Difference Curvature of Product Shape Evoked Emotional Variation in Preferences

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Abstract: According to previous research indicated that people prefer the curved objects than the sharp-angled objects. However, if the variation of curvature of product shape is getting more curved, people' liking rating get higher? This study aim is to explore the relationship between curvature of product shape and subjective liking rating. Fifteen participants rated the curvature and appreciation of smart phone contour. The result indicated that according to the first impression of product image, greater curvature shapes were got higher proportion of like (forced-choice like or dislike immediately). However, the growth trend was not increasing. The growth trend had a turning point at a special curvature. Another step of study, the participants had to rate how much they liked the smart phone contour shown in the picture on a 7-point-Likert scale. The result indicated that while the curvature of product shape was greater curvature, participants' appreciation rating of products was greater but also had a turning point at a special curvature. In sum, no matter forced-choice like or dislike immediately or rating 7-point-Likert scale of liking, find curvature of contour provided the critical influence on liking preferences and reverse at a special curvature.

Keywords: Appreciation, Object Preference, Contour, Curvature

1. Introduction

Visual affective reception of liking object has been shown to be affected by factors such as symmetry, prototypicality, contrast, complexity, and perceptual fluency [1]. People always give immediately objects judgments, is almost based on the object's physical characteristics, by their first impression of the objects. Furthermore, product can "tell" consumers what it is and in certain cases also about the human being who owns it [2]. The case is similar to the reflection level [3]. Therefore, it is an important way through which designers communicate messages and elicit responses from consumers by utilizing the product shapes [4]. Product design utilizes a statement way, through shape, form, color and texture, etc. By visual characteristics of product, people can know how to use it (affordance) or evoke emotional response (e.g. sharp-angled elicit dangerous feeling) [2].

Research in the field of product experience demonstrates that compared with touch, vision is the dominant senses in object size and shape [5, 6]. Schifferstein and Desmet [7] suggested that vision receives the largest amount of information about a product and it does so most quickly. Most of the feelings that are elicited by a product are mediated by initial visual perception. Users can evaluate products in their entirety or individual elements of products. Vision is the most important sense in the product-buying experience [8]. On the other hand, vision provides the quickies and the largest information to help people make a decision. People preferences for visual objects are based on evolutionary-shaped processes, such as users' eye sweep product appearance [9] that

can enlighten and tell us where more or less danger is to be expected [10]. Angular forms not only can provide people such cues for danger [11] but also increase people's attention [12].

People's emotional response is affected by the object's shape no matter the shape angle or the angular contour. Furthermore, people prefer to appreciation the object with curved form or angle [13]. Hence, Bar and Neta [13] pointed preferences of curved designs based on an evolutionary-psychological approach. The preferences of curved designs come from instinctive response by which human can avoid threat or dangerous situations [13]. The researcher utilize neuroimaging to explore the amygdala response, that is involved in fear processing and has been shown to exhibit activation level that is proportional to arousal in general, is whether more active for an implicit perception of potential threat sharp elements. The result showed that the amygdala is significantly more active for everyday sharp objects [14]. The preferences of curved designs are also utilized on car interior design. The research suggests that consumers prefer curved designs to straight designs, and that curvature evoke consumers increased positive emotions [15]. However, the phenomenon doesn't apply to every kinds of product. It is suitable to everyday life objects that have no specifically inherent meaning (e.g., a watch or a sofa). On the other hand, a knife doesn't apply to use because it is inherent negative valence and reminiscent of danger. The effect of negative reminiscence may be larger than preferences of curved.

In accept of Kansei Engineering, researchers are especially regard to explore the relationship between the variations of product shape and people emotional perception evoked by the variations. Previous studies have shown that people prefer objects with curved contours over objects with sharp contours. Those studies procedure were alternative stimuli curved objects or angular objects and calculated the percentage of liking. However, they didn't regard to the stimuli that are the same object but difference between its curvatures of contour. Does people liking rating of product increase follow the curvature of product contour? Therefore, this study's aim is the explore whether people liking rating of product increase will follow the stimuli that are the same object but difference between its curvatures of contour.

2. Method

2.1 Stimuli

The stimuli are consisted of 10 levels of curvatures of smartphone contours. The curvatures of stimuli are divided into 0, 1.5, 3.5, 5.5, 7.5, 9.5, 11.5, 13.5, 15.5 and 17.5 mm. For instance, R1.5 is representative the corner curve in 1.5 mm. The main shape is the same differing only in the corner curvatures, illustrated at Figure 1. All pictures were original proportion presented on a 13.3in monitor in the experiment room at a distance of 50 cm from each participant.

