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Graphic Design for Learning Chinese Characters: Opinions about Effectiveness and Aesthetics from Audience with and without Chinese Culture Backgrounds

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This study aims to investigate perceptions from audience with and without Chinese culture backgrounds in terms of graphic design for learning Chinese characters from two different angles: effectiveness and aesthetics. The results are used to better inform and improve graphic design for the acquisition of Chinese characters. A structured-interview has been conducted with 10 Chinese Speakers (CS) and 10 Non-Chinese Speakers (NCS) to explore their opinions about graphical variables of design in learning Chinese characters. The result shows differences and similarities of opinions between participants with and without Chinese culture background, in terms of effectiveness and aesthetics. The result is an important contribution for improving graphic design for the acquisition of Chinese characters, moreover, it indicates the future research.

Keywords: graphic design; graphic variables; effectiveness; aesthetics; Chinese characters

1. Introduction

Many researches have confirmed that graphics enhance learning, i.e., Mayer (2009) and Clark et al. (2010). Alongside the fast growth of the Chinese economy, in recent years learning Chinese as a second language has seen an explosive growth around the world. Learning thousands of Chinese characters is one of the hardest parts for foreigners. Graphic design has been chosen as an effective way to tackle this difficult issue for many existing learning materials, i.e. *Chineasy* (Shaolan, 2014, 2016). However, the graphical variables in the learning materials influence its effectiveness (Clark et al., 2010). Graphic design for learning Chinese characters as total beginners is an intercultural research study. Complete beginners are not normally familiar with Chinese culture, while the design team for these materials tend to be familiar with that culture. Do people with different cultural backgrounds have different perceptions with graphics for learning Chinese characters? Do people have different perceptions, in terms of effective learning and aesthetic appeal? How do these perceptions inform graphic design for learning Chinese characters? The literature on related questions reviewed as follow.

2. Literature Review

According to Tyler (1992), aesthetic sensibility and effective communication to an audience are both evaluation criteria for graphic design work. For graphics in learning materials, the effectiveness of learning should be considered as the priority, rather than aesthetic appeal. However, it has been pointed out that graphic designers in some cases overemphasise the importance of aesthetics rather than effective communication, which is more crucial to a high-quality of graphic design (Frascara, 2006). Though Frascara (2006) also states the high importance of "aesthetic appropriateness" (p.31) for instructional graphics, effectiveness is still the priority.

Learner's difference is one of the important factors for effective learning (Clark et al., 2010, Kalyuga & Sweller, 2014). Different culture backgrounds might result in different understanding of graphics. But graphic design used appropriately with consideration could cross boundaries of various cultures. (Horton, 1993). McAnany and McAnany (2009) suggest to use global graphics into instructional design to the international audience. Grove (1989) suggests that international symbols is abstract enough which will not be misleading to an international audience. Regarding aesthetics, people with different culture backgrounds have general principles of aesthetic pleasure, which does not deny the differences between individuals (Hekkert, 2006; Kant, 1952). For effective learning, illustrations have been widely reported as an effective approach for memorising and understanding (Ainsworth, 1999, 2006; Dretzke, 1993). Colour-coding has been suggested as an effective approach to enhance learning and memorising (Chandler et al., 1992; Keller et al., 2006; Smallman et al., 1993).

To explore high-quality learning approaches and to better inform design and strategy, graphic designers are suggested to have active conversations with their targeted audience (Frascara, 2006), thus, a structured-interview has been conducted to further investigate the role of graphic design for learning Chinese characters.

3. Research Methods

To investigate the opinions of different learners (international students and Chinese native students), the structured-interview had been conducted with 10 Non-Chinese Speakers (NCS) and 10 Chinese Speakers (CS). To give critical evaluation and design thinking about instructional design for the acquisition of Chinese characters, it is identified the following points as the main analysis questions to be investigated:

- **Question 1**: Aesthetics appeal or effective learning, which is the priority for choosing Chinese character learning materials with instructional graphics?

- **Question 2**: What are the differences and similarities of opinions between NCS and CS about the graphical variables in terms of aesthetic appeal and effective learning?

