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PREFERENCE HOLDS PRIORITY IN PREFERENCE? METHODOLOGICAL APPROACH TO INTUITIVE CHOICE

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ABSTRACT
In design societies, it is important issue how to fine the proper approach to reach the goals that were previously set. In spit of different solutions and creative strategies should be taken based on the type of design problems, it have not been addressed enough. This research showed a case of solution to address an issue with proper approach focus on preference due to the consequence in choice. Preference, however, has been addressed as ***Uninominal information***, but in reality. Consumers consider various perspectives of a product. Only with a product exterior, they can get information from the front, side, rear, top and bottom of it. The aim of research was to explore whether information types whether ***Uninominal*** and ***Binominal***, make differences in the same evaluation. In the experiment, car front photograph were used as ***Uninominal information*** stimuli; car front and side pair photographs were used as ***Binominal information*** stimuli. In the results: 1) ***Uninominal information*** stimuli showed significance in the evaluation on aesthetic; 2) ***Binominal information*** stimuli showed significance in the evaluation on preference.

Keywords: Intuition, information, aesthetic, engineering design

1 INTRODUCTION

The issues of the study built on the need for creative thinking in design aiming to understand consumers' latent desires focus on preference.

Need for creative thinking

The traditional design methods mainly focus on product or technical system themselves, but seldom recognize and consider design process from creative cognition approach point of views. As consumers' latent desires were getting consequences of not only design itself but also marketing, based on the characteristics of product design, incorporating cognitive psychology, emotive information into engineering design, a qualitative model of creativity for product innovation have been developed. Due to understand what consumers want to do with products in various situations, creative thinking is the most important attribution. Often 'creativity' and 'innovation' are used interchangeably. However, they are fundamental differences. Creativity is an essential building block for innovation. This is reflected in the now widely accepted definition of innovation equaling creativity plus implementation. Creativity alone, to come up with idea, is not enough [1]. This research was formulated a design issue based on cognitive psychology, and aimed at a creative approach to fine the proper methods in design process focus on preference.

Preference, never ending theme

Preference is an important attribute of choice. While the influence of preference in ***Uninominal information*** has been well studied, the influence of preference in ***Binominal information*** remains unexplored. Then, are consumers really able to choose what is best for them? Many psychologists suspect that we do not make choices that maximize our happiness. Consumers fail to choose optimally, either because they fail to predict accurately, or to base their choice, or both [2]. It inferred that failed choices could be more related to cognitive process, i.e., prediction or memory, than

subliminal. Subliminal information is not easy to express in words the consumers as well as designers or marketers despite the importance of it.

The meaning of breaking the balance in preference

In previous studies, product form was addressed a value which is one way to gain consumer notice [3-4], thereby a means of communicating to consumers [5]. Hence, it can be a clue to understand consumers' latent desire. However, form or exterior appearance of a product is always interpreted the same meaning by designer, even though consumers don't. Considering the central tenet of Gestalt psychology, the whole is different from the sum of its parts. Product form is one way to gain consumer notice [6-8]. In contrast, to the authors' knowledge, no study has examined yet the relation between preference and information types focus on inherent information from the form had not been found yet despite the needs of understanding. In other words, the questions are that: 1) do consumers prefer the product consisted of all preferred parts of the consumers; 2) if so, preference holds priority in any information condition whether ***Uninominal*** and ***Binominal***?

2 METHOD

2.1 Subjects

20 university students (11 males and 9 females) had been hired for this experiment. All subject were native Japanese. None of the subjects was in an automotive-related major. No subjects had previously experienced evaluation. Each subject was assigned to whole tasks for the analysis not only a between-subject design, but also a within-subject design to compare the independent variables within a subject. It adopted to investigate the relation of each value within a subject as well as between the subjects.

2.2 Stimuli

Considering information types whether ***Uninominal*** or ***Binominal***, there were two groups of stimuli: 1) one hundred car front photos as ***Uninominal information*** stimuli; 2) fifty front & side pair photos as ***Binominal information*** stimuli. There was no same photo in both groups. The images were taken from copyright-free Internet sites and photograph collections. Also, no stimulus was selected on intention, such as brand, model, and producer. All pictures were filtered in gray scale to avoid from color effect. License plates were erased, although brand logos were retained.

2.3 Pre-task

Before one week, the subjects, who will participate the experiment, conducted pre-tasks as follows.

1) In screening for aesthetic reference

The subjects assessed the aesthetics of each photograph on a scale from 0 to 10 (Visual Analogue Scale) with eleven photos each of ***Uninominal information*** stimuli (car fronts) and ***Binominal information*** stimuli (front & side pairs). And, one week later, the results confirmed any changes.

