

# Research on Creative Design of Bidirectional Characters from the Perspective of Gestalt Theory

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## ABSTRACT

Gestalt psychology is one of the main schools of modern Western psychology, which originated in Germany and later developed further in the United States. In recent years, Gestalt theory has gradually become an interdisciplinary research method. Based on the Gestalt theory, this paper finds out the potential laws in the expression forms of Chinese character design from the perspective of scientific psychology, and on the basis of analysis, links the laws of Gestalt with the creative ideas of Bidirectional character design. By analyzing the design logic forms of bidirectional characters, it organically combines the configuration characteristics of Chinese characters with the study of Gestalt laws. Thus, the expression and modeling means of Gestalt principle in Chinese character design are obtained, and these methods are actually used to create, so as to broaden the creative ideas of Chinese character design. The meaning of a single word is transformed into a double-layer or multi-level meaning construction, which provides a new method and a new idea for the development and design of Bidirectional characters. According to the inspiration of Gestalt thinking to Chinese character design, and combined with concrete design, the design practice inspired by Gestalt thinking is carried out.

**Keywords:** Gestalt psychology, Bidirectional word, Font design, Visual perception.

## 1. INTRODUCTION

### 1.1 Overview of Gestalt Psychology

Gestalt psychology was born in Germany in 1912, and the meaning of Gestalt in German is "form" or "whole". The foundation of Gestalt theory is holism, which advocates that the whole is not equal to the sum of its parts, and that the whole should be greater than the sum of its parts. Only within the environmental field of the whole can the parts highlight their significance. Gestalt psychology is a science that discusses human's cognitive response to images. When people watch an object or an art work in daily life, due to the visual cognitive habits of human brain, human beings tend to integrate and simplify the images, and the human visual system does not analyze each element separately. It can automatically combine single visual elements such as shapes, graphics, and objects into a whole. This means that people instinctively perceive objects or works of art as a whole, rather than as separate combinations. Even if objects or works of art are composed of many

substances, perception organizes them into a whole. When people look at things, they do not just focus on a single factor, but pay more attention to the expressiveness and meaning generated by the mutual combination and connection between multiple elements. In the design, the flexible changes between the elements, the increase and decrease, reorganization and adjustment between the elements will make the picture present a richer visual effect.

### 1.2 The Relationship Between Bidirectional Characters and Gestalt Psychology

Two-way characters refers to when the font is rotated at a certain Angle or after the mirror projection, it has a considerable symmetry and can read its meaning, which is called "bidirectional characters" or "Reversible characters". The meaning of bidirectional characters also refers to the Chinese characters that express the same or completely different meanings when looking

forward and backward, which may be antonyms, causality, or other strongly related meanings.

Character is a symbol that has the function of conveying information. In the process of information communication, people recognize the shape and structure of characters. However, at the level of artistic expression, especially in today's increasingly high demand for design expression, the design of character shapes should not only maintain readability, but also achieve multiple information communication functions. That is to say, it is necessary to maximize the presentation of the style characteristics of the character shapes themselves in order to convey content beyond the text information. As a type of font design, bidirectional character is designed by using the structure, stroke and outline of Chinese characters. Starting from the psychological cognition of users, Gestalt psychology is used to help designers understand the visual cognition law of users and grasp the visual perception cognition law of bidirectional character, which contributes to the development of bidirectional character design and broadens the field of font design.

## 2. GESTALT THEORY UNDER THE PERFORMANCE OF BIDIRECTIONAL CHARACTER DESIGN

Gestalt psychology puts forward seven basic principles, including proximity rate, similarity rate, continuity rate, closure rate, simple symmetry rate, subject and background rate and common destiny rate. Bidirectional character design can be based on these basic principles to explore the relevant laws of character design, and find an effective design methodology for bidirectional character design.

