

RESEARCH INTO THE EMOTION DIMENSIONS IN PICTORIAL DESIGN OF CHINESE CHARACTERS

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ABSTRACT

In this study, “connection between picture and meaning” and “character completeness for picture” were proposed as important design properties of pictorial characters. We also made a survey on what the recipients’ emotional cognition categories would be under alternate influence of the two design properties. After observing and analyzing the existing design samples, we had three findings: (a) For the trend of pictorial characters in “connection between picture and meaning”, high connection (37.4%) is in the majority; in “character completeness for picture”, stroke (51.8%) is in the majority. (b) For the emotion dimensions of pictorial characters in “connection between picture and meaning”, high connection can best create positive valence (high connection > low connection > medium connection). For those in “character completeness for picture”, stroke and stroke-pattern can better create positive valence (stroke = stroke-pattern > outline). (c) The comparison of current quantity and emotion survey shows that the existing design of pictorial characters is positively correlated to consumer emotions.

“Connection between picture and meaning” and “character completeness for picture”, proposed in this study as criteria for classification of pictorial characters, will be able to clearly present design trend in the market. We hope this paper will make a contribution to the studies of pictorial character design and consumer emotions.

Keywords: pictorial character, six categories of Chinese characters, connection between picture and meaning, character completeness for picture, emotion

1. INTRODUCTION

This study aims to explore the actual applications of both “connection between picture and meaning” and “character completeness for picture” in pictorial characters and consumer emotions toward them. The purpose of this study is threefold: 1. by reference to related literature, to present “connection between picture and meaning” and “character completeness for picture” as important factors in the design of pictorial characters, 2. to observe the signs, package, and printed material of shops in Taipei, Taiwan, for their design of pictorial characters, and accordingly conclude the actual applications of the design in terms of “connection between picture and meaning” and “character completeness for picture”, and 3. to survey the relations of the two above-mentioned factors to arousal of consumer emotions.

• Definitions

(1) Emotion dimensions

Emotion is a disordered state that originates from mental situation. It is an interaction formed with both subjective and objective factors of complexity, and regulated by nervous system and hormone system. It is most likely to become an important source of evaluation and judgment (Gardner, 1985), even if a slight emotion, positive or negative, will result in errors in consumer ratings. When in good mood, one may have more positive feeling toward some matters or opinions, while a negative emotion will produce negative errors in product ratings (cited from Y. W. Wu, 2004). The mode and intensity of emotional reaction depend on the resulted stimulus. A positive emotion has a connection with activation in the left frontal lobe, while a negative emotion has a connection with that in the right frontal lobe. The Circumplex Model of Affect presented by Russell (1982) is drawn with emotion category — valence (pleasure) vertically crossed with emotional intensity — arousal. Distributed in circle around this crossing structure are 28 types of emotions, all of which represent the degrees of pleasure and arousal. On the other hand, International Affective Picture System (IAPS), developed by Lang et al. (2005), is generally used in the present studies on emotion. valence levels in this system go from “repulsive (-)” at low valence to “attractive (+)” at high valence; for arousal levels, from relaxing (R) at low arousal to activating (A) at high arousal, with neutral (N) in the middle; for the degrees of “valence” and “arousal”: A+ (positive valence, high arousal), A- (negative valence, high arousal), N (neutral), R+ (positive valence, low arousal), and R- (negative valence, low arousal).

(2) Pictorial characters




A pictorial character is composed of a character and a picture. This design technique, including the use of a picture to replace part of a character, is a visual effect formed by interaction between “use of picture” and “replaced position”. The character is a “symbol for

reading”, and rational and objective communication. It is able to clearly represent information, but short of imagery power; the picture is a “form for watching”, and perceptual and subjective communication (Chen, 2004). Their interaction is helpful in demonstrating an artistic conception a simple character is unable reach, adding interests to the scene, and bringing complementing effect to the conveyance of meaning (Chu, 2005; Chen, 2004; Yang, 2007; Su, 1985). Pictorial characters are widely applied in such graphic designs as business logos, the standard characters for business and product names, or the titles on printed matter, ads, and articles. Among them, trademarks, logos, and standard characters are most often seen. (Wang & Chou, 2001; Chou & Wang, 2007; Chen & Yao, 2001).

