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Unity enhances product aesthetics and emotion

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ABSTRACT

Although the aesthetic properties of a product are likely associated with users' emotional responses, empirical evidence does not explain how the aesthetic properties of a product evoke an emotional response. This study presents the hypothesis that users' emotions are evoked when they observe an aesthetically pleasing product with unity. The results implied that a product form with more unity had a greater likelihood of affecting users' positive emotions compared with those with less unity, and that the unity aesthetic may act as a mediator in evoking emotion. In addition, the results confirmed that products composed of curvier elements tended to evoke a stronger pleasure response compared with those defined by straight lines. A systematic approach, namely the decision tree method, acts as a unity design guideline for the enhancement of product aesthetics, which may evoke users' pleasure responses further.

Relevance to industry: Our findings imply that a product form with more unity had a greater likelihood of affecting users' positive emotions compared with those with less unity. In addition, a systematic approach, namely the decision tree method, acts as a unity design guideline for the enhancement of product aesthetics, which may apply for designing products with pleasures.

1. Introduction

Unity, an aesthetic principle, is frequently adopted for enhancing a product's aesthetic features, and aesthetics may play a critical role in consumers' purchase decisions (Hirschman and Holbrook, 1982; McDonagh et al., 2002; Bloch et al., 2003; Blijlevens et al., 2009; Hoyer and Stokburger-Sauer, 2012). Moreover, the perception of a pleasingly designed product can provide users with sensory pleasure in terms of positive emotions (Hekkert, 2006; Chang and Wu, 2007; Kumar and Garg, 2010). For instance, a harmony chair may convey the aesthetic taste of its users (Dhar and Wertenbroch, 2000; Postrel, 2003; Hoyer and Stokburger-Sauer, 2012), and make users feel good and experience pleasure during use (Helander, 2003). Therefore, utilizing the unity principle when creating a product with an aesthetic quality is an essential design topic.

By manipulating design elements (e.g. lines, surfaces and colours) and aesthetic principles (e.g. unity, contrast, balance and proportion), designers can create a product which can stimulate potential users' visual aesthetic sensations (Lauer, 1979; Coates, 2003). To do so, designers must be familiar with the characteristics of design elements (e.g. the line element) and aesthetic principles (e.g. unity), and how these elements affect aesthetic quality. Despite this apparent relevance to product design features, the unity principle has been addressed to a lesser degree in affective design studies, specifically regarding aesthetics with respect to the role of unity in influencing emotional responses.

Unity is defined as 'congruity among the elements of a design which gives each element the appearance of belonging together; that is to say, there appears to be some visual connection beyond mere chance that has caused these elements to come together' (Veryzer et al., 1998). Chairs were used as stimuli in our experiment because of the clear composition of each component, and their properties were assessed in an objective manner (Coates, 2003). This study examined the relationship among unity, aesthetics and users' emotional responses. We present a hypothesis, namely that user emotions are evoked naturally when users observe an aesthetic product manufactured with a congruent unity attribute.

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2. Literature review

2.1. Aesthetics and consumers' pleasure responses

Aesthetics, derived from the Greek word *aisthetikos*, indicates an aesthetic or something sensitive or sentient (i.e. 'I perceive, feel and sense') (Chignell and Costelloe, 2011). The Oxford English Dictionary defines aesthetics as 'a set of principles concerned with the nature and appreciation of beauty.' Aesthetic principles which broadly include repetition, gradation, symmetry, harmony, balance, contrast, proportion, rhythm, dynamics, unity and simplicity are frequently used in product design (Graves, 1941; Kim, 2006). By manipulating product elements to assume a unified order, the aesthetic qualities of a product can be enhanced, thereby attracting users' attention (Norman, 2004). For instance, Bell et al. (1991) utilised colour photographs of living room furniture to test the unity of styles, and found that the aesthetic response was correlated with the perceived unity of a style. Lennon (1990) reported that a model with matching clothes and accessories appeared more competent and desirable compared with a model with non-matching garments and accessories. Prior studies have shown that consumers respond more positively to products exhibiting a high degree of unity compared with those exhibiting a low degree of unity. Therefore, the study of unity is a critical issue in designing a product for aesthetic pleasure.

