an external allusion, since the machine itself is a utility. As a result, it is much more associated with technical and utilitarian attitude towards the built environment.

In this sense Graves' notation, "the possibility of double readings within compositions" (ibid.), can also be understood in these two levels: the perceptual and the associational. In the built environment, the former is manifested through given physical forms, the latter through given cultural contexts. As a physical form is presented as "the set of all its features directly or indirectly perceptible" (Broadbent, et al., 1980, p. 283), meanings decoded at the perceptual level are basically associated with shape, color, texture, smell, sound, temperature, weight, and so forth of the object. For instance, a delineated space can be referred to as "bounded, constricted, contained, contracted or centripetal space" (Beck, 1970, p. 153), whereas an open space as "inward and outward movement, spatial penetration, liberty and freedom" (ibid.). However, in many cases, it is believed that the arrangement of forms contributes little in content, unless people attribute to these forms some system of conventional meanings not inherent in the forms themselves (Venturi, 1966). In other words, although physiognomic forms are not totally without expressive value, "they can only be interpreted within a particular cultural ambience" (p. 63). Once again, the significant form is "an abstraction of physical form which includes some of its features - those which refer to the meaning - and excludes the rest" (Broadbent, et al., 1980, p. 283).

Iconic Sign vs. Symbolic Sign

To understand the nature of symbolic quality of the built environment, it is necessary to recognize the difference between signs and symbols used in the course of nonverbal communication. A sign, as defined by Lang, is “a convention or device that stands for something else in a literal rather than an abstract sense” (Lang, 1987, p. 204). A symbol, in contrast, is a concrete representation of some other entity that is often more abstract. It is “any object, act, event, quality, or relation which serves as a vehicle for a conception” (Geertz, 1966, p. 5). Jung (1964) states that “a sign is always less than the concept it represents, while a symbol always stands for something more than its obvious and immediate meanings” (p. 55). While a sign is limited to the surface of the conscious mind, a symbol is presented from a deep psychic source. Accordingly definitions can be found in the field of semiology, of which two kinds of sign systems - the iconic and the symbolic - are mostly considered relevant to the built environment. Here, the key concern is the relationship between the signifier (form) and the signified (content).

The iconic sign concerns a set of relations between the signifier and the signified. It is, in terms of Peirce’s analysis, a sign “which refers to the object that it denotes merely by virtue of characters of its own, and which it possesses, just the same, whether any such object actually exists or not” (Peirce, 1932, p. 143). The signifier is like the signified in certain ways such as structural similarity. Modern architecture, certainly including mass-built public housing units in China today, is developed on the basis of this sign system. However, as argued by Broadbent, et al. (1980), this kind of pure architecture is unable to communicate exactly as intended for the reason that iconic signs are too restricted in its connotation, and need further symbolic cues to be correctly read.

The symbolic sign is susceptible to many meanings, since its relation to an object is based on convention rather than on a qualitative or physical resemblance. Or, in other words, its conventional usage sets the arbitrary relation between the signifier and the signified. According to Jung, a symbolic sign “possesses specific connotations in addition to its conventional and obvious meaning. It implies something vague, unknown, or hidden from us” (Jung, 1964, p. 20), and thus has a certain degree of ambiguity or multivalence associated inherently. In the most basic sense, symbols with shared meanings provide the basis of human communication. Figure 14 illustrates the basic semiological triangle that specifies a relationship among symbol, thought, and referent (Barthes, 1967). Here, in reference to the present discussion, the built environment is the object; the pattern of the built environment, which results from “a structure of surfaces of various materials, pigmentations, and illumination levels” (Lang, 1987, p. 204), is the signifier; and the ideas and meanings associated with the pattern of the built environment is the signified. One of the examples to apply the symbolic sign into the built environment is the conventional use of three orders of classical architecture. The significance of the symbolic sign in the built environment is addressed by Barrie (1996) as follows:

It is in architecture, however, that we find the most potent and meaningful use of symbolism, because here the symbol is not only representational, but spatial and temporal as well... The totality of the architectural experience, however, is a powerful synthesis of the various media used to communicate symbolic themes. In essence, it is the symbol, transformed into myth and represented by architectural plan, geometry, surface, form, and space. (p. 16)

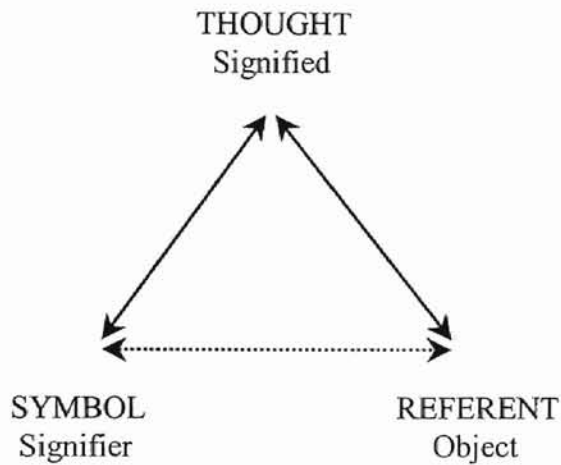


Figure 14. The basic semiological triangle.

In general, in architectural context, any associational element, such as three classic orders, can be referred as the symbolic sign. Other than constructive elements, which meet the very basic requirement for the structure, associational elements tend to revoke something else because of the sharing of common roots, analogies, sound images, similarities in meaning, and so forth. In this sense, any decorative elements in a given interior environment are associational and symbolic, as well as “the consumption of space per se” (Lang, 1987, p. 206), which will be discussed in detail later.

In architectural context, one of the best-known concepts concerning formal aesthetics and symbolic aesthetics is that of *the duck and the decorated shed*. In an examination of architecture of the Las Vegas Strip, Venturi, Brown and Lzenour (1972) present a prototype of the built environment known as *symbol in space before form in space*. They suggest, as presented in the diagram of *the duck and the decorated shed* (Figure 15), “the symbolism of the ordinary via the decorated shed over the symbolism of the heroic via the sculptural

duck” (p. 87). The *duck*, in honor of the duck-shaped drive-in known as Long Island Duckling, is defined as “the building is the sign” (Venturi, Rauch, & Brown, 1984), since there is no external decoration applied to it. Instead, the building turns out to be a decoration itself. It is, in semiotic terms, an iconic sign, because the signifier has certain aspects in common with the signified. The *decorated shed* is defined as “the modest building with a big sign, the shelter with the symbol over it” (ibid.). It is a symbolic sign because it “depends on learned meanings - writing or decoration” (Jencks, 1987, p. 45). Here, an associative concept – the concept of heroic and original (H & O) architecture vs. ugly and ordinary (U & O) architecture – is introduced to assess implicit and explicit symbolism associated with the *duck* and *decorated shed*, respectively (Venturi et al., 1972). The H & O architecture, as referred by the *duck*, derives dramatic expression from the connotative meanings of its original elements. “It gives off abstract meanings - or rather, expressions - recognizable in the physiognomic character of the architectural elements” (p. 86). The U & O architecture, as referred by the *decorated shed*, includes denotative meanings as well, and “suggests more or less concrete meanings via association and past experience” (ibid.). Generally speaking, “to the extent that it is denotative in its meaning, an element depends on its heraldic characteristics; to the extent that it is connotative, an element depends on its physiognomic qualities” (p. 72), since denotation indicates specific meanings, whereas connotation suggests general ones. As manifested through the Vanna Venturi House (Figure 16), from which all associational elements that might suggest *house* have been rigorously initiated, U & O architecture is representative rather than expressive in terms of its spatial articulation and detail treatment. Here, as described by Scully (1989), Venturi has exploited and interwoven “the two ways whereby we experience all works of

art: physically and through association” (p. 12), which “affect us empathetically, through our bodies, and associationally, through everything we know from our cultural coding” (ibid.).

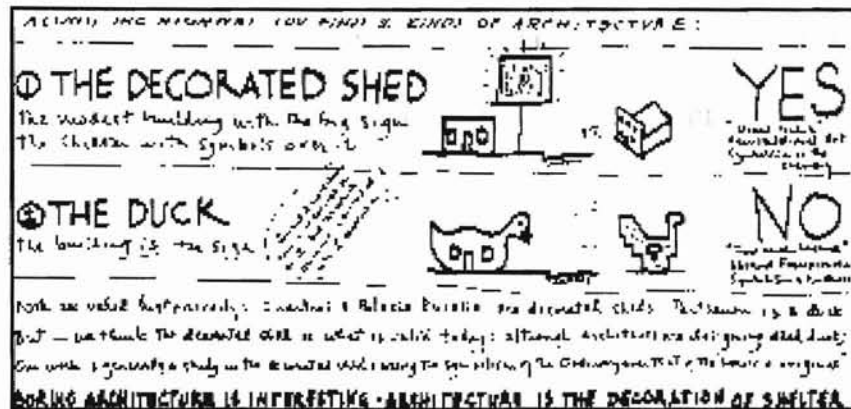


Figure 15. Sketch diagram of *the Duck and the Decorated Shed*. Robert Venturi & Denise Scott Brown, 1970. Adopted from C. Mead (Ed., 1989), *The architecture of Robert Venturi*, page 4.

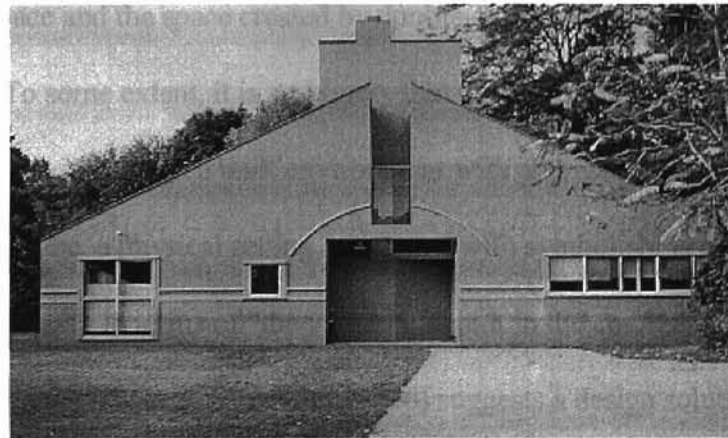


Figure 16. Vanna Venturi House, Chestnut Hill, Pennsylvania. Venturi & Rauch, 1961-64. Adopted from C. Mead (Ed., 1989), *The architecture of Robert Venturi*, Plate 2.

The above discussion is important to the present study. It suggests that a meaningful space can be created through association with past experience and aspiration. Csikszentmihalyi and Rochberg-Halton (1981) note when an object or event is meaningful to somebody, "it is interpreted in the context of past experience, either consciously, or unconsciously in the form of habit" (p. 21). The emotion evoked by the object or event is also "an interpretation or inference, a sign or symbol of one's attitude" (ibid.). To summarize, if a physical setting is articulated in a double-reading context, i.e., being created along with historic references, it may be considered a decorated shed, or a symbolic sign. In the present study, such a setting will be created as a symbolic sign with two sets of complimentary attributes: the rounded and square, and the void and solid.

Ambiguity as Manipulated Perceptually and Associatively

The concept of ambiguity is the key to assess a built environment articulated in double-reading context. It suggests, in reference to the present study, the significant role of the intermediate space and the space created by double-functioning elements in a given interior environment. To some extent, it is ambiguity that makes differentiation between an iconic sign and a symbol. Although a built environment with ambiguous ambience is not necessarily symbolic, a physical setting associated with symbolism is always ambiguous – at least in its context. In terms of "the variety inherent in the ambiguity of visual perception" (Venturi, 1966, p.), Venturi (1996) suggests a design solution known as "richness over simplicity and tension over unity" (p.140). From a historic perspective, it is a mannerist approach to the art that "acknowledged ambiguity as an essential aspect of meaning" (ibid.). Here, "the calculated ambiguity of expression" (Venturi, 1966, p. 29) is of

vital importance to explicit symbolism. As manifested in the façade of The Vanna Venturi House (Figure 16), a carefully calculated composition characteristic of its uneven placement of windows against an enormous broken pediment in the Chippendale fashion, it yields multiple levels of meanings among elements with varying values. According to this analysis, ambiguity, along with accordingly associated tension characteristic of the medium of architecture, are determined by the relationships termed as *complex and contradictory*, which have been a keynote to the Post-Modern architectural design. In his best-known writing, *Complexity and Contradiction in Architecture*, Venturi (1966) claims that

I like complexity and contradiction in architecture. I do not like the incoherence or arbitrariness of incompetent architecture nor the precious intricacies of picturesqueness or express or expressionism. Instead, I speak of a complex and contradictory architecture based on the richness and ambiguity of modern experience, including that experience which is inherent in art. (p. 22)

At the perceptual level, “ambiguity regarding a form’s original identity will result if the portion removed from its volume erodes its edges and drastically alters its profile” (Ching, 1996, p. 52), as diagrammed in Figure 17. In this diagram, after removal of a wedge-shaped portion from the cube, one of two resultant images – either the assemblage of a cube and a wedge, or the combination of two wedges – can be perceived depending on personal visualization. The degree of ambiguity depends on varied configurations of resultant shapes. Once these differentiated shapes are present in approximately equal proportions, the visual ambiguity of the composition reaches to its maximum. As described by Venturi (1966), this sort of perceptual ambiguity can be interpreted more or

less by the paradoxical statements characteristic of the conjunctive *yet* such as follows: Le Corbusier's Shodan House is closed at its corners yet open on its façade (Figure 18); the Tutor plan of Barrington Court is symmetrical yet asymmetrical; Guarini's church of the Immaculate Conception in Turin is a duality in plan and yet a unity; Sir Edwin Lutyens' entrance gallery at Middleton Park is directional space, yet it terminates at a blank wall; etc.

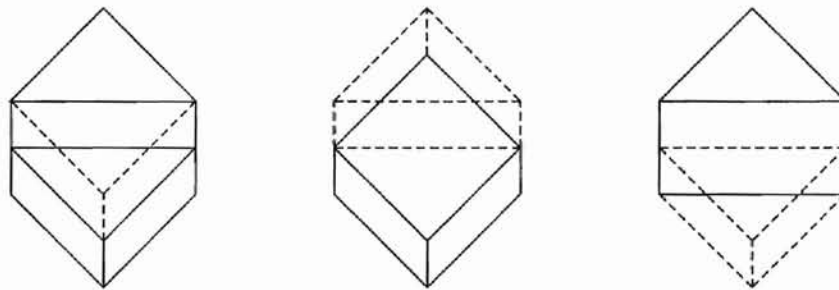


Figure 17. Diagram of perceptual ambiguity. Adapted from F. D. Ching (1996, 2nd ed.), *Architecture: Form, space, and order*, page 52.

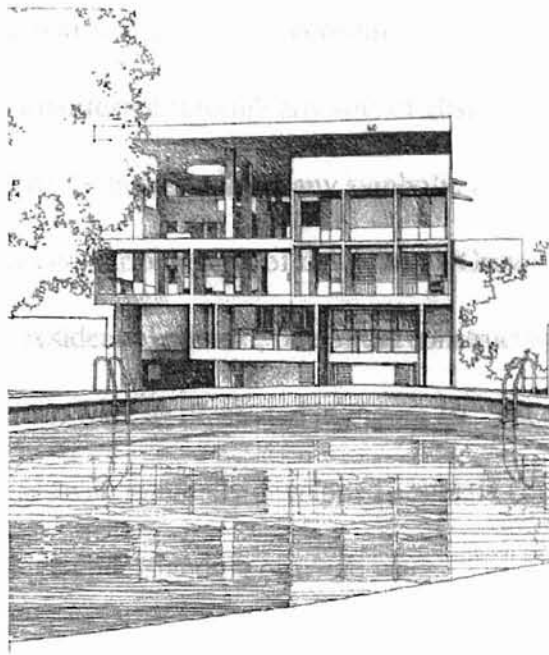


Figure 18. Shodan House, Ahmedabad, India, 1956, Le Corbusier. Adopted from F. D. Ching (1996, 2nd ed.), *Architecture: Form, space and order*, page 54.

