Generation Mechanism of Architectural Design Inspiration Based on the Theory of Brain Subconsciousness

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ABSTRACT

As the times proceeds, the contemporary architectural design thinking gradually changes from the traditional linear harmonious thinking into non-linear, non-balanced, and non-uniform creative thinking. From the perspective of thinking theory of subconsciousness, this paper analyzes the application of subconsciousness in architectural design, and probes deeply into the effect of subconsciousness in generating inspiration for architectural design, discovers the similarities between the theory of non-linear thinking and inspiration generation, and develops a way of thinking on architectural design inspirational thinking based on subconsciousness, which has enriched the generation theory of architectural design inspiration, and provides guidance and theoretical basis for future architectural design.

Key Words: Architectural Design, Subconsciousness, Inspirational Thinking, Nonlinear Theory

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Introduction

With the improvement of the country's overall national strength, the rapid development of information and science and technology, and the gradual improvement of people's living standards, the demand in material aspects has gradually begun to transform into demand in spiritual aspects. For contemporary architectural design, as the people's aesthetics becomes constantly deepening and complex, the design concepts and ideas that can bring joy and enjoyment to the people's spirit have become an urgent need. In the diversified network development structure, the beauty and idea of traditional aesthetics is facing a breakthrough challenge, and the open longitudinal poly-mineralization gradually replaces the traditional co-linear thinking (Rian and Sassone, 2014; Pallasmaa, 2010; Mersal Alsuhbani and Mohamed Al-Mudajji, 2017).

This complex and non-linear network theory, which is composed of architectural forms, such as folding and collage, curves and motion, complexity and freedom, and spatial forms, is gradually developed upon the influences brought by new scientific theories and new ways of thinking (Philip Drew, 2006; Bruce Forwood, 2009; Mays, 1991). The application of scientific terminology and science and technology in architectural design has become an inevitable trend in contemporary architectural design. Non-Euclidean geometry, topological geometry, Cartesian coordinates and other theories has broken the inherent patterns and frameworks of traditional architectural design, and non-harmonious, unbalanced and unconventional new architectural forms continue to emerge

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(Czech *et al.,* 2015; Arosha Gamage and Richard Hyde, 2012).

As shown in Figure 1, the architectural form of Guangzhou Opera House adopts the techniques of twisting, crossing and folding, which makes it break through the traditional and conventional balanced modeling, presenting the aesthetic beauty featuring the effect of ups and downs and natural streamline.

Figure 1. Guangzhou Opera house

The vigorous development of urban construction brings about the rapid emergence of a variety of architectural forms that are in line with the contemporary aesthetics. However, due to inadequate accumulation of architectural thinking theory, most of these architectural designs are completed with the participation of foreign architects. Thus it has become a difficult problem to be solved at present as how to improve the quality and new thinking of architectural designers.

Therefore, in this paper, the subconsciousness is applied to the nonlinear architectural theory of architectural design, the contemporary architectural thinking is analyzed in depth, and the inspiration generation mechanism is explored from the perspective of architectural design thinking. It incorporates architectural design, subconscious thinking, and inspiration into a creative thinking system. The inspiration cultivation is of great significance for the architectural designers to develop the architectural creative thinking. The article enables the architects to combine their creative intentions with the true feelings of the participants and to create works that are both practical and aesthetically consistent with the contemporary public, so that the architectural design can have more clear aesthetic characteristics, always center on the people-oriented design concept, and can provide a more diversified and comprehensive functional experience.

Subconsciousness Theory

Human's thinking refers to the activities that make specific things abstract and then reorganize and induce them. People's perception of consciousness is the premise of people's thinking activity, which exists in the brain in a three-dimensional network model. Therefore, different ideologies often give different meanings to the same thing (Peters, 2017; Jae-In Lee, 2015; HaeseongJe, 2013). For example, the integration of consciousness will endow the architecture the significance of spiritual heritage and historical and cultural symbols, besides the basic living function. This kind of subconsciousness is a creative thinking method based on perceptual knowledge such as perception, intuition and experience.

Table 1. Types and definitions of perceptual thinking

Type	Characteristic	Definition	Significance
Visual perception	A kind of creative thinking	It is the essential explanation of the perceptual things and the overall results of the physical objects.	There is a close connection with aesthetics and can awaken the experience
Auditory perception	A sound perception	Including the sounds of nature and the human voice, beautiful melody and noise.	Make the experience and cognition more true, combined with visual perception
Taste perception	A kind of aesthetics associated with the spirit	Not only is it a visual sense of the taste of the food, but also an experience associated with the spirit.	Feel the expression of architecture for survival
Touch perception	A direct link to life	Let people feel the change of the outside world, and have a direct connection with life.	It can enhance the intensity of perception, extend the scope of perception, and extend the experience of perception.

