

# Comparative Study on Visual Differences of Poster Designs Based on Design Psychology

Tian-yu Wu<sup>(✉)</sup> and Yan Liu

School of Design Art and Media, Nanjing University of Science and Technology,  
Nanjing, Jiangsu, People's Republic of China  
1031063471@qq.com

**Abstract. Objective.** This paper is to offer relevant theoretical basis and experimental method for future Chinese ink poster designs through the information on differentiation obtained from an in-depth analysis of the concept of design psychology combined with objective examination of the visual perception of Chinese ink poster designs of both professionals and nonprofessionals by means of eye movement experiments. **Method.** Methods of questionnaire and eye movement experiments were adopted to extract the differentiated information on the visual perceptions of Chinese ink posters of both design professionals and nonprofessionals with the aim of studying and understanding their visual focus and visual perception of poster designs and realizing the “customer-oriented” concept of Chinese ink poster designs. **Conclusion.** Through data gathering, assessment and analysis, conclusion has been reached that professionals are more concerned about the cultural connotation and aesthetic imagery while nonprofessionals focus more on the information transmission through the hieroglyphs in the posters. The paper argues that Chinese ink poster designs are based on certain psychological theories and tested and evaluated via scientific experiment.

**Keywords:** Eye tracker · Poster · Design · Visual · Psychology

## 1 Overview of Design Psychology

Design psychology is a science which studies the law of occurrence and development of psychological activities of designers in modern design acts based on general psychology with an aim to meet the basic requirements and application psychology of users [1]. As a borderline science at the crossroad of artistic design and psychology, design psychology is both a sub-branch of applied psychology and a major component of artistic design. As modern technologies are experiencing continuous development, the values of “people-oriented” and “design for the real world” are now the theme of modern social activities, which require that designers take the physical and psychological demands into full consideration in the creative process and incorporate them into the whole design practice.

It is undeniable that human visual activity is a complicated social activity, and a part of human psychological activity. As for the designers, the methodologies required to study the patterns of the psychological activities of user communities are no different

from the general psychology research methodologies. The reform and development of human psychology itself has provided a scientific theoretical foundation for the development of design psychology practices and applications [2]. However, human behavior and mindset belong to a distinct field. Therefore, a series of new questions and challenges will be raised when certain approaches of psychology study are applied to investigate the visual behavioral patterns of the audience. As a result, an in-depth analysis of design psychology research methods will not only contribute to the integrity of the specific design project operation but also enrich the experience of major psychology research methods. Conventional approaches adopted in design psychology research include observation, interviews, questionnaires, projection, experiments, the summative rating scale, the semantic differential scale, case study, etc. Among them questionnaires and experiments are generally combined with e-questionnaires and eye movement experiments to repeatedly test and evaluate the stage achievements of artistic design practices so as to achieve the exact purpose of “people-oriented” design.

## 2 Design Psychology and Poster Design

From the perspective of design psychology, human reception and recognition of information have two important stages: perception and consciousness. Perception is the most basic and simplest psychological phenomenon, since there is no consciousness or other psychological activities without perception. Visual sense accounts for 87 % of the all five senses, leaving 13 % to the rest four sense organs [3]. Undoubtedly, poster design is one of the most representative forms in graphic designs. Freehand poster design crosses various disciplines and even till now, Chinese traditional freehand posters still possess the distinctive feature of oriental charm and symbolization, which are not only the inheriting of traditional culture but also pay respect to the expression techniques of traditional art [4]. Unfortunately, at the time of economic globalization, large amounts of Chinese-style poster designs have overlooked the manipulation of design psychology concept, resulting in some specious and superficial works. For this reason, certain scientific theoretical principles should be followed and the core connotations of the poster art should be conveyed from the perspective of design psychology, customer consciousness and the aesthetic form of design, so that poster designs may bring their intended functions into play in public activities and art appreciation.

Among all the fine poster design works, those of Kan Tai-Keung’s are exemplary in graphic art. The success of his design lies more in the assimilation of traditional cultural elements and a profound understanding of the audiences’ visual perception with the assistance of psychological theoretical framework than in his personal artistic style of the “fusion of China and the west”. Hence this paper tries to offer the objective evaluation and repetitive tests of audiences’ visual differences toward the “Feelings of the Brush” poster series (Fig. 1) by conducting eye movement experiments with the aim of extracting some concise and proper points of design.



