

Research on Perception and Evaluation of Smoothness of Clothing Style Line Based on Cognitive Behavior

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Abstract—In order to systematically explore the influence of the smoothness of the clothing style line on perception evaluation, the behavioral experiments were used in this paper to evaluate preference perception, aesthetic perception and pleasure perception of 90 clothes with different smoothness silhouette lines, structural lines and decorative lines. The results show that the smoothness of the clothing style line has a significant impact on the preference perception, and the smoother the silhouette line, the structure line and the decoration line, the more popular the clothing is. The different smoothness levels of the style line have a significant impact on the aesthetic perception of clothing and the pleasure perception of clothing. The clothing with a smooth style line is more beautiful and more pleasant than the clothing with a completely non-smooth molding line. There are significant differences in the reaction time of preference perception, aesthetic perception and pleasure perception evaluation of smoothness of clothing silhouette line and decorative line. The difficulty of perception evaluation from low to high is pleasure perception, preference perception and aesthetic perception.

Keywords—Clothing style; clothing style line; style line smoothness; perception evaluation

I. INTRODUCTION

Smoothness is a term used to describe the appearance characteristics of an object, which refers to the subjective perception of the object's appearance formed by people's observation of themselves and their living environment over a long period of practical experience. Smooth objects are common in our lives, and objects with different smoothness give observers different impressions. For example, a sleek car gives you a sense of fashion, beauty and pleasure, while a square car gives you a sense of strength (Leder et al, 2005). The smooth appearance of the pastry gives a soft, sweet feeling, while the square appearance of the pastry gives a hard, sour feelings (Corradi et al, 2019). What kind of perceptual experience from the smoothness in clothing style is a subject worthy of exploration by research.

Style is an essential factor affecting clothing perception, and the smoothness of clothing style line is the most commonly used form of expression of clothing. The content of its change includes silhouette, structure and decoration (Huang, 2018). At present, most of the researches on

smoothness were focused on interior design and handicrafts (Vartanian et al, 2013; Jadva et al, 2010; Dazkir et al, 2012), while there were few studies on clothing as stimulus materials. In the past, the research on the perception of clothing shape and shape was mostly on the aesthetic perception and preference perception of symmetry and color (Zhong, 2019; Bertamini et al, 2016; Silvia et al, 2009), yet little research has been done to evaluate the smoothness perception of clothing style line.

Cognitive behavioral research technique was used in this research to explore the influence from the smoothness of clothing style line on evaluation of preference perception, aesthetic perception and pleasure perception. In the experiment, 3D virtual pictures of clothing were used as stimulus materials to improve the authenticity and reliability in this experiment.

II. EXPERIMENT

A. Participants

The subjects were 60 students from Soochow University, aged between 20 and 25. The participants were right-handed, with normal vision, volunteered to participate in the experiment and did not do similar experiments.

B. Stimulus materials

In this experiment, 30 women's clothes were selected as stimulus materials for smoothness changes. All the pictures are drawn by CLO standalone and other software. The pixels are all 768×768, and the colors are black and gray. Among them, the smoothness of the silhouette line (neckline and hem) of 10 clothes is changed, the smoothness of the structural line (dart and dividing line) of 10 clothes is changed, and the smoothness of the decorative line (pattern) of 10 clothes is changed. The silhouette line, structure line and decoration line are all changed in three grades of smoothness. These three grades are drawn according to the smooth angle function of the rounded tool in garment CAD, which are polygonal (0%), transitional (25%) and rounded (50%). The three smoothness grades of the silhouette line are named LY1, LY2 and LY3, as shown in Fig.1. The three smoothness grades of the structural line are named ST1, ST2 and ST3, as shown in Fig.2. The three smoothness levels of the decorative line are named ZY1, ZY2 and ZY3, as shown in Figure 3, a total of 90 pictures.



Fig.1 samples with different levels of smoothness of silhouette lines



Fig.2 samples with different levels of smoothness of structural lines



Fig.3 samples with different levels of smoothness of decorative lines

C. Experimental procedure

The experiment was carried out on a computer, and E-Prime2.0 software was used to write the experimental program. The experimental site was selected in a quiet laboratory. The whole experiment consisted of 270 stimuli (90 different clothes, 3 perceptual evaluations) for about 15 minutes.

