

# Empirical Research Methods for Evaluating Affective Satisfaction of Consumer Products

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## 1. INTRODUCTION

Design features of consumer products are now regarded to be just as important as functionalities (Han, Yun, Kim, & Kwahk, 2000). Competitive consumer products commonly have similar functionalities. Design features such as ‘color of buttons’ or ‘size of a display’ of consumer products often become the most critical factors that influence users’ purchase decisions. Design features seem to influence users’ affective satisfaction as well as usability of products.

The concept of affective satisfaction can help product designers to determine features that satisfy users’ affect (Jordan, 1998). Affective satisfaction can be defined as users’ subjective feelings perceived while experiencing products (Han, Yun, Kwahk, & Hong, 2001; Hong, Han, & Kim, 2008). Many studies on affective satisfaction have been conducted to develop or improve relationship models between subjective feelings and design features (Artacho-Ramírez, Diego-Mas, & Alcaide-Marzal, 2008; Han et al., 2000; Hsiao, Chiu, & Chen, 2008; Huang, Tsai, & Huang, 2011; Kim & Han, 2008; Kwahk & Han, 2002; Nagamachi, 2002). Product designers can get feedback about how their design features affect user satisfaction by interpreting the relationship models.

For building the relationship models between affective satisfaction and design features of consumer products, constituents of measurable design features should be defined. Han et al. (2000)

defined the design features as human interface elements (HIEs). HIEs are design features of consumer products that influence affective satisfaction. For example, ‘color of buttons’ or ‘size of a display’ can be regarded as design features.

Affective satisfaction should also be taken apart to some dimensions that can be measured. Han et al. (2001) introduced image and impression dimensions for consumer electronic products, for example, audio/visual products. The dimensions are classified into basic sense, description of image and evaluative feeling. Hong (2005) defined six dimensions for mobile phones including simplicity, delicacy, luxuriousness, color, attractiveness and overall satisfaction.

## 2. OVERVIEW

Pioneering scholars in this area include Dr. Han (Han et al., 2000) at Pohang University of Science and Technology (POSTECH) and Dr. Nagamachi (Nagamachi, 2002) at Hiroshima University. Since the concept of affective satisfaction was proposed and reported, a variety of studies have been conducted to assess affective satisfaction of mobile phones. Dr. Han identified design features of a mobile phone critical to affective satisfaction (Han, Kim, Yun, Hong, & Kim, 2004).

The relationship models between affective satisfaction and design features, so-called HIEs, have been refined and diversified, while a vari-

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ety of consumer products have been targeted in many affective satisfaction studies. Dr. Hong at POSTECH proposed a multiple response surface (MRS) approach to modeling affective satisfaction (Hong et al., 2008).

Apart from practical approaches, affect per se has been studied mainly in the field of psychology. Since Dr. William James at Harvard University had argued that emotion of human might arise by a certain physical event (James, 1884), many assumptions and proofs on emotion and affect have been disputed for decades. Recently Dr. Russell at Boston College defined core affect as a neurophysiological state that is consciously accessible as a simple and nonreflective feeling (Russell, 2003).

### **3. CURRENT SCIENTIFIC KNOWLEDGE IN AFFECTIVE SATISFACTION**

Current research efforts on affective satisfaction seem to be focused on three areas: measurement, modeling and cognitive process. Several leading researchers such as Dr. Han (Han et al., 2000) at POSTECH, Dr. Hong (Hong, 2005) at POSTECH and Dr. Russell (Russell, 2003) at Boston College represent areas of measurement, modeling and cognitive process, respectively.

#### **Measurement of Affective Satisfaction**

A taxonomic structure can make the affective satisfaction concept understandable and measurable, although affective satisfaction is an abstract construct. A few studies have investigated such dimensions of affective satisfaction in early days. As pioneering researchers, Han et al. (2001) introduced totally 25 image and impression dimensions for consumer products. These dimensions are classified into basic sense, description of image and evaluative feeling (See Table 1). Note that the cognitive process of image and impression is the same as that of affective satisfaction.

Dozens of dimensions do not seem to be practically applicable, because they are too numerous to evaluate one by one. Hong (2005) refined them and introduced six dimensions dedicated for mobile phones including simplicity, delicacy, luxuriousness, color, attractiveness and overall satisfaction. Afterward, J. Park, Han, Kim, Cho, and W. Park (2013) redefined seven dimensions for mobile phones with texture dimension added, considering the change of receptivity on mobile phones (See Table 2).

Affective satisfaction dimensions toward consumer products can be directly measured using the magnitude estimation technique. The modified magnitude estimation with a 0-100 scale is popularly used to evaluate affective satisfaction dimensions. A 5 point scale or 7 point scale, so-called a Likert scale, is less efficient in terms of modeling the relationships and conducting statistical analyses. Moreover, a 0-100 scale is psychometrically stronger than a 5 or 7 point scale (Pajares, Hartley, & Valiante, 2001).

Since users' affective satisfaction can be influenced by target products, design features of products are needed to be defined for further investigation. However, design features may vary over target products. Some researchers identified design features of a mobile phone, one of important consumer products in our everyday life (Han et al., 2004; Seva, Duh, & Helander, 2007). In this process, Han et al. (2004) used component-property matrix to identify HIEs systematically. For example, components of a mobile phone include button, display panel and body, while their properties consist of shape, size, color, lighting, number and material. Then, combination of components and properties can be used to develop HIEs such as shape of mainly used button and body material.

HIEs, as design features of consumer products, should also be measurable. Three different types of scales are used to measure HIEs; rating type (selecting a proper value of a feature by using a rating scale provided), measurement type (measuring quantitatively the physical dimension of a feature) and category type (selecting a proper category for a feature). For example, 'Emphasis

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