Fig. 1. Poster design series “Feelings of the Brush” by Kan Tai-Keung

### 3 Design Psychology Tests in Posters

This experiment adopted psychological research methods to test and evaluate the feasibility of designs. The object was poster design series “Feelings of the Brush” by Kan Tai-Keung. Eye trackers were used to analyze behavior reactions of the audience from different professional backgrounds after their visual cognitions of posters. Reliable information on users’ visual variation was obtained at a relatively low cost. This experiment involved college students with bachelor or above degrees in design majors and in non-design majors. 28 subjects were divided into two groups, each with 14. In addition, the experiment was conducted in a behavior analysis lab with noise-resistant and lucifugal conditions. Each subject entered the lab alone to avoid any distraction during the experiment [5]. The evaluation process had two stages: In the first stage, visual heat maps were generated according to the operational process of eye movement tests on selected subjects. In the second stage, subjects who went through the eye movement test should complete a questionnaire. Therefore, subjective information was collected to complement objective information from the eye movement test, and to enable data analysis and summary. The two research modules will be elaborated in the following text. Please refer to the overall flow chart, the flow chart for experimental evaluation (drawn by the author) (Fig. 2).

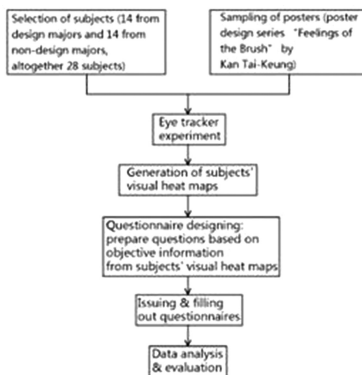
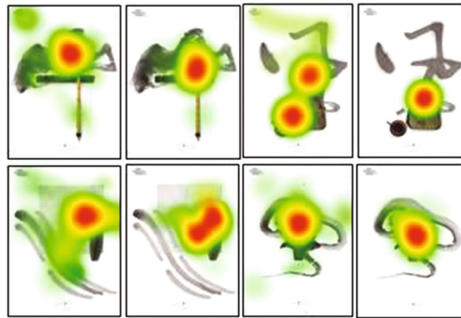


Fig. 2. The flow chart for experimental evaluation (drawn by the author)

### 3.1 Eye Movement Experiments

TobiiStudio eye tracker and its eye-tracking technique were applied in the eye movement experiment to record the movements of users' visual tracks when browsing the source materials (poster design series "Feelings of the Brush" by Kan Tai-Keung). Eye movements during the process were recorded to track their patterns and spatial positions that users took interest in, and their attention shifting process was also acquired in order to identify the visual focus of different groups [6]. Fixation duration, tracks, sequence, regression times as well as other eye movement data were used in the eye movement experiment analysis. The experimental results can even be demonstrated via intuitive graphs and videos, so human psychology and behavior were evaluated to achieve objective results of users' subconscious. The experiment therefore is an applicable evaluation approach to assess the final product of design practices (Fig. 3).



**Fig. 3.** Heat map of poster design eye movement experiment (left: design professionals; right: nonprofessionals).

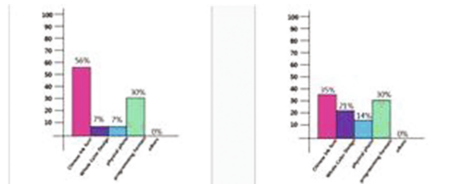
From the heat map, we can see the fixation duration and concentration of the subjects on certain areas. Red indicates fixation and green means a shorter duration. In the poster design series "Feelings of the Brush" by Kan Tai-Keung, Chinese elements are properly applied. Combined with a modern touch, a design concept of cultural continuity with innovation as well as application of both the ancient and modern have been realized. The poster designs are pervaded with aesthetic features of the unity of fiction and reality, along with form and spirit, fully displaying the oriental design style and artistic creation. By observing the eye movement experiment results of 27 subjects, a conclusion has been reached that differences exist between design professionals and nonprofessionals: the visual focuses of professionals are mainly centered on the visual focus of the posters while the nonprofessionals focus more on a certain area of the poster, especially the real item pictures on the poster.

