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## YOUNG WOMEN'S PERCEPTIONS OF REPLACEABLE UPPER SHOES BEFORE AND AFTER THE UPPER INTERCHANGE

Shih-Hung CHENG <sup>1a</sup>, Chieh-Ju LEE<sup>b</sup>

*Department of Industrial Design, National United University, Taiwan.*

<sup>a</sup> *achille.shc@gmail.com*

<sup>b</sup> *jessy199765@gmail.com*

### ABSTRACT

This study tries to investigate the visual perception of casual and formal leather shoe uppers, by conducting semantic differential evaluations. Twelve upper design renderings were generated based on six ideations with casual uppers converted into formal leather uppers. Based on a seven-point Likert scale, twelve renderings were evaluated using fifteen Kansei adjective pairs and young women's willingness to purchase. Factor analyses were performed to analyze the differences and factors between casual and formal leather uppers. In the factor analysis of upper styles, five factors were identified for casual uppers: evaluation, attention, fashion, protection, and temperament; and five factors for formal leather uppers: attention, formality, fashion, weight, and protection. Whether a young woman is looking for formal leather uppers or casual shoe uppers, fashion plays a crucial role in her decision to purchase shoes.

*Keywords:* footwear design, product emotion, customer perception, shoe upper replacement

### 1 INTRODUCTION

Footwear plays an indispensable role in today's life, including various kinds of functional footwear ranging from casual indoor shoes to outdoor shoes, showing our close connection with it. Among them, women's shoes come in many different types and styles, as footwear is required to complement clothing and perform certain functions. Under the impact of covid-19, due to maintaining a safe social distance, consumers panicked about going out shopping once upon a time, resulting in a sharp drop in shoe consumption. The lockdowns imposed by various countries to prevent the spread of the epidemic have directly caused the rupture of the global shoe industry

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<sup>1</sup> Corresponding author.

chain. Global shoe factories, especially those in Vietnam, once shut down for several months and delayed shipping, which once had a profound impact. Under different levels of lockdown control, office workers have adapted to working from home. Therefore, they have developed a habit of not wearing makeup and wearing more comfortable home clothes. Following the ban, their work clothes have evolved into a more casual style, and they won't dress too formally. In such a real-life context, this study is based on women's casual shoes and develops the replaceable upper designs of dress shoes for young women, as well as explores the before-and-after differences in young women's evaluation of the replaceable upper design. Looking forward to exploring new innovative directions for footwear design.

## **2 LITERATURE REVIEW**

### **2.1 The footwear industry in the post-pandemic era**

In the post-epidemic era, global athletic footwear sales will continue to grow, from being valued at \$109.7 billion in 2020 to reaching \$165 billion in 2030, registering a CAGR (Compound Annual Growth Rate) of 4.2% from 2021 to 2030 (Allied Market Research, n.d.). Even with social distance restrictions, more and more supermarkets and retail stores will provide consumers with easy access to sports shoes. Consumers will be willing to spend money on innovative technical properties such as friction regulation, waterproof quality, temperature control, and moisture management; in addition, governments across the globe are also focusing on increasing investments and new strategies to encourage people to participate in sports and physical activities (Sports Footwear Market, n.d.). On the other hand, the traditional leather shoe market is affected by the dramatic changes in lifestyle, especially the epidemic prevention measures of working from home, and its sales are more severe. For example, the Portuguese footwear industry is the third-largest footwear producer in the EU, but its exports from January to August 2020 decreased by 17% from the previous year. To maintain operations, footwear companies began to abandon the production of high-end leather shoes and turned to the production of comfortable shoes suitable for wearing at home or purchasing in supermarkets. Some shoe factories even switched to producing anti-epidemic masks and other related anti-epidemic supplies to reduce losses (Hindustan Times, 2020 Nov. 12).

The market pull is the main driving force in the footwear market, and the changes in lifestyle consumption patterns post-epidemics will have a profound influence. It is estimated that the amount of global utilitarian consumption has increased by 5%-20% in the past few years, and compulsory consumption (necessities) has increased by 40%-80%; the largest decline in consumption is hedonic consumption, and luxury goods are seldom consumed in this decline. The more significant sign is that the purchase of textiles, shoes, and clothing, which could be regarded as compulsory consumption before the epidemic, began to be regarded as luxury items in the process (Tarakci and Yildiz, 2020). As for outdoor adventure sports, such as rock climbing, parkour, skateboarding, surfing, bicycle motor cross, etc., many lifestyle sports athletes who prefer an open environment had an ambivalent attitude toward organized, restricted, or structured competition. Some lifestyle sports media even reminded the public to reduce group sports gatherings and avoid injuries to place less strain on overloaded health care systems (Smith, 2020).