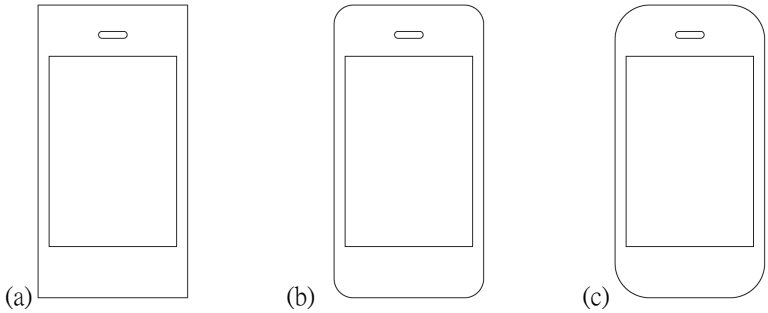

Figure 1. The difference curvature of stimuli. (a) 0mm, (b) 7.5mm, (c) 13.5mm

2.2 Participants

Fifteen students (seven female) were recruited as volunteers from a university industrial design department. Their age ranged from 23 to 34 years with a mean age of 26.6 years (SD = 3.22 years). The nature of the procedures was explained to, and informed consent was obtained from, each participant prior to data collection. The participants had not smoked cigarettes or drunk caffeinated beverages for two hours before the testing session. Additionally, none of them reported any injuries, diseases, or previous eye surgery. All reported normal or corrected-to-normal vision.

2.3 Procedure

This study has two steps to explore the issue. First, each picture was presented for 1000 ms, and subjects were required to make a like/dislike forced-choice decision about each picture based on their immediate by intuition. For each condition, percentage liking was calculated as the proportion of ‘‘like’’ responses out of the total number of responses. Secondly, for every image, four ratings were asked. First the participants had to rate how much they liked the smartphone in the picture on a 7-point-Likert scale (from ‘1’: ‘‘very weak”, up to ‘7’: ‘‘very strong”). As soon as they had made their decision, the scale, shown at the bottom of the screen, was removed, and the next scale was shown. To alert the participant that a new scale had to be rated, the subsequent scale was always shown in difference color. The ratings assessed included liking, curvilineal, technological and comfortable. The order of the stimuli was fully randomized. The whole procedure lasted approximately 10 min.

3. Result

The Step 1 result indicated that participants’ percentage liking by intuition were positive relationship with the curvature regales, excluding the curvature larger than 9.5 mm, as illustrated at Figure 2.

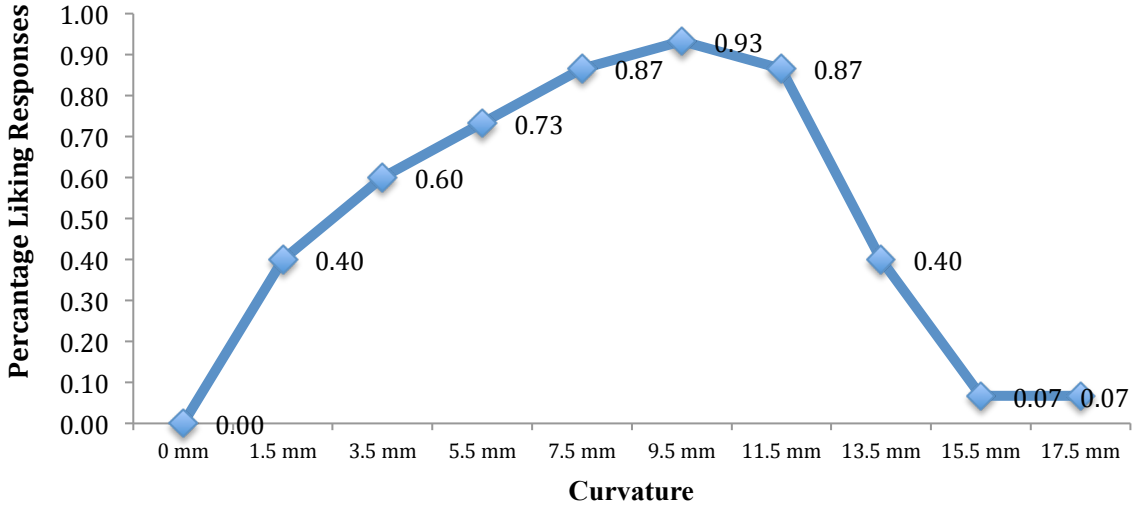

Figure 2. Percentage of like responses (Step 1) for different curvature

The Step 2 result showed that the overall curvature followed an inverted u-shaped trend with minimum curvature ratings for the first 0 mm) and last lustrum (17.5 mm) and with a maximum around the 9.5 mm, as illustrated at Figure 3.