(3) The “connection between picture and meaning” of pictorial characters

The picture has played an important role in the evolution course of Chinese characters. With passage of time, even though the structure of Chinese characters has been simplifying from pictorial scripts to pictographs to modern characters, we can find some traces of pictures in them. This suggests, in terms of structure and form of Chinese characters, existence of replaceability between characters and pictures (Yen, 1998). In the design of pictorial characters, selection of pictures determines their relations to word meaning. As for the studies on structure and form of Chinese characters, Xu Shen in the second century divided Chinese characters into six categories according to their structural composition. They are “pictograms, simple ideograms, ideogrammic compounds, phono-semantic compound characters, phonetic loan characters, and derivative cognates. Among them, the first four categories are closely related to the use of pictures and symbols. Both pictograms and simple ideograms make direct use of the pictures that depict concrete objects or abstract matters, ignoring the relations with word meaning, and resulting in the lowest connection to meaning in the design of pictorial characters; ideogrammic compounds combine the connotation of picture with word meaning to make association and convey new meaning, leading to medium connection; phono-semantic compound characters use pictures whose connotation conforms to the word meaning, having the highest connection due to its easily-seen properties and understandable meaning. In this study, the relations between picture and meaning are divided into low connection, medium connection, and high connection, as shown in Table 1.

Table 1: Samples for “connection between picture and meaning”




Degree of Connection	Low	Medium	High
Sample			

(4) The “character completeness for picture” of pictorial characters

“Character completeness for picture” is the level of varied positions in a character replaced by picture in being a complete character. In the system of Chinese characters,

“stroke” is the most basic unit. Equivalent to the letters in an English word, “stroke” is the minimum component in a Chinese character (Ma, 2000). Strokes constitute a basic stroke-pattern, which turns into an independent “word”, two and more of which can form a combined “character” (Chen, et al., 1996; Lin, 2007; Lu & Huang, 2008). In this study, the positions replaced by picture are divided into three categories: stroke, outline, and stroke-pattern, according to the structure of characters. “Stroke” is the basic unit of Chinese characters, such as 丿; “outline” is closed space formed by interlaced strokes, such as 久 (Lee, 2004); stroke-pattern is the basic structure of Chinese characters, and is between “outline” and a complete character, such as 圭. After replaced, it takes up a larger part of a complete character, as shown in Table 2.

Table 2: Samples for “Character completeness for picture”


Replaced position	Stroke	Outline	Stroke-pattern
Sample			

2. METHOD

(1) Questionnaire

The questionnaire in this study includes pictures of the samples, combining with emotion category — valence (pleasure) and emotion intensity — arousal in emotion dimensions. The most widely used a 9-pt numerical scale in emotion measurement is also offered for test recipients to make assessment. After viewing the samples representative of the pictorial characters, they have to mark on the degrees of “valence” (pleasure) and “arousal”, as shown in Table 3.

Table 3: Scales in the questionnaire for emotion dimensions

	Emotion	-	←————→							+	
	category (pleasure)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			1	2	3	4	5	6	7	8	9
	Emotion	-	←————→							+	
	intensity (arousal)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			1	2	3	4	5	6	7	8	9

(2) Collecting samples of pictorial characters

From January to April of 2009, by means of natural observation, we sampled purposively the signs, package, and printed material of shops in Taipei, Taiwan, for their design of pictorial characters. We obtained a total of 110 samples, and took photos of them with a digital camera for a file. Application of pictorial characters in package is in the

majority, accounting for 41.7%, in printed materials, DM, and posters is second (35.5%), and in shop signs is in the minority (23.3%).

- **Categorization of samples**

After collecting samples, “connection between picture and meaning” and “character completeness for picture” of pictorial characters defined in the related literature were used both as criteria for categorization and for analysis of the 110 pictorial characters. The focus group method is employed in this study for categorization of pictorial characters into “connection between picture and meaning” and “character completeness for picture”. The focus group is an expert panel including 6 professionals with a background and 5 years of practical experience in visual communication, as in Table 4. They had a 2-hour meeting on May 21, 2009, proposing a Latin squares design with a total of 9 (3×3) collocations. Representative samples were also selected for 36 test recipients to measure their emotion dimensions. The background of the focus is shown in the table below.

Table 4: Focus group roster

Appellation	Years of experience in design	Specialty
A	8	Graphic design & project management
B	5	Graphic & art design
C	5	Graphic & product design
D	4	Graphic & product design
E	4	Art design & project management
F	4	Graphic & product design

The categorized samples were projected on a screen with a projector, one at a time, and were located in the center of the frame, 50X50 cm in size. Members of the focus group had a discussion with each other in the process and decided by vote if they reached no common consensus when generalizing the samples.