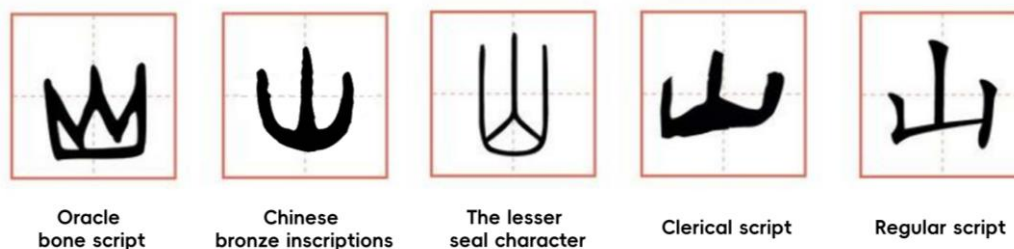


Figure 1 The evolution of "山" characters (Photo credit: Author self-made).

The other is feature recognition, which mainly highlights the phenomenon of stroke effect and component effect in the process of bidirectional character design. The points and lines in the

### 2.1 Bidirectional Character Design in Recognition of Gestalt Features

According to the basic form and interframe structure of Chinese characters, designers can create ever-changing visual forms of Chinese characters. In terms of recognition, the design of bidirectional characters can make use of the basic form and interframe structure of Chinese characters to design, showing endless combination ways and open isomorphic functions, and these diversified visual forms of characters are bidirectional character design without affecting the recognition of characters. The font recognition of bidirectional words is generally divided into two types of recognition.

First of all, the first is the overall recognition, directly to the entire bidirectional characters as a unit. The wholeness of the bidirectional character formation in visual perception is emphasized. From the perspective of gestalt visual perception, the font of a text is just a square pattern. Because people's cognitive ability of the font of Chinese characters and the overall main character of Chinese characters work together, they can recognize the text by the overall font of the text. Taking the Chinese character "山" in "Figure 1" as an example, the evolution of "山" character has experienced from oracle bone script to regular script. Although the strokes vary in thickness and length, its overall characteristics are roughly triangular, which does not affect people's overall recognition of "山" character. Therefore, in the design process of bidirectional character, people should retain the integrity of the main features and visual perception of bidirectional character. Thus avoid affecting the recognition of bidirectional characters.

composition of the shape of the text are called the strokes of the text, and the strokes of the text are the basic elements of the composition of the text. Any change in the strokes may affect the overall

recognition of the text. Even for the same font, by changing the thickness of the strokes, it may affect the visual effect and communication effect of the text. The components of characters refer to the basic strokes of characters that form multiple components of Chinese characters according to different arrangements and combinations. But at the same time, the designer can also use the change characteristics of the strokes and the composition characteristics of the components to strengthen the recognition of the text, especially in the design of the Bidirectional character to highlight the strokes and components of the Bidirectional character, so as to strengthen the recognition effect and visual effect of the Bidirectional character. For example, in "Figure 2", the group of bidirectional characters "现" and "消" highlight the strokes of key subjects and the main parts of "目" and "讠", thus strengthening the characteristics of the text and strengthening the feature recognition of the text. In "Figure 3", the use of "收" and "支" emphasizes the connection of strokes, highlights the characteristics of strokes, strengthens the main features of the two characters, and the prominence of the transition features enhances the recognition and aesthetic sense of the font.



Figure 2 Nomura Yisheng's "现" and "消" Mirror Bidirectional Word Design (Image Source: Online).



Figure 3 "收" and "支" bidirectional character design (Photo source: Internet).

Therefore, in the design of bidirectional characters, in order not to affect the recognition of text transmission, people need to pay attention to preserving the integrity of the text and the main outline and main strokes and components, and follow the relevant laws of visual perception.