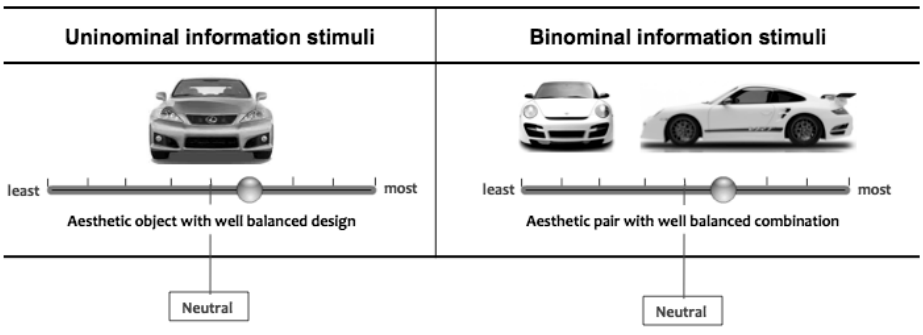

Figure 1. Stimuli screening for aesthetic reference

2) In screening for the experiment stimuli

The subjects chose a button on a scale of like or dislike with one hundred car fronts and fifty front & side pairs. With the screening, three most-preferred and three least-preferred each of the car fronts and fifty front & side pairs were selected considering time priority which to be chosen.

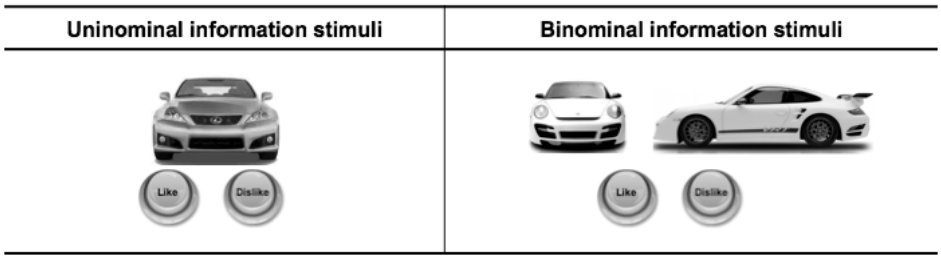

Figure 2. Stimuli screening for the experiment stimuli

2.4 Producing Stimuli

72 car fronts and 36 front-side pair photos were produced with the logic as follows.

1) ***Uninominal information*** stimuli producing

Firstly, selected three more and less liked car front photographs based on the evaluation by the subject. Then, separated the headlight from the photos. Finally, combined each headlight to the cars without headlight [the left of Figure 3].

2) ***Binominal information*** stimuli producing

The logic was the same as ***Uninominal information*** stimuli producing process. Firstly, selected three more and less liked car front photographs based on the evaluation by the subject. Then, prepare the stimuli car fronts and sides. Finally, combined car fronts to sides [the right of Figure 3].

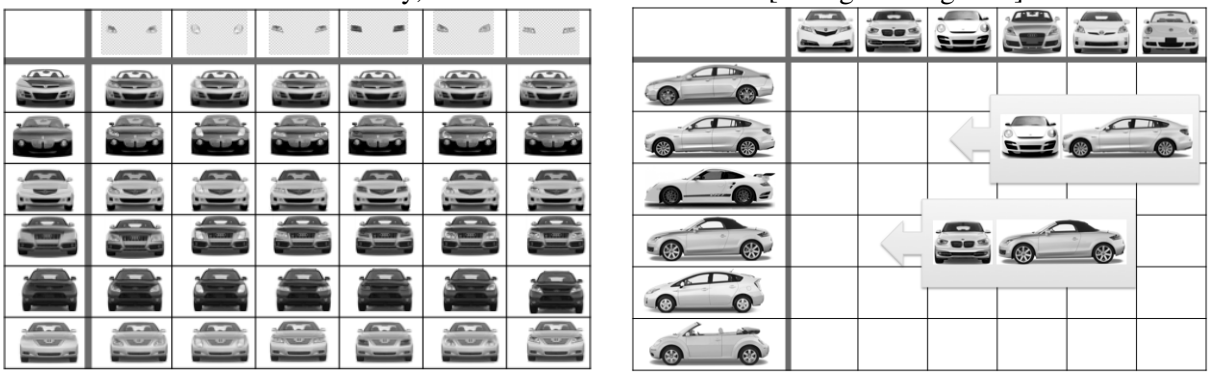

*Figure 3. Matrix for stimuli producing in **Uninominal** and **Binominal***

2.5 Procedure

In the experiment 72 car fronts and 72 front & side pairs were used as ***Uninominal*** and ***Binominal information*** stimuli. The values except aesthetic used a reference photo by the person. All instructions were in Japanese. The subjects were given general instruction including the way of evaluation in the experiment. Figure 5 shows the screen to evaluate aesthetic. In the evaluation, the subjects compared the stimuli with their own aesthetic reference photos in 11 scales [the left of Figure 4]. And, the right of Figure 4 shows the situation to evaluate on valence, arousal, familiarity, preference, decision-making, and knowledge. The scales of evaluations were the same as aesthetic evaluation.

