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Investigation on the Application of Unconscious Design in Product Modeling

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***Abstract*—Nowadays, with the rapid development of science and technology, in the face of the increasingly fast pace of life, the frequent replacement of technologically innovative products, and the intensification of the aging of the domestic population, people's living habits are constantly changing. It has to spend a lot of learning costs to form new habits and adapt to new technological products. This is tantamount to aggravating the learning pressure of people's lives and compressing the time that is not sufficient. This paper firstly studies, analyzes, and sorts out the core ideas and design ideas of the concept of "unconscious design". Analyze the design products of this design concept, investigate and refer to, extract the core ideas and concepts of "unconscious design" applied to product modeling, and finally combine the research data, extract modeling elements in the process of product design, and combine the "unconscious design concept". Data analysis and research on materials, colors, and human-computer interaction, adding real and effective design cases to the research of the subject.**

Keywords—unconscious design, modeling design, product design, bionics, industrial design, application

I. INTRODUCTION

Since China's reform and opening up, its economic strength has gradually increased, and people's living standards have also improved, but with it, the pace of life has accelerated, and the pressure of learning has increased. Due to the accelerated update and iteration of market products, people's living habits and the lifestyle are also changing gradually, which has resulted in the emergence and popularization of new objects, which will be accompanied by a new learning process and new habit formation, but it will cost a lot of time.Therefore, the direction of product industrial design cannot be limited to functionalism, and it is often necessary to consider the psychological changes of people, as well as people's emotional changes and physical reactions in the process of interaction between products and people. Therefore, based on the psychological "unconsciousness" The unconscious design concept of the "direction" greatly satisfies the needs and services of users' basic psychological or physical reactions.

The shape of the product is our first impression in the selection and purchase process, so the shape of the product often plays a high role in the selection process. The shape of the product not only affects the appearance of the product , but also shoulders to meet different interactive forms and provide users with greater services.The proponent of unconscious design—Naoto Fukasawa , his design pursues a simplicity and delicacy, so he requires excellence in the selection and design of the shape, and in the products he adopts the concept of "unconscious design" , the design of the shape is change accounted for a large proportion.The core idea of this subject is to design the appearance of the product to satisfy our central idea of "unconscious design".

II. THE DEVELOPMENT HISTORY AND CONCEPTS OF UNCONSCIOUS DESIGN

A. The development process of unconscious design

"Unconsciousness" first appeared in Austrian psychoanalyst Freud's psychoanalytic theory, which proposed that unconsciousness is biological instinct, consciousness is the function of human reason, so that unconsciousness is the storage container of human habitual experience, and there are composed of many forgotten desires, this forms an "iceberg theory" and the unconscious is the consciousness that exists below the iceberg.Then on the basis of Swiss psychologist Carl Jung, he proposed three concepts of self, individual and collective unconscious, intuition, instinct and prototype to determine each other.In1999, Naoto Fukasawa named the design workshop "Without Thought". With the annual design research, the theory of "Unconscious Design" has gradually improved and matured.

B. The concept of unconscious design

Unconscious design is just like its English literal translation "Without Thought"—without thinking, he discovered the design principles hidden in human unconscious actions, using such principles - that is, "through people's reactions to previous experience and existing knowledge" to design, but this kind of design does not have the learning cost of people contacting the product, so people often use it naturally in the process of interaction.Another notable feature of the unconscious is emotionalization. Emotions are unique to each of us, which affects the interconnection between people, people and things, and people and nature. In terms of demand, emotion is also a part of our human needs, which changes with the improvement and development of the surrounding environment, material conditions, and spiritual levels. A new concept proposed by Matthias Rauterberg, a visiting professor at Jiangnan University: emotion is the perception of mapping from the unconscious high-dimensional problem-solving space to the conscious low-dimensional problem-solving space. He proposed the richness, heterogeneity, openness, and ambiguity of emotions. Emotions are interesting, but they are also easily overlooked and

underestimated. Therefore, emotion also occupies a large proportion in unconscious design, and at the same time, under the influence of emotion, it can also help designers to explore people's deep thinking. Don Norman, the author of "Emotional Design", proposed three levels of design, namely instinct level, behavior level, and reflection level. These three levels of design can also be used in the application of unconscious design.

III. Cases and Design Ideas of Unconscious Design

A. Classification Cases of Unconscious Design

People's unconscious behaviors are based on instinct, experience, and learning outcomes, so such behaviors are often the closest to people's hearts, and unconscious design can well capture people's subconscious minds to provide a comfortable interaction process and a satisfactory user experience. However, unconscious behavior is often completed in an instant, so a lot of user research and design references are needed in the unconscious design process.