Consumers' emotions may be also affected by line-style elements (Coates, 2003) which visually comprise a product with an aesthetic quality. Bar and Neta (2006) indicated that people prefer objects defined by curved lines over those with sharp angles. A chair composed of curved lines appears to be more likely to please users compared with one composed of straight or slanted lines. For example, the Pingo chair designed by Hans Jakobsen in 2000 was devised specifically with curved elements in accordance with the shape of the back, seat, and legs, resulting in an elegant and aesthetically pleasing object. On the basis of the prior research, we assume that chair aesthetics is associated with the assembly of component attributes and line-type elements.

A chair's back, seat, and legs have a clear relationship. Thus, the basic components (i.e. seat, back and legs) have frequently been used as stimuli in experiments (Jindo et al., 1995; Park and Han, 2004). The line attributes of each component were often classified by previous researcher as square, round, and slanted for the back; the same elements were applied to the seat; and straight, curved, and slanted lines were designated for the legs. In this study, we argue that the unity of a chair may influence its aesthetic quality, which in turn affects users' emotions (Fig. 1). In other words, a higher degree of unity is equal to a higher aesthetic, and in turn evokes a stronger emotional response in the user mainly (M1 & M2). Furthermore, we examined the causal relationships between the aesthetic and its pleasure reactions (M2), and also to test whether unity had a direct effect on pleasure (M3).

2.2. Gestalt laws and unity

In perceiving a product's appearance, our sensory systems detect order in chaos or unity in variety (Hekkert, 2006) when examining a group of elements. People have a tendency to view objects such as a chair's structural arrangement as close together or feeling as if belonging together, according to Gestalt laws. Gestalt laws are summarised as 'the whole is more than the sum of its parts' (Köhler, 1920, pp.17). However, previous studies on Gestalt laws have focused on graphical patterns in dynamic graph drawings (Nesbitt and Friedrich, 2002), instructional screen design (Smith-Gratto and Fisher, 1999) and even the haptic and visual grouping of elements (Chang et al., 2007). Specifically, for the present study, we used Gestalt laws to explain chair shapes in terms of a chair's unity (i.e. line attribute arrangement). The principles of proximity, similarity, and continuation were adopted to explain how it is possible to perceive a chair's unity through its compositional arrangement. The proximity principle is defined as elements that are located closest to each other tending to form a group (Wertheimer, 1923). In Fig. 2, Lines 1 and 2 are close together and are viewed as a single group, whereas Lines 3 and 4 are regarded as separate. In this case, viewers may attempt to perceive both the chair's back and seat as one proximity piece (e.g. , , and) because of the closed array between the two components. According to the similarity principle, similar elements tend to form groups; users regard similar elements (e.g. having the same characteristics) as belonging together, and perceive them to be as such on the basis of the attributes (e.g. line, shape, colour, texture, value, volume, and orientation) (Wertheimer, 1923; Chang et al., 2007). For instance, two groups of heavy black lines and two groups of light lines are arranged in straight lines (Fig. 3). Heavy lines are grouped as one, whereas light lines are grouped separately. Moreover, a chair composed of three types of lines (e.g. , , and) may appear to be completely inconsistent, thus exhibiting no unity at all. Continuation concerns the eye seeking relationships between shapes. This occurs when the eye follows a line, a curve, or a sequence of shapes, even when it crosses over negative and positive shapes (Graham, 2008). As shown in Fig. 4, the human eye tends to perceive the '' as a completed 'S'. On a verticle plane, the back and legs of a chair (e.g. , , and) may convey a continuous shape which tends to appear to have a greater degree of unity to the senses. In this study, the chair arrangement of each component (i.e. back, seat, and legs) was controlled and arrayed into every possible combination which could be associated with Gestalt laws. Participants may thus perceive the chair shape by subconsciously applying Gestalt laws.

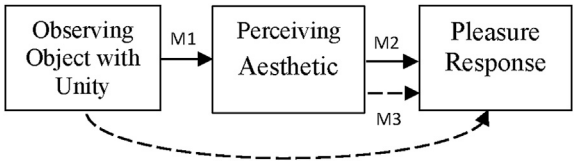

Fig. 1. Conceptual research framework.

3. Methods

3.1. Visual stimuli

The chair was adopted as a stimulus in this experiment because of its widespread use and special structure array, indicating a clear composition on each component. To control the experiment, we used the chair archetype composed of three distinct components: the back, seat, and four legs. Chair arms were omitted because of research limitations concerning experimental complexity. Stimuli, including square, round, and slanted shapes, were employed as representative elements, resulting in 27 stimulus combinations (Fig. 5). Component shape was used as a factor to facilitate unity variation. The following section details how we varied and combined the components to reflect unity as a variable.

Fig. 2. Illustrated proximity.