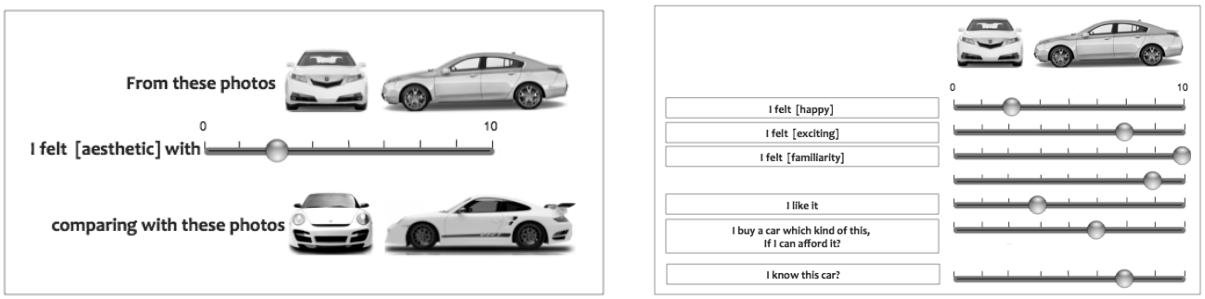

Figure4. Evaluation on aesthetic and other values

3 RESULTS

3.1 One-way ANOVA

It showed the results that comparison with photos which considering the subjects' likeness in each design part whether the means of two groups are statically different from each other.

In the results from ***Uninominal information*** stimuli (car front photos) using session, aesthetic ($p < 0.0001$) and valence ($p < 0.0001$) showed significance [Table 1]. It means that the likeness of the subject affected the evaluation on aesthetic and valence in ***Uninominal information***.

*Table 1. The results of **Uninominal information** stimuli:*

DD: a photo, which consisted of a car body from what evaluated Dislike, and headlight from what evaluated Dislike in the pre-task by the subject's likeness scale/ **DL:** a photo, which consisted of a car body from what evaluated Dislike, and headlight from what evaluated Like in the pre-task by the subject's likeness scale/ **LD:** a photo, which consisted of a car body from what evaluated Like, and headlight from what evaluated Like in the pre-task by the subject's likeness scale/ **LL:** a photo, which consisted of a car body from what evaluated Like, and headlight from what evaluated Like in the pre-task by the subject's likeness scale

	Aesthetic	Valence	Arousal	Familiarity	Preference	Decision-making	Knowledge
	p<0.0001*	p<0.0001*	p<0.56	p<0.57	p<0.65	p<0.92	p<0.82
mean (Std Dev) of DD	3.47 (2.02)	3.13 (1.91)	4.37 (2.92)	4.21 (2.91)	4.11 (3.07)	3.77 (3.15)	2.54 (0.21)
mean (Std Dev) of DL	3.63 (2.03)	3.19 (2.15)	4.42 (2.86)	4.22 (2.81)	4.34 (2.87)	3.96 (3.01)	2.61 (2.89)
mean (Std Dev) of LD	6.11 (2.4)	5.65 (2.57)	4.35 (2.9)	4.06 (2.94)	4.16 (3.02)	3.82 (3.09)	2.37 (2.67)
mean (Std Dev) of LL	6.46 (2.56)	6.01 (2.6)	4.73 (2.74)	4.48 (2.86)	4.47 (2.86)	3.9 (2.99)	2.62 (2.83)

In the results of ***Binominal information*** stimuli (car front & side pair photos) using session, only preference revealed significance ($p < 0.0001$) [Table 2]. It means that the likeness of the subject affected the evaluation on preference in ***Binominal information***.

