1. INTRODUCTION

Understanding the process by which consumers perceive products and make decisions is essential for product planning. Generally, footwear consumers browse the various shoes displayed on the shelves before selecting one for trial. They typically select a specific footwear from a pool of similar shoes. During this process, the consumers perceive, recognize, and distinguish between the styles of shoes. Thus, understanding the consumer’s perception is vital for the designers to create the desired styles.

For decades in Taiwan’s footwear industry, men’s shoes have generally been produced by male designers, and women’s shoes have generally been fashioned by women. Traditionally, the genders of the consumer and footwear designer are often the same, indicating that both genders lack the understanding of the other gender. For instance, almost all bridal-shoe designers in Taiwan’s footwear industry are women. Therefore, understanding the process by which consumers of each gender group distinguish various shoes is important for footwear designers, irrespective of their genders.

The current study applies the methods of classification, a basic cognitive process of classifying objects into categories [1], and semantic differential (SD) evaluation, a commonly used technique in Kansei image studies [2], to evaluate the differences in visual perception of footwear based on gender.

2. LITERATURE REVIEW

In certain industries, the designer’s gender is related to the gender attribute of the product; for instance, almost all automotive exterior designers are men. Moreover, the working personality trait of a few female automotive exterior designers is inclined toward rigidity or masculinity, because a majority of automotive market consumers are men [3], and consumer perceptions and customer preferences are dominant factors in most markets. In the global market, the lifespan of footwear has significantly reduced, particularly in the fast-fashion era [4]. In addition, insights into the preferences and voice of the customer (VOC) enable designers to create and design an even stronger experience before the customers decide upon their selection [5]. Kansei engineering provides access into the VOC and is applied to identify the consumer’s subjective emotional requirements [2, 6]. VOC has been extensively listened to and explored in the footwear industry [7-10].

Attempting to understand the consumer’s perceptions and preferences does not necessarily indicate knowing them personally. Insights into customer segmentation based on their gender, occupation, age, and disposable income assist designers to perform better [11]. Thus, understanding the classification of footwear style based on customer insight can be the first step toward reflecting the VOC. Although gender stereotyping is evident, certain scholars have reported that several traits previously associated with women are associated with men as well. In addition, men are not linked to certain stereotypical
male traits [12]. Under the context of general gender expression, the traits of strength, rationality, masculinity, and self-reliance exhibit a greater association with men than women; women manifest a more emotional, feminine, and loving nature [13]. This gender bias under the gender-conscious atmosphere has been explored for a long time. In a related study, participants were asked to use masculine or unbiased generics to express and project their imagery of a particular sentence onto the person they visualized; male bias was found to be higher under the masculine generic condition than under the unbiased condition, and overall, men were more male-biased than women [14]. Furthermore, the accessibility of self-rated gender traits varies depending on the product type [15].

3. METHODS

In the first stage of this study, a pilot test was conducted to confirm the stimuli of the main experiments. The second stage included the formal classification and description task, wherein dendrograms of cluster analyses were used to detect the differences in the classification results based on gender. The initial result was published in KEER 2020 [16]. Furthermore, the SD evaluation of footwear was applied to continually explore the various footwear perception factors of the two genders. Analysis of variance (ANOVA) with post-hoc tests (pairwise comparison), nonparametric tests (Mann-Whitney U test) and principal component analysis with Varimax rotation with Kaiser normalization was conducted in Statistical Product and Service Solutions (SPSS) to compare the gender differences in visual perception of footwear.

3.1 Pilot test

The initial classification of footwear and the description were based on the similarity of shoe style to explore the gender perception toward the footwear. The current study used images of footwear samples, because collecting a large number of real footwear samples was a tedious task. In the pilot test, an initial classification task was conducted to classify 86 images of footwear samples into a limited number of groups—four, six, and eight groups. The primary objective involved reducing the total number of images to shorten the duration of the main experiment. In addition, this action assisted the subjects in focusing their attention and maintaining judgment. The secondary objective ensured appropriate guidance to the participants by determining the minimum number of classifications required for avoiding ambiguous classifications in the main experiment.

