Emotion Semantics Construction in Industrial Product Application

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Abstract: The theory of emotion semantics constitution put forward in this study aims to explore on how to convey emotions in product design. First, the development of emotion expression methods is reviewed, to point out the trend from physiological aspect to psychological activities and bring up a double-layer research framework composed of expression communication and sensory reception. The study has made a profound discussion on how to convey emotions in product design with sensory elements such as vision, hearing and touch, and to rouse the users' emotional resonance with multiple elements in product design.

On theoretical level, this study has discussed how to construct visual symbols and apply concepts such as "emotional bionics" and product semantics, so as to optimize the function of sensory elements in regulating emotions by combining morphological aesthetics and semantic representations.

In terms of practice, this study puts forward the visual modelling construction theory for "allomorphic" product, corresponds visual symbols such as product modelling, color design and material with emotional conveyance semantics, and highlights the users' unique emotional experience facilitated by art and sensory experience, so that the viewers can be greatly impressed by the product.

The study also emphasizes the key role of design in promoting emotional resonance and sensory experience, and brings forward a series of design methods and technological innovation including emotion analysis, multimedia interaction, multi-element integration, introduction of cultural symbols and the incorporation of knowledge of applied psychology and physiology, aiming at enhancing positive interaction in the users' emotion and psychology via a full range of sensory stimulation.

Key words: emotion semantics, product constitution, symbol narration, emotional comfort

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1.Introduction

As a symbol unique to human society, emotion itself is both a subjective perception of the real world and an explicit form of personal will. Nowadays people are attaching more and more importance to their mental health, and emotion-related design practice and academic research are thus being valued more than ever.

In the field of product design, there are increasing cases of regulating emotions through design combined with advanced technology, most of which focus on product function and the use methods. At present, the major concern in design research is how to combine technology with user experience in design adjustment; efforts have been made to look for solutions to improve users' state through designs from the perspective of physiology and functionality. By highlighting the settling of emotional issues through adjustment of the use and function of the design, this method focuses on functionality and the effect of actual application. From the perspective of emotion, it can be divided into three stages of "inducement activation", "physiological strain" and "external performance". Current researches mostly focus on the stage of physiological improvement, trying to introduce certain functions to ameliorate emotional problems.

Starting from the level of emotional "expressions", this study has emphasized the establishment of the connection between symbol, sense and psychology through design, i.e. to manifest the symbolic features of emotion by designs, to express with design elements, and to make external exhibition of the symbolic features of emotions by means of product narration.

By putting forward the "emotion semantic constitutive theory", this study explores the innovative ways to display emotion semantics through products. The key of this theory lies in the two aspects of "semantics" and "constitution": first, "semantics" emphasizes narrative via product design, i.e. various elements of the product are combined to tell a story; second, "constitutive" focuses on the integration of the artistic quality, expressiveness, conveying power, narrative and functional interactivity into emotion semantics, thereby establishing the link between elements such as product modeling, symbol, color and material and the emotion semantics to be conveyed. With the abstract semantics of emotion as the core, this theory is based on concrete product and its narrative, integrating physiological, psychological, sensory and other human elements, making products a platform to exhibit emotions, convey symbols and communicate feelings, and exploring the dynamic relationship between emotional expressions and the internal physiological perceptions.

In view of the holistic character of design thinking, this study conducts an analysis of the symbolic expression of emotion from multiple dimensions, in an effort to deepen emotional narrative experience with the product as the medium and the senses as

carrier, aiming to realize sensory comfort, trigger profound thinking and bring inspiration for the mind.

Chapter 1 Research Background

1.1 Background information and summarization

In the current era, the Z-generation youth are facing enormous competitive pressure, which is the cause of the common emotional problems among them. Sidewise suppression of emotions leads to great burden on one's body and mind, and this phenomenon has received wide public attention. This research, based on the emotional issue that troubles young people, tries to conduct an in-depth analysis of the constitution of "emotion" itself and its characteristics, to further explore the constitutive manner of "emotion semantics" and understand its characteristics as a product of the spiritual world.

Emotions can be expressed by speech, writing or artistic behaviors. Therefore, by researching on the internal multi-layer composition of emotion and its external expressions, this chapter has combined current academic research and cases of design practice to lay the foundation for subsequent establishment of research framework and to enrich the content therein.

1.1.1 Theory of emotion semantics constitution---the constitutive integration of emotional conveyance and semantic expression

As one of the means to embody emotion, semantics exists in the spiritual world and therefore is characterized by "invisibility". It is not only a window to convey emotions, but also a major channel to express personal emotions through intangible means (such as speech, language, and art). Human beings often adopt intuitive ways to express their emotions through language and facial expressions, for example, yelling out of anger, tears due to sadness, etc. From the perspective of literature and art, writers or artists communicate deep emotion semantics through their writings and paintings, so that when people see these works, they can feel the deep emotions contained therein. These are all artistic semantics. In this chapter, the expression characteristics of "emotion semantics" will be analyzed from the following aspects.

Emotion semantics conveyed via product design: semantics itself can be used as a language unique to the product, i.e. a story is told through the product. By using it as a means of expression, product design endows the product with a kind of "soul", so that it can express "emotion semantics" in a special way. Especially in today's cultural context, consumers attach greater importance to the gaining of emotional value, leading to further releasing of the products' expressiveness. In addition, the study on product semantics can enable users to achieve higher emotional resonance with the product.

Besides, this study also focuses on another aspect, i.e. “perception”. Perception itself can be touched off directly by language. Language not only communicates factual information, but also triggers man’s emotional responses. The two sides of “perception” and “semantics” are linked together by the following factors: **(1)** cognitive interpretation, i.e. while receiving and processing information conveyed by the outside world, the individual also interprets it, including understanding the connotations. In this process, semantics is translated into concrete thoughts and feelings; **(2)** emotional resonance: language can arouse emotional resonance, that is, when what someone says or writes resonates with the experience, emotional state or values of the recipient, strong feelings will arise. This resonance is also subject to the influence from personal experience or emotional factors.

In summary, this study focuses on the use of external elements of the product, the expressions and the semantics for conveying “emotions”. Semantics is related to perception, leading to the derivation of a series of concepts and corresponding theories. The constitution of semantics itself has been put forward due to the limitations of “language”, which is expressed by looking for diverse media with the help of multiple senses. For example, “semantics” is transformed into a visual symbol, to be conveyed by establishing a certain expression medium, and to receive emotion semantics in different ways.

The starting point of the constitutive theory of emotion semantics is to adopt the design research methods from design expression to user perception, so that semantics can penetrate into human hearts through the actual performance of the product, and that the design research can allow people to express and communicate the indescribable semantic elements existing in the spiritual world by “visualized”, “concretized” and “perceptible” means, leading the viewers to feel the intangible “emotional language” based on the design research and to further experience the semantic symbol of the emotion so as to make them rethink emotions. At the same time, on the practical use of the design, analysis can be done by starting from the senses: from sensory perceptions to the physiological and psychological levels, looking for another solution to emotional issues.

1.2 Research purpose and significance

1.2.1 Research content

(1) Seek a practical medium to express the semantics of emotional stream of consciousness with the product as the design medium.

By establishing a multi-level linear design research path, elements such as semantic transformation, symbol construction, medium communication and sensory reception are integrated to bring about the focus on the narrative power, semantic power, communication and artistic value of the product; visual media are adopted to create multi-sensory product symbol medium and to realize the comprehensive communication of the five senses, so that the product is both the core carrier of emotional narration and a practical medium to express and convey artistic semantics.

(2) Produce the communication media able to convey emotion semantics.
Based on product semantics, this study has taken the conceptual products with artistic and installation value as the media to convey emotion semantics to the viewers and to transform it into symbols which are able to take objects as their media. This method lies in the extraction of specific semantics of emotions so as to condense and reconstruct them, and then transform them into product symbols through design. With visual media as the core and supplemented by the communicative characteristics of other senses, the emotional expression media are constructed to realize the process from "man-to-man" to "object-to-man" communication. The communication scope can be further enlarged and the viewers can interiorize the feeling at the physical and mental level, so that they can interpret more meanings from the communication medium of the product.
(3) Seek the "constitutive" methods to convey emotional medium so that the emotion semantics can be interiorized
Apply the five-sense media of vision, hearing, smell, taste and touch to product design, with its constitution featuring basic design elements such as color, shape, smell, touch and material of the product. The functional, interactive and practical properties of products with upgrading prospect are key to the construction of product symbol medium for emotional conveyance, which further influence human physiology and psychology in a profound manner. The crucial point of this method is to build the bridge between product elements and the corresponding emotional expression, so that the emotion semantics can take root in one's heart.
(4) Find new ways to soothe and improve negative emotions through product
By establishing and conveying symbolic media, this study has achieved "emotional comfort" based on the connection between the senses and physiology through the five-sense reception and feedback. Meanwhile, a unique and appropriate method has been searched via a deep exploration of the interaction between the five senses and the media. Semantic symbols are transmitted by the media to establish sensory experience and emotional responses, resulting in a potential method for improving negative emotions.

1.2.2 Significance

(1) Expand the artistic expressions of emotion semantics and propose the new concept of "emotion" bionic design.
By putting forward the concept of "emotion" bionics and designing based on abstract emotions, this study has created a new design method for emotional expression featuring the performance of artistic elements and functional solutions and the combination of theories and methods of physiology, emotion science and psychology. With the product as the carrier in combination with different artistic media and design means, a unique visual language can be created to facilitate the exploration of new ways for artistic expression of the symbols.
(2) Abstract consciousness symbols can be communicated through concrete forms to promote the development and evolution of morphological semantics.

Based on the "constitutive theory of emotion semantics", this study has discussed how to convey abstract concepts and the deep symbolic meaning through concrete forms. By applying specific shapes, color combinations and symbols, simplified or abstracted concrete elements can express deeper semantics by creating intuitive and in-depth visual forms, i.e. the product. Involving the complex combinations of shapes, lines and colors, this method applies dynamic interactive elements in product design, thereby enhancing multi-layer meaning expression and emotional resonance.

(3) Explore the corresponding relationship between semantics and emotions, and establish progressive perception channels for design communication.

Analysis is done on how users perceive the semantic symbols conveyed by the product itself, to study how product semantics and narrative elements can mobilize the users' physiological and psychological responses based on the "constitutive theory of emotion semantics". By means of interdisciplinary knowledge, product research and user behavior observation, the influence of the expressive design of the product upon emotions is explored, and academic models are established to probe into the users' emotional state under the influence of sensory communication. When applied in design, it can better meet users' needs.

(4) Intervene in emotional connections with the senses to look for new ways of emotional comfort.

The study has discussed the influence of senses upon human emotions through product design. The first thing is to identify the emotional needs of target users, such as stress management and happiness enhancement. Product constitutive elements are adopted to express and communicate semantics. Meanwhile, user experience is included in the design so as to ensure effective sensory interaction of the product and to exert influence upon the users' emotional state. Finally, product prototype is made and user testing is conducted, to evaluate how the product can achieve emotional comfort through its functional, practical and interactive features.

1.3 Research context

1.3.1 Research and analysis of emotion semantics in product design

Product semantics is an important guideline in product design. Zhang Xusheng (2002) brought forward the use of laws in language and texts as reference, to conduct classified research and handle the symbol system of the product, namely the graphic language, according to its nature. For example, in industrial product design, some scholars have proposed that product semantics is a modern design trend when industrial design has become a cultural awareness, holding industrial design as a coding process and that the design culture gives shape to products through the coding of modeling language (Cui Tianjian, 2002). The understanding for and standard of "visual dependence" involve physiological and genetic factors, but mostly about psychological factors created by the acquired environment. Oriented toward human needs, product design has two symbolic features: one is the symbol to express the functions of the product, and the other is the symbol of the user's spiritual needs and

consumption culture (Zhao Junfen, 2004). The “beauty” in design exists in man’s spiritual world with social and cultural imprints. Designers should attach importance to the study of the common characteristics of human cognition, psychology, society and culture, and constantly discover the roots of the beauty of artificial things so as to create new beauty (Wei et al., 2002).

Different scholars have offered different opinions on the emotion semantics of materials in product design. Zhou Hongjuan, Zhang Mingyue and others (2007) believe that material, as the main body of design expression, “constitutes the indispensable element in design conception with its inherent properties and emotion semantics”. Different materials give off different feelings due to their texture, luster and other features, leading to different emotion semantics expressed therein. The application of the material’s emotion semantics in product design is mainly reflected in the feasibility, agreeableness, diversity and the taste of the material. Product design should give full consideration to the characteristics of the material so as to “properly manifest its emotion semantics” and meet people’s aesthetic demands. Yang Ping and Dai Duan (2007) have proved this fact in the semantics communication of erotic products. Pan Pan (2016) has proposed that modern product design should focus not only on elements such as function, structure and technology, but also on preliminary exploration of emotional design methods of product forms, so as to expand new fields in emotional design. In terms of emotional expression of product semantics, Zhang Deshuo (2017) has analyzed the two layers of signified meaning of product semantics, believing that the focal point of current product design has been shifted from the marginal meaning only to the combination of denotation and connotation, and that product must be made with its basic functional expression as the premise, balanced with internal meaning such as the emotional appeal of the user as the subject. On this basis, Wang Caixu and others (2022) have made a further design of product innovation with emotional narration by integrating the narrative process and product innovation method into product design procedures, so as to endow the design works with emotional meaning in the reflective level, attraction in the instinctive level, and feasibility in the behavioral level.

There are also scholars who start from the reflective level of emotional design to rouse the users’ reflection, by the conveyance of negative emotions in the interaction process, on his or her relationship with itself and with the society, which will further improve one’s self-awareness who cannot be in peace with oneself. When given a moderate amount of negative stimulation, users can realize the possibility of the multiple roles of product design in life (Wang Meitao, Zhao Yan, 2023). Product appearance design can provide effective means for brand promotion and can be realized through the modelling semantics analysis, color semantics analysis, material semantics analysis and functional semantics analysis of the product appearance (Guo Shengrong, 2023).

Objective practice also requires product design innovation on the basis of semantics understanding. Ren Juanli (2010) has put forward the idea that the role of product semantics must be fully developed. Industrial designers should master the methods for applying product semantics to design practice, and constantly strengthen the

subjective, cultural and vivid features in product form originality. For example, in the post-modern chair design, Luo Shan and Li Bo (2015) lay great emphasis on the emotion semantics expression of forms, and have conducted analysis from vision, texture, color, historical symbol and other aspects. In terms of cultural and creative products, some scholars have proved, by adopting empirical cases, that the use of emotional narration design in cultural and creative products can promote the emotional interaction between products and users, which facilitates the users' understanding and acceptance of the culture and spirit contained in the cultural and creative products (Diao Jiqing, Sun Yayun, 2021). Tian Wei (2022) has discussed the connection between product semantics and the packaging design of cultural and creative products and then put forward the cultural and creative product packaging design strategy based on product semantics.

1.3.2 Case analysis on the art and design of emotional conveyance

Previous studies are mainly concerned with horizontal and vertical investigation of the emotional expressions, means and media of art works, installations and modern products. On this basis, a horizontal analysis of modern products is carried out by starting from the integration of the design discipline, with emphasis laid on the emotional expressions of the cases involved. Vertical investigations concentrate on the visual expression and symbol transmission of art, while horizontal ones are more concerned with the functional and interactive capacities of product design and their influence upon psychology, emotion and physiology. The purpose is to provide a deep understanding of the emotional issues and innovative solution strategies through the combination of art and design.