From an associational perspective, ambiguity can be achieved through an introduction of historic references, or “an equal and complementary expression of ritual and symbol” (Graves, 1982, p.11), which is paralleled by “the technical or internal expression of a building” (ibid.). Here, Graves argues, in architectural context, that the technical or internal expression of a building, as strongly manifested in Modern architecture, must contribute to “purposeful ambiguity, the possibility of double readings within compositions”(ibid.). The latter, a poetic or external language that engages inventions of culture at large, is rooted in “a figurative, associational and anthropomorphic attitude” (ibid.). One of the best examples of this kind of double readings is manifested in the character of a wall. The wall, although more abstract as a geometric plane, has over time accommodated both pragmatic and symbolic divisions. With its horizontal tripartite completed by wainscot and soffit, a human scale is established, and the inhabitant’s

bodily presence within the room is accordingly secured. In this case, the symbolic meaning is not manifested through any sort of abstraction but the relationship of part to whole. Therefore, “it is essential in any symbolic construct to identify the thematic differences between various parts of the whole” (Graves, 1982, p. 12).

In a Chinese residential context, one of the constructive elements used to define interior spaces is the screen wall, as illustrated in Figure 19. The richness in design patterns of the screen wall suggests an internally developed aesthetic complex of ambiguity, and reflects the Chinese unique understanding of *yin & yang*.

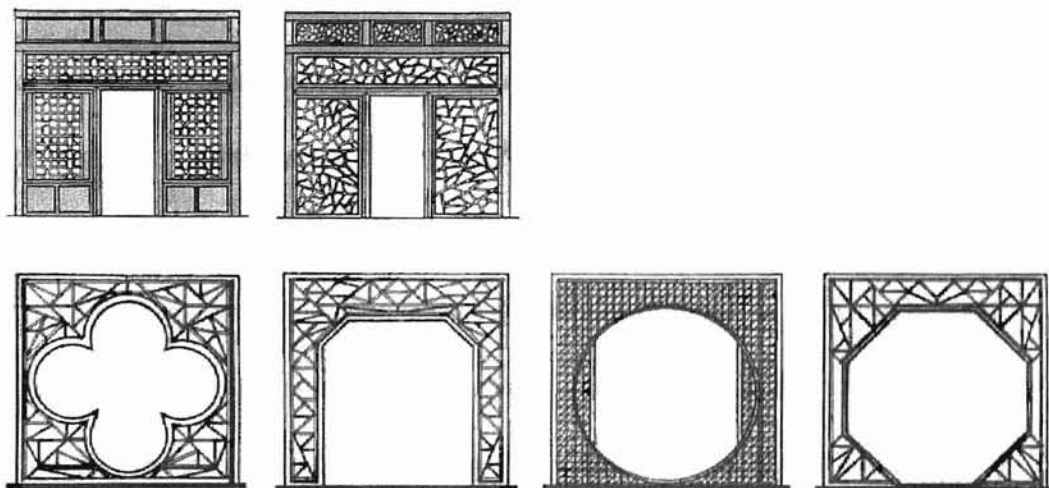


Figure 19. Latticework as shown on screen partitions in traditional Chinese houses. The ambiguous nature resulted from the lattice pattern gives symbolic significance to the screen partition. Adapted from E. Lip (1995), *Feng Shui: Environments of power*, pages 31, 34.

In reference to the discussion above, the verandah area in a traditional Chinese residence (Figures 6 & 7) certainly yields multiple levels of meanings due to its intrinsic

characteristics. It is open from within yet enclosed from outside. In terms of household needs, it serves as a public space yet a private domain as well. The verandah, sometimes including a deep entry, is both an interior extension and exterior space at once. It is the pathway of arrival and departure, a dramatic structure designed for the purpose of human transition.

Journey of Arrival and Departure

As mentioned by Malner and Vodvarka (1992), to a given built environment, transitional elements are not only functionally necessary, but also crucial in forming human experience of buildings as sensory objects. Arnheim (1983) has noted that a viewer's experience of a given built environment is participatory, particularly when he/she approaches or passes through the building. In this sense, along with visual attributes that help to form an appropriate objective percept, a given built environment can be perceived both as a spatial event outside the temporal dimension and as an event unfolding. In this case, beyond utility, "it is aesthetically indispensable that viewers become aware of the interplay between the timeless spatial structure and the time-bound avenues through the building" (p.17). The conclusion is that transitional pathways, such as corridors, entries, and staircases, have involved more dimensions than stationary spaces such as rooms, because the former is tied to human participation, whereas the latter is timeless in nature. Here, two concepts are noted: the goal and the journey. The goal, the point of arrival and departure in architectural context, is referred to as the room, the atrium, the piazza, and so forth. The journey, the path of arrival and departure, is referred to as the staircase, the corridor, the gateway, and the like. Both are functionally necessary in the built environment. The importance of the

journey can be further understood in the studies by Cooper (1974). In reference to the analysis by Bachelard (1969), whose idea of the self and nonself as the basic divisions of psychic space corresponds to the acknowledgement of the house and the non-house as the basic divisions of geographic space, Cooper (1974) postulates a concept known as *the house as symbol-of-self* in terms of collective unconsciousness. Here, the house is defined as one of the closest environments consciously or unconsciously selected by an individual as an outward manifestation of the self, or, as one “to represent or symbolize what is tantalizingly unrepresentable” (p. 131). It has two basic dimensions: its interior or the self as viewed from within, and its facade or the self that one chooses to display to others. Therefore, as suggested by Lawrence (1987), it is instructive to examine the role of transition spaces between the interior and the exterior of houses, and the role of privacy gradients from the most public to the most private room inside the house, in terms of affective and spatial dimensions of home interiors. In a study of spiritual path in sacred architecture, Barrie (1996) terms this kind of transition spaces as *threshold space*, which has been historically associated with a frequent occurrence of ritual activities. A threshold space not only establishes a boundary, but also symbolizes “passage from one mode of existence to another” (p. 58) in ritual context.

If transition space is particularly associated with multiple meanings, then it needs to possess an environmental identity, which would offer its occupants a sense of belonging and connection. To some extent, a space created by physical approaches has no room for its occupants. Without human participation, space is nothing else. “What matters is not space but the interior of space – and the inner horizon of the interior” (Eyck, 1962, p. 28). In this

sense, it is memory and anticipation that “constitute the real perspective of space” (ibid.), and give depth to space.

To the Chinese, this sense is particularly evoked from ritualistic associations as well as from aesthetic experiences, particularly when they are involved in daily activities throughout transition spaces such as the gateway and verandah. For instance, in ancient China, it was believed that the movement of evil spirits was associated with a straight path. As a result, an entry directly open to the residential interiors was not adopted. In the spatial layout of siheyuan, as shown in Figure 4, a screen wall decorated with symbolic signs such as Double-Happiness was normally required in order to protect the household from evil spirit, as well as to block the view from outside. Here, the screen wall was used to define a transitional zone. It was treated as a double-functioning element as termed by Venturi (1966), since it both addressed specific symbolic and utilitarian values. “The combination of the entrance and the screen wall not only provides the visitor with a feeling of seclusion, but also gives identity to the house” (Liu, 1989, p. 172). In this case, it is ritualistic attitude that determines prevalence of symbolic spaces and elements in a Chinese residence, since there seems to be no physical basis.

In an architectural context, an interior environment reminiscent of past experiences or historic aspirations can be created on the conceptual basis of *complexity and contradiction*, the source of ambiguity and tension necessarily associated with a meaningful built environment, as termed by Venturi (1966). Ambiguous in zoning and transformational in its relation of parts to whole, this interior environment can be articulated via a variety of architectural treatments such as screen space, back-lighting, punched-out, and the implication of infinite extension created by overlapping planes (Figure 20). In such a

solution, the boundaries of different zones are often left unclear, the space extended infinitely without apparent edge (Jencks, 1987), as shown in Figure 18. Most of these solutions, no matter how complicated in details, have a certain degree of similarity to traditional Chinese spatial articulation, which tended to suspend the clear ordering of events for a labyrinthine way that never reaches an absolute goal. In an analysis of conceptual relation between Post-Modernism and spatial articulation of a Chinese garden, which is normally considered as an organic part of a Chinese residence, Jencks (1987) indicates that

The Chinese garden crystallises a(n)...in-between space that mediates between pairs of antinomies, the Land of the immortals and the world of society being the most obvious mediation. It suspends normal categories which are built up in everyday architecture and behavior, to become “irrational” or quite literally impossible to figure out. In the same manner Post-Modernists complicate and fragment their planes with screens, non-recurrent motifs, ambiguities and jokes to suspend our normal sense of duration and extent. The difference, and it is a profound one, is that the Chinese garden had an actual religious and philosophical metaphysics behind it, and a built up conventional system or metaphor, whereas our complicated architecture has no such accepted basis of signification... Thus, although Post-Modern space may be in every way as rich and ambiguous as Chinese garden space, it cannot articulate the depth of meaning with the same precision. (p. 124)



Figure 20. An interior space articulated in Post-Modern style. Charles Moore & William Turnbull, Faculty Club, Santa Barbara, California, 1968. Notice that the punched-out walls, as lit from behind, suggest a rich layering of space and a certain mystery as to its extent. Adopted from C. Jencks (1987), *The language of Post-Modern architecture*, page 124.

Theoretically, this kind of articulation can be interpreted by a design language termed as *both-and* in contrast to that of *either-or* (Venturi, 1966). In architectural context, it is believed that *either-or*, a dominant phenomenon in the built environment today, is significantly reflected through the International Style Architecture, which tends to encourage “separation and specialization at all scales – in materials and structure as well as program and space”(p. 40). In such kind of structures, a sun screen is articulated as nothing else, and a flowing space as being outside when inside, and inside when outside, rather than both at the same time. This dominant phenomenon is argued by Brooks (1947) as early as

in the 1940s, who believed that the modern age is too much “disciplined in the tradition of either-or” (p. 75). In his opinion the modern age is really short of a mental agility “which would allow us to indulge in the finer distinctions and the more subtle reservations permitted by the tradition of both-and” (ibid.), one that admits a pluralistic affirmation of the choices offered by history. The importance of the *both-and* tradition in the built environment is further addressed by Venturi (1966) when he claims his preference as follows:

I am for richness of meaning rather than clarity of meaning; for the implicit function as well as the explicit function. I prefer “both-and” to “either-or,” black and white, and sometimes gray, to black or white. A valid architecture evokes many levels of meaning and combinations of focus: Its space and its elements become readable and workable in several ways at once. (p. 23)

Literally, a preference for “black and white, and sometimes gray” rather than “black or white” has a vital concern of gray space in the built environment. It is why Stern (1977) would rather identify Venturi as one of *grays*, an architect of ambiguity who mediates between the exclusive *either-or* positions of black and white by searching the hybrid possibilities of *both-and*. Kurokawa (1991), one of the best-known contemporary Japanese architects, has termed this preference as *aesthetics of gray*. A gray space, or *intermediate space* called by Kurokawa here, is a transition space between inside and outside. It does not have to be physical because it can be created by psychological cues. Venturi (1966) has identified certain *double-functioning elements* as ones that may contribute to a *both-and* phenomenon, a phenomenon of inherent double-meanings. The

double-functioning elements are those that serve as utilitarian and symbolic supports simultaneously in the built environment. Examples include a gallery that serves as a corridor and a room at once, a window that becomes a niche in a Baroque building, and a screen wall that integrates domestic sign as a division. Accordingly, in a given interior environment, boundaries and peripheral areas, along with a variety of architectural details such as the space beneath eaves, corridors, and lattice openings can be defined as *double-functioning elements* as well, since they are much more associated with ambivalence and multivalence at the perceptual level (Kurokawa, 1991). This is why the keystone, a classic motif resting on an arch, has been repeatedly used as a signature of architecture by Graves. In most cases, a keystone is a *double-functioning element* because it closes the arch at the same time as it belongs to the opening.

The concepts of intermediate space and ambiguity are important keys to understanding the aesthetics of gray. They are linked to the idea that a space is unobstructed by any dualistic division between inside and outside, such as a solid wall used for an absolute demarcation between private and public spaces in residential interiors. In the interpretation of his Philosophy of Symbiosis, Kurokawa (1991) suggests “an architecture that incorporates intermediary space, full of charm and mystery as an alternative to the rationalism and dualism of Modernism” (p. 107). In his opinion, a space free from the divisions of solid walls is more able to reinforce the communication to its occupants, since it is gray in terms of its delineation. Here, two ways to manipulate opposite elements in architecture are noted: one is by contrast, which tends to strengthen the power of each; the other, by transition, which tends to unify them without ignoring each characteristic. Since the modern age tends to “reject vagueness by forcing it into a

dualistic mold” (p. 75), individuals often find themselves in a dualistic situation, a selective situation between the exterior and interior, public and private, good and evil, eternal and momentary, and the like. In architectural context, this dualism is transcended through a dialectical method by which the two opposites are resolved on a higher level. The two opposites are either unified into a single entity, or one of the two is negated and rejected. The aesthetics of gray instead suggests a dynamic relationship between the two elements while allowing them to remain in opposition. The result is an “ally of significant ambiguity” (Eyck, 1962, p. 29), which “allows spaces to enter each other and occasions to encounter each other in the mind’s interior” (ibid.).

For space articulation in a given interior environment, a relationship between two opposite elements can be achieved by placing spatial distance or temporal distance between them. A spatial distance usually refers to a neutral zone, while a temporal distance corresponds to a cool-off interval. The former, as diagrammed in Figure 10, can vary in shape, size and nature, and determine the visual and spatial relationship between the two spaces with which they share a common bond. The latter is particularly manifested in a traditional Japanese house (Figure 21), where the removal of shoes upon a raised floor level, a spatial order “symbolized by the architecture of the floor” (Ashihara, 1983, p. 17), is required to define a sacred private domain.



Figure 21. Interior view of a traditional Japanese architecture. The small *Shoin* of *Manshu-in*, 1655. Kyoto, Japan. Adopted from Kiyoshi Hirai (1973), *Feudal architecture of Japan*, Figure 129. New York: Weatherhill & Heibonsha.

The multivalence of a gray space can be recognized through Lippold's study of art structure, in which a cryptic diagram is created between two white pages and two black pages, as shown in Figure 22. This diagram, as illustrated through energetic particles of black isolated by whiteness, is used to reveal the inner structure of black as expected by the artist. It will be noted on close inspection, that there is an order to the little particles, yet it is as deceptive an order, in its relation to reality, as is the order of the chaotic struggle of matter and anti-matter in relation to the form of shapes in space. Thus,

This drawing then, is both something and nothing; it is black and white, it is empty and full. It is as "abstract" as the principles behind the operation of all things, and it is as "real" as the operation of those principles. It is a visual set of laws which in the finished sculpture are broken by the "accidents" of four-dimensional existence, of light, of point

of view, and of perspective. It is also, conversely, the accident of a particular artist's vision in a particular moment in "history", thus becoming a specific, identifiable entity, a "law" - a formula for these particular chance occurrences (Lippold, 1965, p. 163).

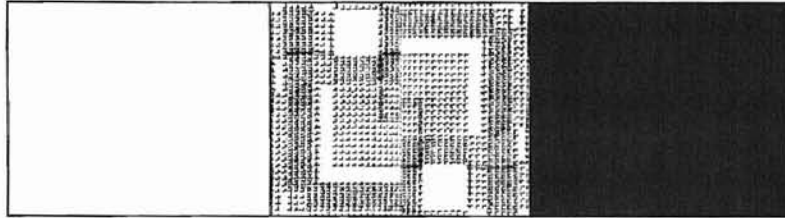


Figure 22. Diagram of art structure. R. Lippold, 1965. Adapted from G. Kepes (Ed.), *Structure in art and in science*, page 160.