## 2.2 Gestalt Phenomenon of Bidirectional Word Design in Structure

In the design of bidirectional characters, it is necessary to design according to the characteristics of the font itself. Before designing the bidirectional word, the designer must first analyze the components and configuration of the selected word object. In the process of word selection, attention should be paid to the pairing of structures. For example, words with the same left and right structure and left and right structure can be combined in Bidirectional character design, and the upper and lower structure can be combined in design, and the similar font structure and the similar outline of the text can be used to facilitate the reduction of strokes and the integration of modules. As a kind of symbol, bidirectional characters will inevitably destroy the original basic characters in the process, while preserving the basic structure of the characters is conducive to design and recognition. Under gestalt thinking, the vision will actively give the outline of Chinese characters, and the geometric outline can make the user recognize Chinese characters more easily. Bidirectional character design can retain the original structure of Chinese characters through geometric deduction, and grasp its unique characteristics and similarities for simplification. For example, as shown "Figure 4", the two characters "学会" designed by Zhang Long are both upper and lower structures, and have similar geometric shapes of characters. Combined with the similarity rate principle of Gestalt, an excellent bidirectional character design case is formed.

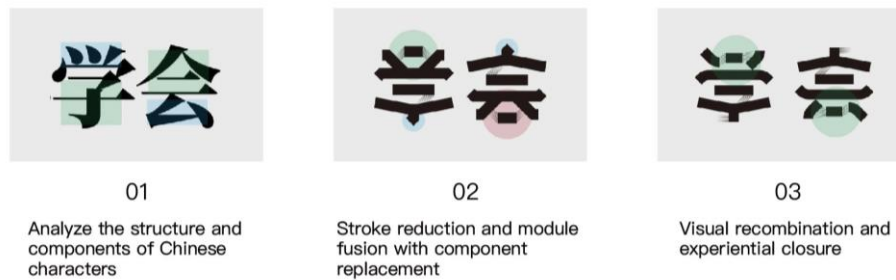


Figure 4 Zhang Long "学会" bidirectional character design flow chart (Photo credit: Author self-made).

### 2.3 The Expression Logic and Form of Bidirectional Character Design Under Gestalt Thinking

In Chinese character design, people deconstruct strokes and modules through the experience closure in gestalt. People usually perceive and organize the observed visual elements from their own experience, thus forming their own cognitive judgments. That is to say, when one's experience and observed things overlap in some specific features, perception is generated, and this perception is often based on the grasp of the whole thing's visual perception, that is, people understand and grasp the objective object through the overall relationship of these features. This is the basis of Gestalt scholars' theory of gestalt psychology.

#### 2.3.1 Chinese Stroke Reduction and Module Integration

The reduction of strokes refers to the fusion and sharing of similar strokes or similar parts. The theoretical basis for the use of omitted strokes in Chinese character design is "shape closure". Shape closure can be understood as the brain automatically imagines the missing shape as complete under Gestalt theory. In the process of Chinese character design, people can reduce or share the strokes of Chinese characters according to this principle, so as to achieve the purpose of recognition. In the case of reducing the visual burden of the audience, the content to be expressed by Chinese characters can be retained, thus producing richer visual content.

The fusion of modules refers to the fusion of similar radicals in bidirectional characters to form creative characters. For example, the three water and four water sides in the text can be represented by vertical lines. Chinese characters are modular characters, and each Chinese character is composed

of a detachable "module". Radicals are the "modules" that make up Chinese characters, and radicals create thousands of Chinese characters by combining them. Especially for the Bidirectional character design, according to the "shape closure" theory, bold simplification of the strokes presented in the bidirectional character design can be more concise, more artistic and interesting, and according to the integration of modules can improve the visual recognition of the Bidirectional character, but not lose the original meaning, so that the design of the Bidirectional character design is more meaningful. As shown in "Figure 5" below, the designer designed a set of bidirectional characters for Li Bin, manager of "NIO" Automobile. Among them, the "寸" in the "蔚" character and the "文" in the "斌" character use the stroke reduction and sharing, to achieve a clear recognition effect and visual beauty. However, "武" and "尉" simultaneously use the reduction of strokes and the integration of modules to simplify complex strokes and components, reducing the weight of multi-stroke Chinese characters without reducing the recognition of characters.



