

The Effect of Object Form and Tactile Enticement Material on the Motivation of Haptic

Chih-Long Lin

Department of Crafts and Design,
National Taiwan University of Arts
59, Section 1, Dagan Rd., Banqiao Dist.,
New Taipei City 22058, Taiwan, R.O.C.
Email: CL.Lin@ntua.edu.tw

Abstract

The main purpose of this research is to investigate the effect of object form (spheroid, cube, and tetrahedron) and tactile enticement material (wood, wool, flannel, acrylic, mirror, aluminum sheet) on motivation of touch, preference and visual sense. The tactile enticement means an object which is arousing the willingness of touch. A total of 30 subjects were recruited in the study. The dependent variables including the willingness of touch, preference and 13 senses were measured by questionnaire interview. The study results showed that the object form affect significantly willingness of touch ($p < 0.001$), preference ($p < 0.01$) and four sensory descriptions ($p < 0.05$). All measures were affected significantly by tactile enticement material effect ($p < 0.05$) except "I want to play it". The results of regression equations showed that the willingness of touch was mainly affected by subjective preference, rating of "I want to play it", and rating of "I want to feel the object's tactile impression". The findings of this study can give an insight into the motivation of touch, and further provide some guidelines and recommendations about the product design and selling method to increase the competitive advantage of product.

Keywords: motivation of touch, need for touch, sense of vision, preference.

1. Introduction

In spite of the “Do No Touch” notices or warning signs commonly seen in front of artworks, luxury goods or dangerous devices at various occasions such as art galleries, boutique stores and public facilities, we can still frequently observe many rebellious souls touching the items against the advice. What are the reasons behind the desire to touch or the motives so strong that people are tempted to ignore the warning signs and reach out their hands? Peck and Childers (2003b) suggested that from the perspectives of the consumers, touching a product allows them to assess it with more confidence and thus increase purchase intention and determination. Therefore, the potential compensations for the loss of tactile experiences of products have become a dominant area of study in the fields of design and marketing in recent years. This study will discuss researches related to the influences of product features and personal characteristics on the motivation to touch.

The behavior of touching a product by the consumers prior to purchasing depends on the different types of products. Peck and Childers (2005) conducted a survey in which the hand gestures and verbal descriptions of the subjects were filmed as they assessed a number of products. The results suggested a high degree of correlation between their verbal expressions and hand gestures. Furthermore, the durations of touch were the longest for products requiring assessments on the material properties (such as sweaters); followed by products with less needs for assessments such as mobile phones or calculators; and the products with the shortest durations of touch were those with the lowest needs for assessment such as food and toothbrushes.

McCabe and Nowlis (2003) further investigated the influences of product material properties and the methods of assessment (visual and tactile, visual and no tactile, or visual only) on the purchasing desires. The results indicated that for product assessments requiring tactile senses such as towels and rugs, the subjects displayed higher purchasing desires with tactile assessments compared to the lack of tactile assessments. However, for products with similar material properties such as audio or video cassette tapes, the availabilities of tactile assessments did not affect the purchasing desires because visual assessment was the primary factor affecting purchasing decisions for this type of products as explained by the authors. An interesting finding was that the influence of touch on the purchasing desires reduced once supplementary information on the characteristics of product materials were provided to the subjects. The research of Peck and Childers (2003b) also indicated the lack of tactile assessment could be compensated with text descriptions.

In addition to the investigation on the potential compensations for the needs to touch, the research of Peck and Childers (2003b) also examined the influences of material properties and

individual differences on product preferences. The study indicated that different reactions were created in response to different material properties, for example the plasticity of a material generated more delightful sensations for the subjects compared to its weight. Furthermore, Peck and Childers believed the presence of individual differences in the preferences for tactile senses, and developed a Need for Touch Questionnaire from a validation process involving seven experiments. The Need for Touch (NFT) is defined as the inclination to collect the required information through touch, which can be further classified as Instrumental Dimension and Autotelic Dimension. Instrumental Dimension is the behavior of touch driven by the desire to collect the information required for a specific purchasing task, in other words, it is the action of objective-oriented searching by the consumers to find the required information for a purchase until the final decision has been resolved. In contrast, Autotelic Dimension is the behavior of touch driven by the desire to enjoy or an impulse or irresistible temptation to explore, which can be interpreted simply as a consumer behavior based on the needs for fun, sensory stimulation or joy rather than for purchasing a product (Peck and Childers 2003a).

