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IMPORTANCE OF PREFERENCE MECHANISM IN PRODUCT EVALUATION

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ABSTRACT
This study is on preference mechanism in product evaluation using automotive images. The aim of this study is at understanding preference mechanism. For the purpose, the authors investigate the relation between ***Subjective Preference (Like-Dislike)*** and product evaluation considering not only various factors of product (e.g. various views and lightness of products), but also ***Reality Sets (Uninominal-Binominal)***. Thirty university students recruited from University of Tsukuba. Semantic Differential method is used as product evaluation. Evaluation values are preference, aesthetic, and pleasure that showed the significances in the previous preference mechanism study. Car-front-face, car-side, car-multi-aspect, and combinations of car front & side were used as stimulus. Subjects were participated in both **Item Screening** and **Evaluation**. The aim of **Item Screening** is at selecting experiment stimuli reflecting ***Subjective Preference***. The screened images were reconciliated per subject. The subjects evaluated the reconciliated stimuli. The results show: ***Subjective Preference*** is related to product evaluation independently in ***Uninominal Reality Sets***, even though considering variations of ***Subjective Preference***, whereas ***Subjective Preference*** is related to product evaluation dependently in ***Binominal Reality Sets***.

Keywords: Intuition, holistic view impression and affective decision

1 INTRODUCTION

"Why do individuals want what they want?" This question has fascinated researchers in design field, and continues to motivate them today. Preference has been addressed as an important theme in design whereas preference mechanism has not been well explained. This study shows preference mechanism in product evaluation using automotive image by an approach considering ***Subjective Preference***. According to the definition by Weber, subjectivity is action includes all interpretive understanding, and the acting individual attaches a subjective meaning to it [1], thereby being deemed to contradict the rational actor. Figure 1 shows an example: while an individual prefer the left car to the right one due to the brand, the other prefer the right car to the left one due to the utility; while an individual prefers the left car due to the horse-power engine, another prefers it due to the safety. Choice is a matter of subjective preference. What people perceive as a desirable effect depends on their values and preferences [2], such as functional, conditional, social, emotional, and epistemic values [3], and individual's choice is a function of multi-values which make differential contributions in any given choice situation independently. If an individual enjoys speed, it is assumed that the individual prefer coupe for van; an individual prefer furniture for oneself, it assumes that the individual prefer a self-assembled kitchen to finished products.

Figure 1. Which car do you prefer?

The present study investigated (1) the relation between ***Subjective Preference*** and product evaluation, (2) the relation between ***Reality Sets*** and product evaluation. By these investigations, preference mechanism was investigated. ***Subjective Preference*** was defined as subjective like or dislike in **Item screening** task. ***Uninominal Reality Sets*** was defined as stimulus using 'one image' whereas ***Binominal Reality Sets*** was defined as stimulus, which consisted of two images of products. The authors hypothesized that user's preference of product is affected not only by ***Subjective Preference*** but also by ***Reality Sets***. It is reasonable to assume that a stimulus consists of subjectively preferred parts will be evaluated affirmatively. In the contrary, it assumes that a stimulus consists of subjectively non-preferred parts will be evaluated negatively. It is expected both ***Uninominal Reality Sets*** and ***Binominal Reality Sets***. In other words, a stimulus, which consists of only subjectively preferred parts reflecting ***Subjective Preference*** is evaluated affirmatively by 'the subject.' Then, what about a stimulus involves both parts came from a subjectively preferred product image and a subjectively non-preferred product image. The scope of this study was there: to investigate preference mechanism not only homo-preference but also hetero-preference [Figure 2].