(1) Horizontal and vertical investigations of the art media and expression techniques of emotion semantics

Creators use graphic, painting, sculpture and other visual expression media to convey the created content. In the traditional medium of painting, emotional expressions of the painting art are narrated by means of composition, color, characterization and picture management. The picture also displays the artist's emotional state, psychological state, and the emotional perception of the painting object.

In modern society, not only painting works, but also the expression means for emotional conveyance can be used as such carriers. On this basis, a variety of media are derived, for example, posters and news can be used as the media for visual communication, including memorial design with public art as the media, as well as novel contemporary art, installation art and performance art. In spite of the difference between art form and expression style of the above works, their commonality lies in the fact that they are the main media for the symbolic communication of emotions based on visual elements.

Figure 1-1 Design Case-“911” Memorial Alter (from the Internet)

Among modern art and design works, the most typical communication case is the “National September 11 Memorial & Museum”, which has impressed many visitors. Designed as a public sightseeing spot, no concrete expression technique has been adopted in overall design. The concise style enables people to feel the former presence of the twin towers, while creating a quiet open space in the busy urban area. Solemnity, respect and heaviness can be sensed in the space. At the same time, the flowing water in the middle reduces the psychological pressure on the part of visitors, which, far from compelling them to leave this place, arouses a deep attachment. Instead of hatred, the viewers can feel the respect for and the reflection on life. One of the slogans of the museum says: “May the lives remembered, the deeds recognized, and the spirit awakened be eternal beacons, which reaffirm respect for life, strengthen our resolve to preserve freedom and inspire an end to hatred, ignorance and intolerance.” This work conveys the author’s own sentiment by visual means, featuring a heavy style without oppression. Moreover, the core semantics of reflection, anti-war, respect for life and ending hatred are also conveyed.

Figure 1-2 Design Case---New York Times (from the Internet)

Another good example of emotional communication is the front page of the *New York Times* on Feb. 21, 2021, a data map consisting of 500,000 dots, each of which represents a life lost due to COVID-19. With the development of the epidemic and accelerated death cases, the dot matrix grows dense and the overall color also turns from grey to black. The visual effect of the whole picture manifests enormity, grotesquery and morbidity, a symbol of the impenetrable death threat like a huge shadow in the sky. This design can be regarded as a typical case of visual semantic

narration, expressing the most intense emotion with the most concise means and the most intuitive symbols. Without any complicated composition, it has awakened people's sentiments with the simplest combination of lines, as the slogan says: "These are not just names on the list, they used to be us."

Vertical research of the symbolic expression means of emotion semantics has undergone a change from "concrete symbol narration" to "abstract symbol narration", with a variety of narrative techniques boasting their respective characteristics. Both narration techniques can offer an imaginative space, with the symbols and the narrated content more intangible. The expression medium can take material as the main object, casting light on subsequent researches on the narration of product semantics.

(2) Horizontal research and analysis of current design cases related to the communication of symbols through perception

Different from other design products, functional products can interact with people and be useful to them. Therefore, the horizontal investigation is done by expanding to the scope of design and on the basis of existing perceptual and emotional expression design cases. By extending from vision to other senses, the research is carried out on the interaction, function and use mode of the investigated cases on the basis of former researches, emphasizing the multiple integration of the design and the introduction of analysis on design psychology, design behavior and physiology, so as to explore the function and influence of emotional products on the body and mind of users.

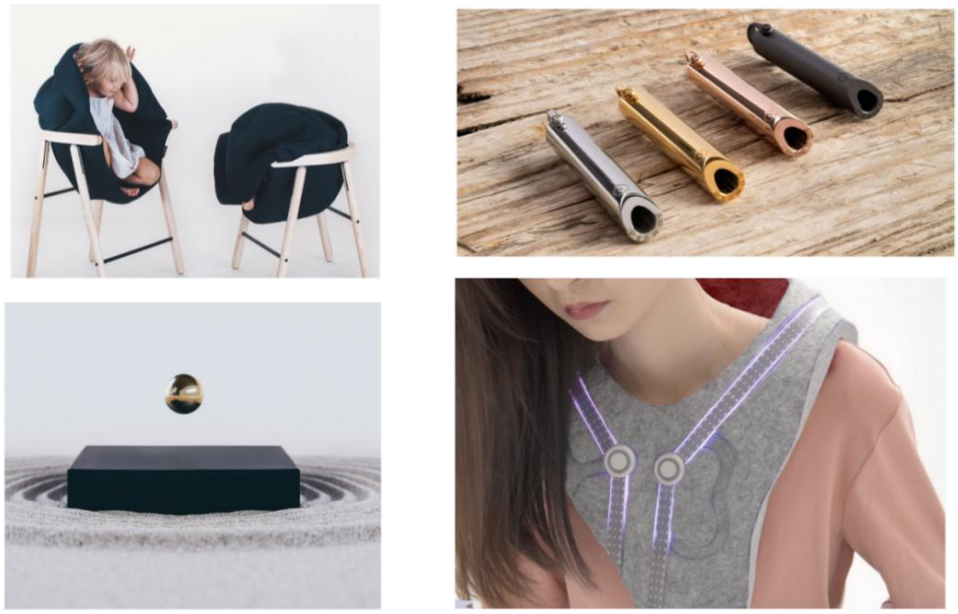

Figure 1-3 Typical Product Design Cases (from the Internet)

At present, the typical product research cases are as follows:

Case 1: Mia Hoodie Chair

In this case, soft and skin-like material is adopted to simulate the "hugging" gesture, to provide children with a sense of security and privacy; and psychological hints are given to children through the shape, texture and touch. When feeling anxious or stressed, one can pull up the cocoon-shaped lid to create a haven separated from the outside world and feel protected.

Case 2: Shift Breathing Whistle

Inspired by the Zen blowing meditation of the ancient Zen Buddhism, it is to help maintain the users' peace of mind by training the users' breathing methods with breathing interventions. Through whistle blowing, users have to breathe slowly to succeed in sounding the syllables. During this process, breath, heart rate and blood pressure are regulated, with the touch medium and active interaction achieving the effect of emotional relief.

Case 3: Buda Ball Meditation Beads

In this case, magnetic levitation technology is adopted to display a sphere rotating in mid-air, to create a ceremonial atmosphere and attract users to stop and watch. This design aims to remind users to slow down in their life. By integrating the function of interacting with the users' breath rate, the product can also help users adjust their mental state for emotional healing and relief.

Case 4: Tactic Touch Therapy

This case has introduced the ASMR technology and made full use of tactile communication, starting with the head and neck of the human body. Meanwhile, in the function design, the users' physiological signals are connected based on sensory responses. The indicator can reflect the users' state of mind to a certain degree and the strength of point touch is thus decided, thereby producing emotional healing which can bring relief to the users' mood.

Summary: the above cases cover multiple fields and all of them are based on emotional expression and perception. Horizontal and vertical designs, with artistic expression and communication as the prior and function and interaction as the secondary, are used as the head reference for the research, so as to establish the subsequent research level, framework, path and content in a specific way. By focusing on the artistic and emotional narration expression of different media, design psychology is introduced to interpret the conveyance of semantics and the users' acceptance with different media. Finally, in the functional and interactive elements of the product, related elements of modern design such as function, interaction and practical use are introduced to achieve the effect of emotional healing of the product.

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Chapter 2 Research Theory and Research Framework

2.1 Summary of related theories

2.1.1 Multi-sensory experience theory and its application

Masayuki Kurokawa, Japanese architect and industrial designer, used to put forward in his book *The Future Archeology of Design* that "The 20th century is an era featuring one-sided rationality, and the power of knowledge has become the basis of all lives." This over-dependence on knowledge has led to the suppression and neglect of human nature and intuitions, resulting in the gradual passivation of human senses. In the 21st century, human requirements for design have gone beyond the stimulating perception of a single sense (such as vision or hearing). The activation of more senses (vision, hearing, smell, taste and touch) is required to enhance individual perception and cognitive process. This experience can be natural or designed, aiming at the creation of a richer, deeper and immersive environment or situation.

Human organs, including eyes, ears, nose, tongue and skin, have the capacity for receiving external stimuli, allowing people to interact with the environment and perceive the changes around them. These organs are collectively known as the "senses". In the process of human cognition, the "multi-organ" mode, by activating multiple senses, has gone beyond the traditional information processing mode that relies solely on vision, thus providing a comprehensive and in-depth perceptual experience. This experience not only strengthens people's perception, but also improves their understanding of the essence of things. Upon stimulation of the senses, reaction will be aroused in the psychological and physiological level, causing a series of perceptual and cognitive changes. Foreign scholars such as Stead et al. have adopted method of text mining and co-citation analysis to study multi-sensory stimulation, multi-sensory stimulation integration, multi-sensory stimulation perception, and the influence of multi-sensory stimulation upon services. Quan Guolong has compared the multi-sensory experience of the subject in the intelligent learning context and found that the difference of the intelligent learning context has led to different multi-sensory experience on the part of the subject, which could further cause the chain interactive reaction in course learning and enhance the subject's experience. Taking Hainan Province as the case study area, Dong Yinyin et al. have adopted the continuous tracking survey and found that multi-sensory travel

experience exerts a positive influence upon destination attachment by sensory power, synesthesia effect and sensory theme, but there are differences in the functional mechanism of "sense-emotion" in different travel stages.

A typical application case of the multi-sensory experience theory, "Field of Light" is an installation designed by the British artist Bruce Munro and was first presented in 2004. Later it is in permanent exhibition in the Uluru region of Australia. Consisting of thousands of balls of light which are connected to the ground by optical fibers and change colors in darkness, this installation embodies the theory in the following aspects: First, transmission of visual elements: the color change of the light balls not only provides a visual shock, but also simulates the color transformation of nature, for example, the gradient color of sunrise and sunset has triggered the emotional resonance for the beauty of nature on the part of the audience; secondly, spatial and tactile experience: when walking among the light balls, the space layout and the tactile feelings of light are combined to create an immersive experience for the audience, thereby establishing the emotional bond between the audience and the work; thirdly, emotion semantics communication: the element and change of light are not only a visual feast, but also a symbol of hope, dream and mystery, arousing the emotional response of the audience and leaving a unique impression on their minds.

Figure 2-1 Multi-sense Design Case---"Field of Light" (from the Internet)

This theory emphasizes that vision is the core element in the human sensory system, and user attention can be drawn by elements such as color, shape and moving images in design and art, so as to further convey information and emotions. The olfactory medium arouses the fond memories and emotions, which further enrich the immersive atmosphere of the design. In terms of hearing, emotions can be channeled through sound. As to the tactile sense, physical contact, for example, touchable design can enhance the interactivity of the work. Though relatively rare, the application of taste sense can also increase the sense of depth of the experience. Different from traditional art, the combination of sensory elements can help create comprehensive and multi-layered works of art, bringing about immersive experience for the audience.

2.1.2 Emotional priming theory and its application

Emotional priming theory is used to explain how a particular stimulus or event can

trigger an individual's emotional response. This theory holds that people respond to certain priming elements in their surroundings which stimulate their emotional experience.

Specifically, these emotional priming can be divided into three stages: the first stage features the capturing of conditions that trigger emotion by forms; the second stage captures the major psychological concepts used in the emotion models of the dynamic logic; the third stage introduces a BDI-based framework (belief-dream-intention) and achievements & goals, to lay a solid foundation for the previous stages.

In the field of art and design, the emotional priming theory refers to the fact that designers can create design works to arouse certain emotions by a deepened understanding of human emotions and psychological reactions. It emphasizes the direct connection between design elements and the user's emotions, and how to enhance user experience through these connections. This experience means that the designer integrates personalized design elements into the work, thereby endowing the work with humanized "vitality" and "personality". It also includes the emotional responses triggered by the information users received while using the product. When these "human" objects evoke the sense of "beauty" in one's heart, they transcend the value of being material and give birth to a more profound spiritual significance beyond aesthetics.

In product design, color is one of the most intuitive emotional triggers. Different colors evoke different moods and psychological responses. In recent years, researchers have delved into how to convey opinions by editing the colors of images, such as color transfer, image recolor and color enhancement, with all these methods aiming to change the appearance of the image by color change. Recently, some scholars have begun to study emotion-based color conversion techniques, i.e. to convey emotions by editing images with some colors or color schemes. Yang et al. have proposed a method for conveying emotions among color images. He et al. put forward a color combination-based color transfer framework, so as to further convey different emotions.

Also as key design elements, shape and material can convey different semantics. For example, rounded shapes often give off friendly and warm feelings, while sharp angles convey power or aggressive semantics. Choice of materials, such as smooth metal or warm wood, can greatly influence the external performance of a product. Besides, interactive ways constitute another key design element, especially in digital product design. The interaction mode between users and the product influences the users' emotional experience. Designers can improve user satisfaction and loyalty by optimizing this aspect so that users can feel relaxed and pleasant during product use.

Emotional priming theory occupies a core position in modern products and advertising, especially in stimulating user participation and in positive behavior change. As a typical application case, "The Fun Theory" advertisement series is a typical example of applying emotional priming theory. This advertisement series aims to promote people's positive change in lifestyle by fun creation, among which the most representative parts are as follows:

(1) The piano staircase experiment, which transforms an ordinary subway station

staircase into a giant and playable piano. Each step on the stairs can trigger the sound of corresponding piano key, bringing pleasure and surprise to users. The musical function of the stairs attracts the attention of the passers-by and inspires their desire for exploration and fun, thus prompting their choice of the stairs instead of the escalators beside. This advertisement experiment means a clever transformation from physical activity (walking the stairs) into an entertainment experience, which further conveys the emotional value of health and vitality to the audience.

(2) The dustbin experiment. In this experiment, a sounding dustbin is designed and whenever trash is thrown into it, the dustbin will make exciting sounds similar to a gaming console. As to emotional priming, this experiment focuses on the users' curiosity and sense of satisfaction. The sounding function has turned trash disposal into a pleasant experience, arousing people's interest in using public dustbins. By this new and creative method, the scheme has emphasized the importance and pleasure of environment-friendly behaviors, conveying a sense of social responsibility for the environment to the entertained audience.

Figure 2-2 Multi-sense Design Case---"The Fun Theory" (from the Internet)

To sum up, emotional priming theory has provided a new perspective to designers, enabling them to create touching products by careful selection and combination of design elements. This user emotion-centered design method can not only enhance the market competitiveness of the product, but also impress the users, thereby establishing the emotional bond between the brand and users.

2.1.3 Emotional transference theory and its application

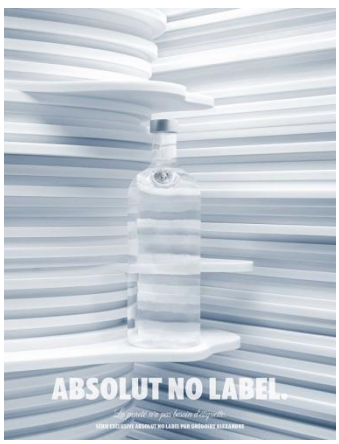
The emotional transference theory is initially applied in the field of marketing, which aims to analyze how the emotional stands of the consumer towards different advertisements and brands influence each other. In relevant studies of marketing, emotional transference theory can explain how the consumers' emotional stand towards former advertisements and brands influence the formation of their attitude towards new advertisements or brands. Broadly speaking, emotional transference can be defined as the process in which an individual's existing feelings for one thing are transferred to another similar or related thing and the emotional reactions therein.