The necessity of a gray space in a residential environment can be further understood by the Japanese domestic concept of *ma*, which is evidenced in the presence of verandah in Japanese traditional residences. Hall (1966) has noted a conceptual difference toward space between Westerners and the Japanese. According to his analysis, for Westerners the space is only the distance between objects. It is perceived as the empty. To the average Westerner, "the house is an object defined by the building walls whether seen within or without" (Greenbie, 1988, p. 43). As a result, throughout the Western world the townscape is primarily built as "an aggregated building-as-objects" (ibid.). Thereafter, it is always the arrangement of objects other than the space as an independent entity that becomes the first concern in the built environment. For the Japanese, who are trained to give meaning to space, space is the *ma*, the interval within spatial and temporal

experiences. Thus, the *ma*, or the interval, is apparently “a hidden consideration” (Hall, 1966, p. 143) in the layout of all spaces. Kurokawa (1991) has described how significantly an *engawa*, the verandah surrounding a traditional Japanese house (Figure 23), involves in Japanese daily life. An *engawa*, in Japanese cultural context, is a *ma* because it offers an interval, or transition between inside and outside. It not only physically connects inside and outside, but also supports daily activities. For instance, in Japan a house owner often uses the *engawa* to entertain the guests, or make deals with the merchants for groceries. In other words, since the *engawa* is a place where daily activities often take place, it eventually becomes a meaning-intensive zone in Japanese residential context.



Figure 23. Guest Hall of *Kangaku-in*, 1600. *Onjo-ji* temple, Otsu, Japan. Notice the *engawa*, the veranda area surrounding the hall. Adopted from Kiyoshi Hirai (1973), *Feudal architecture of Japan*, Plate 77.

Dimensions of Symbolism

In an architectural context, symbolic dimensions can be delineated within a variety of frameworks. For instance, in a diagram designed for a lecture in Tokyo in 1990, Venturi (1996) listed a couple of symbolic concerns, such as the aesthetically based, the ideologically based, and the culturally relevant, etc., to intellectually locate his design philosophy. Csikszentmihalyi and Rochberg-Halton (1981) believe that the objects used by human beings through time and space are “the signs on a blueprint that represent the relation of man to himself, to his fellows, and to the universe” (ibid., p. 38). In this sense, environmental symbolism can be interpreted on the following three levels: the personal that expresses the purpose to animate individual lives, the social that explores the attempt to bind them to or divide them from each other, and the cosmic that focuses on the great natural phenomena controlling the rhythm of life. Lang (1987) categorizes building configuration, spatial configurations, materials, the nature of illumination, color, and the nonvisual environment as the variables of the built environment that may carry symbolic meaning. For instance, as for spatial configurations, “the consumption of space *per se* is an important symbol” (p. 206). In this case, a set of dichotomous spatial variables, such as delineated space vs. open space, verticality vs. horizontality, can be identified as potential carriers of architectural meaning.

In reference to the present study, in Chinese residential context the symbolic dimensions can be categorized as the ritual-oriented or aesthetic-based.

The Ritual-Oriented

The ritual dimension refers to culturally defined behaviors manifested through residential settings, such as behavior taboo in a given environment. Feng Shui, if understood in terms of collective unconsciousness, is basically a ritual dimension. This dimension is evidenced in a variety of non-architectural treatments in Chinese residences. One example is to place a piece of mirror above the entry door to offset the force of evil, because many Chinese believe that a mirror is capable of detecting the appearance of evil.

The associational capability is the first concern to the ritual dimension noted above. Based on this consideration, the following dimensions: symmetrical-asymmetrical, straightforward-contradictory, clear-ambiguous, and central-periphery, etc., are particularly ritual-oriented.

The Aesthetics-Based

The aesthetic dimension can be defined as the reference that is understood through shared perceptions of the built environment. It involves sensory reactions to the given objects, in which conventional physical figures such as constructional norm and decorative motifs are particularly emphasized.

In Chinese residential context, the aesthetic dimension is generally determined by perceptual ambiguity. This perceptual ambiguity may result when two complementary forms interlock as a whole. The included complementary attributes are listed as follows: open-closed, square-rounded, vertical-horizontal, straight-curved, and plain-decorated, etc.

To summarize, the prototype of a traditional Chinese dwelling can be identified as ritualistic in spatial layout and ambiguous in structural variation. It is, as described by

Knapp, a “humanized space...symbolic of family unity and sanctuary, a public statement of status as well as a tangible expression of the family’s aspirations” (1990, p. 51). The balance between the complementaries is the major concern in Chinese environmental orientation. In architectural context, it is manifested through either transition space, or complementary setting created by detail treatment and furniture arrangement. In both cases a perceptual association is necessarily required to evoke symbolic meanings.

In design vocabulary, balance is defined as equilibrium. It results when interactive forces, attractions, or weights tend toward resolution. Through balance a sense of equipoise is evoked. This may range “from static permanence to repose and from suspended animation to actual motion” (Faulkner, R., Nissan & Faulkner, S., 1986, p. 210). To a given house interior, balance can be achieved either at the perceptual level by dealing with the visual weight of architectural features and furnishings, which is determined by the psychological impact it makes on individuals and the attention it demands, or from the associational perspective by working more in terms of collective unconsciousness, as manifested through the practice of Feng Shui.

CHAPTER III

METHODOLOGY

Selection of Subjects

Two hundred subjects were selected at random out of over 600 Chinese living in Tulsa, Oklahoma.¹ Only those whose ages were above 18 were considered as qualified subjects in order to obtain effective responses. The sampling was conducted via the directories of the Chinese-American Association of Tulsa, Tulsa Chinese Christian Church, and Tulsa International Baptist Church.

The sampling procedure is described as follows: first, a list of subject names was acquired and numbered through the directories noted above. To ensure a name to be listed only once, any names repeated in the directories were ignored. Then a calculator was used to generate 200 random numbers from the list. Those whose names corresponded to the generated numbers were selected as the subjects of the survey.

Research Instrument

The research instrument was a paper-and-pencil questionnaire (See Appendix B) that was used to determine subjects' ritualistic and aesthetic orientations toward residential environments, and their referenced design preferences.

¹ The number of Chinese included in the population here is a rough estimate via the directories of the Chinese-American Association of Tulsa, Tulsa Chinese Christian Church, and Tulsa International Baptist Church. The total number of Chinese living in the Tulsa area is likely more than 600, as it is difficult to know how many Chinese live in Tulsa but are not included in the directories.

The questionnaire consisted of three sections including: a brief demographic survey, followed by six line drawings to serve as stimuli with regard to the subjects' housing preferences, and lastly, a 16-item semantic scale in a 7-point bipolar response format. Subjects were asked to respond on the 7-point response scale in order to identify and rate their perception of the ritualistic and aesthetic characteristics, as well as their preferences of the given interior vista. In order to ensure readability, a Chinese translation of the questionnaire was provided for the convenience of the subjects. The questionnaire was designed to obtain information about the subjects' housing preferences, in reference to specific residential settings as illustrated by the line drawings noted above.

Section 1: The Demographic Survey

The demographic section of the questionnaire consisted of six questions, which covered age, sex, marital status, nationality, educational background, and professional status of the subject. The information collected from the demographic survey was used to describe the subjects, and establish sub-groups for subsequent attitudinal analysis.

Section 2: The Line Drawings

The six line drawings were isometric house interiors rendered in black and white (see Appendix B). They were developed on the basis of the floor plan of a massively built complex unit, as advertised in the newspaper (Figure 24). In order to test the research hypotheses, a new structure was added in the doorway area to define an intermediate space within the living room. The newly created intermediate space was used to serve as a

transition zone in a residential context. It was horizontally delineated by an elevated plane (illustrated as a raised floor area) and an overhead plane (illustrated as a drop-down ceiling) at first, as diagrammed in Figure 25; and then was vertically reinforced by *Space Establishing Elements* (or SEEs), which was diagrammed by Thiel, Harrison & Alden (1986) in Figure 26.

SEEs were generalized as being of three types: *objects*, aggregations of objects termed as *screens*, and *surfaces*.^{*} Each of the proposed intermediate spaces had a degree of visual explicitness, which ranged from the lowest (LV) for the simple presence of objects (illustrated as two columns), followed by the medium one (MV) for the exclusive array of objects (illustrated as a see-through screen), to the highest (HV) for the total domination of surfaces (illustrated as a solid wall with a small opening on it in order to adjust visual weight with other two types of SEEs), respectively. All six drawings were organized in such a way that they were alike in view, size, height, and number and arrangement of furniture pieces. Any stylistic features were minimized in order to maintain visual consistence of the stimuli as possible. Other features such as shading of the drawings, etc. were controlled so that the interiors looked alike except for SEEs, i.e. the structural variation in the proposed physical setting at the doorway area. Each of the six drawings was associated with the identical semantic scale noted above, which served as the dependent variables. The subjects were asked to evaluate each drawing by responding to the semantic scale, in accordance with their personal experiences.

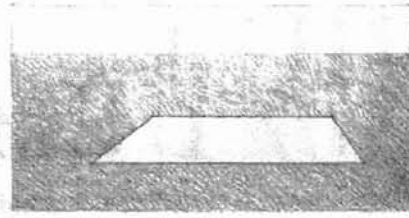
^{*} To simplify the survey, the SEEs were manipulated as vertical elements only. The articulation of floor and ceiling, which are termed as *base plan* and *overhead plan* respectively (Ching, 1996), is not discussed in detail here.

The advertisement is for a residential complex named 'Wen Hua Yuan' (文苑). It features a central floor plan of a two-bedroom unit with a living room and dining area. The floor plan is annotated with several key features:

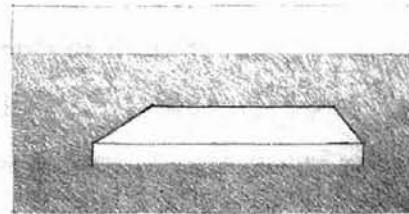
- Top left: '总价 27.8-32.5' (Total Price 27.8-32.5)
- Top center: '文苑' (Wen Hua Yuan)
- Left side annotations:
 - 「全新装饰风格，精装修标准，绝对超值」 (Brand new decoration style, high-quality decoration standard, absolutely super value)
 - 「完善的生活圈，让您的家更温馨，更舒适」 (Perfect living circle, making your home warmer and more comfortable)
 - 「贴心的物业服务，让您的家更有品味，更有格调」 (Thoughtful property management service, making your home more refined and stylish)
- Right side annotations:
 - 「名师精心设计，建筑大师亲自把关，绝对让人眼前一亮」 (Expert design, supervised by a master architect, absolutely eye-catching)
 - 「国际品牌建材，完全符合国家一级标准，绝对让您住的放心」 (International brand materials, fully compliant with national Class 1 standards, absolutely giving you peace of mind)
 - 「项目位于最佳地段，交通便利，周边配套齐全，绝对是您置业的首选」 (Project located in the best location, convenient transportation, complete surrounding facilities, absolutely your first choice for investment)
 - 「品牌开发商，品质保证，让您买的放心，住的安心」 (Brand developer, quality guaranteed, making you buy with confidence and live with peace of mind)
- Bottom center: 「二期一房二卫，最具投资价值的户型」 (Phase 2, 1 bedroom 2 bathrooms, the most valuable investment type)
- Bottom left: A small map showing the project's location relative to the 'Wen Hua Yuan' station and surrounding roads.
- Bottom right: Contact information including '54785588' and '5'.

At the bottom of the advertisement, there is a slogan: 「健康 · 教育 · 安全 · 全龄化」 (Health · Education · Safety · All-age).

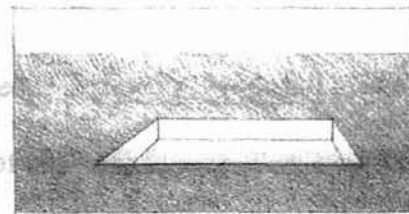
Figure 24. Advertisement for a high-rise residential complex. The illustrated floor plan is of a two-bedroom unit, which includes a living room and a dining area. Adapted from *Shanghai Evening News*, February 25, 2002.

**Base Plane**

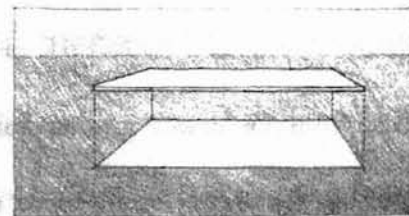
A horizontal plane laying as a figure on a contrasting background defines a simple field of space. This field can be visually reinforced in the following ways.

**Elevated Base Plane**

A horizontal plane elevated above the ground plane establishes vertical surfaces along its edges that reinforce the visual separation between its field and the surrounding ground.

**Depressed Base Plane**

A horizontal plane depressed into the ground plane utilizes the vertical surfaces of the lowered area to define a volume of space.

**Overhead Plane**

A horizontal plane located overhead defines a volume of space between itself and the ground plane.

Figure 25. Diagram of horizontal elements defining space. Adapted from F. D. Ching (1996, 2nd ed.), *Architecture: Form, space, and order*, page 99.

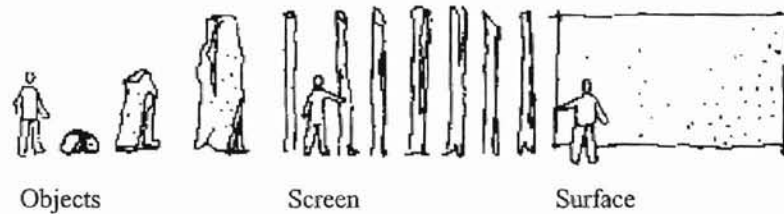


Figure 26. Types of Space Establishing Elements (in the side position). Source: Thiel, P., Harrison, E. D., & Alden, R. S., 1986. The perception of spatial enclosure as a function of the position of architectural surfaces. *Environment and Behavior*, 18, 227-245.

The SEEs used to define the proposed intermediate spaces were coded as follows: a column, a row of columns identified as a screen, and a solid wall. In order to weight visual consistence among three types of SEEs, a small opening was applied to the solid wall noted above. To further incorporate ritual dimensions into the given interior settings, a physical setting was added into the doorway area to complete the establishment of the transition zone. In the real world, such a physical setting could be either a piece of furniture, or a built-in structure. Illustrated as two interlocked blocks or volumes, this physical setting was articulated along with two sets of complimentary attributes: angular vs. curved, and solid vs. void. Although more variables, such as horizontal vs. vertical, etc., can be added into the complementary list, it seems that only these two sets of attributes determine form, space and order of Chinese residential environments at most. The resultant degrees of perceptual and/or associational ambiguity is determined by alternative manipulation of these attributes, and used to code each of the six drawings. For example, if a space is dominated by a curved and a square volumes, then the space will be considered as of high degree of ambiguity due to the presence of a high contrast

scale between the formal and/or associational characteristics of the volumes. On the other hand, if a space is defined by two angular (or curved) blocks, then the space will be considered as of low degree of ambiguity because of its identity to homogeneous formal and/or associational qualities between the SEEs. In the present study, two geometric forms, the square and the circle, were used to manipulate the first set of complimentary attributes (angular & curved). The two geometric forms were organized into the following compositions: a square interlocked by a square, and a square interlocked by a circle (Figure 27). For example, in each of the six line drawings, an overhead plane (illustrated as the drop-down ceiling in the doorway area) was delineated as to interlock with a base plan (dominated by a physical setting between living and dining areas), which determined basic configuration of the intermediate space. The second set of complimentary attribute (solid & void) was manipulated through additive and subtractive transformation, as illustrated in Figure 28. To summarize, additive transformation attaches solid elements to a parent form, whereas subtractive transformation creates volumes of space. For example, in each of the proposed physical settings, a subtractive transformation was completed by removal of a portion of volume from a predefined solid block. The degree of the subtractive transformation determined the level of the ambiguity of the resultant physical settings. Generally speaking, the bigger the volume was subtracted from a solid block, the greater degree of the void would be associated with the resultant physical setting. As a result, a setting with low degree of ambiguity was created by the presence of two blocks in same geometric shapes (angular & angular), with a small portion of volume being removed from an angular block, and coded as the low ritual-based (LR). Similarly, a setting with high degree of ambiguity was defined by the

presence of two blocks in complementary shapes (angular & curved), with a curved block untouched, and a bigger portion of volume being subtracted from an angular block, and coded as the high ritual-based (HR).