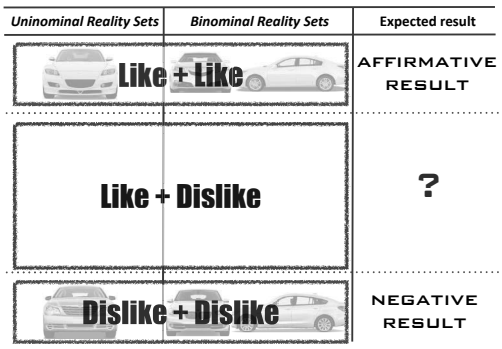

Figure 2. The scope of the present study

2 METHOD

To investigate if ***Subjective Preference*** has related to product evaluation, ***Reality Sets*** and various view and lightness of products were considered. As stimuli of ***Uninominal Reality Sets***, car-front-face, car side, and car-multi-aspect images were used. As stimuli of ***Binominal Reality Sets***, combinations of car front & side images were used. More details will be explained in **STIMULUS**.

2.1 Subjects

Thirty university students (15 females) recruited from University of Tsukuba, Japan. No subjects have taken part in any kind of similar experiment before.

2.2 Stimulus

In ***Uninominal Reality Sets***: (1) seventy car-front-face images (2) seventy car-side images (3) seventy car-multi-aspect were used. Car-front-face and side aimed to investigate if various view of products was related to product evaluation using preference, aesthetic, pleasure. Car-multi-aspect images aimed to investigate if lightness of products was related to the product evaluation. In ***Binominal Reality Sets***, seventy combinations of car front & side were used. It aimed to investigate if ***Reality Sets*** difference was related to the product evaluation.

2.3 Experimental procedure

The experiment consisted of **Item Screening** and **Evaluation**. The **Item Screening** aimed to select experimental stimuli [Figure 3]. In **Item Screening**, subjects categorized a card images subjectively preferred group and subjectively non-preferred group almost evenly for each session (i.e. car-front-face, car-side, car-multi-aspect, and car front & side). Then, subjects selected twenty-five most preferred images from preferred category, and twenty-five most non-preferred images from non-preferred category [Figure 3]. From this process, the authors prepared twenty-five most non-preferred images for each session (i.e. car-front-face, car side, car-multi-aspect, and car front & side), and prepared twenty-five most preferred images for each stimulus type. Stimuli were prepared per subjects. In this study, subjects evaluated stimuli reflecting their own ***Subjective Preference***. In other

words, all stimuli were used in **Evaluation** task was prepared differently per subject [Figure 3]. With these prepared stimuli per subject for each session (i.e. car-front-face, car side, car-multi-aspect, and car front & side), experimental stimuli were remade to investigate if ***Subjective Preference*** was related to product evaluation.

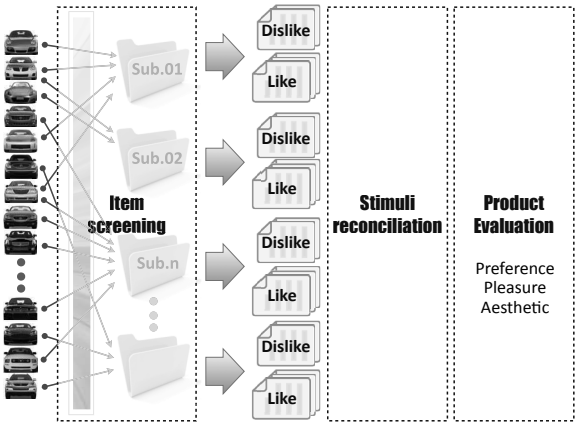

Figure 3. Item-screening process per subject

The process of stimuli reconciliation was as Figure 4. This process is a part of example of subject in car-front-face: The headlights were separated from most preferred and most non-preferred car-front-face images.

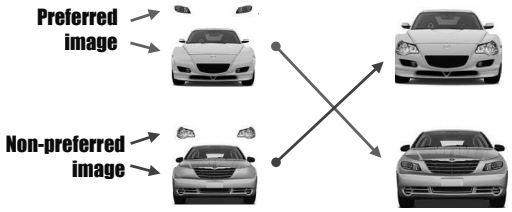

Figure 4. Stimuli reconciliation process in car-front-face images

Reconciliated a stimulus with switching the each-headlights. Stimuli were prepared for each subject. This reconciliation process applied as the same as car-front-face stimuli-remake-process to all stimuli: car side [a of Figure 5], car-multi-aspect [b of Figure 5], and combinations of car front & side [c of Figure 5] as follows.