In the experiment, there were three perceptual questions: preference, aesthetics and pleasure. After each perceptual

question was introduced, 90 different styles of clothing appeared randomly. The subjects scored 90 clothing pictures according to the requirements of the perceptual questions. In order to make subjects make more accurate judgments, two breaks were set in the middle of the program during programming, and subjects could control the rest time according to their own fatigue. Another 9 stimuli were used as pre-experiment practice experiments to enable subjects to master the procedure operation method and adapt to the rapid presentation of stimuli. Grades range from 1 to 5, as shown in Table 1. During the experiment, the stimulus was presented in the central position of the display, and the background was white. Each experiment first showed the description of the perceptual topic. After reading the description, pressed the space bar to start the experiment. First, the fixation point was 100ms, and then the white screen was 400ms. After that, a clothing picture was randomly presented for 700ms. The subject must respond to the stimulus picture according to the perceptual topic requirement, as shown in Figure 4.

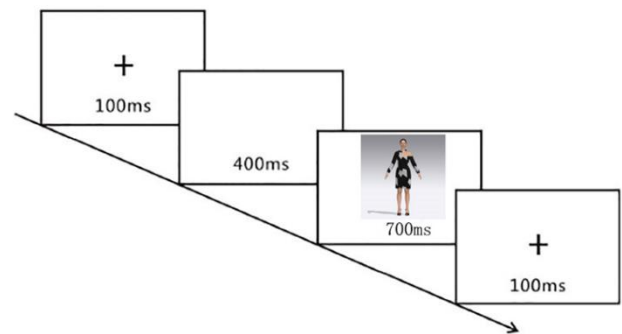


Fig.4 Presentation order of stimuli

Tab.1 Perception evaluation scoring criteria

Perceptual evaluation	like or dislike	Beautiful or not beautiful	Pleasant or unpleasant
Scores	1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5
Note	1 means very dislike 2 means dislike 3 means average 4 means like 5 means very like	1 means very not beautiful 2 means not beautiful 3 means average 4 means beautiful 5 means very beautiful	1 means very unpleasant 2 means unpleasant 3 means average 4 means pleasant 5 means very pleasant

III. RESULTS AND ANALYSIS

A. Clothing style line smoothness perception evaluation

Figure 5 is the evaluation result of the preference perception of the smoothness of the clothing style line. The higher the preference score, the better the clothing will be. From the figure, it can be seen that the smoother the contour

lines, structural lines, and decorative lines of clothing, the stronger the preference for clothing, while the less smooth the three types of style lines, the weaker the preference for clothing. The results of repeated measurement analysis of variance shows that the main effect of the smoothness of the style line is significant ($F=10.084$, $P=0.000<0.050$), indicating that the different smoothness levels of the style line

have a significant effect on the preference perception of clothing.

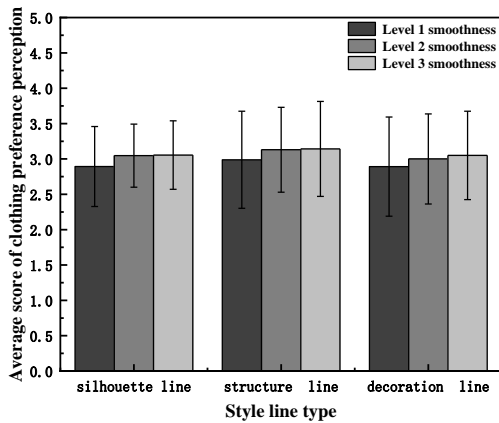


Fig.5 Average score of clothing preference perception evaluation

Figure 6 is the aesthetic perception evaluation result of the smoothness of the clothing style line. The higher the aesthetic score, the more aesthetic the clothing. It can be seen from the

figure that the aesthetic perception scores of the 2 and 3 grades of the smoothness of the style line are higher than those of the 1 grade, indicating that people generally believe that the smooth clothing of the style line is beautiful. The results of repeated measurement analysis of variance shows that the main effect of the smoothness of the style line is significant ($F=4.320$, $P=0.027<0.050$), indicating that the different smoothness levels of the style line have a significant effect on the aesthetic perception of clothing.

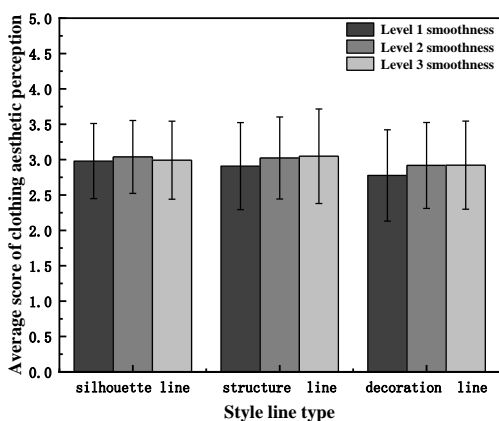


Fig.6 Average score of clothing aesthetic perception evaluation

Figure 7 shows the pleasure perception evaluation results of the smoothness of the clothing style line. The higher the pleasure score, the stronger the pleasure of the clothing. It can be seen from the figure that the pleasure perception scores of the 2 and 3 levels of the smoothness of the style line are higher than those of the 1 level, indicating that people generally believe that the smooth clothing of the style line is pleasant. The results of repeated measurement variance

analysis shows that the main effect of the smoothness of the molding line is significant ($F=10.843$, $P=0.000<0.050$), indicating that the different smoothness levels of the style line have a significant effect on the pleasure perception of clothing.