3.1.1 Participants and materials

Three college students from the department of Industrial Design participated in the pilot test. In total, 108 images of footwear were collected from various websites and magazines. The research team initially examined these images and removed 18 similar images. As depicted in Figure 1, the images were printed in 10 × 10 cm full-color format, and four more images were discarded owing to insufficient resolution. Therefore, 86 images of dress shoes and sneakers were selected for the pilot test.

3.1.2 Procedure and initial results

Initially, all 86 footwear images were displayed simultaneously. The subjects were asked to classify these images into eight groups and mark each group with a descriptive name. Thereafter, the participants were asked to reduce the number of groups from eight to six and revise their descriptive names accordingly. Finally, the participants reduced both the number of groups and the corresponding descriptive names to four. During the process, we recorded the data of the groups and descriptive names.

Subsequently, the results from both the gender groups were compared to analyze the overlap of classifications between the two genders. The comparative analysis revealed the persistence of a particular group—hiking shoe—classified by the male participants that rarely overlapped with the results of the female group. Among the initial eight groups, there were two groups—casual leather shoes and bold-colored multi-material leather shoes—that rarely overlapped, while there was a pair of groups that exhibited an overlap of more than 30%. In particular, there were significant cognitive differences between the two genders for the clearly overlapping group. With six groups, there were two additional groups that overlapped distinctly—sneakers—sneakers and sneakers—running shoes. Furthermore, three pairs exhibited an overlap of more than 30% during the classification into four groups, which may have caused excessively ambiguous results. Therefore, the formal
classification task reoriented the participants to classify the stimuli into at least six groups. In addition, the highly similar images were screened out based on a dendrogram output obtained from the cluster analysis that was conducted to reduce the total number of images and improve the time-efficiency of the subsequent experiment, while preserving the diversity of the stimuli styles. Thereafter, the 86 footwear images were classified into 12 small groups, which were further reduced to 40 images corresponding to the 12 groups (Figure 1).

3.2 Formal classification task with description

The primary objective of the formal classification task involved differentiating the recognition of the footwear styles between the two genders. The secondary objective explored the differences in the style descriptions of shoes with respect to men and women. The participants were guided to describe each shoe style, classify the stimuli based on similarity, and describe the image of each classification. Each participant of the main experiment was asked to classify the stimuli into at least six groups.

3.2.1 Participants and materials

The assigned participants were 15 women (average age: 21.1 y; age range: 20–24 y) and 15 men (average age: 25.4 y; age range: 20–51 y) from northern Taiwan. None of them had any foot injuries. The stimuli set of 40 images was faded the background and shadow. For avoiding looking unnatural and floating in the air, the background and shadow of images were not completely removed. They were also adjusted to grayscale to avoid color interference, and all the images were printed in 10 × 10 cm size (Figure 1).

3.2.2 Procedure

First, the complete stimuli set of 40 footwear images was displayed on the laboratory table to improve the participants’ sight in image evaluation. The participants were allowed to briefly glance at all the images and were then asked to describe each shoe using an adjective to complete the description task. Subsequently, each participant was asked to classify the stimuli set into at least six groups based on similarity of shoe styles. In addition, each participant was asked to name the groups using an adjective to comprehensively describe the group images after completing the classification task. Moreover, all verbal descriptions were recorded during this grouping process. The verbal descriptions for individual stimulus and the group classified by each participant were obtained, and the images frequently used for classifying the footwear styles were further synthesized and analyzed.

3.3 SD evaluation

3.3.1 Pilot test

The words mentioned by the participants in their verbal descriptions were compiled and identified as the Kansei adjectives for footwear. After eliminating the redundant adjectives, two female and two male graduate students from the department of Industrial Design participated in the generation of Kansei adjective pairs. They were asked to find the antonyms for these (44) adjectives, and the antonyms with at least 50% repetition were selected, i.e., based on the similar choices of more than two graduate students. Consequently, the 44 Kansei adjective pairs were generated and categorized into 11 groups based on similarity. Finally, the number of pairs were reduced to 30 in proportion to the 11 groups.

