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CONSUMERS' PREFERENCE ON SCOOTER DESIGN WITH GENDER-NEUTRAL STYLE

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ABSTRACT

Gender-neutral design is regarded as a kind of fashion symbol, it also creates the new opportunity for product successful. To help the company to build the product image of gender-neutral effectively, the cognition and preference of consumer on gender-neutral design were discussed using scooter design as an example. Kansei engineering was applied to extract the factors generic of gender-neutral emotions, and to analyze the relationship between design attributes and users' preference of gender-neutral style on scooters. The result is used to enable product designers to obtain the optimal design alternatives that best meet consumers' preferences.

Keywords: gender-neutral, scooter design, emotion, kansei engineering, form attributes.

INTRODUCTION

Consumer-oriented is regarded as the critical concept to successful marketing. The study of market segmentation variables [4] provides a method of identifying subgroups of consumers who are likely to respond in a relatively homogeneous way to products or brands [1], and many products are thoroughly researched from functional and marketing points of view with the idea of such subgroups in mind. However, the issue of "gender" is almost invariably cited as one of the important segmentation variables [9]. Because of the influence of sweeping social, economic, and technical changes, sex roles and sex stereotype have changed dramatically. Relationship between gender of product and consumer's gender becomes indefinite. For example, the scooter design used to be design gender-specific, masculine looking in Taiwan. The new genderless image of scooter, shown in Figure-1, launched into the market and won a great success. The style of gender-neutral (GN) design is regarded as a kind of fashion symbol, it also creates the new opportunity for product market successfully.

Facing the product equivalence in market, the affective appeal of product has become the critical determinant of consumer satisfaction. Emotion plays a significant role in the actual and perceived experience with products [3, 8]. The challenge of design today is therefore beginning to move beyond the stage of functionality and usability of consumer products toward a more fully pleasure-based approach in design. While designers are now drawing distinct differences related to gender needs, desires and preferences, there is at the same time an increasing trend to create and adopt non-gendered designs [2], with the tactful aim of not "discriminating" and of displaying an acceptance of alternative lifestyles in today's society. Therefore, this study attempts to investigate the relationship between emotional contents of GN style, and to analyze the relationship between form attributes and users' preference of GN style. To help the company and designers to build the product image of GN effectively, the cognition and preference of consumer for GN design were discussed using the scooter design as an example in this study.

Figure-1. GN trend for scooter design in Taiwan.

RESEARCH METHOD

This study involves the following three stages: (1) identifying the emotion attributes of gender neutral style that appeal to consumers, (2) exploring factors underlying these emotion attributes, and (3) exploring the relationship between form attributes and users' preference of GN style. Each stage of the survey design is presented below.

Selecting the representative design samples

Due to the difficulty of collecting a large number of real scooter designs and conducting a questionnaire survey on them, this study used photos of scooter design as the stimuli for eliciting consumer responses. 85 scooter designs were collected. Each scooter design was represented by a scaled 4"×6" black-and-white photographic image. A focus group then was conducted for identifying the representative design samples. 6 senior designers, 2 females and 4 males, with an average design experience of more than 6 years in the scooter or industrial product design field, and 8 consumers, 4 females and 4 males, were asked to participate in a focus group [7]. A total of 22 representatives samples then were selected through focus group, shown in Figure-2.

Identifying the representative emotion attributes

To understand the previous research about GN style for product designs; the literature was referenced to form the concept for this study. The in-depth interview with consumers was conducted for identifying the emotion attributes related to GN images that consumers perceived. 8 senior designers, 4 females and 4 males, with an average design experience of more than 6 years in the product design field, and 8 consumers, 4 females and 4 males, were interviewed. Based on the literature review and the implement of in-depth interview, 13 emotion attributes were determined for the survey, as shown in Table-1.