Fig. 1. MUJI CD Player.

1) Instinct and conditioned reflex—Naoto Fukasawa designed a CD player for MUJI in 1999 "Fig. 1". He created a precedent for CD player switches at that time, and was also a famous work of unconscious design. The switch became a vertical downward pull rope, and The intuitive impression that the rope is vertically downward is the use of " pulling", and in the early 2010s, push switches have not been popularized in all households, so most households include lights, ceiling fans, curtains, etc. When the switches of some indoor electrical appliances use the pull-rope type, this also subtly formed a formula in people's minds at that time, so when people's subjective conscious type is to listen to songs, then the subconscious action is followed by pulling. Pulling the rope, this kind of instinctive reaction or conditioned reflex action directly reduces people's psychological pressure and burden, and there is no need to think about it. Subconscious actions also occur at the same time as the subjective consciousness occurs.

2) Emotional resonance—Unconscious design not only focuses on the unconsciousness of the interaction process and method, but also a kind of emotional resonance that occurs during the interaction between the product and the human, or it may be conscious behavior at the beginning or end of the interaction, but in the process of interaction between the product and the human"Fig.2". An emotional resonance achieved in the process of interaction is indeed formed subtly, that is to say, emotional unconsciousness. In the +-0 see-through kettle, we can clearly see the change in the amount of water in the kettle and the color of the tea, which gives us an intuitive emotional change. Second, this change is caused by the change in the amount and color of the water. The change is that the +-0 table lamp is also the same way. The combination of the table lamp and the nursery fixes the position of the tray, so that the tray appears stably in the area where you rest, so that you can store items well when you relax, and for The sense of security that this person has generated is a subconscious emotional change.

Fig. 2. +-0 Kettle 2008, +-0 Desk Lamp 2003.

Fig. 3. MUJI Rice Cooker 2002, MARUNI Hiroshima Chair 2008.

3) Psychological suggestion—The method of psychological suggestion is also a very common method in product design, and this method is also used in unconscious design" Fig. 3". In the rice cooker designed by Naoto Fukasawa for MUJI in 2002, the rice scoop was placed at the top of the rice cooker, so that the person who served the rice had to pick up the rice scoop to open the rice bag, and the rice cooker was turned on to pick up the rice. The spoon serves rice, which not only satisfies the interactive process of serving rice but also establishes the position of the rice spoon. In the Hiroshima chair designed in 2008, the design of the backrest retracts inward and protrudes upward, similar to a human shoulder. In this way, the image of a clothes hanger is well satisfied. In the process of daily use, especially when entering the room, many people will subconsciously take off their coats and lean on the quilt, which

satisfies the conditions for hanging clothes. The method of psychological suggestion is a relatively common method in interaction design. In the process of combining with the concept of unconscious design, it is necessary to consider a series of psychological activities and physical habits such as human behavior habits and psychological changes. So as to achieve the purpose of an unconscious interaction.

B. *Design method refinement*

As mentioned in the previous article, the changes of people's unconscious behaviors and emotions are transient, unique, and difficult to detect. Therefore, before unconscious product design, it is necessary to conduct a large number of design research on target users and observe the target group's behavior. Daily behavior, mood changes"Fig. 4".

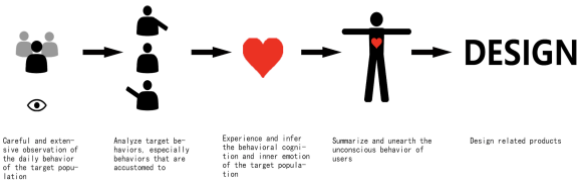

Fig. 4. The process of refining the design method of "unconscious design"

It is necessary to understand and analyze whether the motives and subjective consciousness of target users in producing this behavior are related to these behaviors, and to establish whether the behavior and emotional changes of the target group are directly related to the subjective consciousness, or are related to the subjective consciousness. behavioral and emotional changes. Just like MUJI's CD player, just pull the rope and a piece of music will play. The subjective consciousness is listening to the music, and the process of interaction between the user and the CD player is quiet, just casual and habitual actions.