Tactile stimulation may enhance the positive assessments of products by consumers in many contexts. Breckler & Wiggins (1991) observed that the degree of consistency between the attitudes and behaviors of consumers increased with more exposures to direct contact experiences. Hence it is evident that tactile sensation and product assessment are highly correlated, but only a number of researches discussed the triggers driving the motivation to touch. Therefore, the main purpose of this research is to investigate the effect of object form and tactile enticement material on motivation of touch, preference and visual sense. The findings from this research will not only contribute to the understanding of the underlying mechanisms of the motivation to touch, but can also be applied to product design and marketing strategy to transform the motivation to touch into motivation to buy.

2. Method

2.1 Subjects

A total of 30 subjects (15 males and 15 females) were recruited in the study. Both of the mean age of female or male subjects are about 25 years old.

2.2 Experimental Design and Procedure

This study employed a two-way factorial experiment. The independent variables included the object form (spheroid, cube, tetrahedron) and tactile enticement material (wood, wool, flannel,

acrylic, mirror, aluminum sheet). The subject was a random factor. There were a total of 18 experiment conditions for each subject. 18 sample items, as illustrated in Figure 1, were evaluated. Three different kind dependent variables were measured in the study. They were willingness of touch (5-point scale, with 1 for “I really don’t want to touch it”, 3 for “normal feeling”, 5 for “I really want to touch it”), preference (5-point scale, with 1 for “I really don’t like it”, 3 for “normal feeling”, 5 for “I like it very much”) and 13 sets of sensory descriptions (I want to feel tactile impression, I want to play it, Its tactile seems comfortable, It is good quality, It is familiar, It is beauty, It is delicate, It is novelty, It is funny, It is warm, It is uncommon, It is unique, It is slippery) each ranked on a scale of five grades (1 being “strongly disagree”; 3 being “agree”; 5 being “strongly agree”).

Experiment was conducted under normal day light illumination. Before the experiment, the researcher explained the purpose and procedure to the subjects. After that, one sample was placed in front of subjects at a time. They watched the sample item 10 seconds and then were asked to assess subjective willingness of touch, preference and 13 sets of sensory descriptions questionnaire based on its visual appearance without tactile interaction. The 18 treatment combinations were randomized for each subject and completed within 30 minutes.

2.3 Data analysis

Analysis of variance (ANOVA) was preformed to analyze the object form and tactile enticement material effect on willingness of touch, preference and sense of sight. Post hoc testing with the Duncan multiple range test ($\alpha=0.05$) was then performed to identify significant differences within object form factor and tactile enticement material factor. Moreover, regression analysis with a forward stepwise procedure was conducted to construct two prediction models for willingness of touch and preference with preference and adjectives of sense of sight. The significance level was set $\alpha=0.05$.