- **Question 3**: What are the differences and similarities of opinions between aesthetic appeal and ease of learning for the graphical variables?

Focused on the acquisition of Chinese characters, by looking at 11 books, 2 websites and 2 Apps (Appendix), 6 general graphical variables (details in 3.2) with illustration, colour and typeface have been found. Participants were asked to rank the graphical variables with picture examples from existing learning materials, from easy-to-learn to difficult-to-learn and from aesthetic-appeal to less-aesthetic-appeal. Rank ordering has been suggested as an

important research methodology in terms of preferences (Palmer, Schloss, & Sammartino, 2013). Then, a Likert Scale question was followed to ask their opinions of priority when they choose Chinese character learning materials with instructional graphics.

3.1. Participant

A total of 20 participants were recruited at the University of Leeds, UK. They were all adults (18+) with a mean age of 28 years. There are 10 NCS and 10 CS participants. The 10 NCS participants come from 5 countries: 60% Britain, 10% America (USA), 10% Malta, 10% Brazil and 10% the Netherlands. In other words, they all used a Latin-based or Latin influenced language as their mother tongues, which is an important parameter of their cultural backgrounds.

3.2. Materials and Procedure

Based on the survey of existing learning materials (Appendix), six general graphics variables in illustration, colour and typeface have been categorised in Table 1.

Table 1: Graphical variables in illustration, colour and typeface.

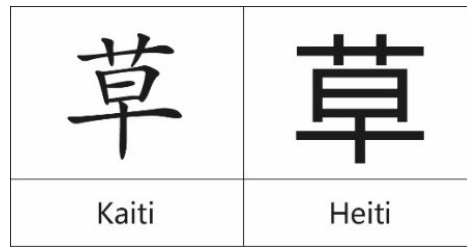| Illustration	
Q1 Size contrast	A. Small Chinese characters with big illustrations
	B. Big Chinese characters with small illustrations
Q2 Relationships between the illustration and Chinese Character.	A. The illustration follows the shape of the Chinese character and the character constitutes the illustration.
	B. The illustration follows the shape of the Chinese character and the character is entirely overlapped upon the illustration.
	C. The illustration follows the shape of the Chinese character and the character and illustration are shown respectively.
	D. The illustration **does not** follow the shape of the Chinese character and the character and illustration are shown respectively. The illustration tells the story behind the character.
Q3 Drawing styles	A. Simple vector
	B. Hand drawing
	C. Silhouette
Q4 Culture background	A. Traditional Chinese elements
	B. International modern elements
Colour	
Q1 Different colour methods	A. Colour-coding on Chinese characters
	B. Colour-coding on the background
	C. Black and white
	D. Original colour
Typeface	
Q1 Different typeface (Figure 1)	A. Heiti Typeface
	B. Kaiti Typeface

Figure 1. A similar example of colour options (Designer: researcher).

All the participants were shown images of Figure 2 in a random order. Figure 2 is a similar example of colour question options which was designed by the researcher due to the copyright issues. All the images shown to the participants are from the existing learning materials. The random order strategy is to avoid participants being influenced by being given the same order. They were shown images with a description of key differences, with A, B, C and D on the reverse (Figure 2). Participants were asked "Which one do you think makes it easier for you to learn Chinese characters. Please rank them from easy to difficult". Then, all the participants were asked "Which one do you think has more aesthetic appeal to you? Please rank them from the most aesthetic appeal to the least aesthetic appeal." This process was repeated for the 6 questions with 20 participants. Next, all participants (20) were asked to fill a Likert scale (5-point) to identify the importance of effectiveness and aesthetic appeal in terms of learning Chinese characters. Table 2 shows the Likert Scale questions.
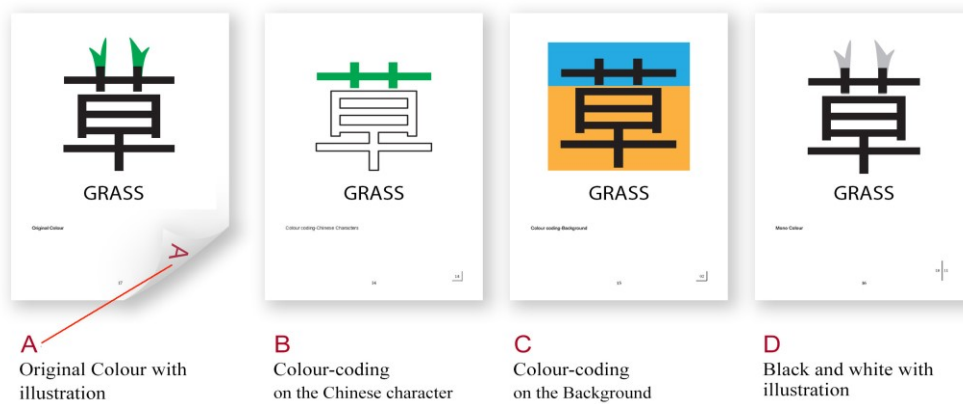