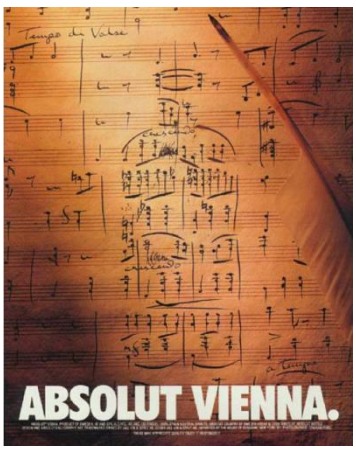
In the fields of marketing and psychology, there are different opinions on the

operation mechanism of emotional transference theory. Most studies in marketing tend to believe that emotional transference mainly takes place through cognitive pathways, which means that while evaluating unfamiliar objects, the individual often relies on the similarity and relevance to known objects, which triggers emotional experience similar to the known objects. The theoretical basis of this opinion is: first, the individual's cognitive evaluation of unknown objects is based on their emotional attitude towards known things and the connection between the two; second, this cognitive process further guides the individual to produce emotional responses to the unknown object. However, some psychological literature hold the opposite view, suggesting that emotional transference may happen unconsciously without the process of cognitive assessment. This automatic transference of emotions is called emotional dislocation mechanism, that is, when individuals cannot distinguish their emotion towards two different objects, they may mistakenly attribute their feelings for one object to the other. As the academic circle hasn't reached a consensus on the specific mechanism of emotional transference, there are different opinions on the results of emotional transference. For example, the individual may form an attitude toward a new object based on his or her overall emotional predisposition toward a certain category; however, sometimes even this new thing belongs to the same category, it may trigger totally different emotional responses.

Currently, this theory is not only valued in the fields of marketing and psychology, but also applied in a larger scope to art and other fields. The theory of artistic emotional transference refers to the phenomenon that during artistic creation and appreciation, artists or viewers project their subjective emotions onto the art works. This theory holds that art and design works may possess values that transcend material existence, able to stimulate the viewers' emotional reaction and psychological resonance.

A typical application of this theory is the advertisement of Absolut Vodka. Never highlighting the wine's selling points such as the origin, quality, taste, etc., this advertisement series has displayed an ideal world through a set of creative pictures. In this world, people are more open, understanding, and harmonious. The visual elements in the advertisement are highly symbolic. For example, artists can convey the message of equality, fraternity and global peace through the creation of the vodka bottle. A typical example is that in the advertisement, an artist uses a map of the world and rearranges it into a glass of Absolut Vodka to symbolize global solidarity. This powerful visual language not only captures the audience's visual attention, but also arouses their emotional resonance for a borderless world.





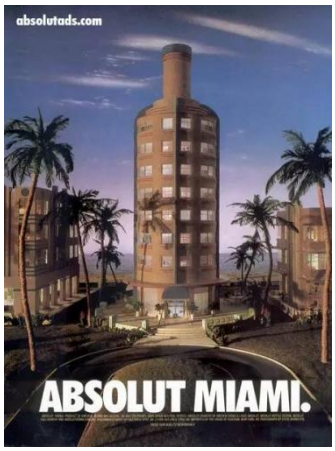


Figure 2-3 Emotional Transference Design Case---“Absolut Vodka” (from the Internet)

The above cases are detailed illustrations of how art can integrate emotional symbols into works to trigger the viewers’ resonance. This also shows the importance of the theory in aesthetics and art psychology, so that works of art can bring about different influences upon different people and further promote the healthy development of their emotion and psychology. Through art, people can gain insight into the inner world and the emotional bond between people. Meanwhile, in marketing and brand management, the emotional transference model describes how consumers transfer their feelings for the brand to the extension products of the brand, thereby influencing their attitude and acceptance for new products.

2.2 Research method

The study mainly adopts qualitative analysis method, with investigations based on literature research combined with case analysis. A comprehensive use of literature research and case analysis can ensure that the research is both scientific and practical.
Literature research method: current methods and theories are summarized by reviewing domestic and foreign literature, and on the basis of product semantics, relevant researches on designs covering senses and emotions and the design practices. Meanwhile, the shortcomings are also highlighted. Efforts are made to provide the study with theoretical foundation and reference basis through relevant literature covering design, art and semantics and the overall results of its practical research.
Case analysis method: collect and analyze the case data of relevant art and design works home and abroad; the collecting process can be carried out by means of time axis which is divided into horizontal collection and vertical collection. In vertical collection, commentaries on famous works in the history of painting art can be used to explore the overall emotional expression mode applied in these works. In horizontal analysis, typical case analysis can be done on the basis of existing designs which feature “semantics” and “emotions”. The summary obtained from the overall expression of “emotion semantics” in some classic design works, as well as the design composition methods used in the communication of “feelings”, can provide sufficient practical basis for the design methodology and attempts for this study.

2.3 Research framework

2.3.1 Construction of a double-layer research framework based on “perceptual semantics”

The research content is divided into two aspects, which can also be attributed to the three-level framework to be established in the research. Level I is semantic conveyance, and Level II is emotional acceptance. Each level boasts relatively independent coverage factors and research priorities. Instead of being separated from each other, they are linked by a linear path.

As the “starting point of emotion”, the emotional expressiveness and semantic conveyance of products stand as the first level of the research, trying to use concrete expression forms to express and convey the perceptual, abstract, stream-like and invisible “inner emotions” in an outward manner with the semantic performance and symbol communication as the basis. The subject of the communication focuses on the visual sense, followed by other senses. This part lays emphasis on aesthetics, emantics, symbol communication, symbolic expression of appearance, visual modeling generation and construction of symbolic medium.

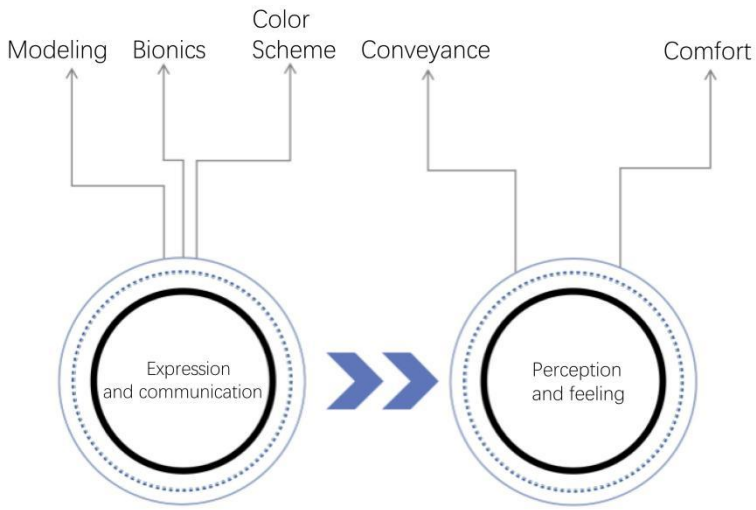


Figure 2-4 Design Research Levels (drawn by the author)

Standing at the second level of the research, emotion reception is based on the audience’s sensory perception and acceptance of the symbolic medium conveyed by Element 1. This part takes the viewpoint of the audience to discuss the reception effect of the emotional medium based on the senses, which could further achieve the functional role of “emotional comfort” with light healing power. This element has combined design psychology, design behavior and physiological analysis, with the key points including sensory reception mode, psychological analysis, semantic perception effect, and the progression from physiological perception to psychology and emotions.

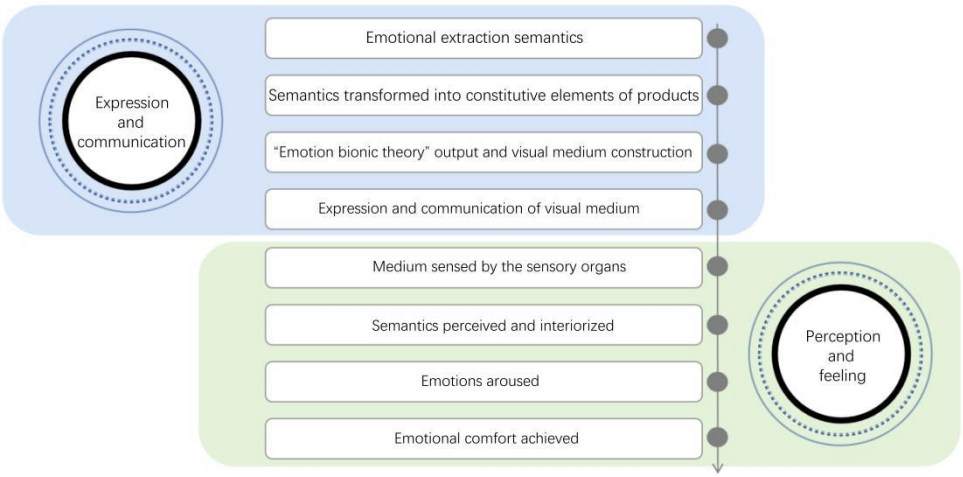


Figure 2-5 Emotive Semantic Level Design Path Analysis (drawn by the author)

2.3.2 Establishment of the overall composition of the study via the dual elements of "symbolic representation" and "audience perception"

Among the symbolic expressions of emotion semantics in products, the first element lays emphasis on "expression and communication", which is the concentrated embodiment of art, expressiveness and form, highlighting the transmission through intentional symbol medium and conveying the external expression with the product as the medium; the second element is concerned with the users "perception and feeling" of emotion semantics, so as to establish the bridge between symbolic media and psychology & physiology.

Meanwhile, by combining all factors covered by the two elements, the overall composition of the research is established. The main element accounting for the largest proportion is "emotion semantics', which is followed by "audience perception". The secondary element is composed of the users' feelings of the media and the physiological & psychological functions, with the specific proportions shown in the above figure.

The design concept of "emotional bionics" is put forward through emphasis on the symbolic expression of "emotion semantics", which means the organic integration of abstract emotional features and consciousness symbols to achieve the visual conveyance of emotion semantics, so that viewers can sense the deep communication of emotion semantics in the product's own elements. The secondary element focuses on the establishment of connections between the physiology and psychology of the user, so as to deepen the user's understanding of the emotional symbols through expression medium and realize the product-based emotional experience from the senses to the spirit.

Starting from the product semantics and product composition, this chapter has discussed the influence of design medium upon user physiology and psychology, trying to find solutions to negative emotions by integrating the functions and interaction in product design for sensory comfort.

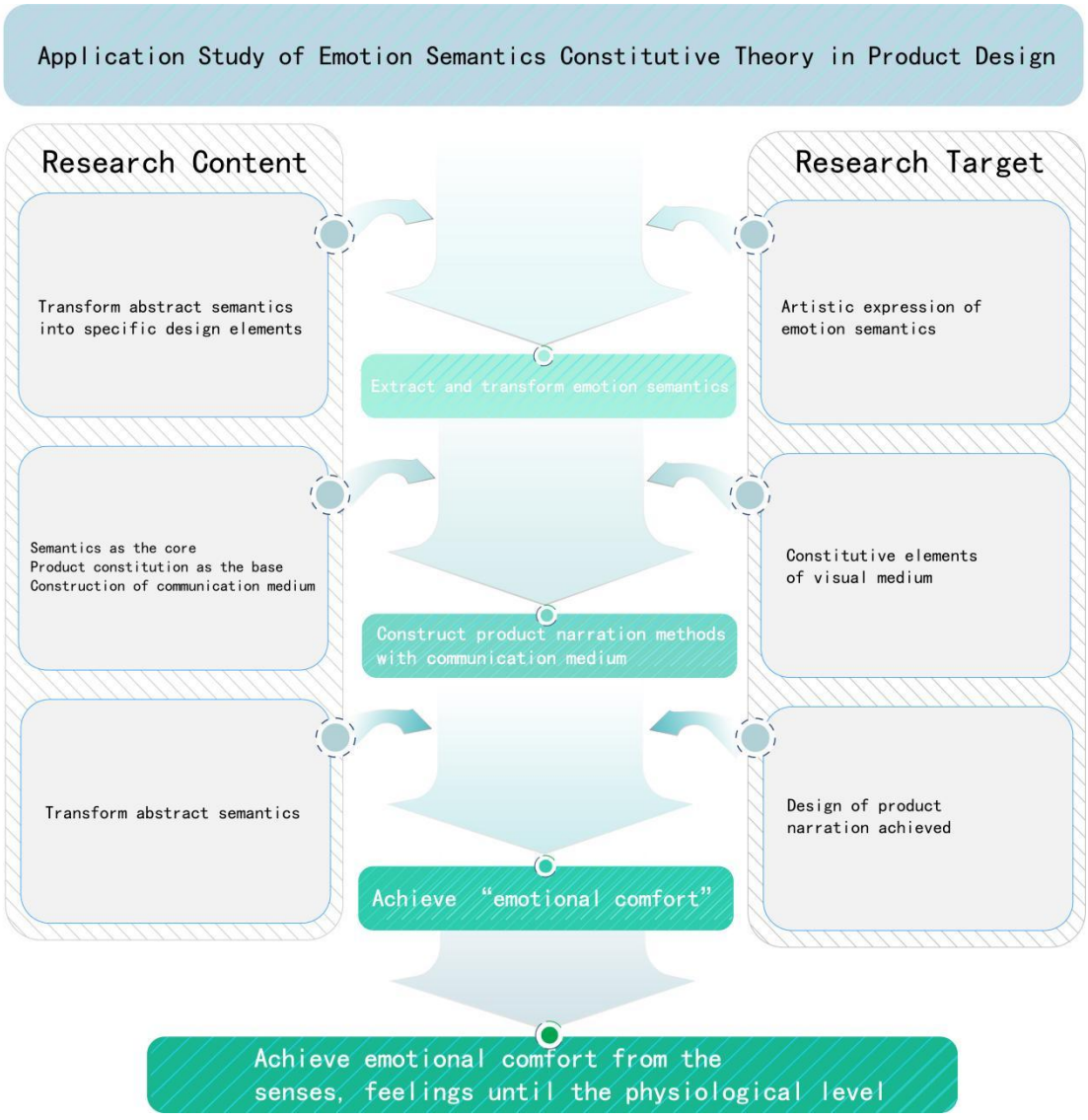


Figure 2-6 Overall Structure of Constitutive Theory (drawn by the author)

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Chapter 3 Design Generated to Convey "Emotion Semantics" and Expression Analysis

The design path for constituting and conveying emotion semantics is taken as the main line, which is divided into eight stages, with emotion semantics as the first of the two steps of "convey-receive". The key point of this chapter is the level of "semantics expression and conveyance" mentioned in the above hierarchy.

The core of this level lies in the extraction process with product as the medium, modeling as the base, so as to extract emotion semantics and transform it into "symbolic medium". The base medium for conveyance is the product itself, and due to different upgrading carriers, the corresponding semantics conveyed also differs. "Medium" is the specific, symbolic and material expression of emotion semantics with the product as the base. It can be divided, with the senses as the scale, into "visual symbol medium", "tactile symbol medium", "auditory symbol medium", etc., so that it can start from the product and be accepted by the senses, realizing the viewers' sensory experience and further achieving "emotional comfort".