*Table 2. The results of **Binominal information** stimuli:*

DD: a photo, which consisted of a car front from what evaluated Dislike, and a car side from what evaluated Dislike in the pre-task by the subject's likeness scale/ **DL:** a photo, which consisted of a car front from what evaluated Dislike, and a car side from what evaluated Like in the pre-task by the subject's likeness scale/ **LD:** a photo, which consisted of a car front from what evaluated Like, and a car side from what evaluated Like in the pre-task by the subject's likeness scale/ **LL:** a photo, which consisted of a car front from what evaluated Like, and a car side from what evaluated Like in the pre-task by the subject's likeness scale

	Aesthetic	Valence	Arousal	Familiarity	Preference	Decision-making	Knowledge
	p<0.08	p<0.07	p<0.2	p<0.21	p<0.0001*	p<0.16	p<0.98
mean (Std Dev) of DD	5.05 (0.18)	4.74 (2.3)	4.56 (2.48)	4.56 (2.56)	3.2 (2.11)	3.74 (2.76)	2.85 (3.08)
mean (Std Dev) of DL	4.43 (0.18)	4.1 (2.22)	4.11 (2.2)	4.03 (2.52)	3.99 (2.51)	3.23 (2.42)	2.76 (2.71)
mean (Std Dev) of LD	4.78 (0.18)	4.42 (2.27)	4.13 (2.42)	4.17 (2.55)	3.22 (2.23)	3.54 (2.64)	2.76 (2.82)
mean (Std Dev) of LL	4.95 (0.18)	4.53 (2.48)	4.44 (2.62)	4.41 (2.69)	6.04 (2.53)	3.82 (2.93)	2.72 (2.8)

Considering the results from one-way ANOVA: 1) aesthetic and valence showed significant differences in ***Uninominal information*** stimuli; 2) preference showed significant difference in ***Binominal information*** stimuli. In other words, while preference priority in preference with ***Binominal information***, but with ***Uninominal information***. In ***Uninominal information***, aesthetic and valence were more significant values to considered by the subjects.

3.2 UNIANOVA

In the UNIANOVA analysis, all values that used in the experiment, valence, arousal, familiarity, preference, decision-making and knowledge were tested.

Aesthetic and preference showed the significant difference at 0 in the component of photographs * Information type contrast. It means that aesthetic and preference evaluations were affected by the composition of **Component of photographs** and **Information type** [Table. 3].

Table 3. The results independent variable combinations showing significance:

Component of photographs: DD, DL, LD, LL [see the Table 1, 2]
Information type: ***Uninominal*** (Car front) and ***Binominal*** (Car front & side pair)

Univariate Tests (Contrast)	Component of photographs*Information types		
	Dependent Variable	**Aesthetic**	**Preference**
	Type III Sum (Mean) of Squares	640.128 (213.376)	379.458 (126.486)
	df	3	3
	F	38.994	17.748
	Sig.	**0 (=0.000)**	**0.000 (0.000)**

Preference, as was used as the dependant variable, showed the significant differences at 0 in the experienced vs. inexperienced * information type and homo vs. hetero * information type in ***Binominal information*** [Table 4]. It means that preference evaluation was affected the three independent variable combination.

Table 4. The results in independent variables combination showing significance:

Experienced vs. Inexperienced:
Inexperienced photograph: a photo did not show before, which consisted of the same setting
Experienced photograph: a photo showed before, which consisted of the same setting
Homo vs. Hetero:
Homo: a photograph consisted of matched likeness, such as DD, LL
Hetero: a photograph consisted of unmatched likeness, such as DL, LD

Univariate Tests (Contrast)		Experienced vs. Inexperienced *Information types	Homo vs. Hetero *Information types
	Dependent Variable	**Preference**	
	Type III Sum (Mean) of Squares	64.980 (64.980)	86.044 (86.044)
	df	1	1
	F	8.457	11.234
	Sig.	**0.004**	**0.001**

4 CONSIDERATIONS

1) While ***Uninominal information*** stimuli using tasks showed significance in the evaluation on aesthetic; 2) ***Binominal information*** stimuli using tasks showed significance in the evaluation on preference and valence. Furthermore, it revealed that not only information type affects preference but also preference is not linear concept. In other words, consumers may not prefer the product that composed of all preferred parts of the consumers'.

Why the information types showed the differences by whether ***Uninominal*** or ***Binominal***? Considering the difference of information processing by information type, didn't it occur perceptive processing without efforts, based on the long-term memories while the evaluating on independent information stimuli (car front)? Didn't it occur discrete-time integration while the subject evaluating on dependent information stimuli (car front-side pair)? Because, in hippocampus of the human, discrete spatial integration and Discrete-time integration occurs when it comes to ***Binominal information***. Also, those integrations don't need with ***Uninominal information***, which are stored on long-term memories. It is worth noticing that aesthetic and preference is affected by information type intuitively. It can give another perspective of design what makes people modify their decisions.

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