(1) Perceptual thinking
In essence, perceptual thinking is the form of perception that is reflected to the brain after human organs are stimulated by certain things, including visual perception, auditory perception, taste perception, and touch perception, as shown in Table 1. It extracts information through senses, and then combines with human intuition and experience, to finally develop a form of perceptual thinking. So perceptual thinking is the starting point of subconsciousness.

(2) Irrational thinking
With the development of the times, rational thinking begins gradually to be questioned, thus the design concept that breaks away from the conventions and seeks non- harmony has been established. Irrational thinking breaks away from the various systems and boundaries, especially in the fields of art and aesthetics, leading to more vivid and diversified art forms and providing people with more free experiences.

1) Intuition is a form of thinking that directly gains the overall cognition of things without logical analysis, which is characterized by uncertainty, irrationality, and comprehensiveness. It is an ideology created with the interaction of emotions, feelings, sensibility, and rationality, and a thinking form for guiding the manifestation of subconsciousness, which embodies the comprehensive cognitive ability. In the field of design and creation, aesthetic cognitive experience is also the perception and feeling of things, which is produced in the brain in a fuzzy state. Therefore, in the aesthetic process, the irrational intuitive thinking under the sensibility can reduce the unnecessary discrimination process.

2) The perceptual experience is not only the simple analysis of the object, but also the knowledge obtained through the processing and integration of the perceptual information, as well as the active modification and improvement of such knowledge. It is characterized by perceptibility, initiativeness and continuous updating. In the process of integration, philosophical understanding and measurement of cultural values are often added. With the application of perceptual experience to the aesthetics, the aesthetics can be raised to the level of experience through the summarization of aesthetic experiences. This way of merging rational thinking with irrational thinking is consistent with the concept of architectural design.

New Transformation of Architectural Design

(1) Transformation of architectural philosophy
Architectural design and nature are inextricably linked. The unique shape and structure existing in nature can serve as an element, source, and power for creation to architects. When exploring design inspiration in nature, the introduction of irregular natural elements, combined with modern technology and materials, can push the building onto a changeable post-modern development road. Among them are the organic forms of buildings (Figure 2), bionic buildings (Figure 3), ecological buildings (Figure 4), and green buildings (Figure 5), all of which reflect the important role of nature in architectural design inspiration. Therefore, unbalanced, non-linear, and non-harmonious variable buildings have become the pursuit of modern architectural design (IremErbas and Dijk, 2012; Hadasshadar, 2001; Trebilcock, 1998). Such dematerialized buildings with visual aesthetics, perceivable experience, and cultural values are becoming more and more important in the contemporary service-oriented society.

The harmonious coexistence of nature and architecture, which is achieved through the application of the philosophy of harmony between man and nature to architectural design, can guide the direction of architectural design, which is the wind vane in the whole design process. In the information age, architectural design has gradually transformed into a design thinking with combination of reality and virtuality, which has created the beauty featuring fuzziness and arbitrariness, breaking away from the traditional harmonious beauty.

Figure 2. Organic form building - Water Villa

Figure 3. Bionic building - Holland "city cactus"