Due to different ways of information reception of different senses, the constitutive elements in this aspect consist of aesthetics, morphology, color psychology, product semantics and other professional knowledge. Emphasis has to be laid on product form, material, color scheme, and the construction of other elements. Moreover, attention has to be paid to the interactive approach of the product, its functional attributes, surface materials and other professional knowledge.

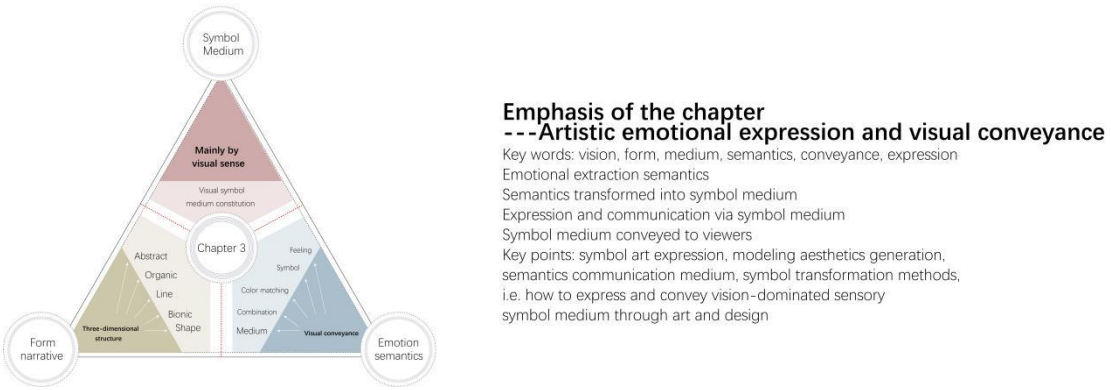

Figure 3-1 Structure of Chapter 3 (drawn by the author)

The constitutive content designed via different communication media, the emphasis constructed and the dimensions to be covered boast major differences. The acceptance of "emotions", as the communication benchmark of each medium, can finally allow the emotion semantics to be interiorized by the user through the expression medium, and produce models based on the visual medium of product semantics, so as to

provide inspirations for subsequent researches.

3.1 Expression first: the conception of "emotional bionics" and its language expression in three-dimensional forms

3.1.1 Sensory symbol medium construction based on "emotion semantics" and the expression forms

In the scope of "design semantics", "semantics" can be understood as "telling", thus design semantics can be interpreted as the communication of inner thoughts, transmission of key information and highlighting symbolic features through design. Design is used to communicate the designer's inner world to the viewers. The design process means to extract and capture specific "image symbols" and make them the constitutive elements of the external modeling; inner atmosphere is further created by giving the design object a unique "personality feature", so as to create psychological experience on the part of the user. Without the need for much elaboration on design concept, and by virtue of the unique symbolic characteristics alone, the users can obtain a unique impression and the image can stay "solid and stereotyped" in its mind and linger in the memory. The use of color media for symbolic analysis tells us that starting from the four sensory expression effects of light, dark, cold and warm, these four levels of sensory effect will arise from every hundred colors.

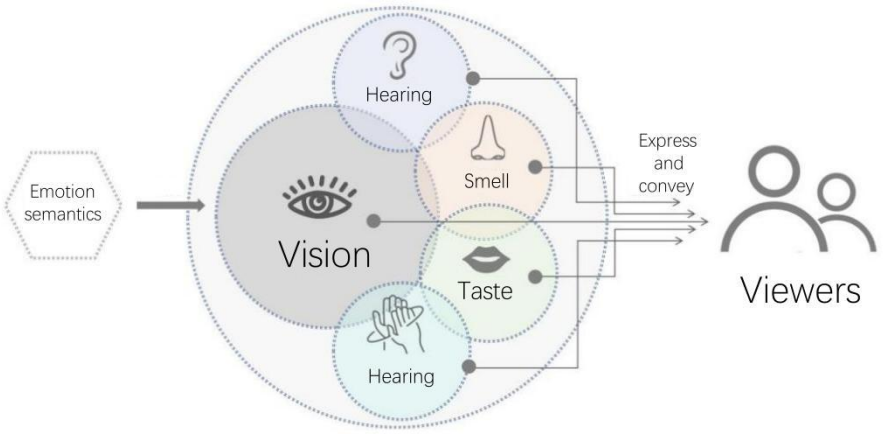

Figure 3-2 Constitution of Conveyance Medium (drawn by the author)

To "express" and "tell" emotions through design forms, the key is to convey emotions through "design semantics", seize the "wave" of emotions, and express emotional feelings and semantics to the viewers by external modeling design. Based on the product's own form, the overall external model is reshaped to endow it with emotional connotation, emphasizing the beauty of rhythm, of motive force and of constitution, thereby realizing the external modeling deduction of the design and

generating the “beauty of symbols” for emotional conveyance.
The in-depth deconstruction of emotion semantics can be expressed through emotional designs in a multi-dimensional manner. With the help of emotional heat map, designers can visualize and understand people’s emotional experience, combining color mapping with emotional states and colors to predict the influence of design elements and accurately convey emotional symbols.
Based on general design tools and with the product as design basis, the focus is on the communication of inner ideas and key information through design, in the commitment to create and introduce novel methods and models. If you want to highlight the external “emotional features” presented by the emotion itself, you have to personally experience the indescribable feelings triggered by the emotion and extract the specific and profound meaning expressed therein. Abstract, perceptual and indescribable “emotion symbols” resembling to stream of consciousness are transformed into concrete “expressive elements”; relative methods based on three-dimensional composition, three-dimensional form aesthetics and emotional color expressions are adopted to construct overall product design methods; the constitutive elements of the product itself are used to convey the symbolic semantics of emotion.

3.1.2 Bring forward product “allomorph” summarization and seek emotion semantics elements

In Chapter 1, investigation on cases related to emotional art conveyance symbols is carried out from the horizontal to vertical time axis. Meanwhile, analysis and discussion are implemented on design cases in which related products have realized emotional relief functions through communication, interaction and perception.
As the starting bases for emotional conveyance medium in the research, the product itself boasts three-dimensional attributes, which is the largest difference from other expressive ways mentioned in the above investigations. Different three-dimensional shapes and structures can enrich the feelings and emotional responses of the viewers and users. Each form can bring about basic semantics and upgrading semantics for them. Upon investigation, the typical three-dimensional forms and the possible subsequent basic semantics can be concluded as follows:

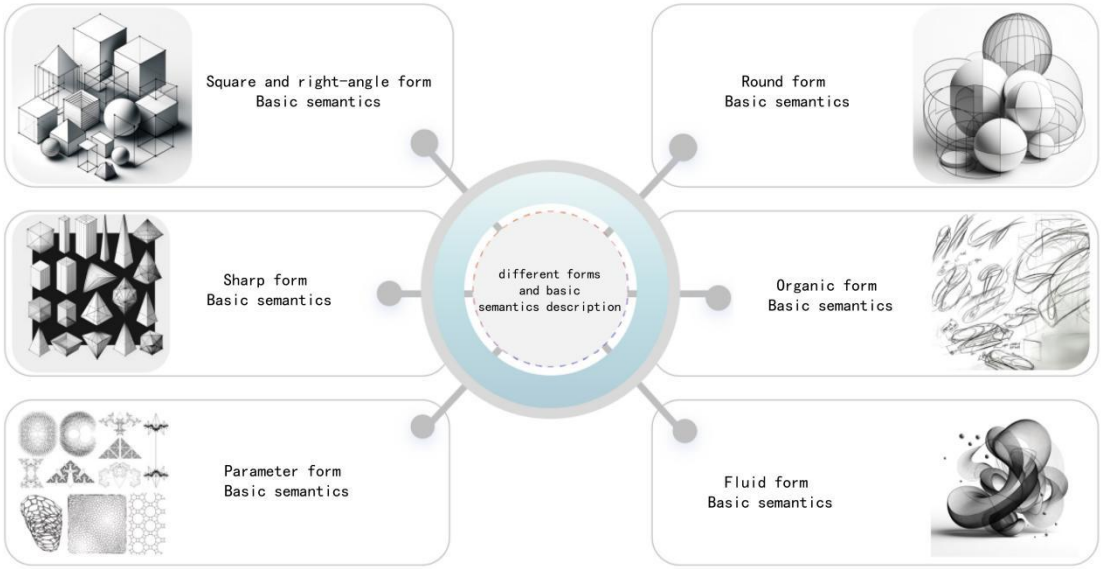

Figure 3-3 Description of Basic Semantics of Varied Forms (drawn by the author)

(1) Rounded forms and curved lines and their corresponding research on emotion semantics: circles and curves give off gentle and soft feelings, bringing smoothness, comfort and security to people. Due to their lack of sharp and corner angles, the basic semantics contained is closeness, fit for contact with human body. In product design, products featuring long time contact with people need to be modeled in rounded angles, such as mouse, cup, bedding, chair, and other categories.
Emotion semantics conveyed by this form: closeness, warm, comfort;
Emotion semantics contained by itself: roundedness, softness, closeness, steadiness

(2) Square and right-angular forms and corresponding research on emotion semantics:
Square designs and those with obvious right angles convey stability, strength and professionalism. Designs of these forms highlight the objects' formal and structured feeling, for example, many 3C electronic products, professional productivity products and equipment, all of which adopt more square and right-angle shapes in design. The basic semantics of these forms is professional, suitable for products that need to convey efficiency and reliability.
Emotion semantics conveyed by this form: stability, reliability, efficiency;
Emotion semantics contained by itself: calmness, seriousness, professionalism.

(3) Sharp angle and sharp forms and corresponding research on emotion semantics:
Sharp angles and sharp lines are often associated with power, speed and aggressiveness. This kind of design is often used in sports or sports-related products. This form could convey a dynamic sense and passion, while incorporating extreme performance. The basic semantics of this form is performance. For example, some motorcycles, sports cars, and consumer-grade electronic products emphasizing performance more or less adopt this form in design.
Emotion semantics conveyed by this form: high performance, competitiveness, geek

only;
Emotion semantics contained by itself: extremity, forcefulness, progressiveness.

(4) Organic forms and corresponding research on emotion semantics:
Designs imitating natural forms generally create a natural and relaxing ambience. Design styles featuring organic forms are often used in products with a prospect of conveying environment protection, health or ecological-friendliness. Giving off warm and smooth feelings, this kind of forms boasts a certain sense of dynamics which is not aggressive but possesses quite natural vitality. The basic semantics of these forms is life, featuring diversity, variability and uniqueness and is often applied to art and design. Products, furniture and architecture with a rich sense of design created by well-known designers have adopted this kind of forms.
Basic semantics corresponding to this form: diversity, rhythm, nature, smoothness;
Emotion semantics contained by itself: dynamics, vitality, mildness.

(5) Parameter and corresponding research on emotion semantics: parameter form design is often associated with modernity, innovation and art. This style of product design often gives off a sense of intelligence and avant-garde, suitable for brands seeking for a break out of tradition.
As the most complicated form with the most variants, it can evoke a variety of feelings of the viewers. For example, symmetrical and balanced geometric forms can make people feel stable and harmonious. The basic semantics of this form is order. Irregular or complex abstract forms convey chaotic and dynamic ambience, while simple geometric shapes offer clear and straightforward feelings to the viewer. This is because geometric shapes possess artistic beauty and, being open and diverse, they can trigger the audience's personal feelings and interpretation.
Basic semantics corresponding to this form: diversity, contradiction, chaos or balance, order or disorder;
Emotion semantics conveyed by itself: stability or mobility, professional, fashion, trustworthiness
(6) Fluid form and corresponding research on emotion semantics: designs simulating fluidity or sports can convey the feeling of vitality and change. This design fits products willing to convey flexibility and vitality. This form often gives people a feeling of smoothness, mildness and agility, which may be visually presented as continuous lines and curved surfaces without fixed boundaries. Boasting a variety of changes itself, it offers the viewers an aesthetic feeling of natural harmony and flexible changes. The basic semantics of this form is vitality. At the same time, this form resembles organic forms and is also often associated with natural elements. In art and design fields, this form is widely used to create works with both dynamic beauty and a sense of softness.
Basic semantics of this form: smoothness, lightness, vitality;
Emotion semantics contained by itself: softness, flexibility, dynamics.

In the design process, it is very important to understand and apply these design forms

so as to achieve semantics construction and communication. This not only influences the products' aesthetic value in external appearance, but also plays a key role in conveying symbolic information and establishing emotional bond with the target audience.

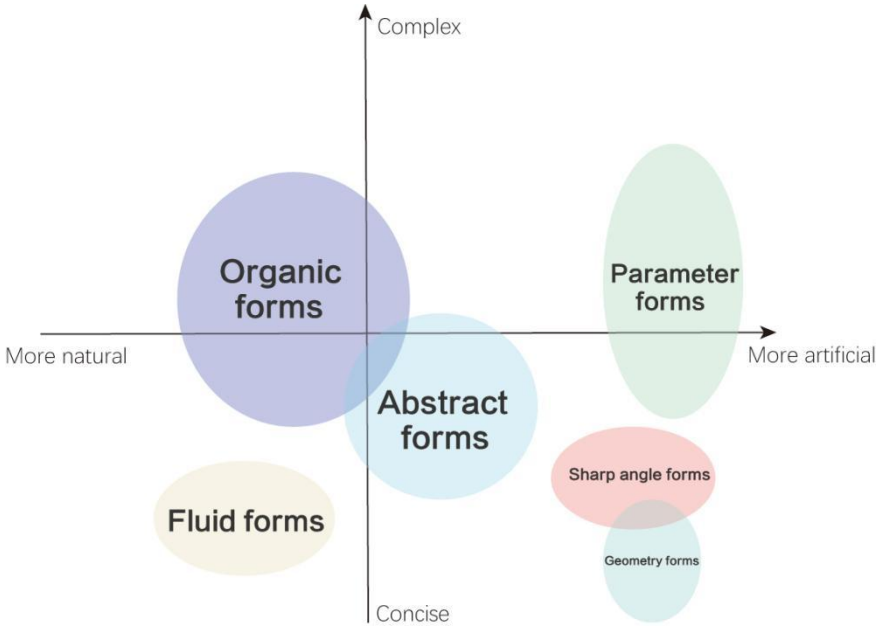

Figure 3-4 Style Bias of Form Semantics (drawn by the author)

In the study, the above forms are collectively called "allomorph", a new concept put forward based on the research carried out in this paper. Allomorph means that such forms are different from most of the forms we see in everyday life; neither as concrete as animals and plants, nor as concise as industrial forms, allomorph stands between the two. This positioning has made it distinctive from 90% of the forms. "Allomorph" boasts a strong sense of dynamic rhythm. Compared with the geometric modeling with square as the standard, organic forms possess stronger sense of dynamic beauty, changing beauty and dynamic vitality. With its inherent rhythmic beauty interlaced with softness, this form is to a certain extent the result of reason-sensibility integration. In the following research, a profound discussion will be made on how to express and communicate emotional symbols with "allomorph", so as to extract semantics and visualize it through realistic forms.