3. RESULTS










(1) Market-based analysis of the design of pictorial characters

The categorization by the two variables of “connection between picture and meaning” and “character completeness for picture” has shown that “high connection”(37.4%) is in the majority among the classes of connection between picture and meaning, “medium connection”(31.7%) in the second, and “low connection”(30.9%) in the rear. Among the

categories of character completeness for picture, “stroke”(51.8%) is at the top, “stroke-pattern”(31.8%) the second, and “outline”(16.4%) in the rear, as shown in Table 5.

A further exploration into the variables of pictorial character design has shown its statistical results in Table 5. In the nine samples numbered a~i, sample c (“high connection” with “stroke”) is the largest in proportion (21%); sample b (“medium connection” with “stroke”) and sample a (“low connection” with “stroke”) (15.4%) are both in the second; sample h (“medium connection” with “stroke-pattern”) (12.7%) and sample i (“high connection” with “stroke-pattern”) (10.9%) are close in number, rank 4th and 5th. Sample e (“medium connection” with “outline”) (3.6%) is the smallest.

Table 5: Design details of “connection between picture and meaning” and “character completeness for picture”

Number of pictorial characters/ Ranking	Connection between picture and meaning				
	Low	Medium	High		
	34/3	35/2	41/1		
%	30.9%	31.7%	37.4%		
Character completeness for picture	Stroke	 a	 b	 c	
		57/1	17/2	17/2	23/1
		51.8%	15.4%	15.4%	21%
	Outline	 d	 e	 f	
		18/3	8/7	4/9	6/8
		16.4%	7.3%	3.6%	5.5%
	Stroke-pattern	 g	 h	 i	
		35/2	9/6	14/4	12/5
		31.8%	8.2%	12.7%	10.9%

(2) Analysis of emotion dimensions by questionnaire

Referring to Circumplex Model of Affect (see Fig. 1) presented by Russell and the emotion dimensions in IAPS (Lang et al., 2005): emotion category — valence (pleasure) and emotion intensity — arousal (see Fig. 2), we made an evaluation of emotion dimensions for the 9 representative samples, numbered a~i, in this paper, and then a statistical analysis of their data, as shown in Table 6.

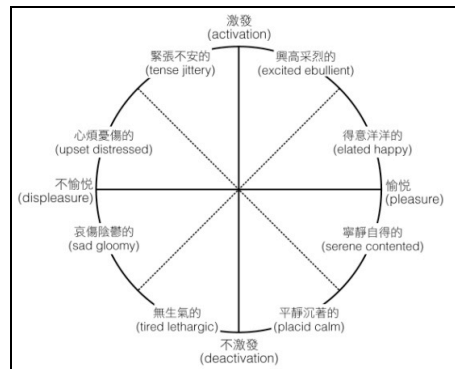


Figure 1: Core affect (Russell, 2003; Russell & Barrett, 1999)

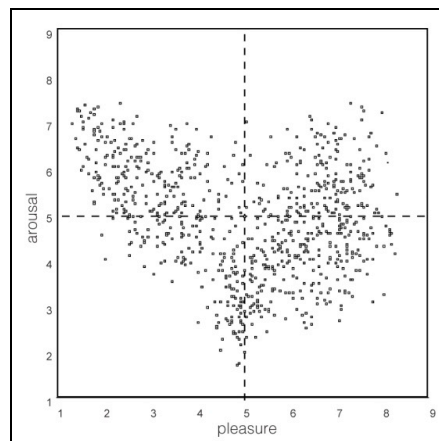


Figure 2: Coordinate chart for emotion dimensions in IAPS (Lang et al., 2005)

Table 6: Statistics of emotion dimensions for pictorial characters

Feature combination of pictorial characters	Valence		Arousal		Attribute in IAPS
	Mean	Standard Deviation	Mean	Standard Deviation	
a low + stroke	5.47	1.76	4.87	1.41	N
b medium + stroke	6.53	1.33	6.53	1.57	A+
c high + stroke	6.30	1.42	6.10	1.40	A+
d low + outline	5.73	1.55	5.33	1.81	A+
e medium + outline	4.77	2.28	6.47	1.55	A-
f high + outline	5.90	1.83	5.97	1.79	A+
g low + stroke-pattern	4.77	1.76	4.93	1.66	N
h medium + stroke-pattern	5.80	1.97	5.77	1.89	A+
i high + stroke-pattern	6.97	1.40	6.77	1.38	A+