A
Original Colour with illustration

B
Colour-coding on the Chinese character

C
Colour-coding on the Background

D
Black and white with illustration

Figure 2. A similar example of colour options (Designer: researcher).

Table 2: Likert Scale questions

When I choose a language learning book, the **EFFECTIVENSS** of learning is the priority.						
Strongly disagree	1	2	3	4	5	Strongly agree
When I choose a language learning book, the **AESTHETIC APPEAL** is the priority.						
Strongly disagree	1	2	3	4	5	Strongly agree

4. Results and Discussion

Regarding the priority comparison between effectiveness and aesthetic appeal in terms of learning Chinese characters, the result of Likert scale questions shows that 90% of participants agreed with the effectiveness as the priority (75% strongly agree and 15% agree), 65% of participants agreed with aesthetics being the priority (5% strongly agree and 60% agree).This is in line with Frascara (2006) who demonstrated that the effectiveness is the priority and aesthetics is the second important factor for graphic design criteria.

For the Aesthetic Appeal, Figure 3 illustrates the percentages of participants who chose the option as the most aesthetically attractive one, data shown in green (left column) is NCS group and magenta (right column) is CS group. In the illustration question group, 100% of NSC group and 60% of CS group chose "big Chinese characters with small illustration", 90% of NSC group and 40% of CS group chose "The illustration follows the shape of the Chinese character and the character constitutes the illustration", 90% of NSC group and 50% of CS group chose "Simple vector", 100% of NSC group and 60% of CS group chose "International modern elements".

The data shows three trends:

- The opinions of NCS group have relatively consistent opinions, in other words, their preferences are very similar.
- The data of CS group distribution is relatively scattered, namely, they hold various opinions.
- The options which have been chosen as the most aesthetically attractive for both NCS and CS group are the same.

For the first two trends, this might be because the CS group are more familiar with Chinese culture, thus, they might have multiple perspectives of understanding the illustrations which lead to a relatively scattered data distribution. On the contrary, NCS group are less familiar with Chinese culture, thus they have a relatively "single" perception. The last findings and the first two are all consistent with Hekkert (2006) who states that human beings with different backgrounds have a universal aesthetic pleasure but they have differences between individuals.