Figure 5. Stimuli reconciliation

In **Evaluation**, subjects evaluated on preference, aesthetic, and pleasure with nine-scale from strongly disagree to strongly agree for evaluation value [Figure 6].

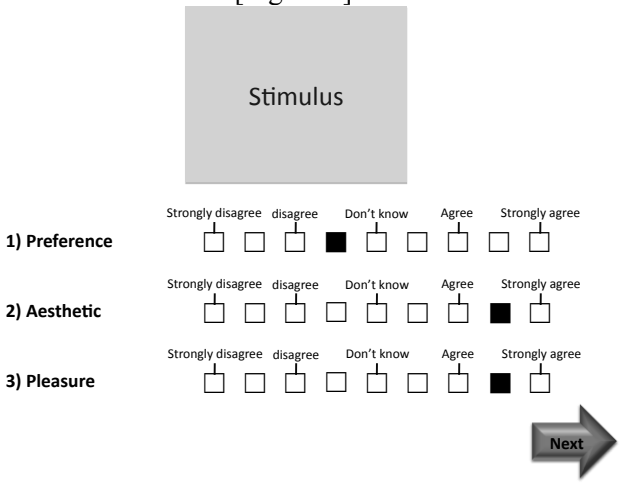

Figure 6. Evaluation

3 DATA ANALYSIS

A 2×2 (***Subjective Preference*** in car body × ***Subjective Preference*** in car headlights, wheels, or headlights & wheels; ***Subjective Preference*** in car-front-face × ***Subjective Preference*** in car side) two-way mixed-design analysis of variance (ANOVA) performed to investigate if ***Subjective Preference*** was related to product evaluation. Figure 7 shows the factors of each stimulus condition.

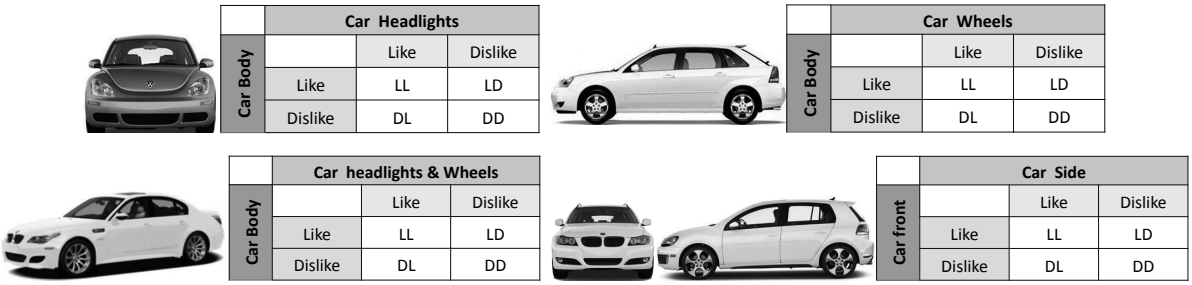

Figure 7. Factors of stimulus

4 RESULT & CONSIDERATION

4.1 In uninominal reality sets

Thirty university students (15 females) recruited from University of Tsukuba, Japan. No subjects have taken part in any kind of similar experiment before.

There was no significant interaction effect in ***Uninominal Reality Sets***.

(1) Car-front-face

Subjective Preference of both factors is related to Product Evaluation. It didn't show any significant interaction effect. ***Subjective Preference*** of both factors is related to Product Evaluation independently [Table 1].