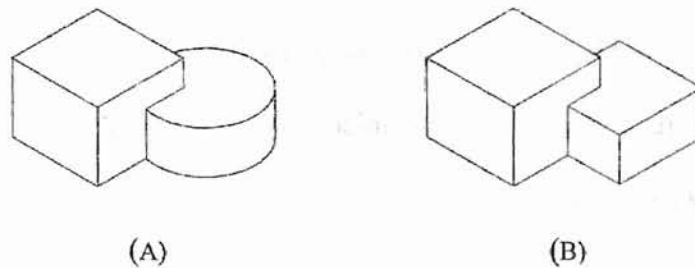
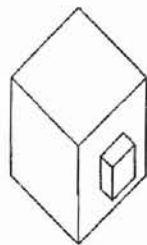
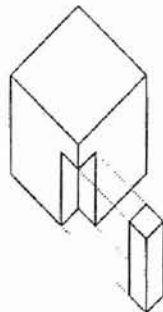


Figure 27. Diagram of interlocked geometric shapes.



Additive Transformation:
A form can be transformed by the addition of elements to its volume. The nature of the additive process and the number and relative sizes of the elements being attached determine whether the identity of the initial form is altered or retained.



Subtractive Transformation:
A form can be transformed by subtracting a portion of its volume. Depending on the extent of the subtractive process, the form can retain its initial identity or be transformed into a form of another family.

Figure 28. Diagram of additive and subtractive transformations. Adapted from F. D. Ching (1996, 2nd ed.), *Architecture: Form, space, and order*, page 48-49.

The drawings are labeled as 1, 2, 3, 4, 5 and 6. To test the importance of the two levels of ritual dimension and the three levels of visual explicitness of the transition space, each of the six drawings was coded as follows: Drawing 1 as being high ritual-based with low visual explicitness (HR & LV); Drawing 2 as being low ritual-based with low visual explicitness (LR & LV); Drawing 3 as being high ritual-based with medium visual explicitness (HR & MV); Drawing 4 as being low ritual-based with medium visual explicitness (LR & MV); Drawing 5 as being high ritual-based with high visual explicitness (HR & HV); and Drawing 6 as being low ritual-based with high visual explicitness (LR & HV), respectively. Notice that Drawing 1 (HR & LV) and Drawing 2 (LR & LV) were on the same level of visual explicitness, because in each of these two drawings the transition space was defined by single columns (or objects). However, unlike the case in Drawing 1, where a curved block was interlocked with an angular volume, in Drawing 2 the whole physical setting was consistent in its angular qualities: an interlocked physical setting in angular shape was created to reinforce an angular space. As a result a low ritual value was assigned to Drawing 2, whereas a high ritual value was assigned to Drawing 1. The same principle applied to Drawing 3 (HR & MV) and Drawing 4 (LR & MV), and Drawing 5 (HR & HV) and Drawing 6 (LR & HV). All the structural components (the SEEs and the physical setting, etc.) used to create the intermediate spaces in all six drawings were highlighted in tone, in order to direct the subjects to focus on the perceptual and associational qualities of the given interior vista. The specific description and corresponding coding of each drawing are summarized in Figure 29.

Drawing No.	Structural Components Used to Define the Transition Space	Corresponding Coding
1	Two Columns Interlocked Angular & Curved Blocks	HR & LV
2	Two Columns Interlocked Angular Blocks	LR & LV
3	A Screen Interlocked Angular & Curved Blocks	HR & MV
4	A Screen Interlocked Angular Blocks	LR & MV
5	A Solid Wall Interlocked Angular & Curved Blocks	HR & HV
6	A Solid Wall Interlocked Angular Blocks	LR & HV

Figure 29. Description and coding for each of the six line drawings.

Section 3: The Semantic Scale

The questionnaire required the subjects to rate the connotative meanings associated with the proposed intermediate spaces, which were represented by black-white line drawings as noted above, on the 16 semantic items. The majority of the 16 bipolar adjectives selected for the survey were determined in terms of ritualistic and aesthetic considerations.

The semantic scale was developed on the basis of a pilot test, during which a pool of bipolar adjectives possibly associated with the proposed interior vistas was sorted. The pool of bi-polar adjectives was generated from those that were used to assess connotative meanings of the built environment (Hershberger, 1972). In order to measure a subject's responses to the interior vistas in the six line drawings, for example, all bipolar adjectives were translated into the following format:

Pleasing _____ Annoying

The semantic differential, a general measuring technique developed by Osgood, Suci, and Tannenbaum (1957) to measure connotative meaning, was selected to obtain judgements of meaning from the subjects in reference to the given line drawings. In the present study, the semantic differential used 16 sets of bipolar adjectives to differentiate the meaning of concepts associated with each given interior vista. The scale was divided into seven points as follows:

Pleasing _____ Annoying

Each subject was asked to consider the concept and place a check mark in the blank in which he/she thought the meaning of the concept lies. From left to right on the above example, a check mark in the blank would indicate: *extremely pleasing, quite pleasing, slightly pleasing, neither pleasing nor displeasing (or neutral), slightly annoying, quite annoying, extremely annoying*, respectively. For example, the following

Pleasing _____ X _____ Annoying

would indicate *slightly pleasing*, an affective degree associated with the above scale.

Pilot Study

The questionnaire was administered to four Chinese volunteers living in Tulsa and one Chinese graduate student living in Stillwater, Oklahoma, as a pilot study. The five individuals were excluded from the group of the subsequent survey respondents. They were instructed to complete the questionnaire and to comment on the questionnaire if terms or description were difficult to understand. The results from the pilot study were examined in

order to refine the instrument, which included reducing the number of adjective pairs to 16 (15 pairs for factor analysis and 1 pair for overall preference assessment).

Procedure

The questionnaire, along with a cover letter (See Appendix C) that requested subject's voluntary participation in the survey, was distributed to the selected subjects by mail within a one-week period. The subjects were asked to complete the questionnaire and mail it back to the investigator. A stamped and self-addressed envelope was provided along with the questionnaire. A follow-up letter (See Appendix D) was mailed to the subjects who did not respond within two weeks.

Statistical Analyses

Statistical analyses includes two sections: analysis of variance (AVOVA) with regard to subjects' preference for the interior vista as illustrated in the six line drawings, and factor analysis with regard to subjects' affective and evaluative responses to the interior vista as illustrated in the six line drawings

Descriptive statistics such as frequency, percentage and measurement of central tendency was used to analyze the demographic data from the survey. For the subjects together as a group, descriptive statistics was used to summarize their preference ratings on the interior vistas as illustrated in each of the six line drawings.

The ANOVA was conducted on the basis of a 2 x 3 factorial design. Independent variables for this factorial design were Ritual Orientation and Visual Explicitness, which were associated with the interior vistas illustrated in the six line drawings, as shown in

Appendix B. The variable Ritual Orientation was demonstrated by manipulations of two geometric blocks: the rounded and the square with alternative degree of solidness and voidness. It was compared at two levels: Low Ritual-Oriented and High Ritual-Oriented. The variable Visual Explicitness was represented by the presence of three types of Space Establishing Elements (SEEs): objects, screen, and surface. It was compared at three levels: Low Visual Explicitness, Medium Visual Explicitness, and High Visual Explicitness. Dependent variables for this study were the subjects' responses on one of the bipolar adjective pairs, specifically, "preferred/not preferred," with regard to subjects' preferences for the interior vistas as illustrated in the six line drawings.

Exploratory factor analysis was performed on the data collected from the subjects' responses on the remaining 15 bipolar adjective pairs, such as "active/passive," "pleasing/annoying," and "straightforward/contradictory," etc. This was done to search for the constructs that may explain the subjects' overall preferences with regard to given interior vistas as illustrated in the six line drawings. Independent variables for the current factor analysis were the alternative interior vistas as illustrated in the six line drawings, whereas dependent variables were the subjects' affective and evaluative responses as measured by the 15 bipolar adjective pairs noted above. To identify the constructs or common factors possibly determined by a group of the bipolar adjective pairs, Varimax factor loadings on each of the six line drawings were listed and examined. The results from the factor analysis were used to determine if there was a correlation between the subjects' overall preference assessment and the undergoing constructs via a linear regression model.

CHAPTER IV

RESULTS AND DISCUSSION

Introduction

The results and discussion of the current study are presented in this chapter. The research data are organized into three sections. The first section describes the characteristics of the respondents. Demographic information about the subjects is reported under the heading, Description of the Respondents, which includes subjects' age, sex, marital status, years living in specific countries or geographical areas, educational level attained, and current professional status. The second section, Statistical Analysis and Results, presents the findings from the hypotheses testing and the results from factor analysis for the semantic differential. The final section, Discussion of the Findings, provides a brief discussion of the results from the hypotheses testing and factor analysis.

Description of the Respondents

There are 60 usable responses out of 64 questionnaires collected from the subjects, which yielded a 30% response rate out of 200 subjects. The ages of the respondents ranged from 19 to 64 years with an average age of 32, as given in Table 1. Among the total 60 effective respondents there were 33 males (55.0%) and 27 females (45.0%), a fairly balanced variance on gender. As for marital status, 22 were single (36.7%) and 38 were married (63.3%). As for educational level attained, 5 (8.3%) graduated from high

school, 18 (30.0%) graduated from college or university, 35 (58.4%) had a master's degree, 2 (3.3%) had a doctoral degree. The professional status of the respondents is categorized as follows: 26 students (43.3%), 18 engineers (30.0%), 11 administrative staff (18.3%), 3 other professional positions (5.0%), and 2 others (3.3%).

Table 2 presents the residence history of the subjects. An average of 28 years living experience in China and 3.5 years in the United States was reported by fifty-four respondents (90.0%), 25 years living experience in Taiwan and 5.5 years in the United States was reported by five respondents (8.3%), and 20 years living experience in Hong Kong and 2.0 years in the United States was reported by one respondent (1.7%).

Michigan State University Library

Table 1

Characteristics of the Respondents

Characteristics	Frequency	Percent (%)
Age		
Below 20s	2	3.3
20s	22	36.7
30s	26	43.3
40s	9	15.0
50s	0	0.0
60s	1	1.7
Total	60	100.0
Gender		
Male	33	55.0
Female	27	45.0
Total	60	100.0
Marital Status		
Single	22	36.7
Married	38	63.3
Total	60	100.0
Educational Level		
High School	5	8.3
College or University	18	30.0
Master's Degree	35	58.3
Doctoral Degree	2	3.3
Total	60	100.0
Professional Status		
Student	26	43.3
Engineer	18	30.0
Administrative	11	18.3
Other Professional	3	5.0
Other (Unemployed, etc.)	2	3.3
Total	60	100.0

Table 2

Residence History of the Respondents

Origin of Country/Area	Frequency	Percent (%)	Average Yrs. of Residence in Given Locations	Average Yrs. of Residence in US
China	54	90.0	28	3.5
Taiwan	5	8.3	25	5.5
Hong Kong	1	1.7	20	2.0
Total	60	100.0		

Statistical Analyses and Results

The research design of the current study was a 2 x 3 factorial design. Independent variables for this investigation were Ritual Orientation and Visual Explicitness as associated with the interior vistas illustrated in the six line drawings, as shown in Appendix B. The variable, Ritual Orientation, was represented by the manipulation of two geometric blocks: the rounded and the square with alternative degree of solidness or voidness. It was compared at two levels: Low Ritual-Oriented and High Ritual-Oriented. The variable, Visual Explicitness, was represented by the presence of three types of Space Establishing Elements (SEEs): objects, screen, and surface. It was compared at three levels: Low Visual Explicitness, Medium Visual Explicitness, and High Visual Explicitness. Dependent variables for this study were the subjects' responses on the bipolar scales with regard to their preferences for the interior vistas illustrated in the six line drawings, as determined by

the adjective pair, “preferred/not preferred,” and the subjects’ affective and evaluative responses as measured by the remaining 15 bipolar adjective pairs associated with each of the six line drawings as well.

Statistical analyses includes two sections: analysis of variance (ANOVA) with regard to subjects’ overall preference for the interior vista as illustrated in the six line drawings, and factor analysis with regard to subjects’ affective and evaluative responses to the interior vista as illustrated in the six line drawings.

Analysis of Variance (ANOVA)

The first section involves hypotheses testing for the subjects over evaluation of the interior vistas and the design factors using analysis of variance. This is achieved by assessing the subjects’ responses on the bipolar adjective pair, “preferred/not preferred” in a 7-point Likert-type response format for each of the six line drawings. Table 3 gives the mean and standard deviation scores for each line drawing. Based on the mean values illustrated in Table 3, the subjects’ preference for the interior vistas in decreasing order are as follows: drawing 1, drawing 3, drawing 5, drawing 2, drawing 4 and drawing 6, with drawing 1 being most preferred and drawing 6 least preferred.

Table 3

Mean and SD Scores for the Bipolar Scale with Regard to Subjects' Overall Evaluation of the Interior Vistas as Illustrated in the Six Line Drawings

Source	<u>n</u>	Mean	SD
Drawing 1	60	2.9500	1.4073
Drawing 2	60	3.8500	1.4241
Drawing 3	60	3.3500	1.4700
Drawing 4	60	4.0667	1.6142
Drawing 5	60	3.8000	1.5924
Drawing 6	60	4.2167	1.6166

Note. Measured on 7-point Likert-type scale with 1 being most preferred and 7 being least preferred in evaluation.

Hypothesis 1

The General Linear Model ($Y_{ij} = \mu + \alpha_i + \varepsilon_{ij}$) was used to test Hypothesis 1 as follows:

H_0 : There is no significant difference among the subjects' preference ratings with regard to the interior vistas as illustrated in the six line drawings.

Analysis of variance (ANOVA) was applied to the subjects' ratings on the bipolar adjective pair "preferred/not preferred," to determine if the subjects' overall evaluations of the interior vistas as illustrated in the six line drawings were significantly different. Table 4 illustrates the results from the analysis. A significant main effect on the subjects' ratings was found, for $F = 5.78$, $p < .0001$. Therefore, at the 95% confidence level, the null hypothesis was rejected. In other words, it was reported that significant difference(s) were present somewhere among the subjects' preference with regard to the interior vistas as illustrated in the six line drawings.

Table 4

ANOVA: Subjects' Overall Preference Rating with Regard to the Interior Vistas as Illustrated in the Six Line Drawings

Source	<u>df</u>	SS	MS	<u>F</u>	<u>P</u>
Model	5	67.1222222	13.4244444	5.78	<.0001
Error	354	821.6666667	2.3210923		
Corrected Total	359	888.7888889			

In order to determine where such a significant difference lies, a Fisher LSD test for the drawings' grouping was conducted on the subjects' preference data. The results given in Table 5 show that there is a significant difference between the three listed groups and no significant differences within the group. Table 5 also shows that there is a significant difference between the subjects' preferences for the interior vistas as illustrated in drawing 1 and in drawings 2, 4, 5 and 6. A significant difference is also detected between the subjects' preferences for the interior vistas as illustrated in drawing 3 and in drawings 4 and 6. There is no significant difference among the subjects' preferences for the interior vistas as illustrated in drawings 2, 4, 5, 6 (Group A), drawings 2, 3, 5 (Group B), and drawings 1 and 3 (Group C). Based on the results from the Fisher LSD test, it is clear that the subjects prefer drawing 1 over drawings 2, 4, 5 and 6, and drawing 3 over drawings 4 and 6.

Table 5

The Six Line Drawings as Grouped by the Fisher LSD Test

	Group A				Group B			Group C	
Drawing	6	4	2	5	2	5	3	3	1
Mean	4.2176	4.0667	3.8500	3.8000	*	*	3.3500	**	2.9500

Note: Means between groups are significantly different. Means within group are not significantly different. Grouping for VE Level is determined via the Fisher LSD test with an Alpha value of 0.05. The Fisher LSD test controls the Type I comparisonwise error rate, not the experimentwise rate error.