For the colour and typeface questions, 60% of NCS and 50% of CS chose original colour (option D). The result is in line with Palmer, Schloss and Sammartino (2013) who states that colour preferences are universal across various cultures, though differences exist. There are 80% of NCS and CS that rank Kaiti Typeface (option B) as having more aesthetic appeal than Heiti Typeface, which might be because Kaiti Typeface resembles handwritten Chinese calligraphy, as stated by Dobres, Chahine, Reimer, Gould and Zhao (2016).
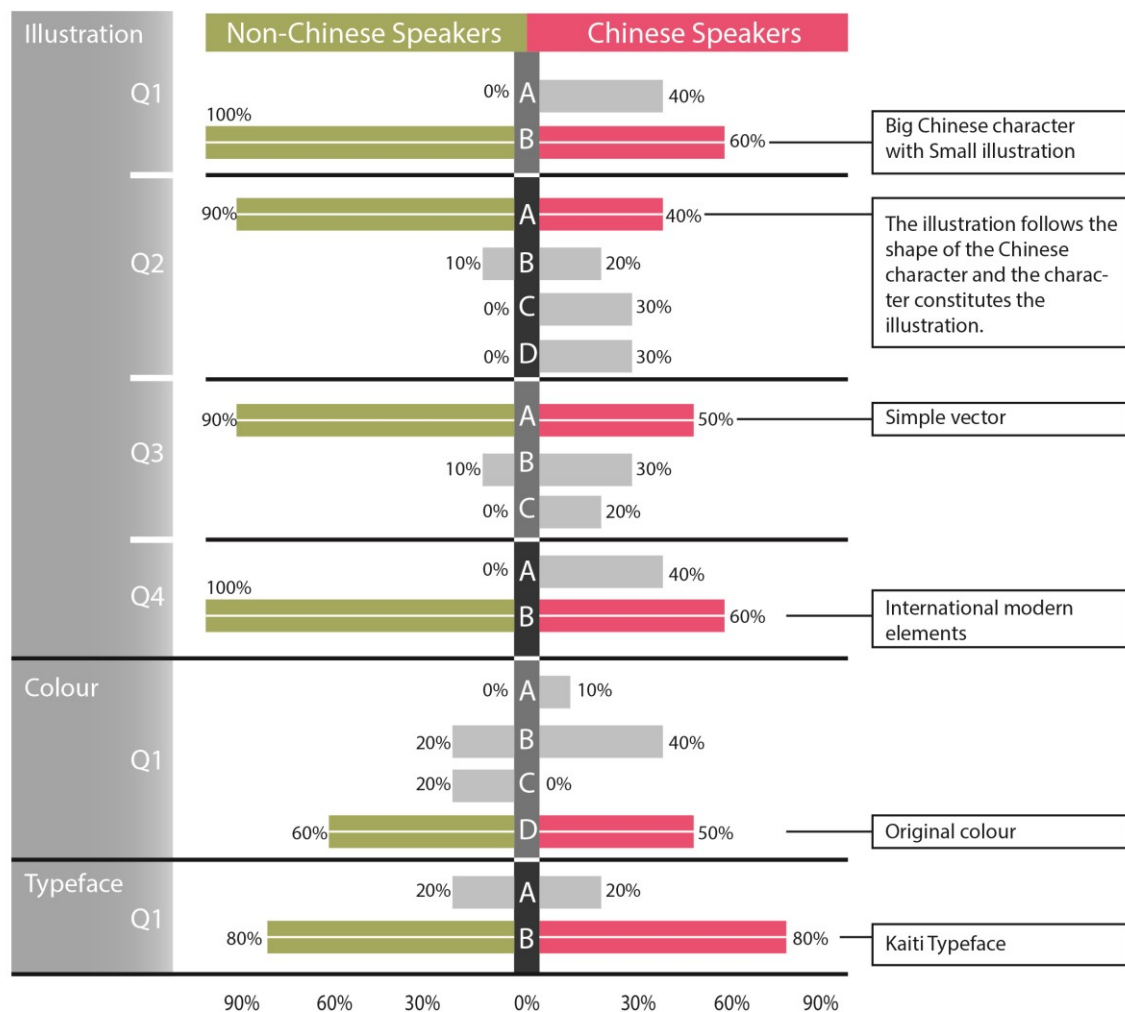
Aesthetic Appeal

Illustration	Non-Chinese Speakers		Chinese Speakers	
Q1	0%	A	40%	
	100%	B	60%	Big Chinese character with Small illustration
Q2	90%	A	40%	The illustration follows the shape of the Chinese character and the character constitutes the illustration.
	10%	B	20%	
	0%	C	30%	
	0%	D	30%	
Q3	90%	A	50%	Simple vector
	10%	B	30%	
	0%	C	20%	
Q4	0%	A	40%	
	100%	B	60%	International modern elements
Colour				
Q1	0%	A	10%	
	20%	B	40%	
	20%	C	0%	
	60%	D	50%	Original colour
Typeface				
Q1	20%	A	20%	
	80%	B	80%	Kaiti Typeface

90% 60% 30% 0% 30% 60% 90%

Figure 3. A clustered bar chart to compare opinions of NCS and CS groups in terms of aesthetic appeal