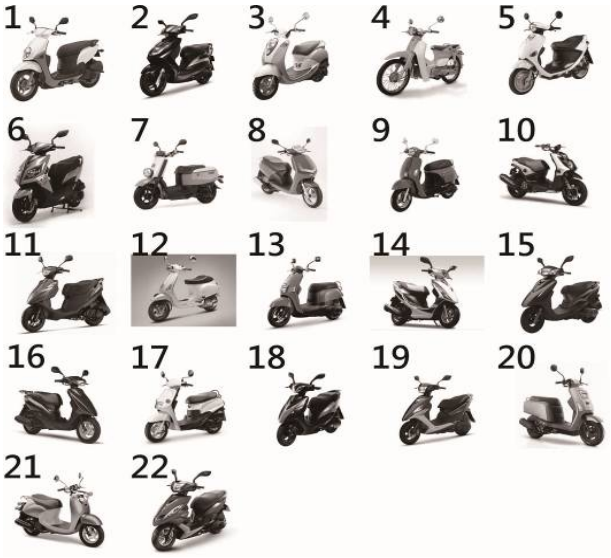

Figure-2. Representative samples of scooter design.

Conducting morphological analysis of product form attributes

The product form is defined as the collection of design attribute that consumers will appreciate. The morphological analysis, concerning the arrangement of objects and how they conform to create a whole of Gestalt, is used to explore possible solutions in a complicated problem regarding a product form [5]. The morphological analysis is used to extract the important and attractive form attributes of the 22 representative scooter design samples. The 6 product experts/designers of the focus group are asked to decompose the representative samples into several dominant form attributes and form types according to their knowledge and experience. Figure-3 shows the result of the morphological analysis, with 10 product form attributes and 30 associated product form types being identified. The form type indicates the relationship between the outline elements. For example, the" Shape of head" form attribute has 3 form types, including "square (A1)", "rounded (A2)", and "Streamlined (A3)". A number of design alternatives can be generated by various combinations of morphological attributes.

Form attribute		Product form types	
A	Shape of head	A1	Square
		A2	Rounded
		A3	Streamlined
B	Shape of headlight	B1	Rounded
		B2	Square
		B3	Streamlined
C	Position of headlight	C1	Inclined plate
		C2	Head
		C3	Head & inclined plate
D	Type of headlight	D1	Single one (big)
		D2	Pairs
		D3	One big & 2 small ones
		D4	Single one (small)
E	Size of front inclined plate	F1	Big plate
		F2	Small plate
F	Form feature	G1	Geometric line
		G2	Large radius
		G3	Small radius
		G4	Muscle-looking
G	Type of raised angle Tail	J1	High
		J2	Medium
		J3	Low
H	Type of style	K1	Sporty
		K2	Speedy
		K3	Retro-looking
I	Color planning	L1	Single one color
		L2	Colored multi-division
		L3	Colored graph
J	Headlight coverage ratio	N1	High
			Low

Figure-3. The morphological analysis of scooter designs.

RESULTS AND DISCUSSION

Factor analysis of GN emotions

The questionnaire survey results were averaged over subjects and analysed with exploratory factor analysis to extract factors generic to the GN emotions on scooter designs. The varimax rotation method is used to extract emergent factors. The emotion attributes of self-confident, glamorous, individual, sense of design, unique and fashionable included in factor1 are related to the personality expression of consumer, were labeled as personality factor. The emotion attributes of harmonious, comfortable, neat and pleasant included in factor 2, due to their relation to the pleasure evoked by product form, were classified to the comfort factor. These two factors were identified with the extracting criteria of an eigenvalue larger than 1 (Table-1). These two emotional factors of GN can account for 91.55% of total variance were extracted.

Table-1. Result of factor analysis using varimax rotation.

emotion attributes	Factor 1	Factor 2
	Personality	Comfort
self-confident	**0.979**	0.039
glamorous	**0.961**	0.236
individual	**0.958**	-0.163
sense of design	**0.929**	0.297
delicate	**0.868**	0.408
high quality	**0.862**	0.432
unique	**0.815**	0.013
fashionable	**0.795**	0.573
aesthetic	**0.787**	0.519
harmonious	0.069	**0.975**
comfortable	0.188	**0.958**
neat	0.041	**0.911**
pleasant	0.642	**0.742**
Percentage variance explained (%)	33.63	57.92
Accumulative percentage variance explained (%)	33.63	91.55