## 2.2 The plight of the leather shoe industry

Sneakers and casual shoes have become the main types of footwear for young consumers. In today's increasingly flexible working environment, young people tend to wear comfortable clothing. In the work-from-home model, casual shoe sales have also been promoted. With the lifting of the lockdown and the reopening of offices, human daily life has entered a post-epidemic mode. However, it is unlikely that only slippers will be worn when going out in the post-epidemic era, even if this habit of wearing is exacerbated by the epidemic. The demand for shoes still corresponds to transitional shoes for going to work, participating in activities, and going out at night or on weekends. The sales volume of leather shoes or formal shoes began to decline before the spread of the new crown pneumonia epidemic. It is speculated that the possible reason is the excessive reliance on classic styles, resulting in a single product structure, which does not provide consumers with the design freshness of leather shoe styles. Leather shoes still face the challenge of diversified designs. Despite leather shoes not being favored by consumers due to their preference for formal business, well-known brands still pay attention to how they mix and match shoe materials and shoe types to meet post-epidemic life and work patterns. This also allows formal business orientation to be incorporated into innovative proposals, and thus serves as an important opportunity for this study to explore. In recent years, some innovative casual or sport shoes have been released with replaceable uppers (Figure 1). Therefore, it is worth discussing how much leather shoes and casual shoes can be converted by replacing the upper, and how many changes can be made to consumers' image evaluation.



**Figure 1.** TRANSHIELD footwear design (Retrieved from <https://sites.google.com/yuntech.org.tw/transhieldfootwear/home>)




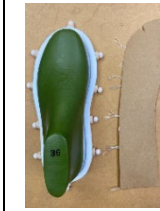




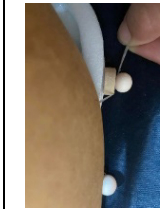

## 3 METHODS

### 3.1 Stimuli - women's shoe design renderings

Before designing the shoe's appearance, 5 conceptual structures for replacing the upper, characterized by notch, tenon, hook-and-loop, laces, and rope hook, were first tested in prototype mode (as shown in Table 1). Considering the duration (efficiency), 3 structures were selected for designing women's casual uppers, namely, notch, tenon, and hook-and-loop. In the development of casual shoe uppers, the knitted sock was used to present a sense of leisure. The research team then developed 2 upper appearance gray-scale proposals for every structure, totaling 6 casual shoe renderings (Figure 2). Six formal leather shoe renderings (Figure 3) were

designed to cover leather uppers on 6 casual shoes, respectively, to complete the interchange (Figure 4). These 12 shoe gray-scale renderings were the stimuli for the image evaluation of the semantic difference method.

**Table 1.** Prototyping and testing of five replaceable upper structures

Type	notch	tenon	hook-and-loop	laces	rope hook
Duration (second)	30.81	13.07	5.80	71.20	63.92
Prototype					
Detail					



**Figure 2.** Six gray-scale renderings of casual shoe upper



**Figure 3.** Six gray-scale renderings of formal leather shoe upper



**Figure 4.** The transformation from casual shoes to formal leather shoes in this study

### 3.2 Participants and procedure

The assigned participants were 15 female college or graduate students (average age: 21.33 y; age range: 19–24 y) and 15 female office workers (average age: 24.13 y; age range: 22–25 y). None of them had any foot injuries. To maintain a safe social distance due to the covid-19 epidemic, the experiment was conducted through online questionnaires. After viewing all the

stimulus renderings, the participants completed semantic differential (SD) evaluations, including 15 Kansei adjective pairs (as shown in Table 2, following the experimental settings of our previous research) and purchase intention (1 represents the least intention, and 7 represents the most intention). Each adjective pair was rated on a 7-level Likert Scale. In Table 2, the left adjective scored 1 point, the right adjective scored 7 points, and the middle 5 scales were not marked with a value. Participants completed the SD evaluation of one shoe rendering before moving on to the next stimulus rendering until all renderings were evaluated.