Effective Learning

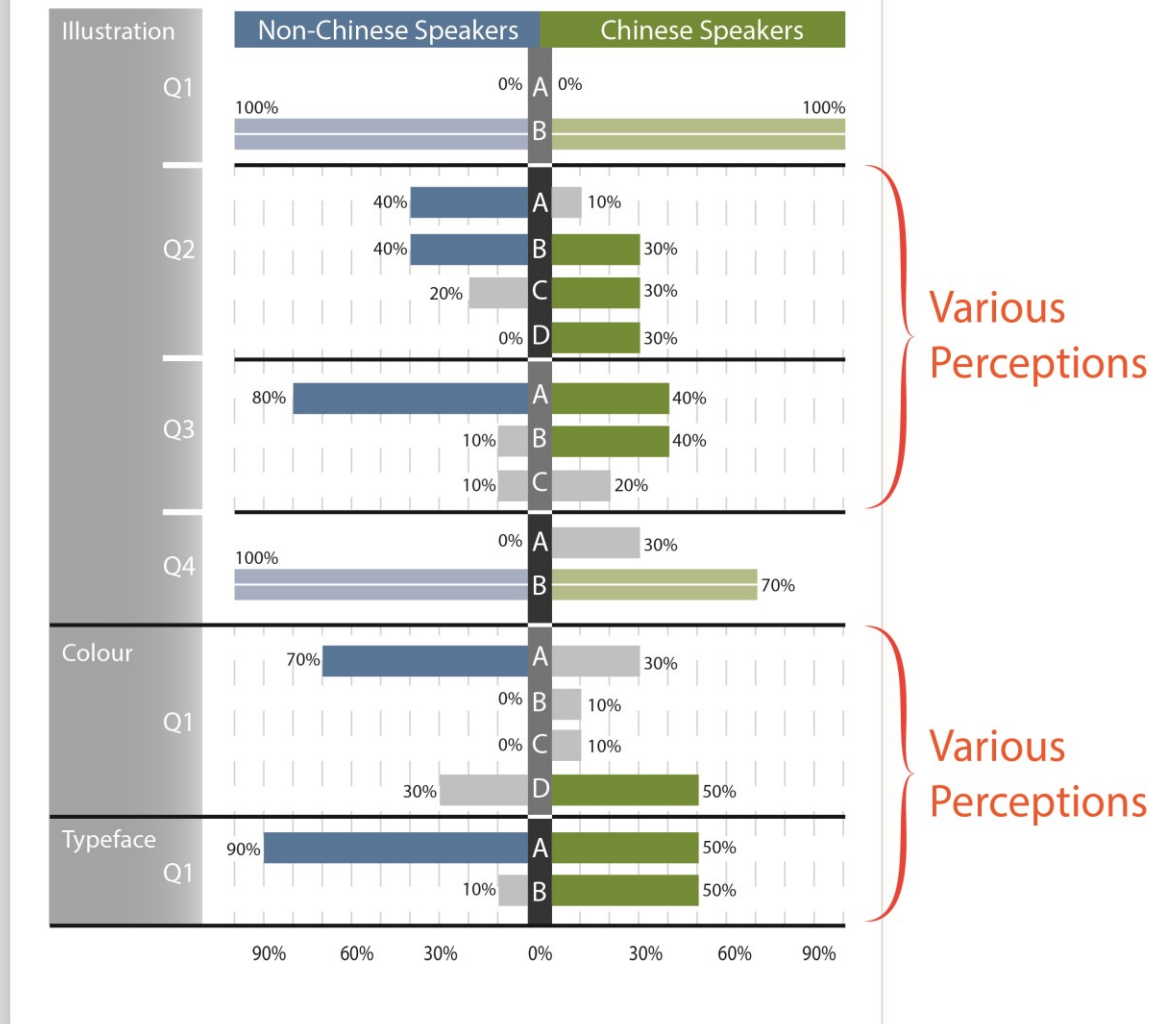| Illustration	Non-Chinese Speakers		Chinese Speakers	
Q1	0%	A	0%	
	100%	B	100%	
Q2	40%	A	10%	
	40%	B	30%	
	20%	C	30%	
	0%	D	30%	
Q3	80%	A	40%	
	10%	B	40%	
	10%	C	20%	
Q4	0%	A	30%	
	100%	B	70%	
Colour Q1	70%	A	30%	
	0%	B	10%	
	0%	C	10%	
	30%	D	50%	
Typeface Q1	90%	A	50%	
	10%	B	50%	

Various Perceptions

Various Perceptions

90% 60% 30% 0% 30% 60% 90%

Figure 4. A clustered bar chart to compare opinions of NCS and CS groups in terms of effective learning.