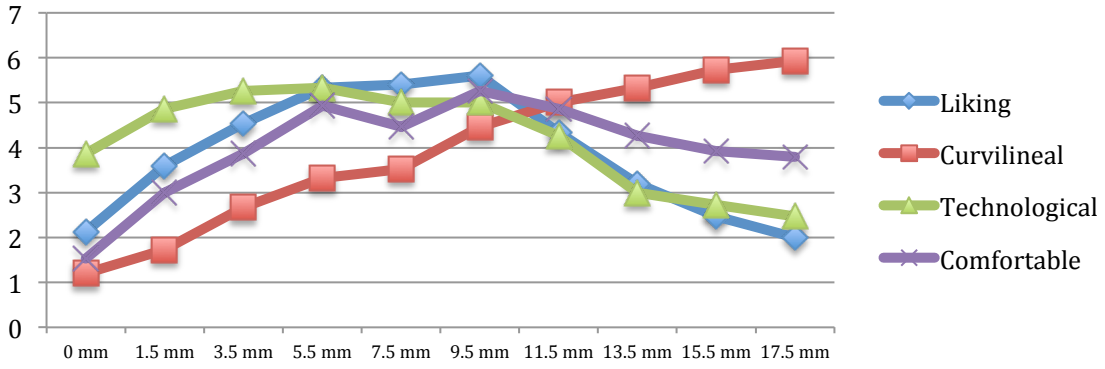

Figure 4. Subjects rating the stimuli with different adjective

Furthermore, other adjective ratings had the same trend with liking rating as illustrated at Figure 3. The correlation between curvature and liking ratings was very high, $R^2 = .969$, $F(3, 6) = 61.92$, $p < .001$ (Figure 4, where $y = 0.003x^3 + 0.119x^2 + 1.195x + 1.959$).

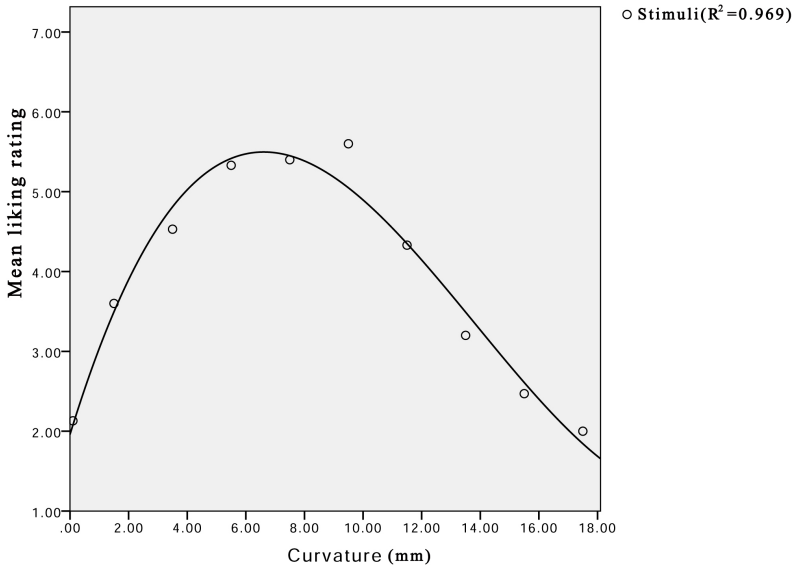

Figure 4. Mean ratings (Step 2) for curvature evaluations for each contour with three-degree polynomials.

4. Conclusions

Bar and Neta [13] indicted that the participants generally prefer curved visual objects. However, those studies used stimuli that were mainly with curved contours and sharp contours. They didn't explore whether stimuli are with curved contours; therefore participants may prefer more curved objects. Hence, this study investigated the relationship between curvature and liking rating. We find that liking scales followed the curvature of shape in certain case (lower 9.5 mm). But the trend does not continue growing. When the curvature of smartphone contour becomes too curved, people will reduce the liking of the smartphone. It is an interesting phenomenon for product design. It has two possible reasons to make this result. First, it may be due to people familiar with iPhone image that curvature is 7.5 mm. Therefore participants prefer to choose the most familiar one. Familiarity with a object is another source of influence on liking preferences [16]. Secondly, it may be possible that each kinds of product

have the most suitable curvature contour. These possibilities are worthy to explore in the future. The future studies can regard to the curvature of different size products (e.g., 4", 5", 6" smartphone and Tablet PC).

5. References

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