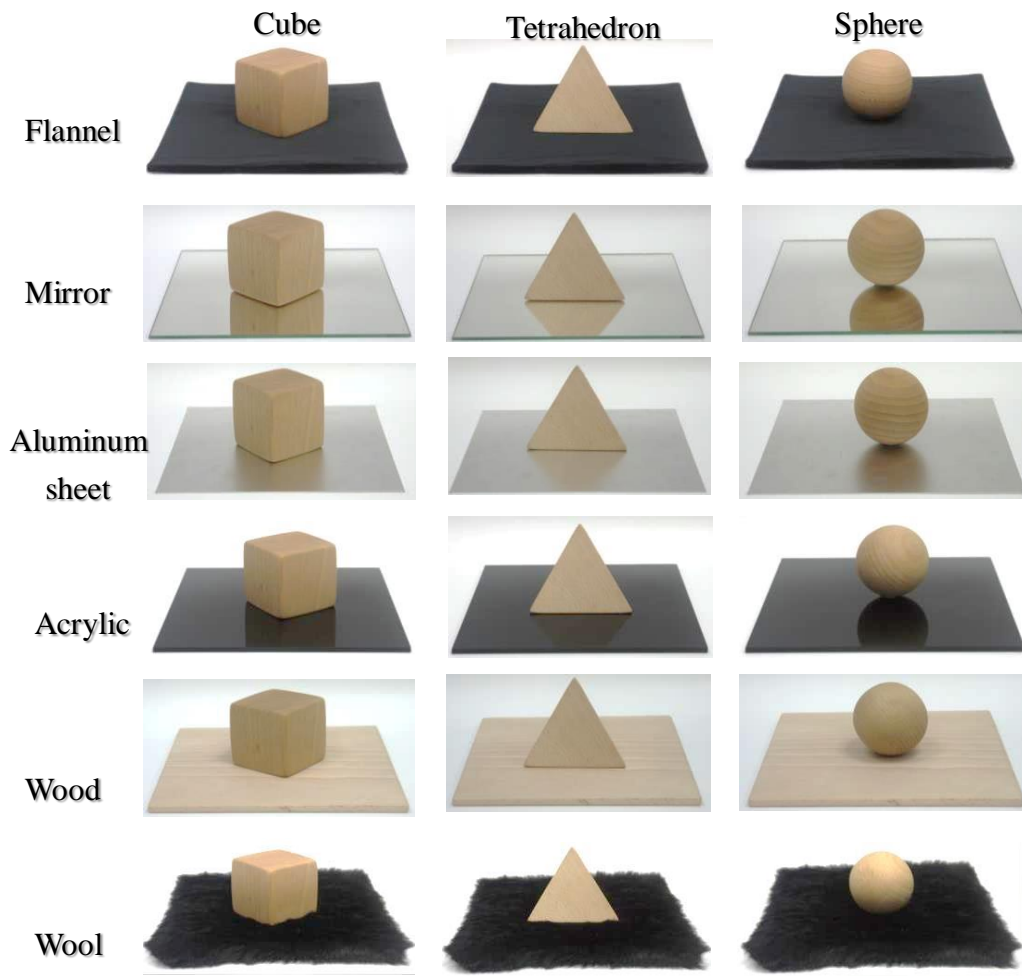


Figure. 1. The 18 treatment combinations were used in this study.

3. Results

3.1 ANOVA results

Analysis of variance (ANOVA) was performed to evaluate the object form and tactile enticement material effects. Tables 1 present the mean values of measures for the independent variables. The result indicates that the tactile enticement material present statistically significant influences on the motivation to touch and preferences ($p < .001$). The Duncan grouping results indicate that the motivation to touch can be classified into two groups. The first group, with the higher motivation was for wool, followed by acrylic, aluminum and flannel. The wood and mirror belongs to lower motivation group. The result of preference is similar to motivation. The group of higher preference includes acrylic, aluminum and flannel. The lower preference group includes wood, mirror and wool. It is interesting to note wool material. It has higher motivation to touch but lower score of preference. The tactile enticement material presents statistically significance on all

of the sensory descriptions. The Duncan grouping results indicate that nine of 13 sensory descriptions are highest for the wool and aluminum; eight sensory descriptions are highest for flannel. Only two sensory descriptions are higher for mirror and wood. Due to smooth surface property, the score of slippery and delicate sensory are higher while putting an object on aluminum or acrylic plate. Due to soft and warm property, the score of warm and comfortable sensory are higher while putting an object on wool or flannel plate. It is rare to see this combination of object and plate, the score of uncommon and unique sensory are higher while putting an object on aluminum or wool plate.

Table 1 also indicates that the object form present statistically significant influences on the motivation to touch and preferences. The Duncan grouping results indicate that the highest was for sphere, followed by cube, the lowest for tetrahedron. Similarly, the level of preferences was the strongest for the sphere and lowest for the cube and tetrahedron. The object form presents statistically significance on four sensory descriptions, they are “I want to play it”, “It’s tactile seems comfortable”, “It is funny” and “It is slippery”. In analyzing the sensory descriptions, the scores for the sphere were the highest for all descriptive terms.