Figure 4 illustrates the results of Effective Learning between NCS group (left column) and CS group (right column). In illustration questions, participants have the same opinions for Q1 (size contrast) and Q4 (culture background). Almost all the participants hold the opinion that big characters with small illustrations (100% of NCS group) and international modern elements (100% of NCS group and 70% of CS group) could bring effective learning. Though some participants (30%) in CS group thought traditional Chinese elements are more close to their own culture understanding. Designers need to pay special attention to this point as not many beginners are familiar with Chinese culture, thus having too traditional Chinese elements might confuse learners. As McAnany (2009) and Grove (1989) suggest to use international graphic elements to cater for international audience.

The orange texts on the right side highlight the various perceptions between NCS and CS group. For illustration questions (Q2/Q3), colour and typeface questions, participants hold

different perceptions from two groups. Participants from two groups hold almost opposite views for option A and D for Q2 (illustration question). For option A, only 10% of CS group rank it as the most effective learning method compared to the other three options, 40% of NCS group made the same choice. This might be because CS group are too familiar with Chinese characters and feel that it's difficult to think of it as a part of an illustration, while NCS group can easily regard Chinese characters as a part of a picture. For option D, none of participants from NCS group thought it is effective, but 30% of CS group found it effective. It is probably because participants from CS group are more curious about the stories behind characters. For the colour question, 70% of NCS group and 30% of CS group chose option A (Colour-coding on Chinese characters), 30% of NCS group and 50% of CS group chose option D (Original colour).This confirms that colour-coding is an effective method to foster learning (Chandler et al., 1992; Keller et al., 2006; Smallman et al., 1993).

For option A, participants who chose it gave the reason that it helps to break down the whole Chinese character into parts and it helps to memorise the position. There were less participants in CS group who chose A, probably because they do not think the composition of Chinese characters is a difficult learning task as they grew up in a Chinese speaking environment. This requires attention by designers that the difficulties of beginners might differ from native speakers' imagination. For the typeface question, 90% of NCS group thought Heiti typeface is more effective than Kaiti typeface, which is in agreement with Zhang (2011) who suggests that Heiti typeface is clearer than Kaiti typeface.