Figure 5 "Weilai" and "Li Bin" bidirectional character design (Photo source: Internet).

### 2.3.2 Chinese Character Structure Disassembly and Component Recombination

The decomposition of Chinese character structure is to decompose the stroke structure of the original Chinese character and then recombine it to form a new Chinese character structure. Using the technique of "addition and subtraction", the "new" image is re-created and a new artistic conception is displayed. On this basis, combined with the audience's personal experience, each stroke, module is combined and associative, so as to obtain the overall information. It can be seen that people's eyes are active to understand things, rather than passively receiving information, recognizing and grasping things according to existing experience, and recognizing things through experience.

The similarity rate in Gestalt principle is used for the recombination of components. Similarity rate refers to the organization of the most similar elements together, other things being equal. This similarity refers not only to formal similarity, but also to similar motion, that is, elements moving in one direction with similar speeds are organized together. Regrouping of parts helps us visually categorize, while similar parts have a tendency to be seen as a whole. In this case, when visual elements of similar appearance are unconsciously grouped into a category, at this time, the distance

between these elements no longer exists, but there is still a natural connection, which is the principle of similarity. The principle of similarity is also called proximity. Proximity rate was first proposed by Gestalt psychologist Whitthelm in 1923, that is, the closest elements are organized together. The principle of similarity is not only a visual law, but also an organizational method of artistic creation. In Chinese character design, the substitution of similar parts based on the principle of similarity can make Chinese character design more interesting and give Chinese character design more vitality. In "Figure 6", Japanese designer Kazuhiro Nomura uses the word "talent" to integrate innovative design with Chinese aesthetics, and plays four super creative talent flip bottles, including talent and effort, talent and perseverance, talent and ambition, and talent and strength. In these four groups of characters, the designer Nomura Kazuhiro disassembled the Chinese character structure of the word "才能", and then corresponding the disassembled strokes with the strokes and structures of the three groups of words "努力", "毅力" and "野心", and reorganized the parts of similar parts. For example, in the group of words such as "野心" and "才能", Kazuhiro Nomura rearranges the components such as "月" and "乚" within the word "能" so that after turning the word "能" over 180 degrees, it forms a "田" within the word "野", which improves the word recognition and the construction of a new order.



Figure 6 Nomura Yisheng "才能" flip bottle bidirectional character design (Photo source: Internet).

### 2.3.3 Visual Adjustment and Closure of Experience

Visual adjustment can be understood as that vision will actively give outline to Chinese characters. In the process of bidirectional character design, people can adjust the distance between different modules, and use visual inertia to carry out visual recombination with the module of another component after Chinese characters are flipped, so as to avoid the reduction of Chinese character recognition caused by the absence of components. The closure of experience means that

in the incomplete form of Chinese characters, even if a non-thematic part is covered or missing, people can still understand these Chinese characters through other overall stroke structure relations. People usually perceive and organize the observed visual elements from their own experience, thus forming their own cognitive judgments. That is to say, when one's experience and observed things overlap in some specific features, perception is generated, and this perception is often based on the grasp of the whole thing's visual perception, that is, people understand and grasp the objective object through the overall relationship of these features.

This is the basis of Gestalt scholars' theory of gestalt psychology. It can be seen that people's eyes are active to understand things, rather than passively receiving information, recognizing and grasping things according to existing experience, and recognizing things through experience. Therefore, in the bidirectional character design, people can use the reorganization of vision and the closure of experience to design. For example, in "Figure 7", Zhang Long designed the word "现在" by visually adjusting the "乚" and "冂" modules in the "现" character, as well as the "丨" and "丿" modules in the "在" character, so that the "现在" character remains the same after a 180 degree rotation.



Figure 7 Zhang Long "现在" bidirectional character design (Photo source: Internet).