According to the categorization of coordinates in IAPS, for those with “low connection” in connection between picture and meaning, samples a, d, g are N(neutral), A+ (positive valence, high arousal), and N; for “medium connection”, samples b, e, h are A+, A- (negative valence, high arousal), and A+; for “high connection”, samples c, f, i are all A+. These results shows that “high connection” produced positive valence and high arousal; “medium connection” produced positive valence, high arousal and negative valence, high arousal; “low connection” produced neutral emotion and positive valence, high arousal. A comparison of the three categories in arousing positive valence shows “high connection > low connection > medium connection”.

For those with “stroke” in character completeness for picture, samples a, b, c are N, A+, A+; for “outline”, samples d, e, f are A+, A-, A+ ; for “stroke-pattern”, samples g, h, i are N, A+, A+. These results show that “stroke” and “stroke-pattern” produced neutral and positive valence, high arousal; “outline” produced positive valence, high arousal and negative valence, high arousal. A comparison of the three categories in arousing positive valence shows “stroke = stroke-pattern > outline”.

In further analysis of “connection between picture and meaning” with “character completeness for picture”, “high connection with stroke-pattern” in sample i is a combination that best aroused the test recipient’s positive emotions, while combinations of “medium connection with outline” and “low connection with stroke-pattern” aroused the test recipient’s neutral toward negative emotions.

It is learned from the above that changes in both connection between picture and meaning and character completeness for picture will make differences in the recipient's emotional reaction. Viewed from the characteristics of connection between picture and meaning, the picture and meaning used in "high connection" are most correlated. Guided by the picture, the recipient can more rapidly understand its connotation and better produce a pleasant emotion. And viewed from character completeness for picture, "stroke" accounts for a smaller proportion of a whole character, which is still recognizable when combined with picture. This will help recipients suffer no trouble in reading pictorial characters; "stroke-pattern" is mostly replaced by similar forms or relevant pictures, which makes itself connectable to character to a certain extent when being read. Therefore, the two categories create a more direct visual stimulus to the recipient and arouse positive emotions.

In the comparison of the number of existing samples, high connection (37.4%) and stroke (51.8%) are in the majority in their respective variables, and they both arouse positive emotions of consumers. In terms of interaction, c (21%), b (15.4%), and i (10.9%) that arouse higher positive emotions are in the majority, and the e (3.6%) that produces higher negative emotions is smallest in proportion. The above-mentioned results suggest that the current design of pictorial characters is positively correlated to consumer's emotional reaction.

4. CONCLUSION AND SUGGESTION

After discussion by related literature, picture choice in the design of pictorial characters- "connection between picture and meaning" and position replacement-"character completeness for picture" act as important factors in affecting the design of pictorial characters and the viewer's perception for them. Application of both in the market shows the difference in the preference for the design of pictorial characters. The combination largest in proportion is "high connection" with "stroke" (21%). This design, with clarity and relevance, is the mainstream in the market. The smallest in proportion is "medium connection" with "outline" (3.6%). The designer can either follow the stream to reduce errors, or employ a less used technique to make different from other design. He should not only take into account the uniqueness of character's form, but make use of the combination of "connection between picture and meaning" with "character completeness for picture". This will create more changes in the design of pictorial characters, manifest its difference from other designs, and provide consumers with a variety of visual perception.

The influence of "connection between picture and meaning" with "character completeness for picture" on consumer's emotion dimensions is surveyed by questionnaire, and the result shows that "high connection with stroke", "high connection with outline" and "high connection with stroke-pattern" are all combinations in arousing the recipient's positive emotions. This reveals that pictures with "high connection" will produce a positive, pleasant emotion, while "medium connection with outline" and "low connection with stroke-pattern" will produce neutral toward negative emotions.

This study is an investigation into consumer's emotion dimensions with existing pictorial characters as its samples. The survey results of present situation and emotions

demonstrate that both “connection between picture and meaning” and “character completeness for picture” have brought some dissimilarity to consumer’s emotional valence, but no striking difference to emotional arousal. The difference exists in the motif of design, presentation technique of picture, and use of font. Therefore, we suggest control over variables other than “connection between picture and meaning” and “character completeness for picture” for future studies, in order to provide more objective guidelines on the design of pictorial characters for designers to follow. The perceptual orientation---positive valence and high arousal---is expected to promote communication of information for complementing effects.

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