Figure 4. Ecological architecture – One & Ortakoy building

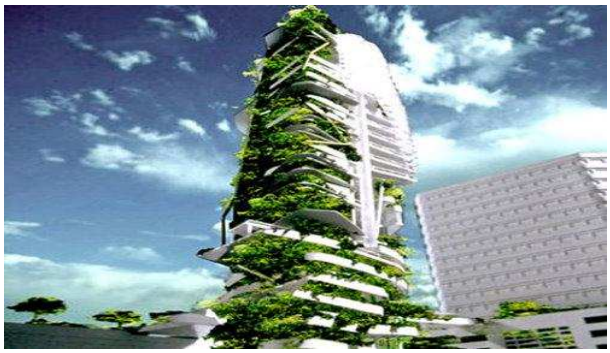

Figure 5. Green building - a sustainable skyscraper

(2) Transformation of architecture technology
Traditional construction techniques are produced by means of building tools for the purpose of human habitation. As architecture develops, the form and volume of architectural space are first updated technically, and then the art of architecture begins to sprout, and non-standardized and non-balanced architectural design comes into being. Depending on science and technology for continuous improvement has gradually become an inevitable direction and means of architectural design. The changes in building materials, design techniques, ideology and design style also reflect the development trend of current architectural design and continue the development course of architectural thinking. As shown in the "Crystal Palace" design in Figure 6, the frame structure design and application of spatially permeable materials, as well as a large amount of capital expenditure all lay a solid foundation for the industrialization of the building. Contemporary advanced building technology has brought about more diversified building structures and technological materials, and enabled the building to serve as a medium for information dissemination. The British Pavilion in World Expo shown in Figure 7, uses visual reflection techniques and multi-dimensional spatial dimension design concepts. The Poland Pavilion in World Expo, shown in Figure 8, uses paper-cutting elements to design its facade, featuring integration of materials and culture. The Swiss Pavilion in World Expo, as shown in Figure 9, continues the ecological design by utilizing the degradable electricity-generating and environment-friendly building skin.

The development and application of building technology has intertwined multi-disciplines, forming a complex network of relationships. The expansion into multi-dimensional disciplines can better solve the complex issues arising from contemporary architecture, and also brings about changes in the aesthetic experience of new things.

Figure 6. Crystal Palace

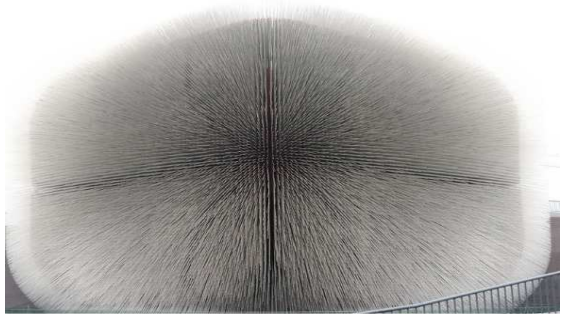

Figure 7. British Pavilion in World Expo, Shanghai

Figure 8. Poland Pavilion in World Expo, Shanghai

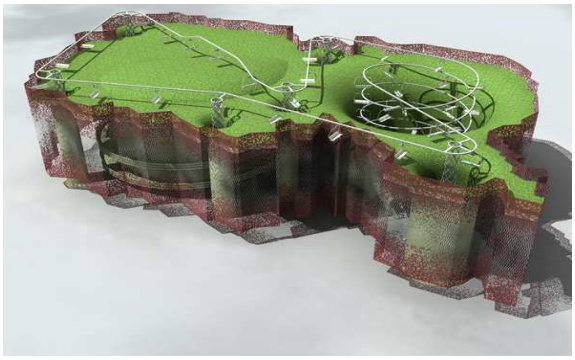

Figure 9. Swiss Pavilion in World Expo, Shanghai

Application of Subconsciousness in Architectural Creation

Based on the analysis of subconsciousness and the new transformation of contemporary architectural design, this paper combines the two to study the function of subconsciousness in architectural creation. In the human-oriented social environment, architectural design thinking gradually transform from the designer's own intention to the building users' intention, from the inherent thinking to the open thinking, developing a fuzzy design focus with the designer-guided thinking and integration of the user's intention. At this time, the analysis of the subconsciousness in architectural design shall start from designers and users who give the building life.

(1) The participants' subconsciousness. The building is constructed for humans, that is, the building serves people. In particular, the users gives the building a dynamic life, which enables its basic and core attribution to be embodied. Through the analysis of the subconsciousness of the building participants, the real experience feedback of the building participants on the architecture can be obtained, which can stimulate the inspiration of the architect and allow him to create a work that fits the needs of the public.

For the building participants, the building first presents the appearance design, that is, visual aesthetic experience. As shown by Louvre in Figure 10, a large-scale glass building can arouse people's curiosity about the space inside the building. Auditory perception is a deepening experience of building materials and building space on the basis of visual perception. Taste perception is most commonly found in food and beverage types of architecture, which enhances participants' taste for architecture and its representative culture. Touch perception is the most direct feeling of the participants towards the building. Touching can stimulate the participant's cells of the whole body, and enable him to obtain the real experience of the building. As shown in Figure 11, Swiss Ice Hotel enables people to get the most intimate contact with the world of ice and snow.