Table 1. Result of car-front-face

	Car body	Headlights	Body × Headlights
Aesthetic	p < .0001	p = .004	p = .7633
Pleasure	p < .0001	p = .0004	p = 1.0000
Preference	s	s	n.s

(2) Car side

Subjective Preference of both factors is related to Product Evaluation. It didn't show any significant interaction effect. ***Subjective Preference*** of both factors is related to Product Evaluation independently [Table 2].

Table 2. Result of car-side

	Car body	Wheels	Body × Wheels
Aesthetic	p < .0001	p = .0289	P = .2893
Pleasure	p < .0001	p = .0011	P = .3002
Preference	s	s	n.s

(3) Car-multi-aspect

Subjective Preference of both factors is related to Product Evaluation. It didn't show any significant interaction effect. ***Subjective Preference*** of both factors is related to Product Evaluation independently [Table 3].

Table 3. Result of car-multi-aspect

	Car body	Headlights & Wheels	Body × Headlights & wheels
Aesthetic	p < .0001	p = .0564	p = .6392
Pleasure	p < .0001	p = .0203	p = .6595
Preference	s	s	n.s

4.2 In binominal reality sets

All evaluation values showed significant main effects. Preference, aesthetic values showed significant interaction effects in ***Binominal Reality Sets*** [Table 4]. If permit you considering the significant interaction effect in pleasure, ***Subjective Preference*** is related to Product Evaluation. As you see, p values are not so far away 0.05.

Table 4. Result of car front & side

	Front	Side	Front × Side
Aesthetic	P = .0013	P = .0002	P = .0018
Pleasure	P < .0001	P < .0001	P = .0526
Preference	s	s	n.s

5 DISCUSSION & CONCLUSION

According to the difference between one image and separated images, separate images are considered as separated wholes. Although separated images come from one object, the separation isolates the evaluation boundary within one image. It assumes that there is the relation between the attributes of factors and reconciliated images by ***Reality Sets***. According to the relation between ***Subjective Preference*** of factors and reconciliated images in ***Uninominal Reality Sets***, preferred factors influence the reconciliated images linearly; if conciliated images involve preferred factor, it was evaluated preferred (balanced, pleasant) [Figure 8]. On the other hand, in ***Binominal Reality Sets***, preferred factors influence to reconciliated images if it consists of preferred factors only; if the reconciliated images involve non-preferred factor, it was evaluated only non-preferred (unbalanced, unpleasant) [Figure 8]. Although subjects were asked to assimilate the separated-image as one, they couldn't: The separated-image couldn't be integrated as one whole, thereby evaluating as isolated wholes. This finding shows the consequence of assimilation of factors of image as one whole in product evaluation: To be evaluated as more preferred (balanced, pleasant), factors of image should be assimilated as one whole: ***Reality Sets*** can influence ***Subjective Preference*** in different ways.