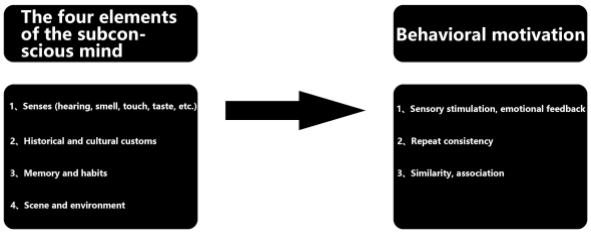

Fig. 5. Four elements of the subconscious mind

This should meet the emotional, habitual, and experiential needs of most target groups. These needs are latent, and designers need to explore and design designs that serve subconscious behaviors and achieve emotional resonance "Fig. 5".

IV. THE RELATIONSHIP BETWEEN PRODUCT STYLING AND UNCONSCIOUS DESIGN

Product modeling is the most intuitive form of expression of a product. At the same time, it also has three influences: function, modeling image, and material and technical basis.

A. *The impact of product styling on interaction and emotion*

1) Influencing factors of product styling—roduct modeling is the most intuitive form of expression of a product. At the same time, it also has three influences: function, modeling image, and material and technical basis. In terms of function, it includes two categories, namely material function and spiritual function. The material function includes technical function and use function; spiritual function includes aesthetic function and symbolic function. The performance of the shape in the function is often not only in the performance, but also plays a great role in the function use and interaction.The material basis includes basic matters such as materials, crafts, and technologies. The material basis of the design product itself, the choice of materials, and the choice of craftsmanship will affect the emotions and actions of the target group during the interaction process.In terms of product modeling, different expressions such as material, appearance, and craftsmanship will change in different ways and emotions when interacting with the target group. Therefore, the design of product modeling is a crucial part of the entire product design process.

2) Product modeling that serves interaction and emotion—In the entire product modeling design process, first of all, in the appearance modeling, the human-machine function should be considered, that is, the human-object-environment should be unified. An effect that serves the emotions of the target group or achieves resonance.In terms of materials and craftsmanship, the target group must be integrated with the interactive environment to meet people's pursuit of interactive satisfaction and comfort. At the same time, the sensory experience and enjoyment of the target group should be considered, so as to achieve the emotional and emotional satisfaction of the target group.

3) The connection between product modeling and unconscious design—On the process of unconscious design, interaction is the main consideration for designers. How to enable the target group to interact with the product through unconscious behavior or the potential emotional or psychological changes generated at the beginning, process, and end of the interaction is an important part of studying unconscious design . For the design of product modeling, it also occupies a large part in the unconscious design. Often people's unconscious behavior is a passive process, that is to say, when people receive information or stimuli, they will produce some unconscious behaviors or emotional changes. Therefore, most of the unconsciously designed products often propose changes in the appearance of the product, so as to achieve the purpose of our unconscious interaction. That is to say, product styling is crucial to unconscious design. Whether it is in the senses, historical and cultural customs, memory habits or scene environment, changes in product modeling can affect the above four points or change the way of interaction.

B. *Product modeling and design expression of unconscious design concept*

Before the design unfolds, it is necessary to extract user behaviors and analyze unconscious behaviors through observation and interviews. After the unconscious behavior is extracted, the "people-oriented" function design is carried out or the senses of the target group are guided in a guiding way. Then make full use of the five senses of the human body and combine it with the history, culture and experience to design and express.

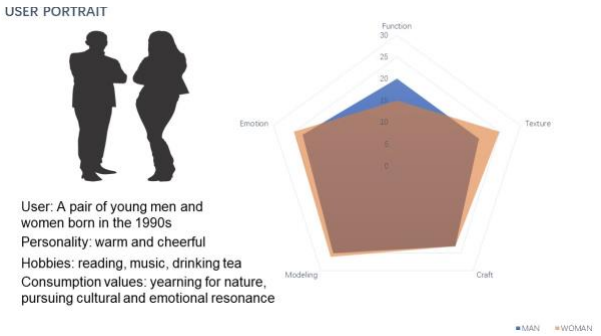

Fig. 6. User portrait

In daily life, stool is one of the furniture that people often come into contact with. As a tool to provide people with rest, it has the advantages of simple structure and small footprint. It is often used in homes, shopping malls, restaurants, receptions and other places to provide people with A place to rest, so there are many designs of stools on the market, but the general emphasis is on the lightness and simplification of the structure of the stool, without considering the use process and emotional feelings of people in the process of using the stool. Therefore, this design practice expression selects a stool as an example to verify.