3.2 Regression analysis

This study obtains two regression models using a forward stepwise searching procedure (Table 2). Results show these models to be statistically significant ($p < .001$) with the coefficient of determination (R^2) 0.62 for predicting motivation to touch and 0.37 for predicting subjective preference. Moreover, the standardized partial regression coefficient of the subjective preference is 0.39, greater than that of the sense of I want to play it (0.28) and the sense of I want to feel tactile impression (0.23). Increase in subjective preference, the sense of I want to play it, and the sense of I want to feel tactile impression followed by an increase in the motivation to touch. On the other hand, the subjective preference was mainly affected by the senses of I want to play it, It is beauty and I want to feel tactile impression. Therefore, the subjective preference increased was followed the rating of I want to play it and then the motivation to touch was increased.

Table 1. Measurements under affect levels of each independent variable

	Object form			Tactile enticement material					
	Tetrahedr on	Cube	Sphe re	Mirror	Wood	Wool	Aluminu m	Flanne l	Acryli c
Willingness and preference									
Willingness of touch	3.27^a	3.25^a	3.61^b	3.09^a	3.36^{ab}	3.51^b	3.43^b	3.42^b	3.46^b
Subjective preference	3.17^a	3.16^a	3.39^b	3.00^a	3.20^{ab}	3.23^a_b	3.33^b	3.32^b	3.37^b
sensory descriptions (1 point – 5point)									
I want to feel tactile impression	3.37	3.40	3.53	3.00^a	3.34^b	3.62^c	3.43^b	3.68^c	3.53^b
I want to play it	3.29^a	3.27^a	3.57^b	3.10^a	3.34^a	3.46^b	3.40^b	3.58^b	3.38^a
Its tactile seems comfortable	3.17^a	3.20^a	3.51^b	2.98^a	3.23^b	3.61^c	3.19^a	3.50^c	3.26^b
It is good quality	3.20	3.25	3.28	2.90^a	3.16^a	3.28^b	3.39^b	3.36^b	3.38^b
It is familiar	2.92	2.93	2.95	2.64^a	3.49^b	2.83^a	2.72^a	3.09^b	2.82^a
It is beauty	2.84	2.93	3.05	2.68^a	2.79^a	2.89^a	3.12^b	3.11^b	3.07^b
It is delicate	3.04	3.06	3.17	2.69^a	2.94^a	3.12^b	3.29^c	3.21^b	3.29^c
It is novelty	2.88	2.84	3.05	2.91^b	2.37^a	3.20^b	3.13^b	2.92^b	3.01^b
It is funny	2.82^a	2.89^a	3.18^b	3.01^b	2.60^a	3.09^b	3.09^b	2.90^b	3.09^b
It is warm	2.76	2.72	2.95	2.08^a	3.40^c	3.44^c	2.46^b	3.14^c	2.34^{ab}
It is uncommon	2.59	2.59	2.68	2.56^b	2.27^a	3.00^c	2.76^{bc}	2.54^b	2.60^b
It is unique	2.81	2.80	2.96	2.89^b	2.39^a	3.11^c	3.12^c	2.76^b	2.87^b
It is slippery	2.88^a	2.86^a	3.26^b	3.20^c	2.92^{bc}	2.60^a	3.27^d	2.78^{ab}	3.23^{cd}

a, b, c: Duncan grouping code; Bold indicates significant differences between levels of a factor for that measure.

Table 2. Regression equations for motivation to Touch and subjective preference

Equation	R ²	Significance
Motivation to Touch = 0.29 + 0.39 Preference + 0.28 (I want to play it) + 0.23 (I want to feel tactile impression)	0.62	p < .001
Preferences = 0.69 + 0.34 (I want to play it) + 0.29 (It is beauty) + 0.25 (I want to feel tactile impression)	0.37	p < .001

4. Conclusions

The objective of study is to investigate the effect of object form and tactile enticement material on subject's motivation of touch, subjective preference and visual sense.. The main findings are that both of the motivation of touch and subjective preference were significantly affected by object form and tactile enticement material. Increase in subjective preference, the sense of beauty, the willingness of to feel the object's tactile impression and the willingness of to play it, followed by an increase in the motivation to touch. The findings of this study can give an insight into the motivation of touch, and further provide some guidelines and recommendations about the product design and selling method to increase the competitive advantage of product.

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