**Table 2.** 15 Kansei adjective pairs used in the SD evaluation (Cheng and Lee, 2021)

1. (1) minimalistic - (7) complicated	2. <b>(1) rough - (7) elegant</b>	3. (1) highly styled - (7) ordinary
4. <b>(1) exposed - (7) covered</b>	5. (1) dangerous - (7) safe	6. (1) classic - (7) modern
7. <b>(1) old-fashioned - (7) fashionable</b>	8. (1) business-casual - (7) sporty	9. (1) stiff - (7) flexible
10. <b>(1) single - (7) multiple</b>	11. <b>(1) low key - (7) eye-catching</b>	12. (1) block-structured - (7) flowing
13. (1) childish - (7) mature	14. (1) lightweight - (7) heavy	15. (1) static - (7) dynamic

## 4 RESULTS

### 4.1 Results of MANOVA

After data import, descriptive statistics were analyzed first, followed by a multivariate analysis of variance (MANOVA). The influences of shoe type and participant background were compared with SD evaluation. Two variables were considered independent, and the evaluation results of the 15 Kansei adjective pairs and purchase intention were treated as dependent variables. The result indicated significant influences of shoe type ( $F [16, 341] = 12.966, p < .00$ ), and participant background ( $F [16, 341] = 4.268, p < .00$ ) but not for the interaction between with shoe type and participant background ( $F [16, 341] = 1.466, p = .110$ ). Regarding the results of between-subjects effects, the SD evaluation results were affected by shoe type in 14 Kansei adjective pairs, except for “exposed–covered” ( $F [1, 356] = 1.262, p = .262$ ) and purchase intention ( $F [1, 356] = 3.268, p = .071$ ). As depicted in Figure 6, the median value of the 7-point scale (4) was regarded as the neutral baseline. It shows that both types of shoes tend to deliver a sense of “covered,” and casual shoes (mean: 4.04) are slightly easier for participants to buy than formal leather shoes (mean: 3.71). On the whole, the renderings of formal leather shoes are more “complicated,” “elegant,” “highly styled,” “safe,” “modern,” “fashionable,” “business-casual,” “stiff,” “multiple,” “eye-catching,” “block-structured,” “heavy,” and “static,” but less “mature” than those of casual shoes. As to the effect of participant background, compared with office workers, students tended to express that these shoe renderings were more “rough” ( $4.21 < 4.80, F [1, 356] = 13.326, p = .000$ ), “covered” ( $6.04 > 5.79, F [1, 356] = 3.949, p = .048$ ), “fashionable” ( $4.41 < 4.82, F [1, 356] = 5.563, p = .018$ ), “multiple” ( $4.86 > 4.40, F [1, 356] = 7.441, p = .007$ ) and “eye-catching” ( $4.16 > 3.70, F [1, 356] = 6.678, p = .010$ ).

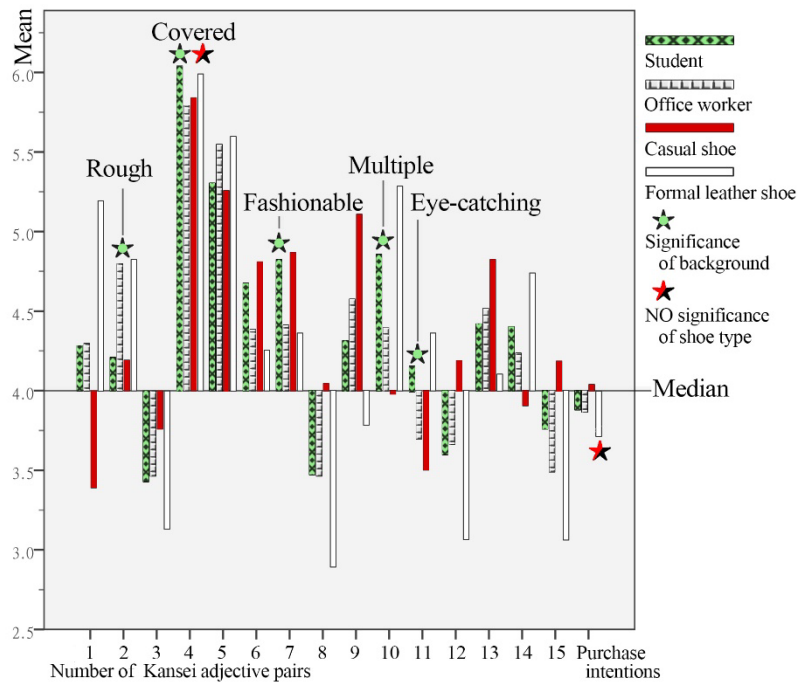


Figure 6. The effects of participant background and shoe type.