Tukey's multiple range t-test then was conducted to compare the overall image of gender-neutral typicality of different scooter designs. Scooter designs used in the survey were ranked and grouped with the consumer evaluation scores based on the analysis results. Figure-4 shows the spectrum of scooter designs for the high score group and the low score group on 'gender-neutral typicality'. The scooter No.13 with the highest level of typicality is the prototype of gender-neutral design in this study, and No.10 is scored as the lowest level of typicality. As Figure-4 indicates, there are noticeable design differences between the high score group and low score group. The scooters belonging to high score group using the nostalgic symbol of scooter design, such as the round front-lamp and structure with Vespa-looking to appeal consumer, are more genderless and personality expressive. On the contrary, the low-score scooter designs with the streamlined form and traditional image of masculine looking to be perceived speedy, strength, and toughness, regarded as gender-specific.

Furthermore a multiple linear regression analysis with backward algorithm was conducted to explore the relationship between these emotion attributes and GN evaluations. In this analysis, the rating scores of GN evaluation are dependent variables, and the emotion attribute scores are independent variables. The regression result (R^2=0.90), as shown in Table-2, indicates that the 6 emotion attributes significantly influence the GN evaluation. The absolute value of standardized coefficient (β) in Table-2 shows the relative importance of the attributes affecting GN typicality. The positive value of β indicates that the emphasis of the emotion attribute can raise the GN typicality. The negative value of β means that the increasing of the emotion attribute causes the decrease of the GN image, on the contrary, promoting the opposite emotion will lead to higher GN evaluation.

As the Table-2 shown that a scooter with the characteristic of "sense of design (1.258)", "complex (1.576)", "retro (1.161)", "comfortable (1.741)", "aesthetic (0.958)" and "rough (1.089)" can induce the GN perception of consumers. This implies that these emotion attributes have different degrees in affecting customer GN evaluation, and the "comfortable" with the greatest influence on GN preference with scooter design.

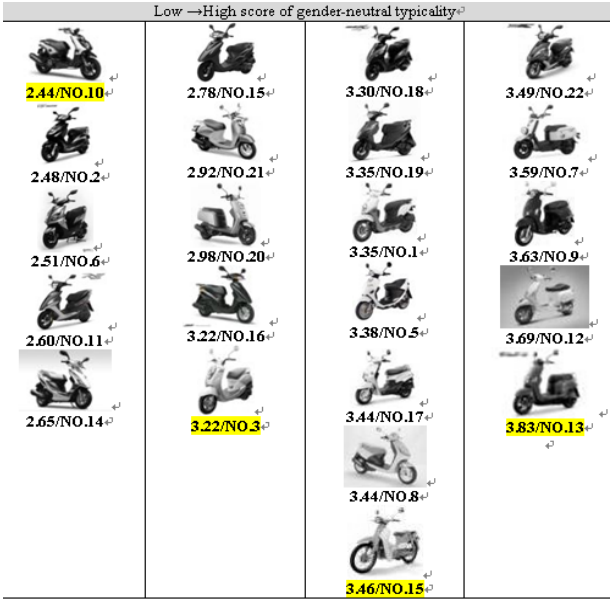

Figure-4. High score group and low score group for gender-neutral typicality.

Table-2. Relationship between emotion attributes and GN evaluations.

Variable	Coefficients *b*	*β*	t	Sig.
sense of design	1.370	1.258	4.383	0.00**
Neat	-1.851	-1.576	-7.070	0.00**
fashionable	-1.161	-0.993	-2.672	0.02*
comfortable	1.741	1.116	4.583	0.00**
aesthetic	0.958	0.755	2.936	0.01 *
delicate	-1.484	-1.089	-3.053	0.01 *
(Constant)	4.645		10.695	0.00 **
R=0.95; R^2=0.90; Sig.=0.00** ; Std. error of the estimate= 0.167				

The result of quantitative theory type I analysis

To explore which form attributes of a scooter has a greater influence on GN evaluation, quantitative theory type I analysis was conducted. Quantitative theory type I [6] is a multiple regression analysis technique for deducing the relationship between a quantitative variable (a dependent variable) and qualitative (nominal) variables (independent variables). Here, the dependent variable is GN evaluation of each experimental sample (scooter

design). Each experimental sample can be decomposed into the 10 independent form variables (A-J, as shown in Figure-3). Table-3 shows the Quantitative Theory Type I analysis results.