3.2 Core conveyance: establishment of the chaining knots of “semantic” elements corresponding to product structures

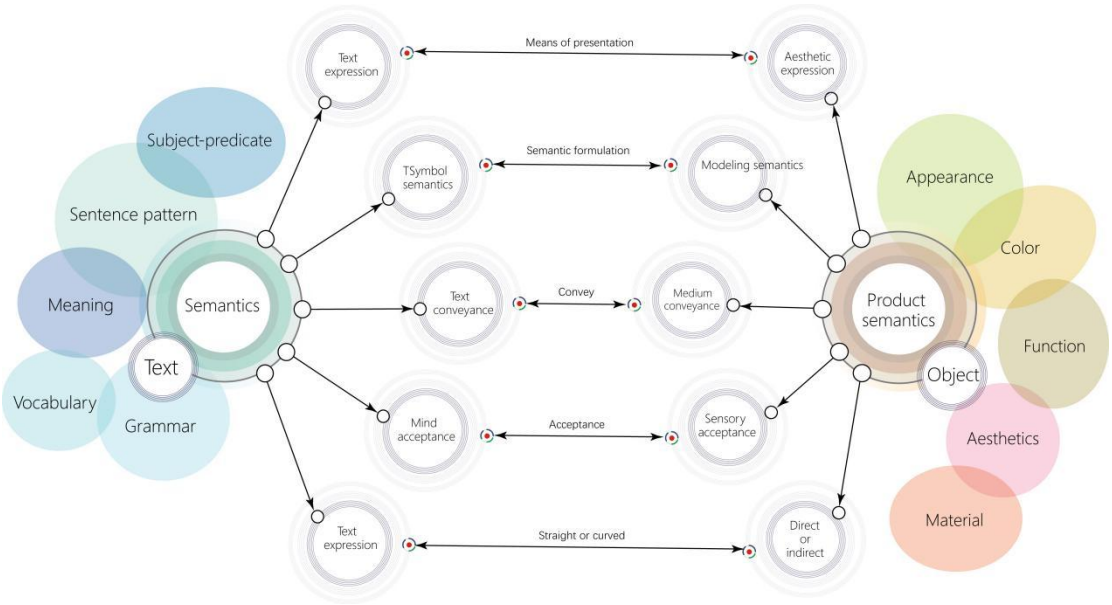

Figure 3-5 Correspondence between forms and emotional symbols (drawn by the author)

The “semantics” mentioned in the above study refers largely to a discipline of the meaning of language, which can help us understand how emotions can be expressed and understood in different texts and contexts. Different from semantics, design semantics means to consider how to express semantics and emotions via all the constitutive elements of a product. The constitution of these elements is presented respectively as follows:

1. Semantics expressed by the product’s shape, line and structure: the above-mentioned “allomorph” can be used as the benchmark to conceive and convey semantics, to arouse the audience’s association.
2. Semantics conveyed by product color: it can be divided into color psychology and color matching, for example, how a single color can evoke emotions and responses, and how color combinations can convey different meanings.
3. Semantics expressed by product material and texture: this includes how to convey emotions through different materials or textures, for example, natural materials convey warmth and intimacy to the audience, while industrial materials convey a sense of modernity, cleanliness or professionalism.
4. Semantics embodied by product symbols: it means to express emotional significance by extracting the specific graphs or symbols contained in semantics.
5. Semantics conveyance assisted by product interaction: if the above parts are the constitutive and communicative elements of the media, then the interactive modes and functions of the product constitute the key for users to receive the medium. The usability, intuitiveness and sense of satisfaction are all important factors that influence emotional experience, while the emotional expression of the product can be strengthened by the touch, sound or even smell.

Besides the above five points on the symbolism, expression and transmission elements of semantics, the constitution of other aspects in product design also contributes to semantic conveyance and reception.

6. Style and context of product use: the style in product design can convey specific emotions, and at the same time affect the communication of emotional symbols. Different situation settings in the design determine the users' different emotional perceptions.
7. User experience and feedback: emphasis is laid on whether users have experienced the emotions and semantics conveyed based on the five senses, whether the interactivity and functions of the product have the effect upon its target user group as expected at the initial stage of the design.

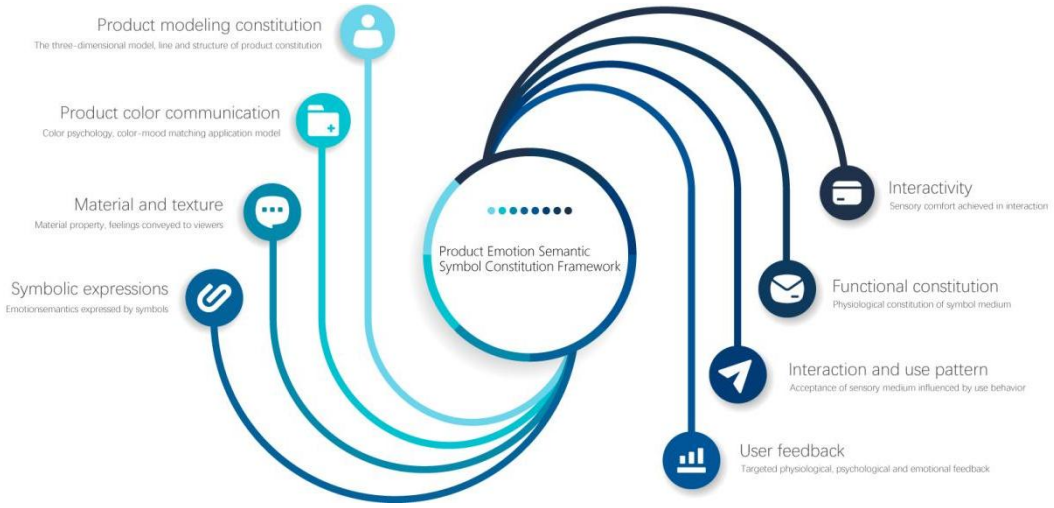

Figure 3-6 Product Emotive Semantic Symbol Constitution Framework (drawn by the author)

The above seven points constitute the basic design logic conceived in this study. If the medium conveyed by traditional semantics means language, then the medium to be expressed in product design semantics is composed of the elements in the above eight aspects. Product design is the starting point to discuss how to express semantics and to use design elements as the "expression media" for the conveyance of emotional elements. Language is used as the conveyance medium in traditional semantics, while in product design semantics, there are eight key design elements for the expression, including construction of elements such as morphology, semiotics, aesthetics, five senses, and design psychology. These symbol media not only include key symbolic semantics of emotions, but also provide viewers with unique "emotional comfort" through the form and interactive modes.

3.2.1 Establish the visual symbol expression medium base of "emotional bionics" based on "allomorph"

As the key factor in the construction of the base media mentioned in the above study, "allomorph" has, based on the relevant characteristics of design semantics, introduced related concepts of bionic design on the basis of forms. General bionic design covers material application, modelling, form change and color composition, combining interdisciplinary knowledge of biology, psychology and ergonomics. It is not just a simple copy, but a detailed analysis of the bionic object on many levels.

Traditionally speaking, bionic design imitates real creatures or elements; however, with the deepening of research, it can also be used to express design semantics, extending its application object from the material world to the spiritual world of stream-of-consciousness symbols. The core of emotional bionics means to integrate these emotional characteristics into the product form and express them as semantic media.

As a kind of artificial shape with strong features, "allomorph" itself boasts a powerful sense of dynamic rhythm. According to the research in Chapter 2.1, in the past, the subjective expressions of emotional communication are characterized by semi-abstract and semi-concrete visual elements including picture, subject matter and forms, with the expressed content mostly bearing symbols of time and space, chaos, concrete distortion, isomorphism and heterogeneity and other elements. Meanwhile, changing elements such as model construction, color matching, and abstract processing of concrete forms can work as important conveyance object of "emotion semantics".

"Allomorph" features stronger dynamic beauty, changing beauty and a sense of potential momentum. Boasting rhythmic beauty interlaced with softness, it also has unique symbolic elements from nature. Semantic characteristics can be extracted and expressed via this form, to completely display the variability, complexity and incorporation of emotions. As the product of reason-sensibility integration, it is a suitable external expression carrier of emotion semantic symbols.

3.2.2 Conduct shape design derivation and semantics conveyance expression based on form narrative summarization

The above studies have established the use of emotional bionic conception as the theoretical element of modeling expression, i.e. the design form can be regarded as the modeling element extended from emotions, while the bionic object is the human emotional symbol existing in the stream of consciousness.

Over the years, designers have tried to combine various forms to express aesthetics, ideas and semantics through combination, incorporation and evolution. This paragraph mainly focuses on the combination of knowledge in related product design disciplines with visual expression media, and adopts form narration as the core element for visual semantic conveyance.

This study has divided the conveyed forms into two major levels: framework-base

type and upper-expression type. The difference between the two is that the former is biased towards the functional constitution of the product, with its overall actual functions and practical use superior to the conveyance power of its appearance, and appearance can be worked out only on the premise of maintaining its actual functions.

As the first level, framework-base type is the physical base of the design item and directly linked to the basic properties of the product. In the general design field, limited by the functions of the designed item, the first level framework base cannot tolerate complex form changes; therefore, the framework base often shows basic geometric shapes, and the changed forms as decoration are often applied to the second level, i.e. the upper expressions.

However, in the design field boasting a variety of complex categories, as the base shape is less subject to functionality compared with the design object, the composite organic form can be applied to the framework base and the upper expressions at the same time according to its inherent functions and definition, and extension design can be carried out on this basis. Multiple arrangements and combinations of the above two forms can facilitate form innovation and result in beautiful forms to meet the needs of emotion semantics narration.

On this basis, semantic symbols with emotional elements can be incorporated into the modeling; by capturing and extracting emotional waves, and upon human extraction, summarization and purification of the plural-level semantics contained in emotions, the abstract, complex, perceptual and indescribably “intangible symbols” are transformed into tangible, relatively intuitive realistic constitutions with abstract semantic symbols.

(1) Macro form constitution research: at the top level of the design, an overall basic form can be established, which can represent a major semantic, such as “strength”, “softness”, “change”, etc. This basic form can be composed of a series of basic geometric shapes, including cube, sphere, and cylinder. These shapes can be of different sizes, proportions and positions, to convey the chosen emotion or theme.

(2) Segmented form semantics: on the basis of macroscopic forms, forms can be further divided into segmented levels, with each level representing different emotions or emotional details. If the major emotion semantics to be conveyed is “strength”, the segmented levels can include “expressions of strength”, “source of strength”, “change of strength”, etc., and each segmented level can have different form elements to express these details.

(3) Form variation and coordination: in each segmented level, diversified form changes can be used to convey emotions or emotional details, which can include the stretching, twisting and deformation of the shapes.

(4) Form aesthetics and its consistency principle: the form changes in each segmented level should be coordinated and follow a basic aesthetic principle, so as to ensure the consistency and harmony of the overall modeling. Meanwhile, based on the different emotional meanings the designer intends to convey, different materials, colors and textures can be tried to enhance the expression of emotions.

(5) Multi-level relationship: more than two hierarchical relationships can be introduced in the design to realize the superposition and integration among

multiple forms. This can be achieved by creating connecting points, transition areas or transitional elements between different levels.

These multi-level relationships can bring about the interlacing and mutual influence between different emotions and forms in the design, resulting in richer and more complex emotion semantics.

Therefore, in terms of the combination of the forms, the two-level structure is the overall form constitution. Under the segmented multiple levels, 2-3 or even more segmented levels can be planned, but 4 levels are generally the maximum, or the form will appear in chaotic style and lack distinction between the primary and secondary elements. Moreover, in constitutive theories, various changes can be made in the forms of each level, on the premise of keeping the harmony and regularity of the forms before making aesthetic extensions of the upper level. In the upper expression type, more than two hierarchical relationships can also be achieved, so that the multiple forms and levels can be superimposed on each other, and that the modeling of the entire design object can achieve a "harmonious combination" based on the interpenetration, superposition and incorporation of various forms, finally leading to a design practice of form innovation.

3.3 Expression generation: construction of expression medium based on morphological aesthetics and semantic expression factors

3.3.1 Construct the emotion-based visual semantics communication methodology with "morphological aesthetics" as a bridge

This chapter focuses on the visual perception level, to study the graphic symbols dominated by "allomorph". Key semantic words have been summed up according to different structures, such as dynamic, lightweight, smooth, etc. Based on the design application goal, a design path diagram is proposed so that the "allomorph"-based morphological aesthetics can tell the semantics. This research model not only enables designers to quickly create beautiful forms according to this methodology upon their first contact with allomorph forms, but also gives shape to a set of design methodology to carry out semantic narration through morphological aesthetics and convey feelings.

As an important factor in expressing products semantics, morphological aesthetics is also the main element to build visual symbol medium. Through design cases covering architecture, products, public art and space, this study has concluded the five major form categories of "allomorph", including arrangement, streamline, dot formation, surrounding, and dissolving forms, with each of them boasting different generation law, constitution and the conveyed semantics.

Research on arrangement form and generation method: this form features a relatively fixed basic shape which is to be arranged along a path; the basic carrier form can be constructed with a simple shape (such as simple polygon, circle or oval, etc.). Meanwhile, this form can undergo arrangement and combination along a certain path; and the arrangement path can be straight or curved lines. Corresponding changes can

take place between each arrangement shape, such as thickness, height, uneven space, etc., so as to form different rhythms and a sense of potential momentum.

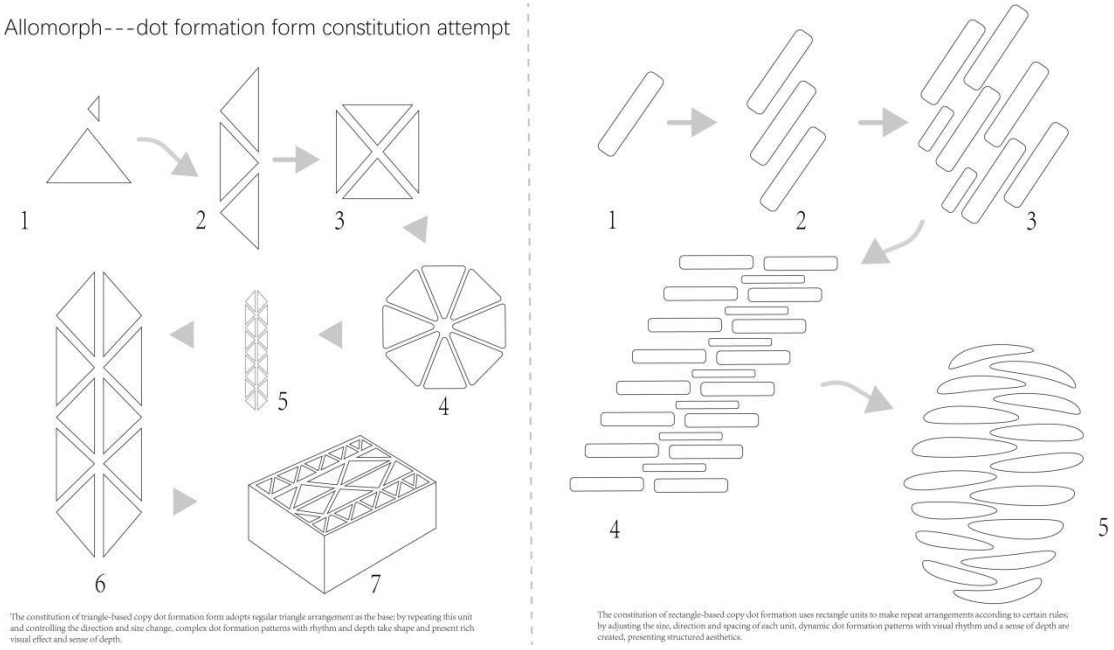

Figure 3-7 Arrangement form generation methodology (drawn by the author)

Research on streamline form and generation method: the general characteristics of this form are derived from streamline objects in nature; in the overall structure, there is not a relatively fixed shape to be arranged along a path; instead, it is generated with a random constitution and combination. Featuring potential momentum, a sense of mobility and lightness, this form is much rooted in reality, for example, sea waves, plants, water ripples, etc. It is widely used in construction and other products including sports and automobile.