* See under Group A. ** See under Group B

Hypothesis 2

The General Linear Model ($Y_{ij} = \mu + \alpha_i + \beta_j + \varepsilon_{ij}$) was used to test Hypothesis 2 as being stated in null form as follows:

a). H_0 : There is no significant difference among the subjects' overall preference rating applied to the two sets of design factors: Ritual Orientation and Visual Explicitness, which is incorporated into the interior vistas as being illustrated in the six line drawings.

b). H_0 : There is no significant difference among the subjects' overall preference rating applied to the first set of design factors: Ritual Orientation, which is incorporated into the interior vistas as being illustrated in the six line drawings.*

c). H_0 : There is no significant difference among the subjects' overall preference rating applied to the second set of design factors: Visual Explicitness, which is incorporated into the interior vistas as being illustrated in the six line drawings.†

The results of analysis of variance are given in Table 6, indicating that at the 95% confidence level, the null hypothesis (a) is rejected since $p < 0.05$. In other words, it is reported, with regard to the two sets of design factors (Ritual Orientation and Visual Explicitness), there is a significant difference among the subjects' preference ratings on the interior vistas as illustrated among the six line drawings.

* $\alpha_i = 0$, for $i = 1, 2$.

† $\beta_j = 0$, for $j = 1, 2, 3$.

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

Table 6

ANOVA: Subjects' Preference Rating Applied to the Design Factors Internal to the Interior Vistas as Illustrated in the Six Line Drawings

Source	df	SS	MS	F	P
Model	3	63.5500000	21.1833333	9.14	<.0001
Error	356	825.2388889	2.3180868		
Corrected Total	359	888.7888889			

For the first set of design factors, Ritual Orientation (coded as RO in Tables 7 & 8), which is manipulated at two levels: High Ritual-Oriented (coded as 1 in Table 7), and Low Ritual-Oriented (coded as 2 in Table 7), it is detected that there is a significant difference between the subject's overall preference rating applied to Level 1 and to Level 2, since $p < 0.05$. Therefore, the null hypothesis (b) is rejected. Because the mean of Level 1 is less than that of Level 2, it is identified that Level 1 is more preferred than Level 2 by the subjects.

For the second set of design factors, Visual Explicitness (coded as VE in Tables 7 & 8), which is manipulated at three levels: Low Visual Explicit (coded as 1 in Table 7), Middle Visual Explicit (coded as 2 in Table 7), and High Visual Explicit (coded as 3 in Table 7), a significant main effect is found on the subject's overall preference rating applied to Level 1, Level 2 and Level 3, since $p < 0.05$. Therefore, the null hypothesis (c) is rejected. A Fisher LSD test for the grouping of the three level manipulations of the

Table 6

ANOVA: Subjects' Preference Rating Applied to the Design Factors Internal to the Interior Vistas as Illustrated in the Six Line Drawings

Source	df	SS	MS	F	P
Model	3	63.5500000	21.1833333	9.14	<.0001
Error	356	825.2388889	2.3180868		
Corrected Total	359	888.7888889			

For the first set of design factors, Ritual Orientation (coded as RO in Tables 7 & 8), which is manipulated at two levels: High Ritual-Oriented (coded as 1 in Table 7), and Low Ritual-Oriented (coded as 2 in Table 7), it is detected that there is a significant difference between the subject's overall preference rating applied to Level 1 and to Level 2, since $p < 0.05$. Therefore, the null hypothesis (b) is rejected. Because the mean of Level 1 is less than that of Level 2, it is identified that Level 1 is more preferred than Level 2 by the subjects.

For the second set of design factors, Visual Explicitness (coded as VE in Tables 7 & 8), which is manipulated at three levels: Low Visual Explicit (coded as 1 in Table 7), Middle Visual Explicit (coded as 2 in Table 7), and High Visual Explicit (coded as 3 in Table 7), a significant main effect is found on the subject's overall preference rating applied to Level 1, Level 2 and Level 3, since $p < 0.05$. Therefore, the null hypothesis (c) is rejected. A Fisher LSD test for the grouping of the three level manipulations of the

factor Visual Explicitness (see Table 8) shows that there is a significant difference between the subjects' overall preference rating applied to Level 1 and Level 3. No significant difference is detected between the subjects' overall preference rating applied to Levels 2 and 3 (Group A), and to Levels 1 and 2 (Group B). Based on the result of the Fisher LSD test, it is concluded, in reference to preference for the level of visual explicitness as illustrated in the interior settings among the six line drawings, the subjects evaluate Level 1 more positively than Level 3.

Table 7

ANOVA: Design Factors Internal to the Interior Vistas with Regard to Preference Rating Applied to the Six Line Drawings

Source	<u>df</u>	Type I/III SS	MS	<u>F</u>	<u>P</u>
RO	1	41.34444444	41.34444444	18.45	<.0001
VE	2	22.20555556	11.10277778	4.95	0.0075

Note. The Type I SS and Type III SS are identical in this analysis.

Table 8. Mean RO and VE Level for male and female subjects, separately. The results are given in Table 9. It is noted that the GLM Procedure: Grouping for Levels of Ritual Orientation and Visual Explicitness

	Group A		Group B	
RO Level	1		2	
Mean	3.3667		4.0444	
VE Level	3	2	2	1
Mean	4.0083	3.7083	*	3.4000

Note. Means between groups are significantly different. Means within group are not significantly different. Grouping for VE Level is determined via the Fisher LSD test, with an Alpha value of 0.05. The Fisher LSD test controls the Type I comparisonwise error rate, not the experimentwise rate error.

* See under Group A

Hypothesis 3

The General Linear Model ($Y_{ij} = \mu + \alpha_i + \varepsilon_{ij}$) was used to test Hypothesis 3 as stated in null form as follows:

a). H_0 : For male subjects, there is no significant difference among their preference ratings on the bipolar adjective scale associated with the interior vistas as illustrated in the six line drawings.*

b). H_0 : For female subjects, there is no significant difference among their preference ratings on the bipolar adjective scale associated with the interior vistas as illustrated in the six line drawings.†

To test the hypotheses noted above, an ANOVA was performed on the preference data

* $\alpha_i = 0$, for $i = 1, 2, 3, 4, 5, 6$.

† $\alpha_i = 0$, for $i = 1, 2, 3, 4, 5, 6$.

collected from the male and female subjects, separately. The results are given in Table 9. It is reported that at the 95% confidence level, there is a significant difference among the male subjects' preference ratings on the interior vistas in the six line drawings, since $p < .05$. As a result, the first hypothesis (a) is rejected. No significant difference was detected with regard to female subjects' preference ratings on the interior vistas in the six line drawings, since $p > .05$. Therefore, the second null hypothesis (b) is not rejected.

Table 9

ANOVA: Preference Rating by Gender Applied to the Interior Vistas as Illustrated in the Six Line Drawings

Source	df	SS	MS	F	P
Male					
Model	5	53.6161616	10.7232323	4.44	0.0008
Error	192	463.9393939	2.4163510		
Corrected Total	197	517.5555556			
Female					
Model	5	23.3333333	4.6666667	2.19	0.0585
Error	156	333.1111111	2.1353276		
Corrected Total	161	356.4444444			

In order to determine where the significant differences lie with regard to male subjects' preference ratings, a Fisher LSD test for the drawings' grouping was performed. The results are given in Table 10. It shows that there is a significant difference between the male

Table 10

The Six Line Drawings as Grouped by the Fisher LSD test (Applied to Male Subjects only)

	Group A				Group B				Group C
Male									
Drawing	4	6	5	2	6	5	2	3	1
Mean	4.4848	4.3939	3.9394	3.9394	*	*	*	3.6667	2.9091

Note: Means between groups are significantly different. Means within group are not significantly different.

*See under Group A

The ANOVA results given in Table 11 also show that in reference to the first set of design factors, Ritual Orientation (coded as RO in Tables 11 & 12), which is manipulated at two levels: High Ritual-Oriented (coded as 1 in Table 12) and Low Ritual-Oriented (coded as 2 in Table 12), there is a significant difference between male subjects' preference ratings applied to Level 1 and Level 2, since $p < 0.05$. For the second set of design factors, Visual Explicitness (coded as VE in Tables 11 & 12), which is manipulated at three levels: Low Visual Explicitness (coded as 1 in Table 12), Middle Visual Explicitness (coded as 2 in Table 12) and High Visual Explicitness (coded as 3 in Table 12), a significant main effect is found on the male subjects' preference ratings applied to Level 1, Level 2 and Level 3, since $p < 0.05$ (see Table 11).

As for female subjects, the result from ANOVA for factorial design (see Table 11) also shows, in reference to the first set of design factors, Ritual Orientation, it is detected that there is a significant difference between their preference ratings applied to Level 1 and Level 2, since $p < 0.05$. For the second set of design factors, Visual Explicitness, a significant main effect is not found on preference ratings applied to Level 1, Level 2 and Level 3, since $p > 0.05$.

Table 11

ANOVA: Preference Rating by Gender Applied to the Design Factors Internal to the Interior Vistas as Illustrated in the Six Line Drawings

Source	df	Type I/III SS	MS	F	P
Male					
RO	1	29.17171717	29.17171717	12.13	0.0006
VE	2	21.64646465	10.82323232	4.50	0.0123
Female					
RO	1	13.06172840	13.06172840	6.18	0.0140
VE	2	9.33333333	4.66666667	2.21	0.1134

Note. The Type I SS and Type III SS are identical in this analysis.

Based on the mean value associated with each of the two levels (see Table 12), it is identified that Level 1 is more preferred than Level 2 by both male and female subjects, in reference to the first set of design factors, Ritual Orientation. A Fisher LSD test (see Table 12) for grouping three levels of manipulation of the second set of design factors (Visual Explicitness) also shows that there is a significant difference between the male subjects' preference ratings applied to Level 1 and Level 2, 3. No significant difference is detected between the male subject's preference ratings applied to Level 2 and Level 3 (Group B). Based on the result from the Fisher LSD test, it is concluded, in reference to the male subjects' preference for the level of Visual Explicitness manifested through the interior setting in each of the six line drawings, Level 1 is more positively evaluated than Level 2 and Level 3.

Table 12

The GLM Procedure: Grouping for Levels of Ritual Orientation and Visual Explicitness, as Categorized by Gender

		Group A	Group B
Male			
RO Level		1	2
Mean		3.5051	4.2727
VE Level		1	2 3
Mean		3.4242	4.0758 4.1667
Female			
RO Level		1	2
Mean		3.1975	3.7654
VE Level		N/A	N/A
Mean		N/A	N/A

Note: Means between groups are significantly different. Means within group are not significantly different. Grouping for VE Level is determined via the Fisher LSD test, with an Alpha value of 0.05. The Fisher LSD test controls the Type I comparisonwise error rate, not the experimentwise rate error.

* See under Group A

Factor Analysis for Semantic Differential

Exploratory factor analysis was performed on the 15 bipolar adjective pair data associated with each of the six line drawings (such as “Active-Passive,” “Pleasing-Annoying,” and “Straightforward-Contradictory,” etc.), in attempt to determine groups of adjective pairs to form constructs that may influence the subjects’ preference for the interior vistas as illustrated in the six line drawings. The bipolar adjective pair,

“Preferred-Not Preferred” was not included in the factor analysis. The results are given in Table 13.

Three common factors were found as shown in Table 13, which illustrates Varimax factor loadings over 0.40 (a measurement of moderately high loading). The criteria for extraction of a common factor is that if a group of bipolar adjective pairs loads the highest on a given factor in one of the six line drawings, then this group of adjective pairs must also load the highest on a given factor in the other five line drawings, since “the largest loadings give the clue to the identification of the factors” (Kline, 1994, p. 108). However, as extraction of a pure factor tends to be impossible in practice, an exception can be made in the current study. That is, if a bipolar adjective pair, along with other bipolar adjective pairs to constitute a potential common factor, repeatedly loads the highest on a given factor among the most drawings, then a common factor can be identified and extracted.

Table 13

Varimax Factor Loadings over 0.40 by Factors and Subjects' Rating on Each of the Six Line Drawings

	Drawing 1			Drawing 2			Drawing 3		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Active – Passive		0.75883				0.83677	0.66022		
Delicate – Rugged			0.84996			0.39898**			0.85680
Profound – Superficial		0.58926				0.62159	0.63955	-0.40629*	
Controlled – Accidental			0.71807			0.60584			0.80254
Unique – Common		0.72294		0.43462*		0.61139	0.64854		0.46716*
Spacious – Confined	0.65272		0.42964*	0.67525	0.40118*			0.67107	
Clear – Ambiguous	0.79262			0.46205*	0.62143		0.44346*	0.62226	
Pleasing – Annoying		0.40343*	0.57669	0.60276			0.61197	0.43760*	
Simple – Complex	0.75484			0.41401*	0.70742			0.70633	
Interesting – Boring		0.68009		0.83136			0.72472		
Cheerful – Gloomy		0.75749		0.75231			0.81784		
Ordered – Chaotic	0.79751				0.80739			0.79007	0.83123
Welcoming – Forbidding	0.52257	0.49129*				0.50318	0.78917		0.8749*
Comfortable – Uncomfortable	0.50066*	0.56593		0.73788			0.69662		
Straightforward – Contradictory	0.70283				0.79380			0.40019*	0.59634

* These scales load more highly on one of the other factors.

** Less than loading over 0.40 but it is the highest loading on the given factor.

Table 13 (Continued)

Varimax Factor Loadings over 0.40 by Factors and Subjects' Rating on Each of the Six Line Drawings

	Drawing 4			Drawing 5			Drawing 6		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Active – Passive			0.72313		0.84974		0.76643		
Delicate – Rugged		0.68614	0.56949*	0.70546	0.41274*			0.64216	0.46428*
Profound – Superficial			0.78878		0.76500		0.78797		
Controlled – Accidental		0.70305	0.49237*	0.73381				0.73054	
Unique – Common			0.75424		0.70098		0.68057		
Spacious – Confined	0.56518	0.47539*		0.74077			0.44590*	0.61257	
Clear – Ambiguous	0.50377*	0.65711		0.55510	0.45496*			0.76926	
Pleasing – Annoying	0.81283					0.75926	0.73387		
Simple – Complex	0.56789*	0.72005		0.78039			0.40922*	0.78587	
Interesting – Boring	0.76907				0.57252	0.47528*	0.84614		
Cheerful – Gloomy	0.76256				0.54507*	0.65612	0.74395	0.43179*	
Ordered – Chaotic		0.70501		0.84446					0.83121
Welcoming – Forbidding	0.64880					0.83000	0.53967*		0.69495
Comfortable – Uncomfortable	0.76946				0.57552	0.54548*	0.72657	0.42213*	
Straightforward – Contradictory		0.73404		0.56106		0.53813*		0.70742	0.49075

* These scales load more highly on one of the other factors.

The first common factor involved four bipolar adjective pairs as follows: "Clear-Ambiguous," "Simple-Complex," "Ordered-Chaotic" and "Straightforward-Contradictory," which were labeled as "organizational dimension." Most of these adjective pairs load the highest on a given factor in each of the six line drawings (factor 1 in drawings 1 and 5, factor 2 in drawings 2, 3, 4 and 6). However, with regard to the bipolar scales "Ordered-Chaotic" and "Straightforward-Contradictory," an exception was reported: "Ordered-Chaotic" loads more highly on factor 3 in drawing 6, "Straightforward-Contradictory" loads highly but not the highest on factor 2 in drawing 3.

The second common factor, loads on four bipolar scales as follows: "Active-Passive," "Profound-Superficial," "Unique-Common" and "Comfortable-Uncomfortable," which was labeled as "evaluative dimension." These four scales load the highest on the given factor in each of the six line drawings, except for the bipolar scale "Comfortable-Uncomfortable," which did not load highly on factor 3 in drawings 2 and 4.