1) Design analysis—As shown in Figure 6, the post-90s generation will be more inclined to the three parts of emotion, texture and shape in the process of selecting products, which means that today's people are more willing to choose the shape that conforms to their own aesthetics, can resonate with themselves emotionally, and achieve their own texture. However, the focus on functions is somewhat lower. First, conduct research and analysis on the behavior of different target groups. When people are in a relaxed state when using the stool, they act subconsciously. This allows for the analysis of the user's unconscious behavior and explores their underlying sentiment analysis. As shown in Figure 7-10 above, by analyzing the user's sitting posture in different state environments, it can be clearly seen that when the person is in a relaxed state and the mood is relaxed, the performance of sitting on the stool is generally, the legs move naturally, and keep the most relaxed and most accustomed action, when there is no table in front of you, the body is leaning forward, and the hips are derived back. According to the analysis of the above users, through the design of product modeling combined with the concept of unconscious design, the stool design is made in terms of human-computer interaction and emotional resonance.

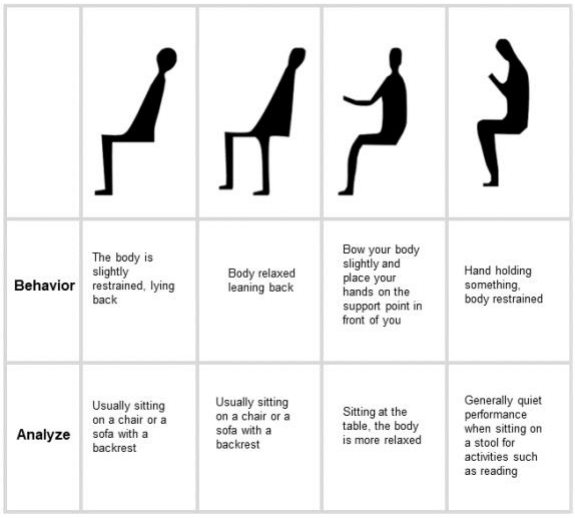

Fig. 7. User Behavior Analysis

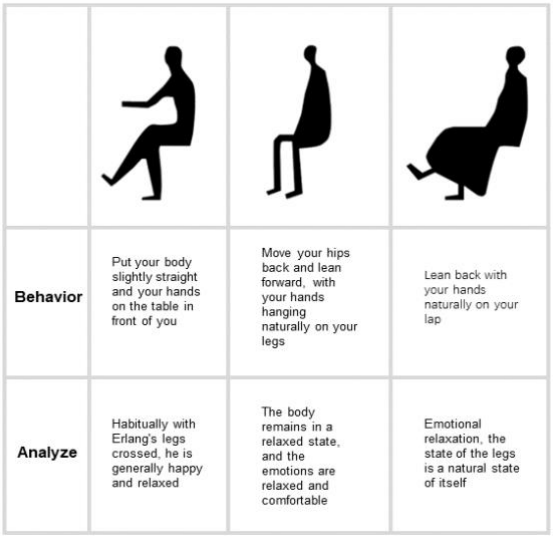

Fig. 8. User Behavior Analysis

SERIAL NUMBER	ENVIRONMENT	NUMBER OF ENVIRONMENTS	The ratio of the stool to the table
1	Fast food shop	5	80%
2	Milk tea shop	7	30%
3	Noodle House	3	180%
4	Shopping mall waiting area	15	50%

Fig. 9. User Behavior Analysis

CROWD	SITTING POSITION	RELAXED STATE
MAN	Random	Lean forward, arms on legs
WOMAN	Respectful attention to manners	Bend your body slightly, put your arms in front of you
Prime of life	Easy	Usually looking for support
Elderly	Cautious	Difficulty relaxing, need support

Fig. 10. User Behavior Analysis

2) Design Practice Expression—From the design analysis, it can be found that the user's behavioral needs for the stool are

more psychological needs. Combined with the unconscious design concept, the stool is innovatively designed, so that the user can have an emotional resonance with the user during the interaction with the stool. The material of the stool is wood, which satisfies the user's potential desire for nature and originality. The designed stool is shown in Figures 11.

Fig. 11. User Behavior Analysis

V. CONCLUSION

Unconsciously designed products can always arouse people's deep resonance. Unconscious design is not to make amazing changes, but to be people-oriented, to tap the unknown instincts, impulses and emotions in people's hearts, so as to reach deep within people's hearts. As a product that always accompanies people, it is more urgent to be people-oriented, pay attention to people's instinctive behavior and cognitive habits, tap people's potential and instinctive needs, and achieve emotional resonance with people, and can integrate the product and the environment to achieve the harmonious requirement of "people-object-environment". This article takes the method of case analysis to extract the unconscious design concept method from several aspects, and applies it to the design, which can provide designers with new ideas.

At the same time, I also felt the charm of unconscious design in the whole design process, and also understood how important service design and interaction design are in the current age of technology.

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