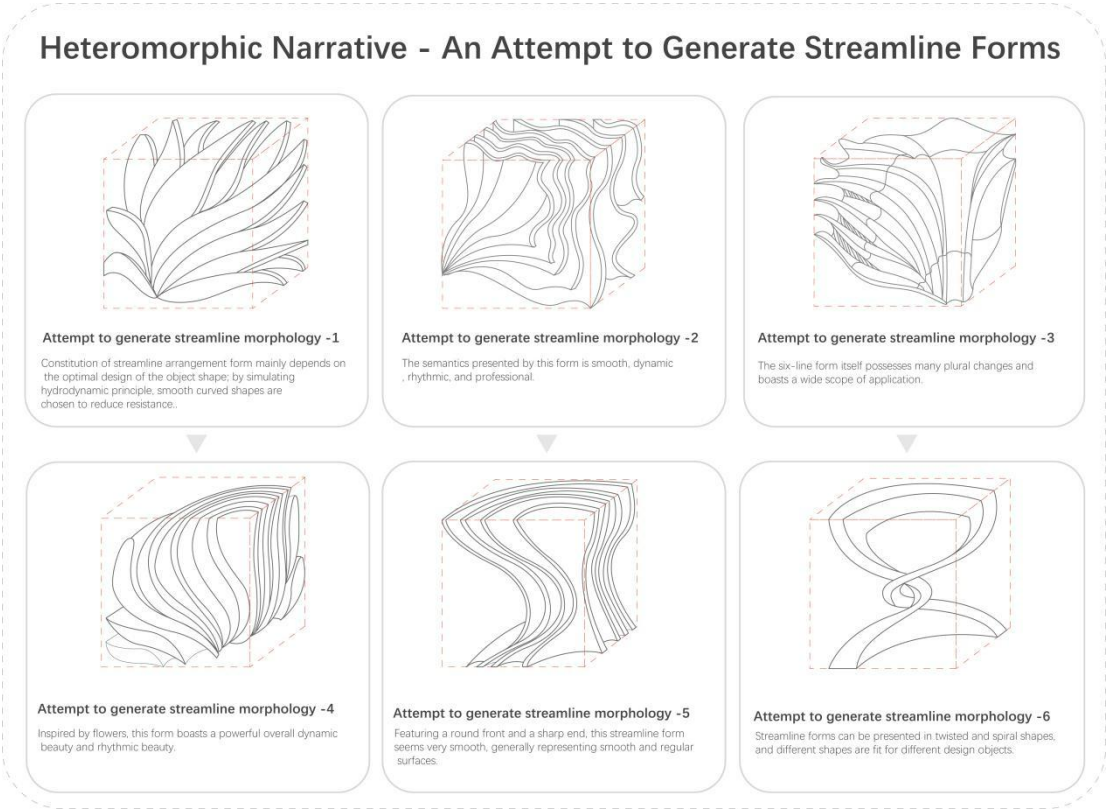

Figure 3-8 Streamline Form Generation Methodology (drawn by the author)

Research on dot formation form and its generation: this form is characterized by the arrangement pattern in multiple aggregations of a relatively fixed basic shape; different from other arrangement forms, dot formation is not arranged along a single path, but undergoes repeated form combinations in a multiple arrangement manner. This form can also tolerate changes in thickness, height and uneven patterns, resulting in different senses of rhythm and potential momentum. This form is often applied to the surface of products and buildings to enhance visual beauty; the well-known parameter form is also in this category.

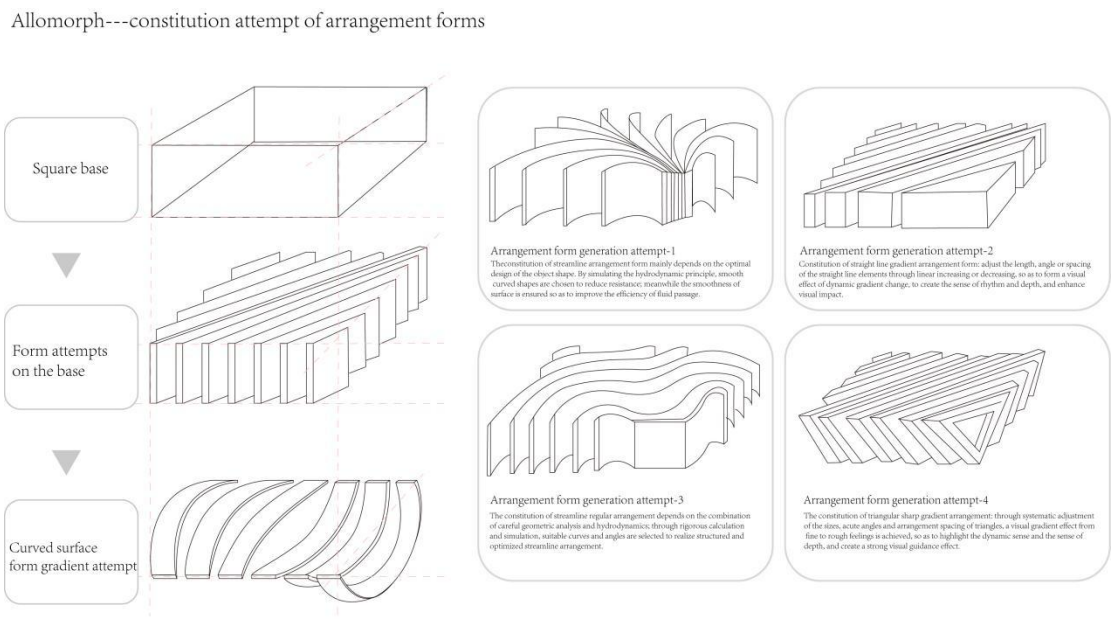

Figure 3-9 Dot-formation form generation methodology

Research on dissolving form and the generation method: the dissolving form is embodied in the gradual transition of design elements from a fixed and identifiable state to a state of ambiguity or complete dissipation. This form imitates the dissolving, melting or dissipation process of substance in nature, so as to convey the beauty in fluidity, variability and invisible boundaries. Dissolving forms are often used to express the passage of time, the change in the state of matter or the blurred conceptual boundaries. In visual art, dissolving forms can be realized through gradient color, blurred edge treatment, or gradual reduction of element size, so as to create a visual effect of fluidity or disappearance. For example, in public art installations, material transparency or shadow effects are adopted to create the feeling that the elements are gradually “dissolved” into the environment, thereby strengthening the interaction and experience of the audience.

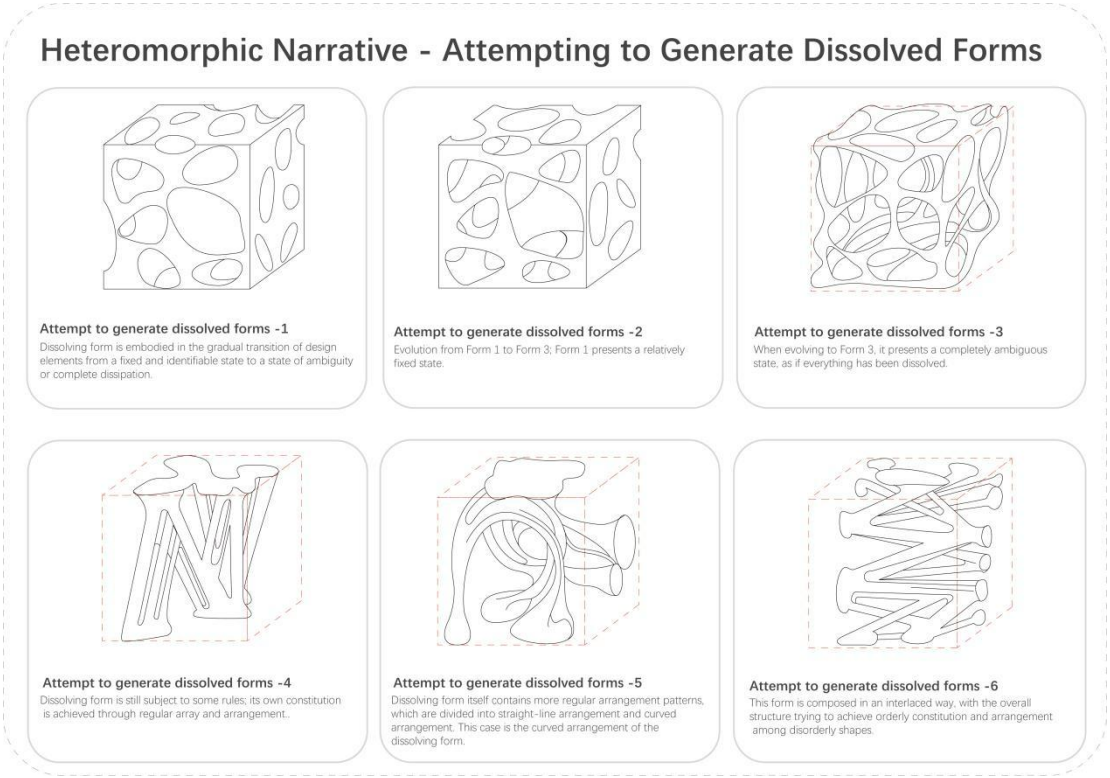

Figure 3-10 Dissolving Form Generation Methodology (drawn by the author)

3.3.2 Construct a product communication-based visual medium with upgrading elements such as color matching and symbol

Besides modeling, color use in design also affects the users' emotions. First, in terms of color relationship: each color can cause specific emotional responses, and this influence is also determined by the culture of the individual's environment. Second, in terms of color matching and psychological perception: color is also linked with people's values. Then in the application of color matching and ambience: different color schemes can create different ambiences and emotional responses, exerting influence upon human psychology. Finally, in color matching and personal preference: due to personality difference, an individual's preferences for specific colors reflect his or her current psychological state.

Based on the above dimensions, it can be known that colors can convey emotions and feelings in various levels. An extensive research on the application of color psychology in product design can make segmented divisions of emotional transmission of each color and the semantics conveyed, and the result is as below:

Warm color---emotion semantics conveyed by red color: this color is often connected with energy, passion and danger. In product design, red color can be used to attract attention and arouse strong emotional responses. The semantics conveyed by this color is dynamics, vitality, sense of urgency, speediness, warning, and emergency.

Warm color--- emotion semantics conveyed by yellow color: this color emphasizes brightness and is connected with emotions such as happiness and vitality. The feelings conveyed by this color include vitality, happiness, positive feeling, and relaxed

feeling. The semantics conveyed by this color is sunshine, optimism, positive attitude, yearning for progress.

Cool color---emotive semantics conveyed by blue color: this color signifies stability and reliability. The feelings conveyed by this color include: professional, reliable, trustworthy, security; the semantics conveyed is: technology, professional, clean and pure.

Cool color---emotion semantics conveyed by green color: this color is often connected with nature and serenity. In product design, the use of natural green can convey a feeling of peace and relaxation to the user. The feelings conveyed by this color include: closeness to nature, inartificial, peace, intimacy; semantics conveyed by this color: nature, closeness, environmental protection.

Cool color---emotion semantics conveyed by purple color: this color signifies luxury and mystery. In product design, the use of purple can convey the nobility and uniqueness of the product to the user. The semantics conveyed by this color is: high-class, unique, special, elegant, solemn.

The above study is about the five basic colors used for direct communication of basic emotional semantics, and the feelings brought to people through semantics. Based on these two aspects, a further study is made on the actual application cases in product design, which allows us to rethink the overall color matching application logic and the standard methods in product appearance and packaging which have become so common in our daily life.

But a single color cannot fully express complex emotional states; the connection between colors and richer and more delicate emotions requires the expansion and combination of various colors, so as to create an academic model which can be applied to many design fields, including visual art, product design, advertisement design or even color psychotherapy.

Expand the basic colors to 24 advanced color combinations, and superimpose 2-4 colors of them to establish an “emotional symbol color model”. In accordance with color psychology and emotion theories, this idea aims to use color-related theories in art, aesthetics and psychology, to construct an emotion-based non-lingual communication channel.

Combination 1: research on color scheme to convey “eco-friendly” semantics

The base color in the color scheme of eco-friendly products and the packaging is often a combination of light brown and cream color which symbolizes earth and is often associated with nature, growth and environmental sustainability, conveying a respect for ecology and nature. Emotional color takes green as the main tone, which is often used to symbolize natural materials and plants, to suggest the purity and environmental protection features of the product. Gray can be chosen as the auxiliary color to add some important information and enhance clarity and the professional feel, and at the same time highlight product constitution, thereby emphasizing the importance of product information.

Figure 3-11 Conceptual pictures include AI generated diagram and works of foreign designers (from the Internet)

Combination 2: research on color schemes for the conveyance of "performance" and "technology" type semantics constitution

This combination consists of the two groups of gray tone and blue tone, with dark gray as the base color, which is common in science and technology product packaging due to its ability to convey a strong sense of modernity and technology. The selection of relatively stable colors helps to highlight the advanced and practical quality of the product, and also constitutes a solid background for other bright colors, giving them more prominence.

Figure 3-12 The upper picture is AI-generated diagram, the lower one is the work of foreign designers (from the Internet)

As an emotional color, sky blue aims to evoke the users' emotional association, such as freedom, freshness, innovation and trust. This color can arouse the consumers' natural association with sky and water, thereby producing a relaxed and pleasant ambience. It also conveys the brand's positive attitude towards innovation and future technology. The use of sky blue in the packaging of technology products can effectively appeal to young consumers who seek fresh experiences and the hi-tech feel.

Combination 3: research on color schemes to convey "fashion" and "elegance" type semantic constitution

The base colors of this combination include gold and purple; golden color symbolizes wealth and nobility in the general traditional sense; for the public, its semantics can be understood as luxury, quality and success. The basic meaning of purple is mystery, giving the design a deep and mellow sense of satisfaction and creating a quality-first ambience for the product packaging.

As an emotional color, greenish blue infuses, on the basis of the original packaging, the fresh aura of nature. Representing both vigor and vitality, it also implies gracefulness and healing emotion. This color breaks the steady feel of gold and purple, making the entire packaging younger and more vivid; it has, to a certain degree, “transcended” the popular feel of the product packaging due to the golden color.

Pinkish red is also chosen as the auxiliary color, which adds to the vitality and potential momentum of the design, as the bright color itself is endowed with some smart feel unique to the youth and fashion, very appealing to young consumers. It has conveyed the semantics representing youth and vitality. The combination of pinkish red, gold, purple and greenish blue has formed a color contrast full of luxury and vibrant feelings, giving the entire product packaging a more prominent visual effect.

