

# Understanding Gender Differences in Visual Information Processing of Clothing

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**Abstract:** Throughout human history, clothing and jewellery has served both functional and symbolic purposes. This study pays attention to whether biological genders have different paradigms of visual information processing concerning clothing and jewellery. In this study 20 participants viewed a series of photos and the viewing behaviors were recorded by an eye tracker. According to the eye tracking data, that both females and males paid similar levels of attention on detail decorations. And females showed higher detail information processing capability. At the same time, both genders paid more attention to models' faces over jewellery in close-up facial photos. Potential reasons of above findings are also discussed. The results of this study can help shed light on the aesthetic appreciation of females and males. And findings can further benefit the fashion industry which facilitates product design and marketing strategy.

**Keywords:** Gender, Visual Information Processing, Clothing, Eye Tracking

## 1. Introduction

As a social commodity, clothing and jewellery are usually infused with fashion elements to reflect individual tastes. In light of the differences between males' and females' sense of beauty, the clothing industry strives to make clothes that fit different genders. Indeed, numerous studies have shown that the aesthetics of clothing is influenced by the aesthetic preference of both genders: Males are usually thought of as being physically attractive with "firm bodies", emphasizing rigid lines and the outline; at the same time, females are viewed with "soft" and "tortuous degree", emphasizing smooth lines <sup>[1]</sup>. Similarly, another study investigated the difference in aesthetics of boys and girls a study. This study primarily compared the lines and colors children used during drawing. The result indicated that girls tended to use brighter colors and soft lines to fill up the blank space than boys did. At the same time, it found that males tend to activate more of the right hemispheres in the given experiment, while females utilize both right and left hemispheres <sup>[2]</sup>. Similar conclusion was found by Ma. When females and males use their brain, females tend to use whole brain area. In contrast, males tend to only use specific parts of their brain <sup>[3]</sup>.

This study aims at investigating the differences between how males and females view clothing and jewellery. Through the use of an eye tracker, the appreciation process can be traced and any differences can be understood. This study could help improve the understanding to aesthetic appreciation between two gender, so that enable the clothing and fashion industry to better design products that fit females' and males' aesthetic appreciation respectively as well as facilitate advertisement design.

## 2. Method

### 2.1 Participants

In the study, a total of 20 individuals (M = 33.00, SD = 9.32) were randomly recruited at a shopping mall in Shanghai, China, with 10 females and 10 males. Participants were informed they would see a series of photos during the experiment. They were informed of the potential risks of the study and consented to participate in the study. Participants were divided into two groups according to biological genders.

## 2.2 Stimuli

Participants were asked to watch a series of photos of gender-neutral clothing, which reduced the variability resulting from different clothing and jewellery preferences in gender. This series of photos consists of two types: type I displays models' catwalk show with whole body, including faces of models, decorations on outfits (considered as details), upper outfits, lower outfits; type II are close-up photos of model's faces wearing ear rings (considered as details).

## 2.3 Experimental design

The study used an in-subject design. Participants were asked to view a dozen photos divided into two types, as described above. Researchers first asked the participants to sign the consent form. Afterwards, participants were asked to sit in front of a screen. The screen was connected to a laptop and an eye tracker (7invensun, A6). Following a successful three-point calibration procedure, participants were asked to watch nine type I pictures and three type II pictures one by one.

The display sequence of photos is fixed. The task took approximately twelve minutes to complete, and the display time of each photo was seven to ten seconds. After finishing watching all the pictures, participants were asked to fill out a questionnaire. For type I images, AOI can be classified as outfits (including upper outfits, lower outfits and decorations on outfits), decorations on outfits (considered as details), face; For type II images, AOI can be classified as faces and ear rings (considered as details). After the data was categorized into biological gender categories, analysis and discussion were carried out.

## 2.4 Data analysis

To test if females and males view clothing and jewellery in different ways, a T-test has been conducted with explanatory variables (biological genders) and response variables, total fixation duration (FD) and fixation count (FC), in outfits areas, faces and details of all photos.