### 3. BIDIRECTIONAL CHARACTER CREATIVE TEXT DESIGN PRACTICE

Based on the research on the application of Gestalt psychology in the Bidirectional character design, the author tries to carry out the bidirectional character creative design for the three groups of auspicious words "常乐" and "长寿", "富贵" and "安康", "幸福" and "胜意", and carries out the design application on the Spring Festival red envelope.

#### 3.1 Analysis on the Structural Features of Three Groups of Auspicious Words

Before the bidirectional character design, it is necessary to analyze the font structure of the three groups of Chinese auspicious words "常乐" and "长寿", "富贵" and "安康", "幸福" and "胜意", and grasp the key characteristics of the font structure of these three groups of words. By analyzing the stroke characteristics, structural overlap, and similarities and differences in direction of each character in a word, these three groups of words can achieve visual order and balance.

As shown in "Figure 8", among the three groups of Chinese auspicious words, "常乐" and "长寿", "富贵" and "安康" belong to the upper and lower structure, the number of strokes is similar, and the overall shape outline is similar. "幸福" and "胜意" in this group of words, "幸" and "意" are the same upper-middle and lower structure, the font outline is similar, "福" and "胜" belong to the left and right structure, the number of strokes is close. The font structure of the above three groups of Chinese auspicious words is similar, which can be used for creative design of bidirectional characters. In the design process, some complex strokes are simplified, the strokes that do not affect the recognition are refined or deleted, and some simple strokes that restrict the imagination space are reduced and shared with other strokes. Through the reduction of strokes and the integration of modules, the dismantling of the framework and the reorganization of parts, the good recognition of bidirectional character design is improved.



Figure 8 Three groups of Chinese auspicious word font structure analysis diagram (Photo credit: Author self-made).

#### 3.2 Three Groups of Chinese Auspicious Words Bidirectional Character Design

Based on the analysis of the above three groups of words and the gestalt rule of bidirectional character design, the text form of the running book is selected for this bidirectional character design. In this design, the bidirectional character design method summarized above is applied to carry out a 180 degree reversal of the bidirectional character design for "常乐" and "长寿", "富贵" and "安康", "幸福" and "胜意", as shown in "Figure 9". These three groups of words are reduced by strokes, integrated by modules, restructured by structure and components, and then the overall font effect is visually optimized.

Chinese words	Chinese stroke reduction	Module fusion	Structure removal	Component recombination	Visual adjustment	Empirical closure
常乐 长寿	寿 →	乐长 → 乐长		常 → 寿 →		
富贵 安康	康 →	富 → 康 →		安 → 贵 →		
幸福 胜意	意 →	福胜 → 幸意 →		福 → 胜 →		

Figure 9 Disassembling flowchart of three groups of words(Photo credit: Author self-made).

### 3.3 Three Groups of Chinese Auspicious Words Bidirectional Character Design Application

Through the bidirectional character design of the three groups of auspicious words, "常乐" and "长寿" implies that in life often happy will live long life, "富贵" and "安康" means that physical health is the best wealth in life, "幸福" and "胜意" shows that everything is the meaning of happiness in life. These three sets of auspicious words record the Chinese people's vision for a better life and reflect the auspicious culture in the Chinese nation. Through the creative design of these three groups of words and creative cultural design application, a set of New Year red envelope as the main content of the development of cultural creative products. ("Figure 10")



Figure 10 Three groups of words bidirectional character design application (Photo credit: Author self-made).

## 4. CONCLUSION

Gestalt theory is an important theoretical system in the field of psychology, and its visual laws are also applicable and blooming in the field of art design. This article analyzes and studies the creative design process of bidirectional characters based on the physiological and psychological activities of people in Gestalt psychology, and summarizes the expression forms of bidirectional character design creativity based on Gestalt principles. It finds a design method for bidirectional character design and attempts a new interdisciplinary approach to promote the progress of bidirectional character design.

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