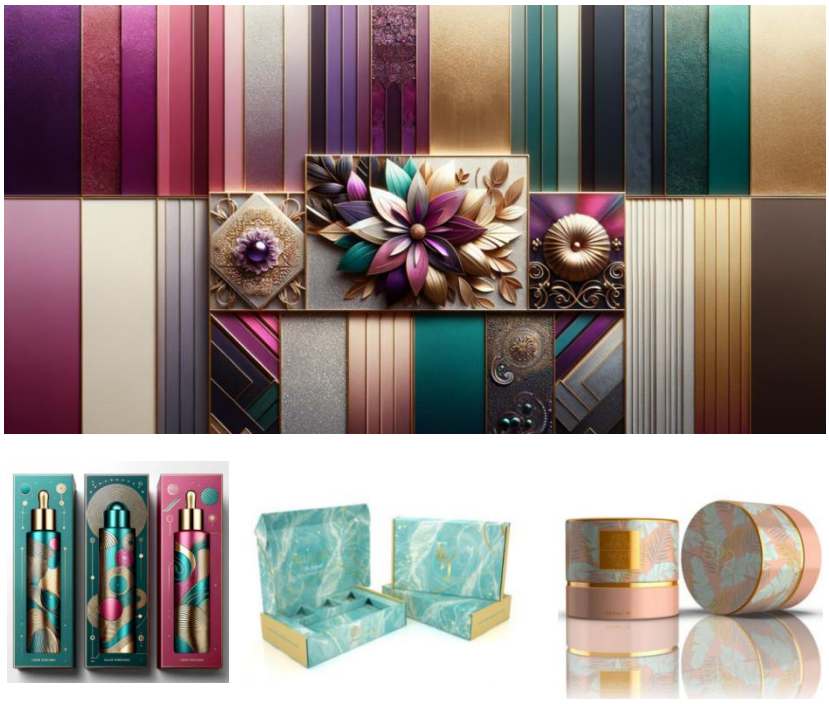

Figure 3-13, pictures 1 and 2 are AI generated, while pictures 3-4 are works of foreign designers (form the Internet)

Combination 4: research on color schemes to convey “vitality”, “youth” and “sports” type semantic constitution

This semantic color combination adopts the natural and bright lake blue as the base color; blue itself makes people feel fresh and clear; associated with the flowing water in nature and the sky, it also implies the youthful spirit.

Bright yellow is chosen as the emotional color, as it possesses the emotion semantics of happiness and sunshine. This color not only enhances the overall visual brightness, but also enriches the positive emotions of the design; setting off the freshness of the

lake blue, the entire semantic color scheme appears more vivid.

The dynamic reddish orange is chosen as the auxiliary color. A vibrant color, reddish orange can not only arouse passion and vitality, but also gives off a sport feel, suitable for young and dynamic symbol expressions. The combination of reddish orange, lake blue and yellow has formed a design color combination for conveying young and sporty semantics.

The combination of the above colors conveys the three-fold emotion semantics of “vitality”, “youth” and “sports”, facilitating the resonance between the product’s emotional attributes and young consumers, at the same time giving a fashionable image to the entire design.

Figure 3-14, pictures 1-3 are AI generated, while pictures 4-5 are the works of foreign designers (from the Internet)

Combination 5: research on color schemes to convey “closeness”, “peace” and “comfort” semantics constitution

This color combination focuses on the communication of emotion semantics of “closeness”, “peace” and “comfort”; soft colors can be chosen as the main tone, and light green is used as the base color to enhance the intimacy and comfort of the entire design.

The thematic emotion color in the middle is warm cream color, which can create a relaxed atmosphere due to its own warm and soft tone.

The last auxiliary color can be grayish pink, which is full of vitality but not too

intense. Its combination with light green and warm cream color has enhanced the feel of closeness of the entire color group, highlighting the harmony and comfort of the overall color scheme. It is suitable for design works aiming to convey a warm and relaxing atmosphere while retaining elements that express vitality and youth.

Figure 3-15, pictures 3-15 are AI generated, while pictures 2-4 are works of foreign designers (from the Internet)

The above color scheme generation practice is based on the five cases mentioned, which are methods to convey emotion semantics with narration and colors. The base color in a color combination represents its main attributes; the emotional color is decisive in “differentiating” the color combinations. The key point is to convey personalized implications without being detached from the major attributes of product packaging. Auxiliary colors are used to enhance the basic effects of emotional colors, so as to embellish the packaging with more emotional depths.

Semantic base color (1st-step colors): provides a balanced and neutral background;
Semantic emotional color (2nd-step colors): conveys the main emotions and atmosphere;
Semantic auxiliary color (3rd-step colors): enhances visual effects and provides additional emotional depths

It is difficult for individual colors to create color combinations for specific emotional needs; some key aspects and potential meanings of this method have to abide by the following principles when applied to emotional color scheme extension models:

Diversity and balance: colors of different types (such as base color, emotional color and auxiliary color) are combined to create visual and emotional balance.

Symbolic semantics of colors: consider the symbolic semantics of each color in specific culture and context.

Color combinations of different emotion semantics are constructed in accordance with the above principles, to suit different design goals and creation needs. Extension can be made on this basis; the following core standards have been concluded for reference of similar subsequent studies.

Emotional attributes of colors: each color has its unique emotional and symbolic meanings, for example, red represents passion and energy, and blue is for calmness and professionalism; considering the emotions conveyed by each color is the key in color matching.

Contrast and harmony: color matching can be done based on contrast (such as red & green) and harmony (such as blue & green); contrast creates visual impact, while harmony provides visual comfort.

The influence of color proportions on emotion semantics: the proportion of different colors in the scheme and the effect of the matching; the concise and clear two-color matching suits strong expressions, while the complex and rich multi-color combination is good for creating depths and profundity.

Therefore, color matching is not only crucial for conveying symbolic elements in product design, but also an important carrier for emotion semantics, able to express specific feelings and convey emotion semantic media. By applying the principles of color psychology, the emotional bond with users can be established. Using color to express mood is a method to provide intuitive and popular means of emotional conveyance that transcends language barriers. It has enriched the research on “visual symbol medium” and displayed potential application value in various fields, enabling people to convey feelings through artistic designs.

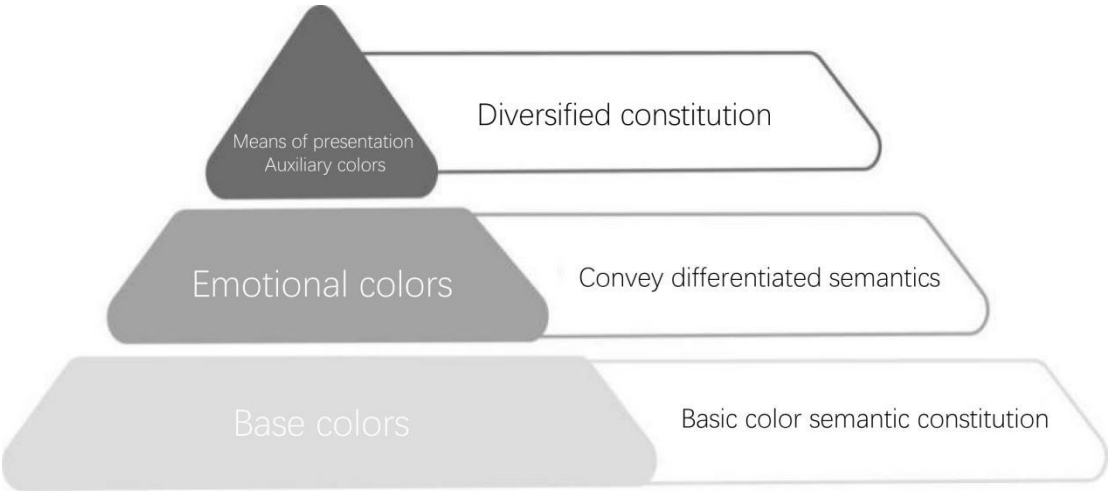

Figure 3-16 Multiple Color Semantics---Color-matching Levels (drawn by the author)

Chapter 3 References

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2. Wu Zhiqian, Xue Jing, Organic Form Furniture Model Image Construction under Symbol Semantics [J], in *Hunan Packaging*, 2021, 36 (04): 46-49.
3. Wu Huijuan, Application Analysis of Sensory Design Concepts in Packaging Design [J], in *Journal of Taiyuan City Vocational College*, 2013, (10): 173-174.

Chapter 4 To Build Up Connection between "Body-mind Perception", Behavior and Emotion

Through the combination of several elements such as form, semantics, symbol and color with emotion semantics, the constitution method of product visual semantics is established, forming the key elements of the subsequent design-oriented research.
In the study of emotional regulation of modern people and the influence of physiological signal change and dietary behavior upon human mood, psychology is used in design thinking to integrate various elements in pursuit of design innovations. Design has to be based on accurate identification of physiological signals, so as to adopt an amiable way to optimize user mood, and to establish a design framework with "senses", "behavior", "physiology", and "impression" as key words. Emphasis is laid on the improvement of sensory symbol medium, to highlight symbol semantic feelings from "conveyance" in the previous chapter to "perception" in this chapter.

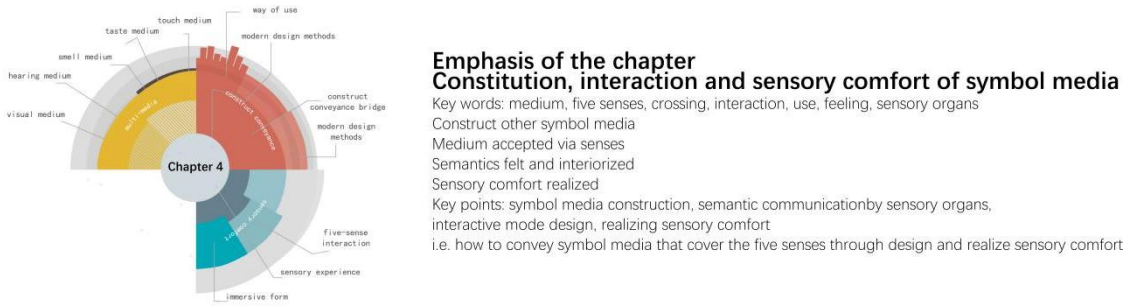

Figure 4-1 Research framework of Chapter 4 (drawn by the author)

If the key words of Chapter 3 are vision, modeling symbols, expression construction, etc., and the core is deducing the constitution of visual medium and conveyance method models with forms, color schemes and symbols, then this chapter will try to introduce related knowledge of other disciplines on the basis of the existing ones such as design and aesthetics, so as to supplement the constitution of other sensory symbol media including touch, smell, taste and hearing. This is further extended to the key word of "senses", i.e. to construct the five-sense symbol medium through design to realize "emotional comfort", and prepare for the research of the next chapter: to achieve emotional relief via the sensory acceptance of semantics and by combining design functions.

4.1 Interpretation of "communication medium": users' reception of semantic symbols and response

4.1.1 Exploration of the audience between "emotion semantics" and senses and their connections

This study takes the survey of “sensory conveyance” as the leading communication condition of “symbol semantics”, which is also the basis of the entire design research. Product designers have to explore deeper into the relationship between sensor organs and symbol semantics, so as to create more meaningful and engaging user experience. To achieve this, the symbolic response between the users’ five sense and their inner mood has to be considered, to ensure that the communication of symbol semantics is in line with the perception mode of the target user.

In designs related to emotional communication, there is a close relationship between symbol semantics and symbol medium. Both of them are important in the communication of feelings and mood, but in different roles and with different functions:

Communication of emotion semantics is based on the following aspects:

Semantic meaning and conceptual expression: symbol semantics is a channel to convey meanings and concepts through symbols, vocabulary, images or other representations. It can be the way of understanding shared by the culture, society or individuals, to express specific concepts, emotions or information.

Design communication medium for emotions: symbol medium can convey emotions and moods through visual elements, sound, touch, smell and taste. For example, in films, music and sound effects can enhance the emotional experience.

Sensory experience: symbol medium is the medium to communicate symbol semantics through the channel of senses, including vision, hearing, touch, smell and taste. Different sensory media can create different feelings and emotional responses.

External expressions of feelings and emotions: symbol semantics can include words, colors, icons or symbols that can trigger user feelings and emotional responses. For example, red can be associated with passion or warning, and smiley faces can convey joy or friendliness.

Direct or indirect context and experience: symbol medium can not only convey symbol semantics, but also place it in a specific context and user experience. Designers can choose proper media and contexts to guide the user’s emotional experience.

In designs related to emotional communication, designers often use symbol semantics to choose appropriate symbols, vocabulary or graphics, to convey specific feelings and moods. Different media combination can enable designers to create user experience of greater emotional depth and emotional resonance, either in product use, news media, art or other media.

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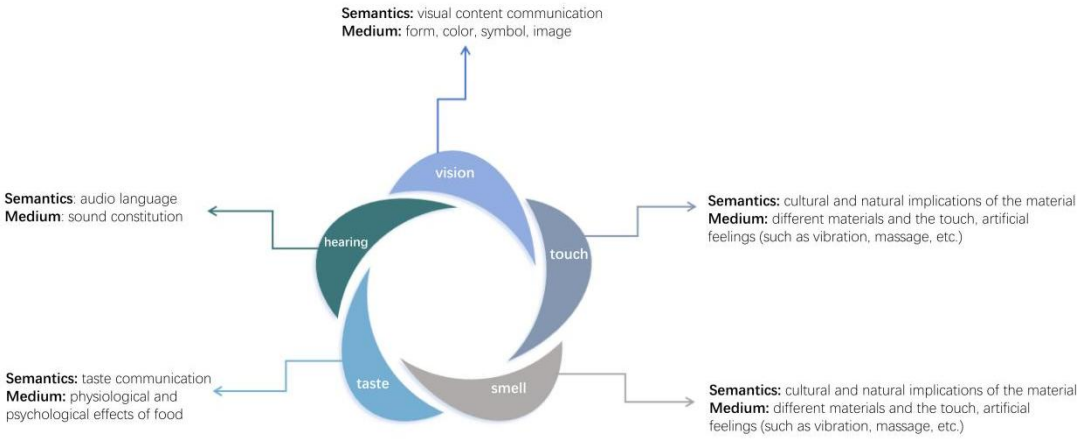

Figure 4-2 Conveyance medium constitution model covering senses (drawn by the author)

(1) Visual perception symbol semantics and medium constitution:

Semantic medium---text: as a form of symbol semantics, text itself can be understood as meanings conveyed through communication methods such as writing and language. The focus of research is on how to enable users, via visual design, to perceive the text in different ways and understand the conceptual semantics and information conveyed by the design.

Medium—image, chart, shape, color and other visual elements: used to convey information, text, semantics, data, etc.; people can perceive the feelings and semantics conveyed by these elements through vision.

(2) The hearing sense and symbol semantics and medium constitution:

Semantic medium---audio language: sound and audio elements of a language are used to convey the meaning of the language; people perceive the audio and sound via hearing, and understand the concept and information in the language.

Medium---music: including artificial and natural sounds; it can be considered as a form of symbol semantics, and various media including musical instruments are used to convey emotions, stories and concepts. People perceive sounds through hearing, and interpret the symbols and meanings therein.