Figure 5 shows the comparison of Aesthetic Appeal and Effective Learning of 20 participants. The interesting and crucial finding is Q1, Q2 and Q3 in the illustration questions, the chosen options are corresponding. Taking the significance of effectiveness and aesthetics into consideration, the best circumstance is the materials having both effectiveness and aesthetics. For other questions, participants have various perceptions in terms of aesthetic appeal and effective learning. For the incompatible options, some have obvious preferences, like 70% of participants thought Heiti typeface is more effective for learning rather than Kaiti typeface, while 80% thought Kaiti has more aesthetic appeal. Heiti typeface will be chosen into design due to the effectiveness of learning and the aesthetic pleasure will be abandoned. However, for colour methods, and relationships between Chinese characters and illustrations, participants have relatively average viewpoint, for example, 50% of participants chose A and 40% chose D for colour question in terms of effective learning, 5% chose A and 55% chose D in terms of aesthetic appeal. In this case, it is better to have an experiment study to compare the effectiveness of learning Chinese characters in further studies.
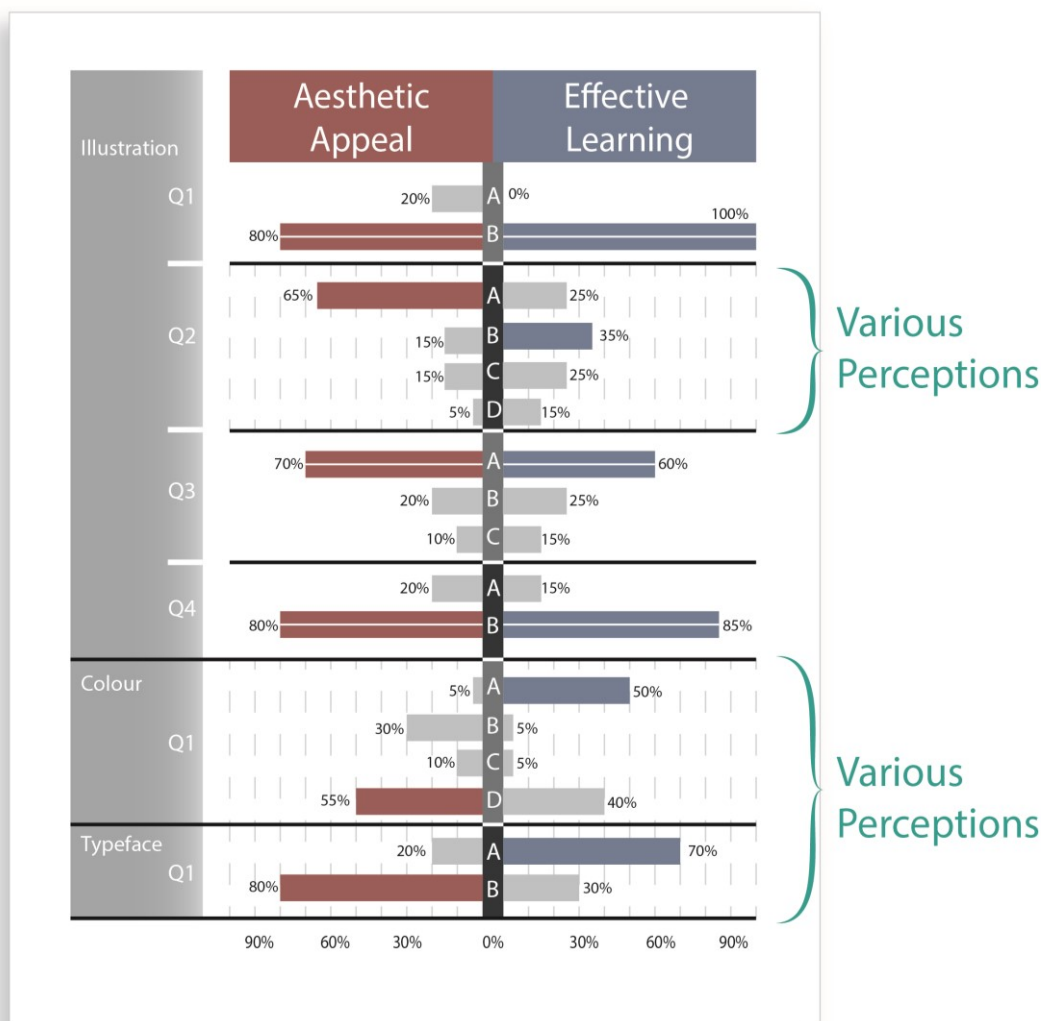
Figure 5. A clustered bar chart to compare opinions of aesthetic appeal and effective learning.

5. Conclusion

This study evaluated different graphical variables for graphics in learning Chinese characters, from aspects of aesthetic appeal and effective learning. Rank ordering as the main research methodology aids research to find the most aesthetic appeal variable and the most effective variable in illustration, colour and typeface. The acquisition of Chinese characters as a second language is a cross culture study, the design objects are Chinese culture related, while the targeted audience are international learners and are mostly not familiar with Chinese culture. Therefore to collect and compare opinions from NCS and CS is crucial to inform and increase graphics for learning Chinese characters as a second language, which is the main contribution of this study. Moreover, this study indicates the future research that colour-coding might be an effective learning method for the acquisition of Chinese characters, which is not widely used and in turn could be further researched.

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7. Appendix

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	XiaoXiang Hanzi. (2016) My very first book of Chinese Characters.
Websites	https://characterpop.com/
	https://ninchanese.com/chinese-character-components/
Apps	Zizzle Version 1.67.300
	ChineseSkill Version 6.1.7

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