The third common factor, labeled as "affective dimension," displayed high and generally restricted loadings on such affective pairs as: "Pleasing-Annoying," "Interesting-Boring," and "Cheerful-Gloomy," for drawings 2, 3, 4 and 6. The same group of adjective pairs also loaded highly on one of the other factors for drawings 1 and 5, with exception for the bipolar scales "Pleasing-Annoying" and "Interesting-Boring," which load highly but not the highest on the given factors (factor 2 in drawing 1 for "Pleasing-Annoying" and factor 3 in drawing 5 for "Interesting-Boring").

The approximately consistency among the largest factor loadings with regard to each of the six line drawings give, as referred by the bipolar scales noted above, the clue to the identification of the three common factors as being considered organizational, evaluative,

and affective, respectively. Thus, based on the subjects' ratings with regard to the interior vistas as illustrated in the six line drawings, three common factors (together accounting for approximately 50% of the total variance and labeled as organizational, evaluative, and affective dimensions, respectively) were obtained. The results are shown in Table 14. These three common factors covered 11 out of the 15 bipolar adjective pairs selected to measure the subjects' evaluative and affective responses to the interior vistas as illustrated in the six line drawings. The remaining sets of bipolar adjective pairs, "Delicate-Rugged," "Controlled-Accidental," "Spacious-Confined," and "Welcoming-Forbidding," were excluded from the current study since no more than two scales can be grouped together and replicated in each of the six line drawings, in reference to the subjects' ratings via these bipolar adjective pairs. In general, a minimum of three variables is required to constitute a factor (Kline, 1994).

Table 14

Varimax Factor Loadings with the Largest Value by Factors and Subjects' Rating on Each of the Six Line Drawings.

	Drawing 1	Drawing 2	Drawing 3	Drawing 4	Drawing 5	Drawing 6
Organizational Dimension						
Clear – Ambiguous	0.79264	0.62143	0.62226	0.65711	0.55510	0.76926
Simple – Complex	0.75484	0.70742	0.70663	0.72005	0.78039	0.78587
Ordered – Chaotic	0.79751	0.80739	0.79007	0.70501	0.84446	0.39729*
Straightforward – Contradictory	0.70283	0.79380	0.40019*	0.73404	0.56106	0.70742
Evaluative Dimension						
Active - Passive	0.75883	0.83667	0.66022	0.72313	0.84974	0.76643
Profound – Superficial	0.58926	0.62159	0.63955	0.78878	0.76500	0.78797
Unique – Common	0.72294	0.61139	0.64854	0.75424	0.70098	0.68057
Comfortable – Uncomfortable	0.56593	0.36574*	0.69662	0.26902*	0.57552	0.72657
Affective Dimension						
Pleasing – Annoying	0.40343*	0.60276	0.61197	0.81283	0.75926	0.73387
Interesting – Boring	0.68009	0.83136	0.72472	0.76907	0.47528*	0.84614
Cheerful – Gloomy	0.75749	0.75231	0.81784	0.76256	0.65612	0.74395

* These scales load more highly on one of the other factors.

In order to determine if there is a correlation between the subjects' preference assessment and the organizational, evaluative and affective dimension constructs in reference to each of the six line drawings, a linear regression procedure was introduced.

The linear regression model used is demonstrated as the follows:

$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \epsilon$, where Y denotes the subjects' preference assessment, X_1 , X_2 and X_3 denote organizational, evaluative and affective dimensions, respectively.

Table 15 illustrates the parameter estimate and p-value associated with the three constructs (Organizational, Evaluative and Affective, respectively) in each of the six line drawings. Here, the dependent variable is the subjects' ratings on the bipolar adjective pair: "Preferred-Not Preferred," with regard to each of the six line drawings. The value for adjusted R-Square associated with each of the six line drawings is far more than 0.20, an acceptable measurement in social science research, to indicate the regression model as being fit in data analysis. In the current study, all six values of the adjusted R-Square exceed 0.50, indicating that a linear regression model used for predicting the subjects' preferences by the given constructs is quite effective.

Table 15

The Regression Procedure: Intercept, Organizational Dimension, Evaluative Dimension, Affective Dimension, and Adjusted R-Square.

	Intercept		Organizational		Evaluative		Affective		Adj. R ²
	Estimate	P-Value for	Estimate	P-Value for	Estimate	P-Value for	Estimate	P-Value for	
	β_0	H ₀ : $\beta_0 = 0$	β_1	H ₀ : $\beta_1 = 0$	β_2	H ₀ : $\beta_2 = 0$	β_3	H ₀ : $\beta_3 = 0$	
Drawing 1	-0.96365	0.0299	0.06162	0.0431	0.13191	0.0035	0.16555	0.0050	0.5948
Drawing 2	-0.50024	0.2286	0.05617	0.0368	0.13358	0.0002	0.15574	0.0003	0.6753
Drawing 3	-0.53011	0.1707	0.03550	0.2528	0.14993	< .0001	0.15080	0.0010	0.6912
Drawing 4	-0.03912	0.9239	0.06560	0.0389	0.08381	0.0335	0.17202	0.0007	0.6759
Drawing 5	-0.20106	0.6139	0.04239	0.2279	0.10643	0.0110	0.16725	0.0029	0.6681
Drawing 6	0.34526	0.4519	0.04686	0.2130	0.16817	0.0040	0.04215	0.5559	0.5808

Note. Estimate = Parameter Estimate

Examination of the results given in Table 15 shows that for drawings 1, 2 and 4, all three constructs have significant effects on the subjects' preference ratings applied to the given interior vista, since the associated p-values for β_1 , β_2 and β_3 are less than 0.05. For drawings 3 and 5, only the evaluative and affective dimensions have significant effects on the subjects' preference ratings, since the p-value associated with the evaluative (β_2) and affective (β_3) dimensions are less than 0.05. Only the evaluative dimension (β_2) is reported to have a significant effect on the subjects' preference ratings applied to the interior vista illustrated in drawing 6, suggesting that the subjects' responses to each of the six line drawings are inconsistent.

The degree of accuracy in predicting the subjects' preferences by the regression model is measured by the Student Residual, as given in Table 16. Here, an absolute value of the Student Residual determines the degree of accuracy in prediction: an extreme high degree (less than or equal to 0.5), a high degree (greater than 0.5 and less than or equal to 1.0), an in-between degree (greater than 1.0 and less than or equal to 1.5), a low degree (greater than 1.5 and less than or equal to 2.0), and an extremely low degree (greater than 2.0), respectively. Based on the accumulated frequency among the 60 observations as grouped by the absolute values of the Student Residual, it is reported that 50 observations (83%) in drawings 1 and 3, 53 observations (88%) in drawing 2 and 6, 54 observations (90%) in drawing 4, and 51 observations (85%) in drawing 5, have been predicted with an extremely high or high degree of accuracy.

Table 16

The Regression Procedure: Frequency for Student Residual to Estimate Degree of Prediction Applied to the Total Observations

	Frequency					Total
	$ \text{SR} \leq 0.5$	$0.5 < \text{SR} \leq 1.0$	$1.0 < \text{SR} \leq 1.5$	$1.5 < \text{SR} \leq 2.0$	$ \text{SR} > 2.0$	
Drawing 1	38	12	8	2	0	60
Drawing 2	41	12	4	1	2	60
Drawing 3	45	5	5	5	0	60
Drawing 4	42	12	3	1	2	60
Drawing 5	45	6	6	1	2	60
Drawing 6	45	8	3	1	3	60

Note. SR = Student Residual

former tasks, as well as the

the subjects' preferences. The

Discussion of the Findings

of the factor of ritual

The demographic information about the subjects as given in Table 1 on page 73 shows that the majority of the subjects were well educated, since 55 out of the 60 respondents had college level degrees or above. In this sense it is assumed that the subjects had a good understanding of the issues addressed by the survey. In addition, fifty-four respondents had an average of 28 years living experience in China, five respondents had an average of 25 years living experience in Taiwan, and one respondent reported 20 years living experience in Hong Kong. This indicates that the majority of the respondents, if not all, had a solid Chinese cultural background. Generally speaking, for a sample with a size of 60, the variation was fairly balanced by gender but not by age, educational level and professional status, as reported in Table 2 on page 74.

In summary, together as a group, it is clear that the subjects evaluated drawings 1 and 3 more positively than drawings 5, 2, 4 and 6. Mean data suggest that the subjects' preference for the interior vistas in the six line drawings in descending order are as follows: drawing 1, drawing 3, drawing 5, drawing 2, drawing 4 and drawing 6, with drawing 1 being most preferred and drawing 6 least preferred. This seems to suggest that the original premise of the study: the Chinese will prefer a residential setting manipulated in a double-reading context, is partially supported, since drawings 1, 3 and 5 are manipulated as being high ritual-oriented, whereas drawings 2, 4 and 6 were manipulated to be low ritual-oriented. Here, a double-reading context refers to a circumstance from which multiple meanings can be elicited, as mentioned in Chapter I. In other words, with regard to two sets of design factors, Ritual Orientation and Visual Explicitness, the

former takes account more than the latter in determining the subjects' preferences. The order of the subjects' preference rating also shows, regardless of the factor of ritual among orientation, that the subjects tended to prefer a low level of visual explicitness rather than a medium or high level of visual explicitness. As mentioned previously, the alternative levels of visual explicitness are determined by the presence of three types of Space Establishing Elements (SEEs): *objects* for low level of explicitness (illustrated as the presence of two columns), *screen* for medium level visual explicitness (illustrated as the presence of a row of columns), and *surface* for high level visual explicitness (illustrated as the presence of a solid wall with a small opening on it), respectively. The preference of low level visual explicitness associated with the transitional space among drawings 1 and 2 did not correspond to the premise anticipated by the investigator, that is, the more ambiguous the visual cues, the more significant the transitional space. However, along with the vertical plane to which SEEs applied, other structural elements, particularly the horizontal planes such as the drop down ceiling and the raised floor present in each of the six line drawings, also joined to define the transitional space. In this case, strong visual cues relative to the significance of the transitional space could be generated from such structural elements other than the vertical plane defined by SEEs. Thus, the apparent preference for the low level of visual explicitness might not account too much for the significance of the transitional space in this case.

The analysis of variance (ANOVA) with regard to the subjects taken together as a group shows that the subjects preferred drawing 1 over drawings 2, 4, 5 and 6, and drawing 3 over drawings 4 and 6. Generally speaking, such a result does not conflict with the one given by the descriptive statistics noted above, for drawing 1 was manipulated as high ritual-oriented

with low visual explicitness, and drawing 3 was manipulated as high ritual-oriented with medium visual explicitness. Of interest here is that there is no significant difference among the subjects' preference ratings on the interior vistas as illustrated in drawing 2, 4, 5, 6, in drawing 2, 3, 5, and in drawing 1, 3 (see Table 7). This further indicates, as having been supported by descriptive statistics, that the subjects tended to evaluate a given interior vista by ritual orientation as a first priority, and then the alternative levels of visual explicitness as a second priority.

In reference to the design factors as incorporated into the interior vistas in each of the six line drawings, it is reported that the subjects (together as a group) prefer an interior setting of high ritual-orientation (illustrated as an angular volume interlocked by a curved block), and low visual explicitness (illustrated as a vertical plane defined by two columns), rather than one of low ritual-orientation (illustrated as two angular blocks interlocked together), and high visual explicitness (illustrated as a vertical plane defined by a solid wall with a small opening on it). No significant difference of the subjects' preferences was reported between low visual explicitness and medium visual explicitness (illustrated as a vertical plane defined by a row of columns), or between medium visual explicitness and high visual explicitness. The fact that medium visual explicitness can either be grouped with low visual explicitness or with high visual explicitness from a statistical viewpoint may suggest that the subjects' identified medium visual explicitness as an in-between manipulation. However, based on the subjects' preference ratings, such an in-between status for medium visual explicitness does not exactly correspond to the investigator's anticipation.

The ANOVA results (see Table 11) have shown that for both male and female subjects, the first design factor (Ritual Orientation) has a significant main effect on their

overall evaluation upon the six line drawings. Both male and female subjects favor a physical setting of high ritual-orientation, rather than one of low ritual-orientation. For male subjects, the second design factor (Visual Explicitness) had a significant main effect on their overall evaluation of the six line drawings. It was found that male subjects favor a vertical plane defined by SEEs as being of low visual explicitness, rather than one as being of medium visual explicitness or high visual explicitness. For female subjects, no significant main effect on their responses to the three levels of visual explicitness as illustrated in the six line drawings was found. This means that the alternative manipulation of SEEs does not make any difference, from a statistical viewpoint, in determining female subjects' preferences for the interiors vistas as illustrated in the six line drawings.

The results from factor analysis and the subsequent linear regression procedure (see Tables 13, 14, 15 and 16) show that the organizational, evaluative and affective dimensions influenced the subjects' preferences for drawings 1, 2 and 4. For drawings 3 and 5, only the evaluative and affective dimensions influenced the subjects' preference ratings. Only the evaluative dimension had a significant effect on the subjects' responses with regard to their preference for drawing 6. This finding suggests that for at least 5 out of the 6 line drawings, both the evaluative and affective dimensions did have a main effect in determining the subjects' preference for the given interior vistas as illustrated in the drawings. The positive values of the parameter estimate associated with the organizational, evaluative and affective dimensions in each of the six line drawings, as given in Table 15, indicate that there is a positive relationship between the subjects' preference ratings on the given interior vista and the three constructs. The adjusted R-

square of an over 0.50 value applied to each of the six line drawings indicates a satisfied fit for regression models. In addition, based on the accumulated frequency by the Student residual as shown in Table 16, it can be concluded that such a prediction of the subjects' preference for the given interior vistas by using linear regression model was quite accurate, since over 83% of the observations were predicted with a high degree of accuracy.

In conclusion, findings from this study suggest that to create an ideal interior environment for Chinese, it is recommended to work initially from an associational perspective. This is because the first set of the design factors, Ritual Orientation, was manipulated on the basis of its associational quality. Statistical significance was determined for this factor as an influence on preferences. The second set of design factors, Visual Explicitness, as articulated at a perceptual level, is also important. Although significance between the three levels of visual explicitness was not as anticipated, the development of the stimuli may be responsible. Thus, further explanation is warranted for the design factor, Visual Explicitness.

spot was found in the transitional space, or the intermediate space as defined by
Kangawa (1997). Therefore, the significance of transitional space in a given interior
environment needs to be further explored. **CHAPTER V** associational perspective, an identified
transitional space is related to ritual behavior in Chinese residential context. At the
SUMMARY AND RECOMMENDATIONS
perspective, the significance of an intermediate space is determined by articulation of

Summary of Findings

The purpose of the current study was to explore the meaning of and preference for
interior spaces, specifically the transitional spaces relative to the living room in the public
housing unit for the Chinese. The ambiguous nature associated with the identified spaces is
assessed in order to determine Chinese environmental orientation. The major objectives of
the study were: (1) to develop alternative articulations of traditional Chinese interior spaces
to serve as the stimuli in a questionnaire relative to content symbolism; (2) to identify
symbolic associations inherent in given house interiors, specifically the intermediate space
as identified in the living room area, in a Chinese ritual context; and (3) to determine
Chinese aesthetic preferences for interior environments, specifically spaces and elements
articulated with certain degrees of ambiguity.

A review of literature focused on the traditional Chinese residential environment,
particularly its interior dimensions, shows that for the majority of Chinese, an interior
setting articulated in a double-reading context was strongly preferred. Such a preference
was determined by the concept of Feng Shui, a classical Chinese ritual orientation of
placement. The essence of Feng Shui is not only concerned with complementary forces
known as *yin* and *yang*, but is really about the in-between realm, the third spot where the
power of *yin & yang* is generated. Manifested through the built environment, such a third

presence of three types of SEEs (Space Establishing Elements): objects, screen, and surface. It was compared at three levels: low visual explicitness (illustrated as two columns), medium visual explicitness (illustrated as a row of columns), and high visual explicitness (illustrated as a solid with a small opening on it). Dependent variables were subjects' responses on the bipolar adjective pair, "preferred/not preferred," with regard to their overall preferences for the interior vistas among the six line drawings, and subjects' affective and evaluative responses as measured by the other 15 bipolar adjective pairs associated with each of the six line drawings as well. The subjects were asked to provide ratings using the bipolar adjective pairs to assess alternative interior vistas as illustrated in each of the six line drawings.