(3) Tactile perception and symbol semantics and medium constitution:

Semantics medium---the material itself: the touch of the object and material texture can convey information and symbol semantics; tactile perception can be used to understand the properties, texture and grains of the object.

Medium---tactile feedback while watching or using: gestures and tactile feedback can be used as part of symbol semantics, for example, sign language and touch screen feedback can convey information and communicate meanings.

(4) Smell and taste perception & symbol semantics and medium constitution:

Semantics medium---smell: some smells can be associated with certain symbol semantics, for example, the smell of some perfumes can convey specific emotions or contexts.

Medium---perception and effect: the key symbol of the taste sense is taste, which can be associated with symbol semantics; different tastes can trigger the emotions of the

recipients, thereby establishing the symbol semantics connected with emotions.

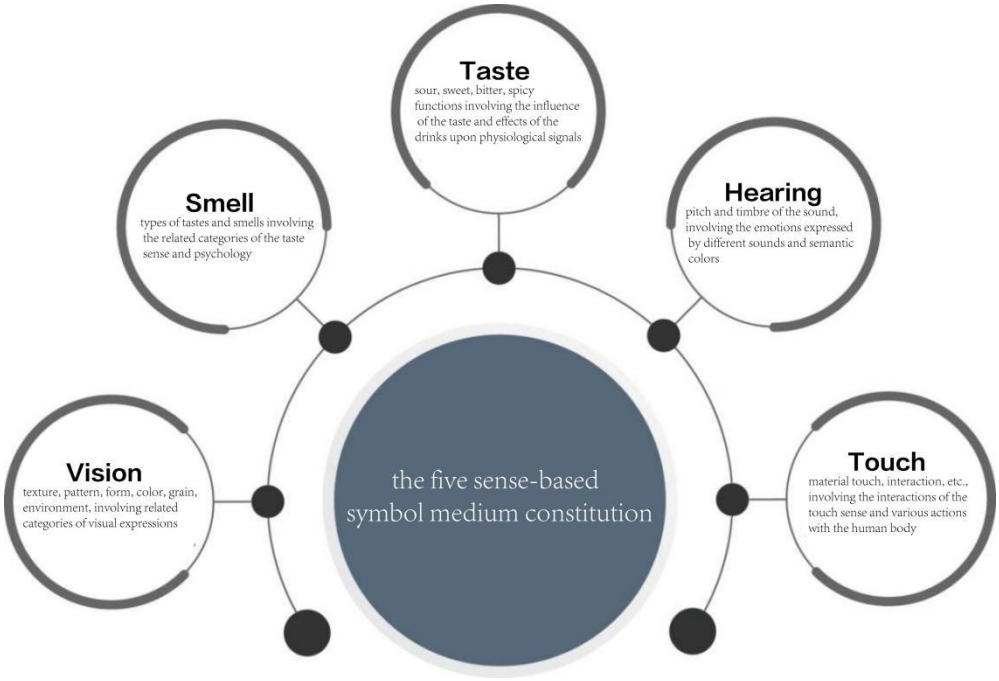

Figure 4-3 Five-sense symbol medium constitution (drawn by the author)

4.1.2 Exploration of the sense-based emotion communication medium constitution

The study has, based on the above content, analyzed and established the connection between emotion semantics, symbol medium and the senses, as well as their role in conveying feelings and moods in design. The study emphasizes that designers must have a deep understanding and make use of the interaction and complementarity of the three, so as to convey emotional semantics, create user experience and realize sensory comfort. Description of the interaction between the elements is as below.

(1) The role of emotion semantics

Emotion semantics conveys specific concepts, emotions or information through symbols, vocabulary, images and other representations. Representing certain meanings, these symbols can be shared by the culture, society or individual ways of understanding. Directly associated with emotional communication, it is vulnerable to influences from the language and culture. Users under different cultural backgrounds may have varied understandings of the same symbol.

(2) Construction of expression medium

Conveying emotion semantics through the senses (vision, hearing, touch, smell and taste), symbol medium is the medium for sensory experience. The construction of symbol media can give rise to feelings and emotional responses, for example, color, form, icon, sound, touch, taste and other elements can be used as the bridge to communicate semantics, to evoke the user's feelings and emotional response, thereby conveying and enhancing emotions in certain situations and experiences.

(3) User-medium interaction

Users can interact with the product's expression medium with their own senses. For example, text and language can convey semantics via visual and hearing perception; the touch and texture of the object can convey information via tactile perception; the smell and taste senses communicate symbol semantics through smells and tastes, which may be associated with specific emotions and contexts.

To sum up, the relationship between emotion semantics, symbol medium and senses constitutes the basis for conveying feelings and emotions through design. This interaction not only enhances the emotional dimension of design, but also realizes user experience covering the five senses. By improving experience quality and depth, the user's "emotional experience" is upgraded to "emotional comfort" by semantics, which further enables users to fully "feel" the emotional symbol semantics of the product conveyed by different media with their senses as the bridge.

4.2 Analysis of "emotional comfort": analysis of emotional impact based on product interaction

4.2.1 Integration of the five-sense elements into design interaction to trigger emotional comfort

The above research has completely established the constitution mode, communication content and expression form of the symbol media covering the five senses. Meanwhile, the five major sensory media have undergone communication-biased and perception-biased duality analysis, and the conclusion is that vision and hearing are conveyance-biased; smell and taste are perception-biased, while touch is equally involved in the two.

The ultimate goal of the research is to communicate emotion semantics through symbol medium construction, and then trigger the user's "emotional comfort" with multi-media sensory perception. The key is to explore how to use modern design methods to evoke interaction modes covering the five senses in multiple angles including function, interaction, physiology, psychology and sensibility. The triggering modes of emotional comfort are divided into "active triggering" and "passive triggering". The two of them are different in the triggering mode, media, interactive mode and communication mode; related design elements also differ greatly. This section will further discuss the correlation between sensory media and design methods, so as to further construct the connecting bridge between design methods and sensory media.

1. Design cases and analysis---various design and interaction modes to trigger sensory comfort

Sensory therapy products trigger sensory comfort---triggering mode: in sensory therapy, the way in which sensory comfort is obtained means to meet different sensory needs through design. In terms of material and interaction, soft plush material can be added to introduce interesting touch feedback mechanism, so as to realize a unique product interaction mode, thereby enabling the stimulation to be received by

the touch, hearing, vision and even smell and taste senses and providing a comprehensive sensory experience. The rich sensory stimulation brought about by this type of product can facilitate the improvement of sensory integration, result in emotional comfort and relaxation, and realize the effect of sensory comfort.

Interaction mode covering the senses: a design example in this aspect is that a “sensory box” can be built, with children as its recipient; the purpose of the design is to prepare a box full of objects of different textures, shapes, colors and sizes. This box may contain:

Wearable devices to trigger emotional comfort---triggering mode: wearable devices realize sensory comfort mainly by means of integrating various sensors, intelligent software and other technologies. The connected device can conduct real time monitoring of the user’s physiological state and can thus identify his emotional state. The above data can be used to conduct personalized adjustment of functions, which means to adjust the music, light therapy and slight vibration based on the user’s physiological signals, so as to relieve stress and anxiety. This type of product can be synchronized through smart focus apps to provide personalized settings and feedback. This makes wearable products not only technological products, but also comprehensive tools for sensory experience which facilitate emotional adjustment and physical & mental health.

Interaction modes covering the senses: (1) physiological signal monitoring, heart rate monitoring, skin electric activity, etc., to judge the user’s emotional state; (2) musical therapy: automatic adjustment of the type and rhythm of music played based on the monitoring results; (3) light therapy and vibration: provide soothing light therapy effect and slight vibration, to enhance the feeling of relaxation; (3) touch feedback: provide physical relaxation through functions similar to mild vibration or heat therapy; (4) visual content experience: graceful and concise shape design and comfortable wearing can be adopted to enhance visual experience.

Place yourself in a healing space to trigger emotional comfort---triggering mode: create a healing environment for body, mind and emotion, similar to spaces like tea rooms and massage rooms. Soft and adjustable lighting can be used for the ambience, to simulate the warmth and comfort of natural light. Elements of nature can be added to the inner space, such as indoor plants, water features or natural material decorations, so as to enhance the sense of connection with nature. Meanwhile, space layout and the selection of furniture should be supportive to physical comfort and relaxation. Through these detail designs, the healing space can communicate peaceful and natural semantics to the user, thereby triggering the body-to-heart emotional comfort.

Interactive modes covering the senses: (1) in terms of vision, the tone of the whole space shall be mild and natural, such as light blue, soft green or the warm earth colors, to create a peaceful and comfortable emotional atmosphere; (2) in terms of hearing, the sound in the space is also an important factor to evoke sensory comfort, through artificial soft music, natural sounds or installation of sound-absorbing materials to reduce the interference of noise and create a quiet environment for the hearing; (3) in terms of smell and taste, essential oils or aromatherapy can be used to exude gentle and soothing aromas, which help people relax and enhance the healing effect of the

space; (4) in terms of touch, specific furniture placement can make touch an auxiliary element for the space to produce sensory comfort.

2. Interaction and feedback---active and passive triggering of emotional comfort

Active triggering by contact with the product: this type of products is a typical case of active triggering; the users' active use of the product results in activities of touch, vision and smell senses, and direct stimulation of the senses can be achieved based on the feedback, which further promotes sensory integration and emotional comfort.

Passive triggering of wearable product: wearing products are typical cases of passive triggering; this type of products provides functional feedback unilaterally to the user without the user's initiative for interaction. These products monitor the user's physiological state with technologies so as to suit the emotional and physiological needs and provide immediate sensory comfort.

Products with physiological function attributes work with actions for the triggering: for example, healing products and some health products for the adjustment of physiological signals can influence emotional state and realize physical and mental relaxation during product use by cooperating with the user's active behaviors, including deep breathing, progressive muscle relaxation, etc., to regulate heart rate and blood pressure.

Triggered by the dynamic environment: through integrated dynamic environment and adjustment of environmental elements such as light, sound and fragrance, a comfortable living space is created to suit the user's emotional changes. This type of design is by itself active, i.e. environmental triggering happens according to one's own environment and preferences.

Static space triggering: create a space that facilitates relaxation and restoration, the design inspiration can come from tea rooms, massage rooms, etc. Different from dynamic environments, elements of nature play a prominent role in this pace, and all serenity-related design elements such as soft lighting, natural elements, Zen meditation elements are needed to reach progressively deeper sensory experiences. This experience is more passive.

4.2.2 Design-based construction of the connecting bridge between conveyance based on semantics-senses and perception

This study emphasizes the combinative resonance of user perception, emotion and mood. Chapter 3 focuses on visual communication, while Chapter 4 is concerned with how to trigger the user's emotional resonance and create deep sensory experiences. Modern design technologies are introduced and combined, for example, multi-media interaction, social media and virtual reality, and psychological and physiological knowledge is incorporated, to optimize product design and meet the users' emotional and psychological needs. The focus is on the use of medium communication and emotional resonance to deepen sensory experiences, and how to use modern design technologies and multi-sensory elements, such as multi-media interaction, social media and virtual reality, including psychological and physiological knowledge, to work on the users' emotional and psychological needs, and to finally realize

personalized and meaningful immersive user experience.

Design methods and technologies and other elements are as follows:

1. Construct a user-experience design covering the five senses

Product interaction: establish personalized interactive mode of the product based on symbol medium

Previous studies have constructed the five sense-based "conveyance medium" to communicate the emotional content, trying to enhance the user experience of the product by installation of personalized interaction modes, establishing a close emotional bond and realizing the user-product resonance. That means the integration of experience and pleasure through product use and behavior, so as to trigger deep emotional resonance.

2. Emotional design: how a product conveys emotion semantic through its use

This aspect emphasizes the communication of emotion semantics via "ceremonial atmosphere" and is based on this standard. Taking "tea culture" as an example, the tea set is considered as a product, the use process such as burning incense, changing clothes, meditation, awakening the tea, and other rituals, is not only a set of rituals, but can calm the user's mind and enhance his emotional stability. Meanwhile, although the "ceremonial atmosphere" may add to the complexity of the operation, it constitutes the key to convey emotional experience; the "Zen" quality in tea ceremony is the external embodiment of the emotional symbols brought by the ceremonial atmosphere.

3. Interactive experience design concept for the purpose of triggering "emotional comfort"

Comprehensive sensory experience: to communicate "semantics" with visual media as the main channel, deduction has to be done on the appearance to look for modeling innovations and link modeling symbols with abstract emotion semantics. At the same time, the practical use of the product has to play corresponding roles; this element fits especially products designed with the function of emotional comfort, and the crucial point is to produce a more interesting, amazing, pleasant and even unforgettable use experience, so that the users' deep emotions and emotional experience can be aroused. What you feel about the product can awaken the linked responses in the senses, heart and emotion of the consumers, thereby influencing users with "symbol media" and realizing "emotional comfort".

Sensory interaction: (1) for tactile interaction, touch feedback technology can be used to simulate real touch with vibration, pressure change and other means; technological integration of tactile sensor can provide real-time body feedback; (2) for visual interaction, on the basis of the original form, color and symbol for conveyance of aesthetic semantics, visual symbol medium can be combined with the entire perceptual scenario to provide the product with auxiliary dynamic visual content, by using interactive screen and projection technology.

4. Design aids: environment and context

User space: design research should take the environment and space of the product into account, for example, family use, office use or outdoor use; on the one hand, this element can determine the influence of environment upon sensory experience, on the

other hand, the user's emotion, mood and the communication effect of the symbol media differ a lot under different contexts.

Sound environment: the coordination between the product and the surrounding sound environment should be considered; during the design process, consideration of the environment and the creation of an overall comfortable sensory experience on this basis can better trigger "sensory comfort".

5. Sensory adaptation design

Adaptability to different user needs: product design should possess flexibility, especially in element study involving emotional expression, communication and perception; good use of these elements can enable the product to suit the specific needs and preferences of different users.

Chapter 5 Conclusion

The study has put forward the constitutive theory of emotion semantics, and expounds how to construct, with product and semantics as the basis and via "emotional bionics" theory, the emotion symbols conveyed by the product, perceived by the user and based on elements such as product shape, color scheme, symbols, materials and interaction. The use of the above senses in emotional adjustment and psychological therapy is also included in the study.

Moreover, there is also an in-depth analysis in the study on the ways in which design plays a key role in sensory experience, so that users are provided with emotional experiences through multi-sensory interaction which is created to trigger sensory comfort. Design practices in vision, hearing, smell, taste and touch for realizing emotional balance are carried out through specific modeling, color, music, food, and touch materials. This study has discussed how to communicate emotional symbols through design, so as to realize "emotional comfort", soothe emotions, and further enable the product to trigger sensory experience and the substantial function of emotional micro-healing.

It is hoped that through the above studies, people can pay more attention to emotional "semantics", to deepen their understanding of emotions via different experiences. Our sensory experience can be used in a more conscious way, so that we can explore another method to improve our emotions. That is to say, artistic expression and sensory experience can give users special feelings and new horizons, and new perspectives and new ways can be explored for the improvement of negative emotions, so as to realize product innovation for more profound connection between user emotion and psychology. It can cast light on subsequent studies on product emotional narration and symbolic experience.