Figure 10. Louvre

Figure 11. Swiss Ice Hotel

(2) Subconsciousness for architectural design. The significance of the architectural designer is to create valuable and vital architectural space upon people's different needs. When he designs, his professional sensitivity begins to play a role, that is, his subconsciousness begins to create ideas for the design inspiration. The subconsciousness includes the knowledge of

design elements such as materials, light and shadow, colors, and functions, as well as the understanding of external forms and spatial structures. This subconsciousness mainly comes from professional qualities of the designer and the accumulation of different materials in life, as well as the long-term experience to the architecture. It has always been in the process of development and change, saving time and effort for architectural design. In addition, with benefit from his self-subconsciousness, the designer shall see to people's needs so as to understand the architecture more deeply and thoroughly and complete the final architectural design.

(3) Architectural experience under the subconsciousness

Figure 12. Berlin Jewish Pavilion

The development of society makes the building not only a place for consumer, but also a kind of consumer commodity. As a consumer commodity, the cultural aesthetics it brings by is a demand for spiritual enjoyment, and the experience of architectural aesthetics can resonate with the participants. This cultural aesthetic has become another important meaning of the architecture in addition to its residing function. It is rich in novel content and inseparable from the subconsciousness of human beings. As shown in Figure 12, the Berlin Jewish Pavilion, inspired by the analysis of historical sites, has a jagged, multi-faceted shape with a strong sense of visual impact, as well as a sense of shock on the scene. When you walk on the cold and dry concrete in the towering narrow space, the cast iron components of the ground will produce a jingling sound each step. These experiences from the visual, hearing, touch and other perceptual levels will allow participants to feel the uneasy atmosphere, thus showing the value of architecture.

Inspiration in Contemporary Architectural Creation

The application of subconsciousness can give the contemporary architecture more vitality, so the analysis of the source of subconscious can better understand the generation of design inspiration. The role of the subconsciousness is to integrate the subconscious elements and precipitate consciousness. The subconsciousness screens and combines the information in the consciousness, resulting in an integrated ideology acting on the awareness, thus forming a process of rational thinking. Only when the rational consciousness and the irrational subconsciousness are combined with each other can the whole cognition of things be achieved. With the interdisciplinary integration of multiple disciplines and multiple fields, the simple and inherently scientific approach gradually transforms into a complex and nonlinear science, and the inspirational thinking of subconsciousness theory and creative thinking also gradually adapts to the asymmetric, non-uniform, and nonlinear scientific development. The generation of inspiration is the result of the interaction between non-logical thinking and logical thinking in this thinking process. That is, consciousness is the basis of inspiration, and the relationship between inspiration and subconsciousness is shown in Figure 13.

(1) Source of inspiration in architectural design

Architectural design is a kind of creative activity, which mainly depends on inspirational thinking, that is, the creative thinking after the interaction between subconscious non-logical thinking and conscious logical thinking. An architectural

creation first starts from regional culture analysis by logical thinking, which is diverged into pieces of design inspiration through non-logical thinking, followed by integration by logical thinking, and finishes with the final design proposal. Throughout the entire process, repeated interactions between non-logical thinking and logical thinking allow the design to meet the needs of both the ideal and the reality. Therefore, the source of design inspiration cannot be obtained overnight, but it is a kind of thinking activities obtained through a long-term accumulation and precipitation.

(2) Inspiration generation in architectural design
The inspiration for architectural design is first received through visual perception, thought which and the form of a new building can be intuitively seen. Since the unique shape and appearance simulation of the object are inspired by nature or cultural background, and thus architecture plays a certain role in the bearing of history. With the development of science and technology, the dimension of people's touch perception expands and their true feelings become more realistic from a stereoscopic space to a dynamic three-dimensional one. Hearing can awaken people's subjective consciousness, bring out visual effects, and conduct deeper communication. Similar to hearing, olfactory effect can bring sense of smell to people in advance. It can be seen that the perceived feelings of the construction participants can guide the designers and stimulate their inspiration, so that they can design an architecture with more contemporary, technological and comfortable senses. Therefore, it shall be an effective channel to stimulate l thinking from the perspective of subconsciousness.