Analysis of variance (ANOVA) and factor analysis were performed on the data collected from the subjects. The ANOVA result shows that there was a significant difference among the subjects' preference rating on the interior vistas illustrated among the six line drawings. A Fisher LSD test showed that the subjects (together as a group) preferred drawing 1 over drawings 2, 4, 5 and 6, and drawing 3 over drawings 4 and 6. ANOVA was used to examine preferences by gender. The results show that there was a significant difference for male subjects and no significant differences for female subjects. A Fisher LSD test also showed that male subjects preferred drawing 1 over drawings 2, 3, 4, 5 and 6, and drawing 3 over drawing 4.

In order to determine if the two sets of design factors, Ritual Orientation and Visual Explicitness, had a main effect on the subjects' preference rating on the interior vistas among the six line drawings, additional ANOVA was conducted on the basis of a 2 x 3 factorial design. The results show a significant difference for the factor Ritual

Orientation, which was manipulated at two levels (High Ritual-Based and Low Ritual-Based). High Ritual-Orientation was more preferred than Low Ritual-Orientation. With regard to the factor, Visual Explicitness, which was manipulated at three levels: Low Visual Explicitness, Medium Visual Explicitness and High Visual Explicitness, a significant difference was also reported among the subjects' preference ratings. A Fisher LSD test showed that the subjects preferred the Low Visual Explicitness level over the High Visual Explicitness level. No significant difference was reported between the level of Medium Visual Explicitness and the level of Low Visual Explicitness, or the level of High Visual Explicitness.

Additional ANOVA was conducted on the preference data by gender, with regard to the two sets of design factors noted above. The results show that for male subjects, there was a significant difference among their preference ratings for the factor Ritual Orientation, and for the factor Visual Explicitness. A Fisher LSD test showed that the level of High Ritual-Orientation was more preferred than the level of Low Ritual-Orientation, and Low Visual Explicitness was more preferred than the other two levels (Medium Visual Explicitness and High Visual Explicitness) for the factor Visual Explicitness. As for female subjects, there was a significant difference among their preference ratings applied to the two levels of the factor Ritual Orientation, with the level of High Ritual-Orientation being preferred over Low Ritual-Orientation. No significant difference was reported among female subjects' preference ratings applied to the three levels of the factor Visual Explicitness.

The factor analysis, which was conducted on the data in reference to the 15 bipolar adjective pairs as associated with each of the six line drawings, yielded three common

factors. The first two common factors were each comprised of four bipolar adjective pairs. The first factor was labeled “organizational dimension” and the second “evaluative dimension.” The third common factor involved three bipolar adjective pairs and was labeled “affective dimension.” This suggests in the current study, that three constructs might have potentially influenced the subjects’ overall evaluation of the interior vistas as illustrated in the six line drawings, which was measured by the bipolar adjective pair, “Preferred-Not Preferred.” To determine if there was a correlation between the subjects’ preference ratings and three constructs noted above, a linear regression procedure was used. The results from the linear regression show that such a correlation was present with regard to the six line drawings, although the results were not uniform for all of the drawings. Generally speaking, the organizational, evaluative and affective dimensions had a combined effect on determining the subjects’ preferences for drawings 1, 2 and 4. For drawings 3 and 5, both the evaluative and affective dimensions influenced to determine the subjects’ preference ratings. Only the evaluative dimension had a significant effect on the subjects’ responses with regard to their preference for drawing 6. This sort of inconsistency among the results from linear regression procedure suggests, at least for 5 out of the 6 line drawings, both the evaluative and affective dimensions did have a main effect on determining the subjects’ preference for the given interior vistas as illustrated in drawings. The positive values of parameter estimate associated with organizational, evaluative and affective dimensions in each of the six line drawings, as given in Table 15 on page on page 98, indicate that there was a positive relationship between the subjects’ preference ratings on the given interior vista and three factors.

Conclusions

Based on the hypotheses testing summarized above, it is concluded that:

- 1). Together as a group, the subjects prefer an interior setting as being manipulated of high ritual-based and low visual explicitness or medium visual explicitness.
- 2). The male subjects prefer an interior setting manipulated of high ritual-based and low visual explicitness or medium visual explicitness.
- 3). The preference mean value data associated with each of the six line drawings suggest that the design factor, Ritual Orientation, is more influential than the design factor, Visual Explicitness, possibly indicating that associational qualities of the given interior vista is more of a determinant than perceptual characteristics, in identifying the subjects' preferences for interior environment.
- 4). Based on the results from factor analysis and the subsequent linear regression procedure, it is fairly clear that the subjects' preferences for a given interior vista, as constructed in the six line drawings, was mainly determined by evaluative and effective dimensions.

Recommendations for Future Studies

Recommendations for additional studies are listed as follows:

- 1). Based on a low return rate (30%) of the survey, a questionnaire developed with a simpler format, for example, fewer drawings along with relatively concise measuring scales, may improve obtaining efficient and effective responses.
- 2). The number of visual cues associated with the proposed interior settings should be

further reduced, in order to increase the likelihood that only correct information is conveyed to the respondents.

- 3). Professional approaches for the articulation of the in-between realm in a residential context could be further listed and discussed. Thus more design factors would be incorporated into the alternative residential prototypes to test the given hypothesis.
- 4). In order to explore symbolic associations with given public residential units, other alternative solutions, such as articulation of periphery spaces in the living room area, could be developed, and studies designed to evaluate the alternatives.
- 5). Due to the samples homogeneous makeup for the current study, conducting additional similar surveys in other US cities and/or in China would provide information from subjects with a broader background.

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APPENDICES

APPENDIX A
IRB APPROVAL FORM

Oklahoma State University
Institutional Review Board

Protocol Expires: 5/30/02

Date: Thursday, May 31, 2001

IRB Application No HE0169

Proposal Title ARTICULATING IN THE IN-BETWEEN REALM - A SYMBOLIC SOLUTION TO THE
INTERIOR ENVIRONMENT IN CHINESE RESIDENTIAL CONTEXT

Principal
Investigator(s):

ShanQing Zhang
7750 S Victor Ave., #1850-B
Tulsa, OK 74136

Donna Branson
447 HES
Stillwater, OK 74078

Reviewed and
Processed as. Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

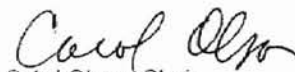
Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

- 1 Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
- 2 Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
- 4 Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 203 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,



Carol Olson, Chair
Institutional Review Board

2011年11月
11月11日

APPENDIX B

RESEARCH INSTRUMENT

(Questionnaire for Housing Symbolism & Preference)

THE QUESTIONNAIRE FOR HOUSING SYMBOLISM & PREFERENCE
關於居室象征主義設計以及居室布局偏好的問卷

1. Demographic Information about the Subject

第1部份：填卷人個人簡況

Comment: Please answer all the following questions. Remember that your responses are anonymous.

說明：請逐一回答下列問題。您所有的回答都將是匿名的。

1). Age 年齡：

____ years old 歲

2). Sex 性別：

Male 男

Female 女

3). Marital Status 婚姻狀況：

Single 未婚

Married 已婚

4). How long have you lived in the following countries or areas (If applicable)?

請註明在下列國家和地區中，您生活的年數：

People's Republic of China 中華人民共和國: ____ year(s) 年

Taiwan 台灣: ____ year(s) 年

Hong Kong 香港: ____ year(s) 年

United States 美國: ____ years(s) 年

Other (please specify) 其他 (請註明): _____ year(s) 年

5). Please check the highest level of education that you have achieved?

您的最高學歷：

Elementary school 小學

Junior high school 初中

High school 高中

College or university graduation 大學本科畢業

Master's degree 碩士學位

THE QUESTIONNAIRE FOR HOUSING SYMBOLISM & PREFERENCE
關於居室象征主義設計以及居室布局偏好的問卷

1. Demographic Information about the Subject

第1部份：填卷人個人簡況

Comment: Please answer all the following questions. Remember that your responses are anonymous.

說明：請逐一回答下列問題。您所有的回答都將是匿名的。

1). Age 年齡：

____ years old 歲

2). Sex 性別：

Male 男

Female 女

3). Marital Status 婚姻狀況：

Single 未婚

Married 已婚

4). How long have you lived in the following countries or areas (If applicable)?

請注明在下列國家和地區中，您生活的年數：

People's Republic of China 中華人民共和國: ____ year(s) 年

Taiwan 台灣: ____ year(s) 年

Hong Kong 香港: ____ year(s) 年

United States 美國: ____ years(s) 年

Other (please specify) 其他 (請注明): _____ year(s) 年

5). Please check the highest level of education that you have achieved?

您的最高學歷：

Elementary school 小學

Junior high school 初中

High school 高中

College or university graduation 大學本科畢業

Master's degree 碩士學位

[] Doctoral degree 博士學位

- 6). Your current professional status (Examples: student, clerk, factory worker, medical doctor, teacher, engineer, business person, etc.): _____

您目前的職業或身份(學生, 藍領工人, 辦公室文員, 醫生, 教師, 工程師, 商務人員, 等等): _____

2. Identify bi-polar scales associative to the interior settings

第2部份: 確認雙向評估尺度

Comment: Please carefully examine the following 6 interior vistas, particularly the highlighted areas. Please notice structural variations among these highlighted areas. Suppose you are walking from point A to B, then from B to C. Please indicate your emotional experience by placing a check mark on the attached bipolar scales. For example, the following scale

Pleasing _____ Displeasing

has seven degrees. From left to right a check mark in the blank would indicate: *extremely pleasing, quite pleasing, slightly pleasing, neither pleasing nor displeasing (or neutral), slightly displeasing, quite displeasing, extremely displeasing*. By placing a check mark on the scale as follows,

Pleasing _____ X _____ Displeasing

you have determined that the interior vista is *quite pleasing* to you. Remember, check each scale carefully and mark only **One** blank on each scale.

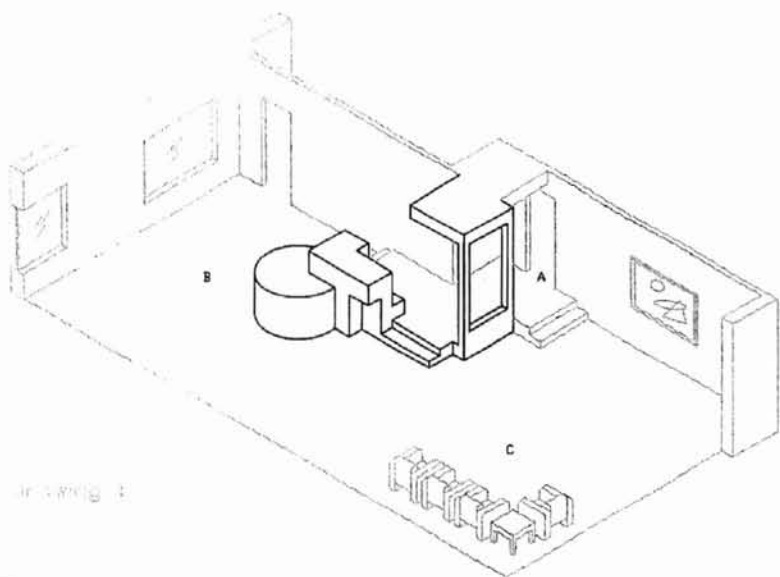
說明: 請仔細審閱下列6幅室內圖景, 尤其是圖中的深色區域。請留意這些區域中, 結構上的不同。請設想您從A點走到B點, 然後又從B點走到C點。請根據您的真實感受, 並對照附列于每一幅圖景下的雙向尺度, 評估該圖景。例如, 下列尺度

愉悅的 _____ 不愉悅的

共有7個層次(與空白欄目相對應)。從左至右依次為: 極端愉悅的, 相當愉悅的, 愉悅的, 既非愉悅的亦非不愉悅的(或中性的), 不愉悅的, 相當不愉悅的, 極端不愉悅的。倘若您的標記如下列,

愉悅的 _____ X _____ 不愉悅的

則表明您認為該圖景是令人相當愉悅的。請根據您的評估, 相應在某一空白欄目上, 標示記號。注意: 請仔細標示每一雙向尺度; 每一雙向尺度上僅能標示一個記號。

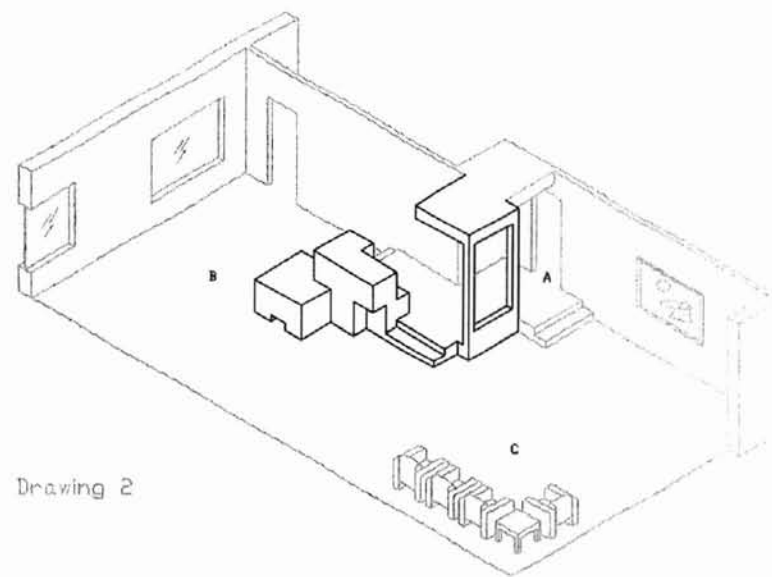


Drawing 1 (圖 1)

Active 積極的	_____	_____	_____	_____	消極的 Passive
Delicate 精緻的	_____	_____	_____	_____	粗獷的 Rugged
Profound 深刻的	_____	_____	_____	_____	浮淺的 Superficial
Controlled 規範的	_____	_____	_____	_____	隨意的 Accidental
Unique 別致的	_____	_____	_____	_____	普通的 Common
Spacious 寬敞的	_____	_____	_____	_____	侷促的 Confined
Clear 清晰的	_____	_____	_____	_____	模糊的 Ambiguous
Pleasing 愉悅的	_____	_____	_____	_____	惱人的 Annoying
Simple 簡單的	_____	_____	_____	_____	複雜的 Complex
Interesting 有趣的	_____	_____	_____	_____	乏味的 Boring
Cheerful 歡快的	_____	_____	_____	_____	陰郁的 Gloomy
Ordered 有序的	_____	_____	_____	_____	雜亂的 Chaotic
Welcoming 歡迎的	_____	_____	_____	_____	拒斥的 Forbidding
Comfortable 舒適的	_____	_____	_____	_____	難受的 Uncomfortable
Straightforward 一致的	_____	_____	_____	_____	衝突的 Contradictory

Your Overall Evaluation 您的總體評估:

Preferred 喜愛的 _____ 不喜愛的 Not Preferred



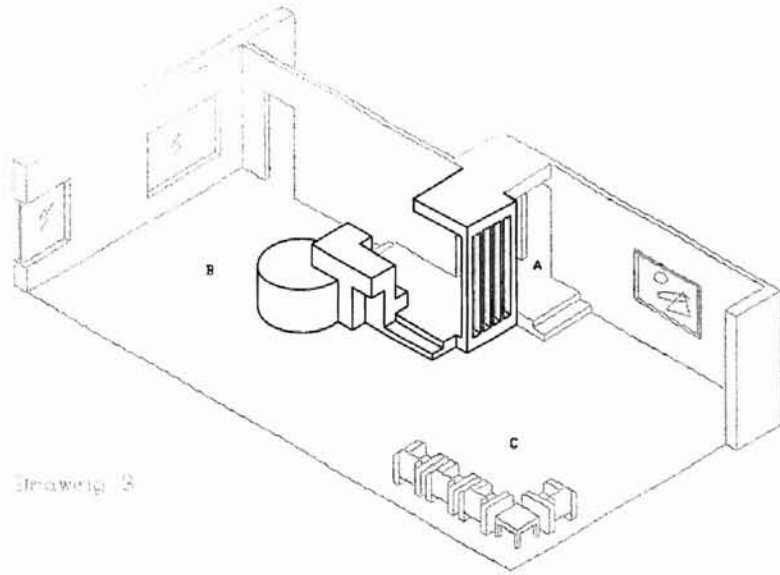
Drawing 2

Drawing 2 (圖 2)

Active 積極的	_____	_____	_____	_____	消極的 passive
Delicate 精緻的	_____	_____	_____	_____	粗獷的 Rugged
Profound 深刻的	_____	_____	_____	_____	浮淺的 Superficial
Controlled 規範的	_____	_____	_____	_____	隨意的 Accidental
Unique 別致的	_____	_____	_____	_____	普通的 Common
Spacious 寬敞的	_____	_____	_____	_____	侷促的 Confined
Clear 清晰的	_____	_____	_____	_____	模糊的 Ambiguous
Pleasing 愉悅的	_____	_____	_____	_____	惱人的 Annoying
Simple 簡單的	_____	_____	_____	_____	複雜的 Complex
Interesting 有趣的	_____	_____	_____	_____	乏味的 Boring
Cheerful 歡快的	_____	_____	_____	_____	陰郁的 Gloomy
Ordered 有序的	_____	_____	_____	_____	雜亂的 Chaotic
Welcoming 歡迎的	_____	_____	_____	_____	拒斥的 Forbidding
Comfortable 舒適的	_____	_____	_____	_____	難受的 Uncomfortable
Straightforward 一致的	_____	_____	_____	_____	衝突的 Contradictory

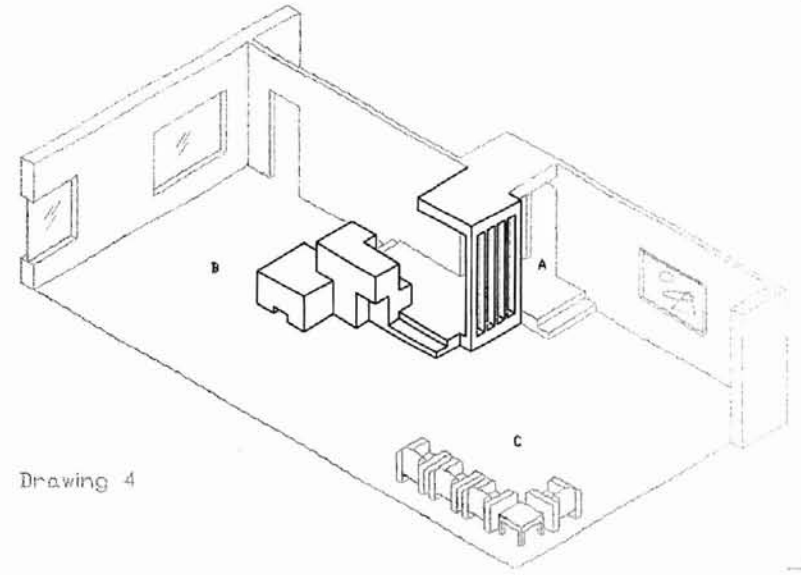
Your Overall Evaluation 您的總體評估:

Preferred 喜愛的 _____ 不喜愛的 Not Preferred



Drawing 3

Drawing 3 (圖 3)



Drawing 4

Drawing 4 (圖 4)

Active 積極的	_____	_____	_____	_____	消極的 Passive
Delicate 精緻的	_____	_____	_____	_____	粗獷的 Rugged
Profound 深刻的	_____	_____	_____	_____	浮淺的 Superficial
Controlled 規範的	_____	_____	_____	_____	隨意的 Accidental
Unique 別致的	_____	_____	_____	_____	普通的 Common
Spacious 寬敞的	_____	_____	_____	_____	侷促的 Confined
Clear 清晰的	_____	_____	_____	_____	模糊的 Ambiguous
Pleasant 愉快的	_____	_____	_____	_____	惱人的 Annoying
Simple 簡單的	_____	_____	_____	_____	複雜的 Complex
Interesting 有趣的	_____	_____	_____	_____	乏味的 Boring
Cheerful 歡快的	_____	_____	_____	_____	陰郁的 Gloomy
Ordered 有序的	_____	_____	_____	_____	雜亂的 Chaotic
Welcoming 歡迎的	_____	_____	_____	_____	拒斥的 Forbidding
Comfortable 舒適的	_____	_____	_____	_____	難受的 Uncomfortable
Straightforward 一致的	_____	_____	_____	_____	衝突的 Contradictory

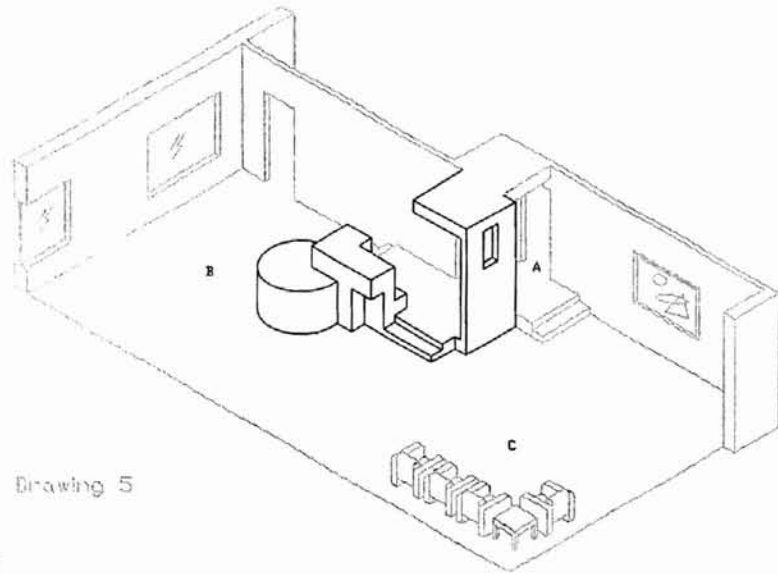
Your Overall Evaluation 您的總體評估:

Preferred 喜愛的 _____ 不喜愛的 Not Preferred

Active 積極的	_____	_____	_____	_____	消極的 passive
Delicate 精緻的	_____	_____	_____	_____	粗獷的 Rugged
Profound 深刻的	_____	_____	_____	_____	浮淺的 Superficial
Controlled 規範的	_____	_____	_____	_____	隨意的 Accidental
Unique 別致的	_____	_____	_____	_____	普通的 Common
Spacious 寬敞的	_____	_____	_____	_____	侷促的 Confined
Clear 清晰的	_____	_____	_____	_____	模糊的 Ambiguous
Pleasant 愉快的	_____	_____	_____	_____	惱人的 Annoying
Simple 簡單的	_____	_____	_____	_____	複雜的 Complex
Interesting 有趣的	_____	_____	_____	_____	乏味的 Boring
Cheerful 歡快的	_____	_____	_____	_____	陰郁的 Gloomy
Ordered 有序的	_____	_____	_____	_____	雜亂的 Chaotic
Welcoming 歡迎的	_____	_____	_____	_____	拒斥的 Forbidding
Comfortable 舒適的	_____	_____	_____	_____	難受的 Uncomfortable
Straightforward 一致的	_____	_____	_____	_____	衝突的 Contradictory

Your Overall Evaluation 您的總體評估:

Preferred 喜愛的 _____ 不喜愛的 Not Preferred

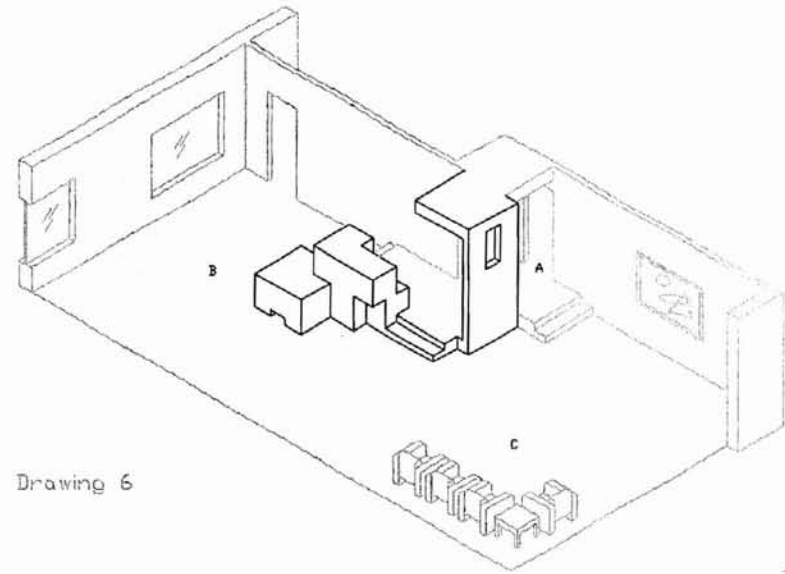


Drawing 5 (圖 5)

Active 積極的	_____	消極的 Passive	_____
Delicate 精緻的	_____	粗獷的 Rugged	_____
Profound 深刻的	_____	浮淺的 Superficial	_____
Controlled 規範的	_____	隨意的 Accidental	_____
Unique 別致的	_____	普通的 Common	_____
Spacious 寬敞的	_____	侷促的 Confined	_____
Clear 清晰的	_____	模糊的 Ambiguous	_____
Pleasing 愉悅的	_____	惱人的 Annoying	_____
Simple 簡單的	_____	複雜的 Complex	_____
Interesting 有趣的	_____	乏味的 Boring	_____
Cheerful 歡快的	_____	陰郁的 Gloomy	_____
Ordered 有序的	_____	雜亂的 Chaotic	_____
Welcoming 歡迎的	_____	拒斥的 Forbidding	_____
Comfortable 舒適的	_____	難受的 Uncomfortable	_____
Straightforward 一致的	_____	衝突的 Contradictory	_____

Your Overall Evaluation 您的總體評估:

Preferred 喜愛的 _____ 不喜愛的 Not Preferred



Drawing 6 (圖 6)

Active 積極的	_____	消極的 passive	_____
Delicate 精緻的	_____	粗獷的 Rugged	_____
Profound 深刻的	_____	浮淺的 Superficial	_____
Controlled 規範的	_____	隨意的 Accidental	_____
Unique 別致的	_____	普通的 Common	_____
Spacious 寬敞的	_____	侷促的 Confined	_____
Clear 清晰的	_____	模糊的 Ambiguous	_____
Pleasing 愉悅的	_____	惱人的 Annoying	_____
Simple 簡單的	_____	複雜的 Complex	_____
Interesting 有趣的	_____	乏味的 Boring	_____
Cheerful 歡快的	_____	陰郁的 Gloomy	_____
Ordered 有序的	_____	雜亂的 Chaotic	_____
Welcoming 歡迎的	_____	拒斥的 Forbidding	_____
Comfortable 舒適的	_____	難受的 Uncomfortable	_____
Straightforward 一致的	_____	衝突的 Contradictory	_____

Your Overall Evaluation 您的總體評估:

Preferred 喜愛的 _____ 不喜愛的 Not Preferred

APPENDIX C

COVER LETTER FOR SURVEY INSTRUMENT – FIRST MAILING

(English & Chinese Version)

Cover Letter for Survey Instrument - First Mailing

July, 2001

Dear Sir or Madam,

Thank you very much for your voluntary participation in the survey. Your opinions are very valuable to the current study, which is to determine Chinese housing preferences in a contemporary residential context.

Enclosed is a copy of the questionnaire, which may take you 15 minutes to complete it. Please complete the questionnaire and mail it back to us as soon as possible. A pre-stamped envelope is provided here for your convenience.

If you have any questions, please do not hesitate to contact us. Thank you again for your participation.

Sincerely,

Shanqing Zhang (Investigator)
Dept. of Design, Housing and Merchandising
Oklahoma State University
Tel: (918)496-4546, E-mail: sqzhang20@hotmail.com.

關於問卷調研的說明信

親愛的先生或女士：

非常感謝您自願參加本次調研。本次調研試圖確定在現代條件下，中國人對於居室佈局形態的偏好。因此，對於我們的研究而言，您的意見是非常有價值的。

附上問卷(中英文對照)一份。完成此一問卷大約需時15分鐘。如有可能，請于一周之內完成問卷並郵寄給我們。附上貼好郵票的信封一份。謝謝。

如果您有疑問的話，務請與我們聯係。再次感謝您的協助。

張上清(調研者)

俄克拉何馬州立大學居室與服裝設計營銷系

電話：(918)496-4546

電子郵件地址：sqzhang20@hotmail.com

二零零一年七月

附註：本說明信無須寄回，以免信件超重。謝謝。

APPENDIX D

COVER LETTER FOR SURVEY INSTRUMENT – SECOND MAILING

(English & Chinese Version)

Cover Letter for Survey Instrument - Second Mailing

July, 2001

Dear Sir or Madam,

About two weeks ago, we mail a copy of the questionnaire to you to request your participation in a survey, which is about to determine Chinese housing preferences in a contemporary residential context. However, we have not receive your response yet. Since your opinions are very important to our study, we sincerely ask you to complete the questionnaire. Your assistance is greatly appreciated.

Enclosed is a copy of the questionnaire, which may take you 15 minutes to complete it. Please complete the questionnaire and mail it back to me. A pre-stamped envelope is provided here for your convenience.

If you have any questions, please contact me at (918)496-4546, or sqzhang20@hotmail.com. Thank you again for your participation.

Sincerely,

Shanqing Zhang (Investigator)
Dept. of Design, Housing and Merchandising
Oklahoma State University

關於問卷調查的說明信

親愛的先生或女士：

大約兩個星期以前，我們曾郵寄給您一份問卷，請求您參加一個調查。這一調查試圖確定在現代條件下，中國人對於居室佈局形態的偏好。不過，我們尚未收到您的回答。由於您的意見對於本次調查是至關重要的，我們誠摯地請求您撥冗完成問卷。非常感謝您的協助。

附上問卷一份。完成此一問卷大約需時15分鐘。當您完成問卷後，請盡快郵寄給我們。同時附上貼好郵票的回郵信封一份。

如果您有疑問的話，務請與我們聯繫。我的電話：(918)496-4546，電子郵件地址：sqzhang20@hotmail.com

再次感謝您的協助。

張上清(調查者)

俄克拉何馬州立大學居室與服裝設計營銷系

2001年7月

v

VITA

Shanqing Zhang

Candidate for the Degree of

Master of Science

Thesis: ARTICULATING IN THE IN-BETWEEN REALM – A SYMBOLIC SOLUTION TO THE INTERIOR ENVIRONMENT IN CHINESE RESIDENTIAL CONTEXT

Major Field: Design, Housing and Merchandising

Education: Graduated from Gongnongpin High School, Shanghai, China in July 1976; Received a Bachelor of Art degree in History and a Master of Art degree in History from Fudan University, Shanghai, China in July 1986 and July 1989, respectively. Completed the requirements for the Master of Science degree with a major in Design, Housing and Merchandising at Oklahoma State University in December, 2002.

Experience: Employed as a mechanic technician in a factory in Shanghai, China, 1978 - 1982. Received a graduate teaching assistantship to monitor the Computer Aided Design (CAD) Lab in Oklahoma State University, Department of Design, Housing and Merchandising, 1995 – 1998.

Professional Memberships: Member of Phi Upsilon Omicron, the Honor Society in Home Economics.