In the pilot test of SD evaluation, the selected (30) Kansei adjective pairs were used to evaluate the stimuli (40 footwear images) respective to a seven-point Likert scale after the initial viewing of the entire set. The participants were five male and five female students from the design department, who had participated in the classification task. The pilot-test data were analyzed using the Pearson product-moment correlation coefficient in SPSS for reducing the number of adjective pairs. The initial results indicated that four Kansei adjective pairs were not highly correlated with all other adjectives (r < 0.5), including minimalistic–complicated, flowing–block-structured, heavy–light, and multiple–single. Considerations of the context of correlation coefficient, standard deviation, and mean yielded the selection of 11 adjective pairs. Thus, the number of adjective pairs was reduced from 30 to 15, as presented in Table 1. Each former adjective is treated as 1 point and the latter adjective is 7 points.

|     | 1   | 2   | 3   |
|-----|-----|-----|-----|
| 1   | (1) minimalistic | (1) elegant | (1) highly styled |
|     | (7) complicated  | (7) rough   | (7) ordinary     |
| 4   |     |     |     |
| 7   | (1) covered     | (1) safe   | (1) classic     |
|     | (7) exposed     | (7) dangerous| (7) modern    |
| 8   |     |     |     |
| 10  | (1) fashionable | (1) business-casual | (1) flexible |
|     | (7) old-fashioned| (7) sporty | (7) stiff      |
| 11  |     |     |     |
| 13  | (1) multiple    | (1) eye-catching | (1) flowing   |
|     | (7) single      | (7) low key | (7) block-structured |
| 14  |     |     |     |
| 15  | (1) mature      | (1) heavy | (1) dynamic    |
|     | (7) childish    | (7) lightweight | (7) static  |
3.3.2 Formal SD evaluation

These 15 Kansei adjective pairs were applied to evaluate the 40 images in the stimuli set using a seven-point Likert scale. Moreover, the 30 participants of the classification task were invited to participate again, among whom 10 participants had completed the SD evaluation in the SD pilot test, and the remaining 20 participants were subsequently recalled for formal SD evaluation. Additionally, 15 women and 15 men were newly recruited, who were not involved in the classification task and did not have any foot injuries. The summary information of the 60 participants (4 groups) is presented in Table 2.

4. RESULTS

4.1 Classification results

The analysis results of the classification task with description marked each footwear sample and the respective group with 30 adjectives describing the individual features. The group data of each participant were entered as a 40 × 40 matrix prior to the cluster analysis in SPSS. The matrix was used to record the similarity between the members of every possible pair of footwear images. Subsequently, the average 40 × 40 matrix of 30 participants was used for cluster analysis. Moreover, the average 40 × 40 matrices of 15 male and 15 female participants were applied to determine the gender differences in perception of footwear images.

Overall, the dendrogram obtained using Ward’s method was used to categorize the 40 shoes into four groups, which can be broadly distinguished into two major types: leather shoes and sneakers (Figure 2). Furthermore, the results revealed that the footwear market can be classified into two main categories: shoes and sneakers. The four groups were more clearly characterized based on the frequency of descriptions of individual footwear rather than sorting the images of groups that each member belonged to. Participants tended to describe Group A as “fancy and gorgeous” (23.3%) and “highly styled” (16.1%), and Group B as “retro–old-fashioned” (15.1%) and “comfortable and restrained” (13.1%) based on the images in the groups. However, focused on the descriptions of individual footwear, the participants tended to describe the members of the former group as “fancy and exaggerated” (18.9%) and “mature and traditional” (9.4%), whereas that of the latter as “casual” (15.4%) and “classic and traditional” (8.5%). On the contrary, Groups C and D were too varied to be differentiated from each other after checking the images; participants tended to describe the individual sneakers of the former as “covered and protective” (9.7%) and the latter as “sporty” (10.3%) and “street-style” (9.7%) [16].