#### 4.2 Results of factor analysis

According to the results of MANOVA, the shoe type was a significant factor affecting more Kansei adjective pairs. The data of 6 casual shoe renderings and 6 formal leather shoe renderings were analyzed using factor analysis with Varimax rotation and Kaiser normalization, respectively. Five factors were extracted from the factor analysis results of casual shoes (Table 3) and named evaluation, attention, fashion, protection, and temperament (Table 4). As to the results of formal leather shoes, the other five factors were extracted (Table 3) and named attention, formality, fashion, weight, and protection (Table 5). After examining the correlation between purchase intention and 15 SD evaluations with the Pearson correlation coefficient, the results showed that the purchase intention of casual shoes was significantly associated with “old-fashioned–fashionable” ( $r=0.423$ ), “classic–modern” ( $r=0.268$ ), and “childish–mature” ( $r=0.291$ ) from low to moderate associations. The purchase intention of formal leather shoes also had low to moderate correlations with “old-fashioned–fashionable” ( $r=0.447$ ), “classic–modern” ( $r=0.428$ ), and “childish–mature” ( $r=0.217$ ). These three Kansei adjective pairs constituted the fashion component in the factor analysis of both shoe types, in other words, the purchase intention of both casual shoes and formal leather shoes has a moderate correlation with the fashion factor. Modern, fashionable, and mature shoes are more desirable.

Table 3. Total variance explained for casual shoes and formal leather shoes (with eigenvalues > 1)

Component	Casual shoes			Formal leather shoes			
	Rotation Sums of Squared Loadings			Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %		Total	% of Variance	Cumulative %
1	2.781	18.540	18.540	1	2.336	15.577	15.577
2	2.507	16.715	35.254	2	2.053	13.686	29.262

3	2.093	13.951	49.205	3	1.911	12.741	42.003
4	1.670	11.132	60.338	4	1.821	12.142	54.146
5	1.396	9.304	69.642	5	1.502	10.014	64.160

**Table 4.** Rotated component matrix of casual shoes

Kansei adjective pairs	1 evaluation	2 attention	3 fashion	4 protection	5 temperament
stiff - flexible	0.774	-0.151	-	-	0.100
lightweight - heavy	0.750	0.178	-	-	-
block-structured - flowing	0.687	-	0.311	-	0.112
business-casual - sporty	0.682	-	0.106	0.239	-0.368
static - dynamic	0.644	-	0.347	-	-0.462
single - multiple	-	0.814	-	-	-
low key - eye-catching	-	0.759	-	-	0.255
highly styled - ordinary	0.124	-0.752	-	0.159	0.141
minimalistic - complicated	-0.169	0.735	-0.264	-0.223	-0.159
old-fashioned - fashionable	0.267	0.116	0.805	-	-
classic - modern	0.359	-	0.767	0.116	-0.170
childish - mature	-	-0.235	0.716	-	-
exposed - covered	-	-0.144	-	0.879	-0.101
dangerous - safe	-	-0.125	0.136	0.844	0.175
rough - elegant	-	-	-	-	0.913

**Table 5.** Rotated component matrix of formal leather shoes

Kansei adjective pairs	1 attention	2 formality	3 fashion	4 weight	5 protection
low key - eye-catching	0.779	-	-	-	-
highly styled - ordinary	-0.721	-	-	-	0.146
single - multiple	0.707	-	0.173	-	0.155
minimalistic - complicated	0.692	-	-	-0.221	0.112
static - dynamic	-	0.817	0.226	0.205	-
rough - elegant	0.140	-0.774	0.126	0.212	-
business-casual - sporty	-	0.773	0.130	0.303	0.117
classic - modern	0.185	0.142	0.803	0.167	-
old-fashioned - fashionable	0.272	-	0.739	0.248	0.139
childish - mature	-0.222	-	0.702	-0.251	-
lightweight - heavy	0.104	-	-	-0.799	-
stiff - flexible	-	0.168	-	0.792	-
block-structured - flowing	-	0.298	0.301	0.395	-0.290
dangerous - safe	-0.105	-0.102	-	-	0.844
exposed - covered	0.154	0.152	-	-0.116	0.771

## 5 DISCUSSIONS AND CONCLUSIONS

Replaceable shoes belong to a relatively new retail market, and most of the existing cases are male-style. In this study, we tried to study the possible design direction of (formal leather) dress shoes in the future market by exploring women's shoes with replaceable uppers. The results showed that the willingness of young women to buy casual shoes was still slightly higher than that of dress shoes. However, because the difference was not significant, potential shoe developers in the future may consider using casual shoes as the base to increase the market acceptance of dress shoes. The purchase intention of participants for the two types of uppers was both related to fashion, which might reflect the customer preference of young women. In addition, this study achieved a similar result as the previous one: women are very sensitive to the coverage of shoe uppers. We chose to use knitted socks as the basic upper of casual shoes. Due to our focus on creating a prototype in our laboratory, we also covered the leather upper so it could become dress shoes. This setting might also make it easier for participants to feel covered. It may be a major shortcoming of this study. Researchers and footwear designers in the future should redesign this part to explore more potential paths for the leather shoe industry.

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