### 3.2 Questionnaire Survey

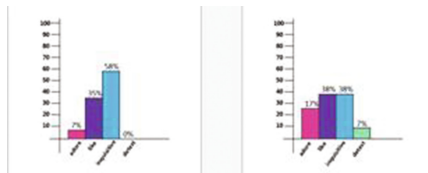
After the data gathering of eye movement experiments, subjects were asked to fill in the questionnaires to identify the sources of test data. Possible reactions to the various

design elements in the above-mentioned posters were looked into and collected, and 9 representative questions were devised with one linking another in a progressive manner. Questions were edited and questionnaires were typeset, with multiple choice questions with one or more answers, along with subjective questions. After the eye movement test, subjects were asked to write down their subjective feelings about the posters. Data have shown that 56 % of subjects from design majors would pay attention to the ink font, and 30 % of them would focus on the overall layout. It suggests that subjects with a design background often have visual aesthetic demands in terms of the overall layout and special techniques of expression, and obviously they prefer posters of this category (Tables 1 and 2).

**Table 1.** Bar chart of “poster focus selection” of design professionals & design nonprofessionals



**Table 2.** Bar chart of “reason focus selection” of design professionals & design nonprofessionals



### 3.3 Data Analysis and Result Discussion

In this experiment, posters with distinct features were selected. The spiritual connotation of their imagery and traditional aesthetic charm served as the inspiration for designers. Therefore the final manifestation of the posters is more abstract compared to the usual realistic ones. So experimentation and questionnaire methods of design psychology were adopted to provide the scientific assessment and evaluation of the poster series “Feelings of the Brush”. The experimental data indicate that the visual focuses on different subjects clearly differed from each other and so did the objective information reflected. Design professionals among the subjects instantly noticed the words in Chinese ink on the posters and then their focuses fluctuated between the words and the overall color, and then wandered in the center of the poster for some time before they took notice of the picture of real items. On the contrary, nonprofessionals immediately cast their sight to the most realistic pictures on the posters and finally paid

attention to the ink brushwork by the end of their observation. It is therefore clear that the series of visual elements in the posters have effects on audiences' visual perception to different degrees, including images and symbols, decorative color, font and size, typeset and layout, as well as techniques of expression. In addition, target users from a variety of educational and professional backgrounds also have different judgments and aesthetic preferences toward poster designs of typical styles.

## 4 Conclusion

As the most expressive creative form of graphic design, poster design has been exerting constant effects on modern designers for them to make continuous innovations and elevations. Its cultural charm and aesthetic consciousness have also inspired love for graphic art in modern people. Through the analysis and study of the posters "Feelings of the Brush" by Kan Tai-Keung, it is evident that designers should base their works on certain theoretical foundation of design psychology, grasp the aesthetic preferences of the audience with the assistance of psychology, avoid the self-centered design habit and convey the unique cultural connotations and imagery charm of the artistic posters. On top of that, to be closer to the visual perception experience of target customers, after completing stage design practices, test approaches to design psychology should be actively adopted to offer viable tests and objective evaluations on current designs. There is no doubt that eye movement studies are the most effective evaluating method of graphic art and provide more proofs to explain how different tasks affect cognitive processing in real time [7]. User groups of various backgrounds display obvious value discrepancy concerning the visual perception of posters, which indicates that designers should adhere to the "people-oriented" principle and create poster designs in line with users' aesthetic preferences, spiritual needs and visual perceptions in a scientific manner.

## References

1. Pieters, R., Wedel, M.: Attention capture and transfer in advertising: brand, pictorial, and text-size effects. *J. Mark.* **68**(2), 36–50 (2004)
2. Zhang, Z.-S., Shen, D.-L.: *General psychology*. Educational Science Publishing House, Bei Jing (2001)
3. Dai, R.-X.: Design psychology study method and application. *Art Des.* (11), 13 (2007)
4. He, P.-J., Chen, P.: Comparison and analysis of poster design between Kan Tai-Keung and Tanaka. *Packag. Eng.* **31**(10), 62 (2010)
5. Shi, B.-Y.: On Usability Design Evaluation of Product Packaging Based on Eye Movement Research. *Human University of Technology, Human* (2012)
6. Chang, F.-Y.: Usability evaluation of smart phone application graphic user interface based on eye-tracker. *Packag. Eng.* **36**(8), 55 (2015)
7. Pieters, R., Wedel, M.: Goal control of attention to advertising: the yabus implication. *J. Consum. Res.* **2**, 224–233 (2007)