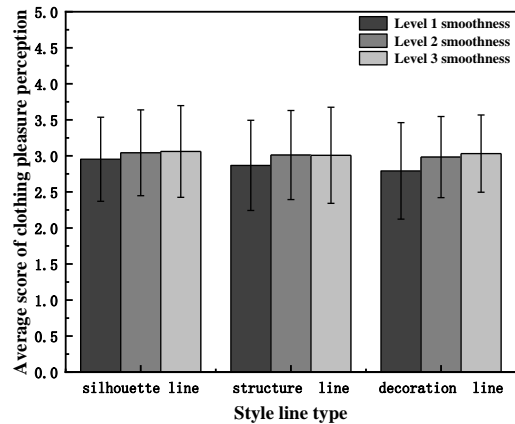


Fig.7 Average score of clothing pleasure perception evaluation

B. Clothing style line smoothness perception evaluation reaction time difference

Figure 8 is the result of the reaction time of the perception evaluation of the smoothness of the clothing style line. The reaction time of the three perception evaluations from short to long is pleasure perception evaluation, preference perception evaluation and aesthetic perception evaluation, indicating that aesthetic perception evaluation is a more complex psychological process that requires more time to think about the reaction and is more difficult. The reaction time of pleasure perception evaluation is similar to that of preference perception evaluation, and the judgment time is shorter than that of aesthetic perception evaluation, indicating that the subjects are more likely to make pleasure and preference choices. The results of one-way analysis of variance shows that there are significant differences in the reaction time of the three perception evaluations of the smoothness of the clothing silhouette line ($P=0.002<0.050$); There are significant differences in the reaction time of the three perceptual evaluations of the smoothness of the clothing decoration line ($P=0.015<0.050$); there are no significant difference in the reaction time of the three perceptual evaluations of the smoothness of the clothing structure line ($P=0.397>0.050$).

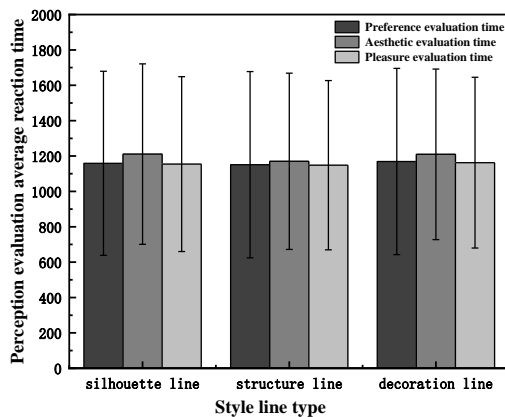


Fig.8 Clothing style line smoothness perception evaluation reaction time

IV. CONCLUSION

The behavioral experiments were used to evaluate the preference perception, aesthetic perception and pleasure perception of 90 clothes with different smoothness silhouette lines, structural lines and decorative lines. The conclusions are as follows:

In the evaluation of clothing preference perception, the different smoothness levels of the style line have a significant impact on the perception of clothing preference, and the smoother the clothing silhouette line, structure line and decoration line, the stronger the clothing preference. In the evaluation of clothing aesthetic perception, the different smoothness levels of the style line have a significant impact on the clothing aesthetic perception, and the clothing with a smooth style line is more aesthetic than the clothing with a completely non-smooth style line. In the evaluation of clothing pleasure perception, the different smoothness levels of the style line have a significant impact on the clothing pleasure perception, and the clothing with smooth style line is more pleasant than the clothing with completely non-smooth style line.

There are significant differences in the reaction time of clothing silhouette smoothness preference perception, aesthetic perception and pleasure perception evaluation. There are significant differences in the reaction time of clothing decoration line smoothness preference perception, aesthetic perception and pleasure perception evaluation. The difficulty of perception evaluation from low to high is pleasure perception, preference perception and aesthetic perception.

This study tested the impact of smoothness of clothing style line on perceptual evaluation and summarized the rules involved. Adding new research content to the field of clothing has certain value in both theory and application.

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