

Exploring Gender Stereotype Perceptions: An Eye-Tracking Study on Household Product Commercials

Ziran Sun

Abstract

Gender stereotyping, characterized by oversimplified perceptions of women and men in society, engenders prejudices that significantly impact individuals' evaluations of different genders. The media, as a potent carrier of cultural and social norms, plays a pivotal role in shaping societal views on gender stereotypes. Advertising is a prevalent form of mass media that widely appears in people's daily lives. Commercials embed cultural and social concepts when promoting products and establishing brand images. This study measures people's gender stereotypes while viewing advertisements, specifically focusing on household products traditionally associated with females. Different groups of participants were exposed to advertisements adopting female and male models, respectively, with an eye-tracking device employed to record and quantify gaze distribution, which reflects people's attention. Results revealed that female and male participants exhibited a greater attention bias toward male models in the advertisements.

Additionally, female participants demonstrated heightened sensitivity to male models compared to the male participants in this experiment. This attention bias suggests a noteworthy phenomenon in household product advertisements, where traditionally female-associated tasks are incongruously portrayed with male models, prompting increased viewer attention due to the perceived disparity. This research utilizes a novel eye-tracking approach, providing quantitative and precise insights into gender stereotypes within advertising. The results revealed the enduring presence of gender stereotypes in today's society. It is crucial to advocate for a more inclusive, fair, and unbiased perspective on gender to promote societal change, and the media plays a significant role in this responsibility.

Keywords: *Gender stereotypes, Advertising, Household products, Household chores, Eye-tracking*

1. Introduction

Stereotypes encompass social generalizations about the characteristics of a group of individuals, often disregarding individual differences and relying on fixed concepts in people's minds. These perceptions, though not always grounded in fact, wield significant influence over individuals' outlooks and behaviors (Pelley, 2015). Gender stereotyping specifically involves ingrained notions and biases regarding femininity and masculinity, fostering narrow and irrational perceptions of gender identity and roles. Such stereotypes perpetuate gender inequality, fueling discrimination and prejudice while constraining equal participation and opportunities across political, social, and economic spheres. Moreover, they limit freedom in career choices and development for individuals and society (Brown, 2016). The term "gender stereotyping" is frequently employed when examining the portrayal of women in the media (Eagly & Wood, 2012), and these stereotypes often reveal hidden prejudices, inequalities, and sexism. As demonstrated by Pelley (2015), social psychologists have highlighted two channels through which stereotypes arise: direct interactions with particular individuals or groups, leading to the

generalization and perpetuation of their characteristics, and indirect means, such as media descriptions. The mass media plays a crucial role in shaping gender stereotypes, reflecting cultural norms through selective representations and emphasis on specific themes to communicate with audiences and maximize recognition (Boster, 2002).

Advertising, a pervasive aspect of mass media, primarily influences consumers by persuading them to transform abstract purchasing desires into concrete shopping behaviors. The proliferation of the Internet has given rise to new online media outlets, a trend capitalized upon by the advertising sector. From LED facades on high rises to bus and subway advertisements, product placements in films and television, and the ubiquity of pop-up and jump ads in various applications and websites on mobile devices, advertising has become omnipresent (Hu, 2022). Its impact extends beyond consumption, influencing values, moral standards, social norms, and lifestyles. Individuals are unconsciously exposed to advertising content for extended periods, leading to alterations in their thoughts and ideas (Wu, 2004).

Commercials significantly influence societal values and carry a responsibility to disseminate accurate messages to the public. However, some advertisements fall short of

adopting an objective and equitable stance in promoting gender awareness and perpetuating stereotypical gender roles. They aggravate the perception of gender inequality, especially in their portrayal of women. A study in the United States revealed that 75% of female characters depicted in TV commercials were shown using kitchen and bathroom products (Li, 2007). Similarly, Chinese researchers (Bu, 1997) found that advertisements categorized women into two groups - the traditional, virtuous wives or mothers and the modern, beautiful vases. Advertising, to some extent, exhibits a social bias against women, objectifying, stereotyping, and sexualizing them while concealing deeper issues of gender inequality (Fang, 2022). Therefore, it is crucial to understand people's perception of potential gender stereotyping factors in advertisements.

Previous studies on gender bias often relied on questionnaires or interviews, with subjects possibly concealing their true thoughts on sensitive questions due to social pressure. Hence, some researchers questioned the reliability of results obtained through these methods. Implicit association tests perform better when measuring irrational concepts like prejudice and discrimination, which could categorize people's attitudes in two opposite directions. However, an individual's attitudes toward a specific topic are often nuanced, and most people fall within a middle area. Generalizing and categorizing attitudes into two extremes may not accurately capture the complexity of these attitudes. Therefore, this study employs a relatively new method in gender stereotype studies – eye-tracking technology. Eye-tracking experiments can unveil an individual's underlying thoughts and ideas when browsing relevant content, providing a more objective perspective. Furthermore, the quantitative gaze data collected by the eye-tracking device enables detailed analysis and comparison, offering robust and reliable support for the study's conclusions and opinions.

2. Methods

2.1 Participants

Participants for this study were recruited from a moderately visited shopping mall in Shanghai, China. 21 individuals ($M=30.95$, $SD=11.44$) participated in the experiment, with 11 males and ten females. The participants were randomly assigned to two groups, Group A and Group B, ensuring an equal distribution of males and females in each group. Before the commencement of the experiment, participants received a briefing on their task, which involved casually browsing through several advertisements. They were also informed about

the potential risks and harms of the experiment. Each participant expressed their willingness to participate and signed an informed consent form.