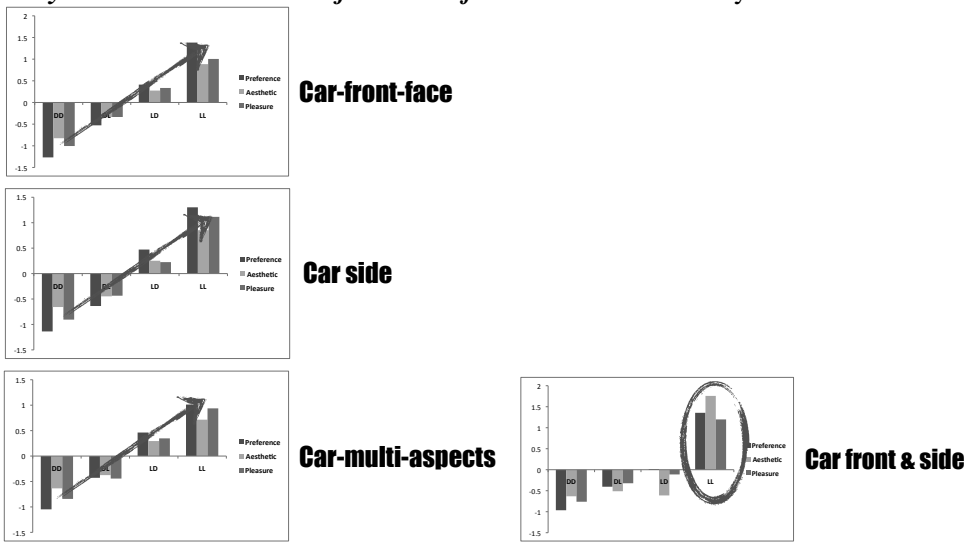

Figure 8. Result of Uninominal Reality Sets & Binominal Reality Sets

In summary, individuals evaluate product images independently in ***Uninominal Reality Sets*** whereas individuals evaluate product images evaluated dependently in ***Binominal Reality Sets***. The findings of this study can be applied to understand how ***Subjective Preference*** affects to product evaluation. It assumed that there is a relationship between the attributes of factors and reconciliated images by *Reality Sets*. According to the relationship between ***Subjective Preference*** of factors and reconciliated images in ***Uninominal Reality Sets***, preferred factors influence the reconciliated images linearly; if conciliated images involve preferred factor, it was evaluated preferred (balanced, pleasant). On the other hand, in ***Binominal Reality Sets***, preferred factors influence reconciliated images if it consists of preferred factors only; if the reconciliated images involve non-preferred factor, it was evaluated only non-preferred (unbalanced, unpleasant). Although subjects were asked to assimilate the separated-

image as one, they could not: The separated-image could not be integrated as one whole, thereby evaluating as isolated wholes. This finding shows the consequence of assimilation of factors of image as one whole in product evaluation: To be evaluated as more preferred (balanced, pleasant), factors of image should be assimilated as one whole. Considering the difference between one image and separated images, separate images are considered as separated wholes. Although separated images come from one object, the separation isolates the evaluation boundary within one image. In other words, there was a correlation between the attributes of factors and the results of combined factors in product evaluation in ***Uninominal Reality Sets***. On the other hand, there was not a correlation between the attributes of factors and the results of combined factors in ***Binominal Reality Sets***. This relationship is found in not only car body and car headlight but also car body and car wheels; car body and car headlight & wheels. Then, why ***Subjective Preference*** is related to product evaluation differently by the ***Reality Sets***? It can be assumed that while partial factors of reconciliated images are related to product evaluation according to the sum of ***Subjective Preference*** in ***Uninominal Reality Sets***, partial factors of reconciliated images are not relate to product evaluation according to the sum of ***Subjective Preference*** in ***Binominal Reality Sets***. In ***Binominal Reality Sets***, partial factors influence product evaluation independently. As the results, while partial factors influence product evaluation in ***Uninominal Reality Sets*** as the author hypothesized, partial factors do not influence product evaluation according to the sum of ***Subjective Preference*** in ***Binominal Reality Sets***. Recently, several authors considered the role of the product appearance on consumer product evaluation or choice [4-7]. Holistic view impression has been addressed as an important understanding in product evaluation. Designers may consider how the design will look as a whole. The integration of a consistent look is an important aspect of understanding Preference Mechanism. Orth et al. revealed that holistic designs are useful in identifying visual competitors; packages within a holistic design type appear similar to consumers [8]. Their studies determined how these holistic designs are related to individual brand impressions or product images. Otherwise, the present study investigated the difference between one holistic view and separated image in product evaluation, and to the author's knowledge, experimental approach of Preference Mechanism using ***Subjective Preference*** has not been reported. This consideration shows that the difference may occurs not from like or dislike per se, but from the assimilation in Reality Sets. As further study, it will be needed to increase the samples. To generalize the findings, additional investigation will be needed to prove if other designed-object images show the same consequence as the findings. It can lead the designers to understand what users appreciate in product in various ***Reality Sets***.

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