## 3. Result

T-tests were conducted on all types of photos. For details in type I photos, FC of females ( $M=0.93$ ,  $SD=0.29$ ) was significantly ( $t=2.23$ ,  $P < .05$ ) smaller than that of males ( $M=1.70$ ,  $SD=0.93$ ), and FD was not significant ( $t=0.63$ ,  $P > .05$ ). For details in type II photos, FC shows a significant difference ( $t=-2.16$ ,  $P < .05$ ) between females ( $M=0.21$ ,  $SD=0.36$ ) and males ( $M=0.4$ ,  $SD=0.52$ ), and FD was not significant ( $t=-0.95$ ,  $P > .05$ ). For faces in type I, there is no significant difference between females and males in FC ( $t=1.43$ ,  $P > .05$ ) and FD ( $t=1.43$ ,  $P > .05$ ). For outfits in type I, there is no significant difference between females and males in FC ( $t=1.43$ ,  $P > .05$ ) and FD ( $t=0.64$ ,  $P > .05$ ). For faces in type II there is no significant difference between females and males in neither FC ( $t=-0.76$ ,  $P > .05$ ) nor FD ( $t=1.17$ ,  $P > .05$ ). However, in type II photos, both genders have significant difference on viewing faces (FC:  $M_{male}=4.20$ ,  $M_{female}=3.67$ , FD:  $M_{male}=3.95$ ,  $M_{female}=4.99$ ) and details (FC:  $M_{male}=1.53$ ,  $M_{female}=0.40$ , FD:  $M_{male}=1.04$ ,  $M_{female}=0.21$ ) in terms of FC ( $t_{male}=3.73$ ,  $P_{male} < .05$ ,  $t_{female}=6.36$ ,  $P_{female} < .001$ ) and FD ( $t_{male}=4.16$ ,  $P_{male} < .001$ ,  $t_{female}=7.88$ ,  $P_{female} < .001$ ). Table 1 and 2 shows the total FD and FC of males and females in type I and type II photos.

Table 1: The total FD and FC of males.

	FD (s)		FC (s)	
	Type I	Type II	Type I	Type II
Face	0.74	3.95	0.67	4.20
Details	1.70	1.04	1.70	1.53
Outfits	2.74	-	3.41	-

Table 2: The total FD and FC of female.

	FD (s)		FC (s)	
	Type I	Type II	Type I	Type II
Face	3.39	4.99	0.30	3.67
Details	0.93	0.21	0.93	0.40
Outfits	2.46	-	2.39	-

#### 4. Discussion

In both type I and II photos, total FD showed no significance between females and males on viewing details which means both genders paid similar levels of attention on detail decorations. However males had higher FC on viewing details than that of females. This indicates males process less detail information in per fixation. Therefore females demonstrated higher ability on processing detail information. This finding is similar with a previous research. Baron-Cohen concluded males showed lower detail information processing ability in eye-tracking tasks than females did [4]. Following researches may explain the reason behind. According to Wang, males utilize more of their right brains to absorb beauty-related information than females do, instead females use both right and left hemispheres [5]. Neuroscientists have discovered that right hemispheres of human brains specialize in processing general patterns rather than specific objects. On the other hand, left hemispheres tend to concentrate on local features [6]. Above all, in this study females and males paid similar levels of attention on details of clothing and jewellery. Comparing to females, males showed lower capability on processing detail information. At the same time, in type II photos both females and males paid more attention to faces than details. As close-up photos of faces, models' faces occupy the dominant portion in photos. That may explain why both females and males spend more time on viewing models' faces in type II photos. Another study has similar findings which suggests models' faces would attract people's attention over the brand and product [7]. Moreover, models used as stimuli in this study have strong facial traits. This is also a potential reason why both genders spent more time on faces in type II photos. Above analysis indicates when if the model's face occupies the major part of a poster or has strong facial traits, consumers might be distracted from products or brand related information.

Some limits still exist in the experiment. The majority of models chosen in photos as stimuli are female and models also have relatively stronger facial traits, which might cause participants more likely to focus on the appearance. When delineating the AOI areas, some small edges or corners of AOI are overlapped, resulting in minor deviations in the eye tracking data. For further research in the same field, both female and male models are suggested to be included as stimuli.

#### References

- [1] Xu G.L. (2011). *Analysis of clothing aesthetic deposits from gender differences. Eastern Corporate Culture* (12), 246+244.
- [2] Moss, G. (2003). *The implications of the male and female design aesthetic for public services. Innovation*, 8(4), 4.
- [3] Ma, W.-H. (2003). *The brain is different for men and women. Friends of Science*, 10.
- [4] Baron-Cohen, S. (2002). *The extreme male brain theory of autism. Trends in cognitive sciences*, 6(6), 248-254.
- [5] Wang, S. L.. (2009). *A new explanation for the phenomenon of aesthetic differences between men and women - men use more right brain and women use the whole brain. Science Advisory*, (5), 64-64.
- [6] MacNeilage, P. F., Rogers, L. J., & Vallortigara, G. (2009). *Origins of the left & right brain. Scientific American*, 301(1), 60-67.
- [7] Rui L.Z.(2012). *ERP study on the cognitive processing and emotional evocation of graphic appeal ads (Master's thesis, Soochow University)*.