Upon comparing the two average matrices of the 15 male and 15 female participants, the total number of shoes were classified into five groups: Group m-A to Group m-E for male participants and Group f-A to Group f-E for female participants; similarly, these were distinguished as either leather shoes or sneakers.

Table 2: Four groups of participants in SD evaluation

| No. (average age) | Men       | Women      |
|-------------------|-----------|------------|
| Participated in classification task | 15 (25.4 y) | 15 (21.1 y) |
| Newly recruited   | 15 (20.6 y) | 15 (21.6 y) |

Figure 2: Dendrogram of cluster analysis
However, the characterization of these groups revealed the gender factor affecting the classification of footwear styles. Although Groups m-A and f-C appeared almost identical among the groups, sorting the group images demonstrated the trend of male participants describing these shoes as “eye-catching” and “fashionable and gorgeous,” however, the female participants were more likely to describe them as “personal styled” and “fancy and exaggerated.” The most common descriptions quoted by male and female participants for individual footwear were “fancy and exaggerated” and “elegant and refined,” respectively. The female participants seemingly accepted the “exaggerated shoes” and regarded them as “elegant and refined,” as rearranged and presented in Table 3.

The remaining man-classified groups partially overlapped with the other woman-classified groups. Notably, the overlap did not occur between sneakers and leather shoes. The results for the remaining individual leather shoes (Table 4) depicted that male participants used “casual,” “comfortable,” “elegant-gorgeous,” and “mature-steady” as the classification criteria, whereas female participants often considered “mature-conservative,” “simple-ordinary,” “formal,” and “lady-elegant” as the classification criteria. Moreover, male participants often described the group images as “casual” and “formal business,” and female participants described them as “formal polite” and “fashionable.”

As depicted in Table 5, the male participants tended to feel the sense of “sporty-speedy,” “high-tech,” and “wrapped-steady” while perceiving a pair of sneakers, whereas the female participants often sensed “sporty,” “woven-breathable,” and “heavy.” For the group images of sneakers, the male participants were more likely to perceive them as “young-trendy” and “sport-functional,” whereas the female participants perceived them more as “sporty,” “thick-solid,” and “hip-hop-fashionable.”
4.2 Results of ANOVA

The influences of gender, stimuli, and participant experience were compared with SD evaluation, irrespective of participation in the classification task; three variables were considered as independent, and the evaluation results of the 15 Kansei adjective pairs were treated as dependent variables. A repeated measures ANOVA was applied to test the statistical significance. The result indicated significant influences of the Kansei adjective pairs ($F_{14, 31360} = 300.797, p < .05$), gender ($F_{1, 2240} = 42.104, p < .05$), and stimuli ($F_{39, 2240} = 25.929, p < .05$) but not for the participant experience ($F_{1, 2240} = 2.778, p > .05$). Therefore, the stimuli and Kansei adjective pairs selected in this study were verified to exhibit a considerable degree of coverage. Moreover, the SD evaluation results were unaffected by the participation in the classification task.

As depicted in Figure 3, the median value of the 7-point scale (4) was regarded as the neutral baseline. The post-hoc tests (pairwise comparison t-test) indicated that gender affected six Kansei adjective pairs significantly ($p < .05$, marked as asterisks), namely, “Covered–Exposed” (No. 4), “Safe–Dangerous” (No. 5), “Flexible–Stiff” (No. 9), “flowing–Block-structured” (No. 12), “Heavy–Lightweight” (No. 14), and “Dynamic–Static” (No. 15). In particular, women were more likely to perceive shoes as “covered,” “safe,” “block-structured,” “heavy,” and “static,” whereas, men were more likely to perceive shoes as “stiff” while viewing.