In the last two rows of Table-3, R represents the correlation between the observed and predicted values of the dependent variable, and ranges from 0 to 1. The coefficient of multiple determinations is R^2. This explains the linear relation between the independent variables (four design variables) and the dependent variable (factor scores). The higher the R^2 value, the better the linearity between the dependent and independent variables is.

Table-3. Result of quantitative theory type I analysis.

Form attribute		Product form types		GN evaluation	
				Category grade	PCC
A	Shape of head	A1	Square	0.571	0.965
		A2	Rounded	-2.667	
		A3	Streamlined	1.143	
B	Shape of headlight	B1	Rounded	1.515	0.962
		B2	Square	-2.612	
		B3	Streamlined	0.245	
C	Position of headlight	C1	Inclined plate	-0.284	0.973
		C2	Head	-1.061	
		C3	Head & inclined plate	0.431	
D	Type of headlight	D1	Single one (big)	-0.089	0.939
		D2	Pair	0.594	
		D3	One big & 2 small ones	0.165	
		D4	Single one (small)	-0.581	
E	Size of front inclined plate	E1	Big plate	0.238	0.836
		E2	Small plate	-0.238	
F	Form feature	F1	Geometric line	2.315	0.966
		F2	Large radius	-0.335	
		F3	Small radius	-0.637	
		F4	Muscle-looking	-0.907	
G	Type of raised angle Tail	G1	High	-1.090	0.965
		G2	Medium	-0.693	
		G3	Low	1.354	
H	Type of style	H1	Sporty	-1.304	0.972
		H2	Speedy	-0.463	
		H3	Retro-looking	1.442	
I	Color planning	I1	Single one color	0.623	0.966
		I2	Colored multi-division	-0.869	
		I3	Colored graph	-0.028	
J	Headlight coverage ratio	J1	High	0.037	0.189
		J2	Low	-0.011	
				R=0.987; R^2=0.975	

The partial correlation coefficients (PCC) indicate the relative importance of each of the four design variable. As Table-3 indicated that the variable with the highest PCC is the "C< Position of headlight >" (PCC =0.973), meaning that the front view of the scooter, especial the composition of headlight has the greatest influence on GN evaluation of consumer. "J< Headlight coverage ratio >" (PCC =0.189) is the least significant variable. Accordingly the "C< Position of headlight >" (PCC=0.973), "H< Type of style >" (PCC=0.972), "F< Form feature >" (PCC= 0.966), "I<Color planning>" (PCC=0.966) and "A<shape of head>" (PCC=0.965) have higher impacts on GN evaluation.

The category grades of a level indicate the effect of each design variable on each level for consumer preference. A positive grade indicates that this design variable level can increase the perceived GN with a scooter, while a negative grade should be avoided in scooter design. The form attributes, "F1< Geometric line feature > (2.315)", "B1< round headlight > (1.515)", "H3< Retro-looking >", "G3<low raised angle Tail> (1.354)" with the higher grades have greater impact on consumer GN evaluation. The numerical analysis result confirmed with the consumers' perception of GN, as shown in Figure3. Based on the analysis, the optimal combination of design attributes for GN design includes A3(streamlined head), B1 (round headlight), C3 (headlight on Head & inclined plate), D2(Paired-headlight), E1(Big plate), F1(Geometric line feature), G3(low raised angle Tail), H3(Retro-looking), I1(Single one color), J1(High headlight coverage ratio).The model can help the company and designers better understand consumers' preference of scooter design for the corresponding GN style.

CONCLUSIONS

The empirical results explored the consumers' perception on GN typicality evaluation. Factors, personality and comfort, underlying these emotion attributes of GN were also explored. According to analyzed result the important emotion attributes, "sense of design", "complex", "retro", "comfortable", "aesthetic" and "rough", to build the GN image were identified. By using Quantitative Theory type I the relationship between form attributes and users' preference of gender-neutral style on scooters were inferred. The analyzed result is used to enable product designers to obtain the optimal design alternatives that best meet consumers' preferences for a scoot design of GN style.

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