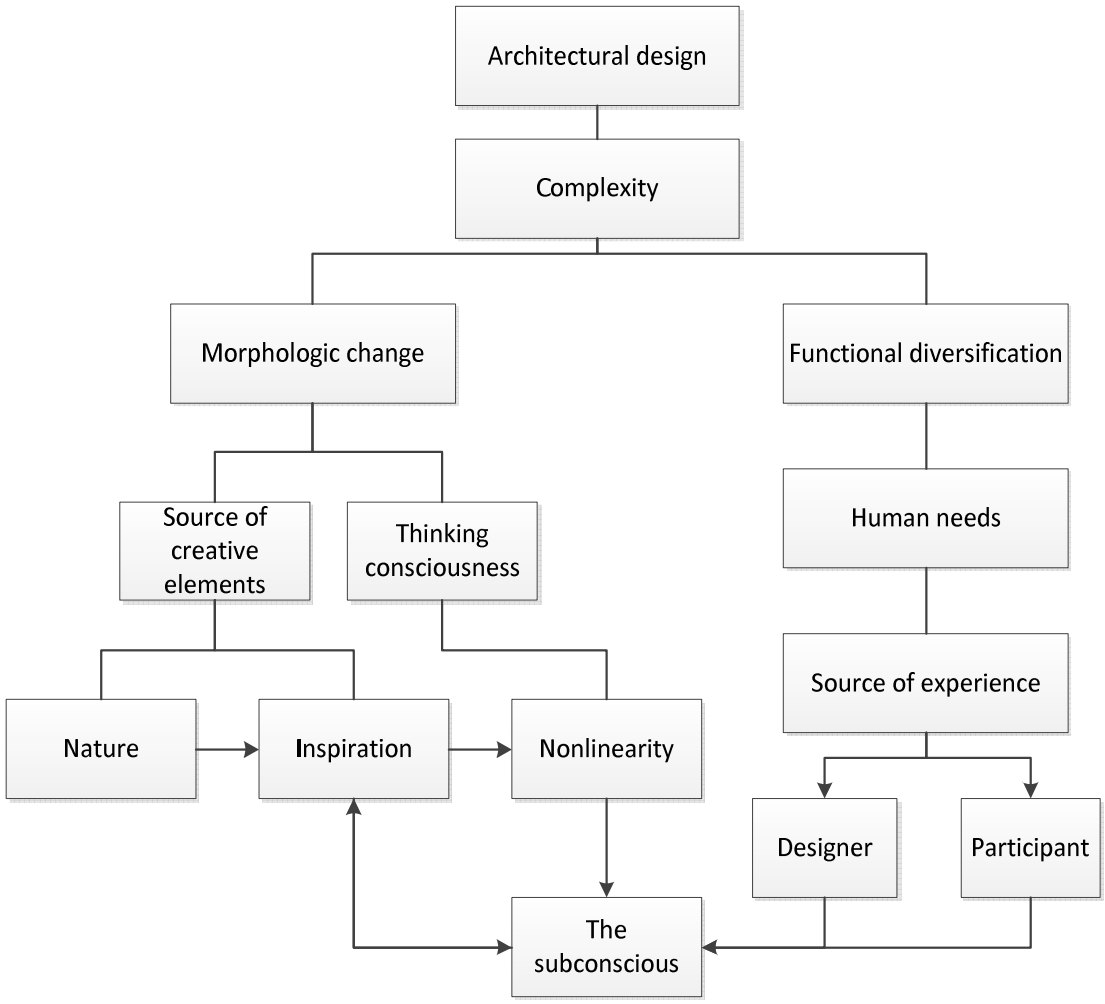

Figure 13. The relationship between the subconscious and the inspiration

Conclusions

Contemporary architectural design is a field that pursues both functionality and humanity. The diversified characteristics of architectural form and concept, as well as the abstract characteristics of architectural language, make the traditional architectural creative thinking unable to meet the needs of modern architectural design.

From the perspective of thinking theory of subconsciousness, this paper analyzes the application of subconsciousness in architectural design, and probes deeply into the effect of subconsciousness in generating inspiration of architectural design, and develops a way of thinking on architectural design inspirational thinking based on subconsciousness, which has enriched the theory of architectural design inspiration generation.

(1) The people-oriented concept is extended into architectural design, and people are divided into two groups for architecture: designers and participants, which reflects the pursuit of architectural design seeking people as the starting point and destination.

(2) This paper analyzes the experience of visual perception, auditory perception, taste perception, olfactory perception and touch perception of architecture participants, which provides guidance for architectural design.

(3) This article uses non-linear thinking theory to analyze the architectural design inspirational thinking, and also discusses the role of subconsciousness in inspirational thinking, which provides theoretical basis for architectural design in the future.

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