4.3 Results of Mann-Whitney U test

In terms of strict definition, the data obtained from SD method has doubts about whether it is suitable for parametric analysis [17]. We additionally conducted the Mann-Whitney U test of nonparametric tests. The results, similar to those of ANOVA, indicated significant influences of the stimuli and gender on Kansei adjective pairs ($p < .05$). Among them, gender affected five Kansei adjective pairs significantly ($p < .05$, marked as U in the Figure 3). Through Mann-Whitney U test, it can be inferred that gender did not significantly affect the feeling of “Dynamic–Static.”

4.4 Results of Factor Analysis

According to the results of the above statistical tests, the data of 30 male and 30 female participants were analyzed using factor analysis with Varimax rotation and Kaiser normalization, respectively. Four factors were extracted from the results of male participants (Table 6) and named as: evaluation, attention, feature, and protection (Table 7).

Similar to the result of rotation sums of squared loadings for male participants, the factor analysis for female participants yielded four factors (Table 8). Considering

![Figure 3: Gender effect on 15 Kansei adjective pairs](image)

| Component | Rotation Sums of Squared Loadings |
|-----------|----------------------------------|
| Total | % of Variance | Cumulative % |
| 1 | 5.192 | 34.610 | 34.610 |
| 2 | 2.985 | 19.902 | 54.512 |
| 3 | 2.572 | 17.147 | 71.659 |
| 4 | 2.441 | 16.271 | 87.930 |

| Component | Rotated component matrix (male participants) |
|-----------|----------------------------------|
| Kansei words | Component |
| 1 Evaluation | 2 Attention | 3 Feature | 4 Protection |
| flexible | .942 | .217 | -1.920 | .920 |
| dynamic | .888 | -.272 | .292 | .841 |
| classic | -.825 | -.217 | -.920 | .920 |
| business-casual | -.820 | -.217 | -.920 | .920 |
| fashionable | .725 | .888 | .582 | .582 |
| mature | -.675 | .217 | -.217 | -.217 |
| eye-catching | .102 | .888 | .888 | .888 |
| highly styled | .289 | -.217 | -.217 | -.217 |
| elegant | -.333 | .102 | -.217 | -.217 |
| minimalistic | -.250 | .289 | -.217 | -.217 |
| multiple | .477 | .289 | -.217 | -.217 |
| flowing | .596 | .102 | -.217 | -.217 |
| heavy | -.455 | .289 | -.217 | -.217 |
that the components in the four factors for women were different from those for male participants, they were carefully named as: evaluation, charm, volume, and coverage (Table 9).

The cumulative squared loadings exhibited excellent percentages (male participants: 87.930%; female participants: 85.825%) for the extracted principle components. It indicated that these factors with good explanatory power were quite convincing for the gender effect on footwear perception.

### 5. DISCUSSIONS AND CONCLUSIONS

The results of the cluster analyses indicated that leather shoes and sneakers were the main footwear styles that could be perfectly distinguished from each other. Leather shoes could be distinguished into two styles: fancy–gorgeous and old-fashioned. Similarly, sneakers could be distinguished into two styles: protective and sporty (as Figure 2). Thus, the classification of leather shoes was determined by the style and that of sneakers was evaluated based on its functionality. The results also indicated that a type of woven–embroidered leather shoes perfectly overlapped the two genders and could be described as “fancy and exaggerated” by male participants and as “elegant and refined” by female participants (as Table 3). However, male and female participants differed in their classification of other leather shoes and sneakers. The men tended to classify leather shoes as “formal” or “casual,” while simultaneously distinguishing sneakers based on “young-trendy” or “functional.” Women often perceived leather shoes as being “polite” or “fashionable” and sneakers as being “sporty” or “thick-solid.” In other words, men were more concerned about the occasion or functionality of footwear, while women paid more attention to whether they were in line with fashion. The results concluded that women were more likely to consider footwear as a part of their outfit, whereas men perceived footwear as a tool.

The results of repeated measures ANOVA and Mann-Whitney U test indicated a gender effect on the visual perception of footwear. Women were more likely to perceive the coverage, safety, block-like structure, and weight attributes of footwear and expressed sensitivity toward these attributes. Therefore, designers of women’s footwear could avoid proposing an over-covered, extremely safe, block-like, or obviously heavy design idea. On the contrary, men were more likely to consider the stiffness attribute in shoes, indicating that men focused on functionality and wanted their footwear to be more flexible.

The results of the factor analyses indicated that men and women focused on four major factors, respectively. The first factors for men and women were so highly overlapped that we gave them the same name “evaluation.” And the only different component of “evaluation” was “safety” attributes, which women focus on. However, the results of SD evaluation illustrated that women were likely to consider most footwear as highly safe. This implies that footwear with a high emphasis on safety are not easy to be favored by women. As to male factor “attention,” men had a clearer idea of whether the style of footwear was obvious or eye-catching. Men were less likely to mix the concept of “highly styled” or “eye-catching” with other components. But with regard to the factor “feature,” there were more components, showing that men’s perception of this factor is more divergent. Finally, about female factor “volume” and “coverage,” women were more precise in perceiving these two factors. This was consistent with the results of the classification task, wherein female participants tended to use “woven-breathable,” “heavy,” and “thick-solid” to describe footwear. Therefore, the attribute of lightweight and breathable should not be ignored, particularly in the design process of footwear for women.

### Table 8: Total variance explained for female participants

| Component | Rotation Sums of Squared Loadings |
|-----------|----------------------------------|
|           | Total % of Variance | Cumulative % |
| 1         | 5.320               | 34.865       | 34.865       |
| 2         | 3.607               | 24.047       | 58.912       |
| 3         | 2.471               | 16.475       | 75.387       |
| 4         | 1.566               | 10.439       | 85.825       |

### Table 9: Rotated component matrix (female participants)

| Kansei words | Component          | 1 Evaluation | 2 Charm | 3 Volume | 4 Coverage |
|--------------|--------------------|--------------|---------|----------|------------|
|              |                    | Total        | % of     | Cumulative % |              |
|              |                    |              | Variance |           |            |
| flexible     | -0.902             | -0.133       | 0.137   | -0.199    |            |
| dynamic      | 0.882              | 0.202        | -0.108  | 0.323     |            |
| business-casual | -0.868       | -0.125       | 0.111   | -0.327    |            |
| classic      | -0.849             | -0.292       | -0.179  | -0.265    |            |
| mature       | -0.765             | -0.315       | 0.112   |            |            |
| fashionable  | 0.698              | 0.398        | 0.298   | 0.326     |            |
| safe         | 0.483              | -0.452       | -0.482  | 0.300     |            |
| eye-catching | -                  | -0.903       | 0.208   | 0.183     |            |
| highly styled| 0.158              | -0.896       | -0.208  | 0.087     |            |
| minimalistic | -0.199             | -0.865       | 0.337   | 0.115     |            |
| multiple     | 0.482              | -0.722       | -0.318  | 0.149     |            |
| heavy        | -0.195             | -                | -0.875  | 0.304     |            |
| elegant      | -0.519             | -0.258       | 0.709   | -0.179    |            |
| flowing      | 0.453              | 0.133        | 0.695   | 0.138     |            |
| covered      | 0.209              | -                | -0.244  | 0.883     |            |
ACKNOWLEDGEMENTS
This study was supported by Taiwan’s Ministry of Science and Technology under Research Grant MOST 108-2410-H-239-005-. The author is grateful of their support. In addition, the author would like to thank Professor Chien-Cheng Chang for his suggestions on the methodology.

REFERENCES
1. Chang, C.-C., and Wu, J.-C.; The underlying factors of product form classification, International Journal of Industrial Ergonomics, 39(5), pp.667-680, 2009.
2. Schütte, S., Eklund, J.A.E., Axelsson, J.R.C., and Nagamachi, M.; Concepts, methods and tools in Kansei engineering, Theoretical Issues in Ergonomics Science, 5(3), pp.214-231, 2004.
3. BMWBLOG; http://www.bmwblog.com/2011/04/16/video-designers-perspective-z4-with-juliane-blasi/ (accessed 2020.11.28).
4. McKinsey & Company Official Website; http://www.mckinsey.com/business-functions/sustainability/our-insights/style-thats-sustainable-a-new-fast-fashion-formula (accessed 2020.11.28).
5. Shep Hyken’s customer service blog; https://hyken.com/customer-experience-2/customer-preference/ (accessed 2020.11.28).
6. Rosyidi, C. N., Laksono, P. W., and Nagamachi, M.; Factor analysis of Kansei words for female batik clothes using three stages research: Looking, touching, and wearing, Advanced Science Letters, 23(1), pp.100-103, 2017.
7. Solves, C., Such, M.-J., González, J.C., Pearce, K., Bouchard, C., Gutierrez, J.M., Prat, J., and García, A.C.; Validation study of Kansei engineering methodology in Footwear design. In; Bust, P.D. (ed.), Contemporary ergonomics 2006, Taylor & Francis, Great Britain, pp.164-168, 2006.
8. Green, A., and Chattaraman, V.; Creating an affective design typology for basketball shoes using Kansei Engineering methods. In: Fukuda, S. (ed.), Advances in Affective and Pleasurable Design; AHFE 2018. Advances in Intelligent Systems and Computing, 774. Springer, Cham. pp.355-361, 2019. https://doi.org/10.1007/978-3-319-94944-4_38
9. van Lottum, C., Pearce, K., and Coleman, S.; Features of Kansei engineering characterizing its use in two studies: Men’s everyday footwear and historic footwear, Quality and Reliability Engineering International, 22(6), pp.629-650, 2006.
10. Shieh, M.-D., and Yeh, Y.-E.; Developing a design support system for the exterior form of running shoes using partial least squares and neural networks, Computers & Industrial Engineering, 65(2013), pp.704-718, 2013.
11. I Want It Now - the customer engagement blog; https://iwantitnow.walkme.com/understanding-your-customer-preferences/ (accessed 2020.11.28).
12. Ford, J.B., Voli, P.K., Honeycutt, E.D., and Casey, S.L.; Gender role portrayals in Japanese advertising: A magazine content analysis, Journal of Advertising; 27(1), pp.113-124, 1998.
13. Ivits, S., Johnson, F., Kelly, N., and LeBel, S.; Gender spectrum: What educators need to know. Pride Education Network, 2018. https://teachbcdb.bctf.ca/permalink/resource432 (accessed 2020.11.28).
14. Hamilton, M.C.; Using masculine generics: Does generic increase male bias in the user’s imagery?, Sex Roles, 19(11-12), pp.785-799, 1988.
15. Chang, C.; The influence of masculinity and femininity in different advertising processing contexts: An accessibility perspective. Sex Roles, 55, pp.345-355, 2006.
16. Cheng, S.-H., and Lee, C.-J.; Effect of gender on footwear style classification, KEER2020: Harmonious Value Creation in Inclusive Society, 2020.
17. Calver, M., and Fletcher, D.; When ANOVA isn’t ideal: Analyzing ordinal data from practical work in biology, The American Biology Teacher, 82(5), pp.289-294, 2020.

Shih-Hung CHENG (Non-member)
Shih-Hung Cheng is an Assistant Professor in the Department of Industrial Design, National United University (NUU), Taiwan. He received his PhD from National Chiao Tung University (NCTU) in 2014. He supervises master’s students in the Program of Department of Industrial Design, NUU. Cheng is interested in Kansei engineering, users’ emotional responses, embodied experiences, transportation design, and footwear design. He is also involved in innovative research in neuroscience for bridging the gap between cognition research and design practice.

Chieh-Ju LEE (Non-member)
Chieh-Ju Lee is a graduate student supervised by Dr. Cheng. She was a two-month summer intern in Qingyuan Global Technology Services (GTS) in 2019. Currently, she is exploring research related to women’s footwear for her master’s degree thesis.