2.2 Stimuli

This experiment utilized advertisements showcasing household products. In traditional Chinese culture, women are often associated with household chores. The experimental materials comprised four product advertisement images: a frying pan, household gloves, a mop, and laundry detergent. Each image presented the left half with specific product information, including brand details, functionality, detailed product images, and advertising slogans. The right half depicts a model using the respective product in a specific scenario. The left side, displaying product information, remained constant, while the right side exhibited models of different genders in different experimental groups. Specifically, Group A participants viewed advertisement images with female models on the right side, while Group B participants saw images with male models on the right side. The models in both groups were of similar ages, exhibited similar postures, and had similar proportions in size. Aside from the models' gender, the experimental materials for Groups A and B remained identical regarding products, layout design, brightness, resolution, and other relevant aspects.

2.3 Design and Procedure

This experiment utilized a between-group design. Before initiating the experiment, participants were given a briefing on the general procedure and tasks and signed the consent form. Following this, the experimenter guided participants to their seats, each equipped with a display screen directly in front and an eye tracker at the bottom to capture eye movement data as participants viewed the advertisements. Behind the display screen, the experimenter's computer, connected to both the display screen and the eye tracker, was used to control the experiment and monitor participants' eye movements in real time. The back-to-back arrangement of the computer and display screen helped minimize distractions for participants during the experiment.

After seating participants, the experimenter assisted in adjusting their positions and seating postures to ensure accurate recording of eye movements by the eye tracker. Once the calibration procedure was completed, the experiment officially started. The display screen sequentially presented advertisement images corresponding to each participant's assigned group: Group A viewed advertisements featuring female models, while Group B viewed advertisements featuring male models. Each image was displayed for 15 seconds before

disappearing. The display sequence remained the same. The experiment concluded after all four images were shown, and participants received a small dessert as a reward.

In Groups A and B, the Areas of Interest (AOI) for eye-tracking analysis were centered on the models in the advertisement images. Four eye gaze parameters—total fixation time (TFD), fixation count (FC), first fixation duration (FFD), and time to first fixation (TFF)—were selected for further statistical analyses.

2.4 Data Analysis

To compare the differences in gaze behavior between participants observing models of different genders, independent t-tests were conducted for TFD, FC, FFD, and TFF between Groups A and B. Simultaneously, to further assess the influence of participants' gender, t-tests were performed for male and female participants within Groups A and B. Results of Group A (female) vs. Group B (female), and Group A (male) vs. Group B (male) were also compared.

3. Results

3.1 T-test Analysis for TFD

In Table 1, a T-test was conducted on the Total Fixation Duration (TFD) for all participants between Group A and B, revealing that the TFD of Group A ($M=5.55, SD=1.56$) was significantly shorter ($t=1.73, p<0.05$) than that of Group B ($M=7.11, SD=2.08$).

Table 2 shows the results of separate T-tests after categorizing participants by gender. It was observed that male participants in Group A ($M=5.21, SD=0.68$) exhibited a smaller TFD than males in Group B ($M=6.16, SD=1.12$). Meanwhile, females in Group A ($M=5.89, SD=2.17$) also demonstrated a shorter TFD than female participants in Group B ($M=8.25, SD=2.51$). Although the differences did not reach statistical significance ($t=1.86, p>0.05$; $t=1.86, p>0.05$), the p-value was very close to 0.05.

Furthermore, within Group B, female participants ($M=8.25, SD=2.51$) exhibited a higher TFD than male participants ($M=6.16, SD=1.12$). The difference did not reach statistical significance ($t=2.02, p >0.05$), but the p-value was very close to 0.05.

3.2 T-test Analysis for FC

In Table 1, a T-test conducted on the Fixation Count (FC) for all participants in Groups A ($M=18.53, SD=5.34$) and B ($M=21.59, SD=5.97$) revealed no significant difference ($t=1.73, p>0.05$).

Table 2 shows the results of analyzing female participants between Groups A and B. The T-test showed that female

participants in Group B ($M=21.40, SD=5.62$) had a higher FC than in Group A ($M=15.60, SD=5.63$). Although this difference did not reach statistical significance ($t=1.86, p>0.05$), the significance level was close to 0.05.

3.3 T-test Analysis for FFD

In Table 1, a T-test conducted on the First Fixation Duration (FFD) for all participants in Groups A ($M=0.20, SD=0.10$) and B ($M=0.19, SD=0.07$) revealed no significant difference ($t=1.75, p>0.05$) between the two groups.

Table 2 shows the results of separate t-tests for male and female participants. Within Group B, female participants ($M=0.24, SD=0.05$) exhibited a significantly higher FFD compared to male participants ($M=0.14, SD=0.03$) ($t=1.89, p<0.05$).

3.4 T-test Analysis for TFF

In Table 1, a T-test conducted on the Time to First Fixation (TFF) for all participants in Groups A ($M=2.88, SD=4.23$) and B ($M=1.12, SD=0.92$) revealed no significant difference ($t=1.81, p>0.05$) between the two groups, but the p-value was very close to 0.05.

Results of separate T-tests after categorizing participants by gender are shown in Table 2; it was found that within Group B, female participants ($M=0.61, SD=0.33$) exhibited a significantly shorter ($t=1.94, p <0.05$) TFF than male participants ($M=1.53, SD=1.07$).

Compared to Group A ($M=2.92, SD=4.09$) for female models, male participants in Group B also had a shorter TFF for male model advertisement ($M=1.53, SD=1.07$). However, the p-value was very close to 0.05, it did not reach the level of statistical significance.

Table 1. The TFD, FC, FFD, and TFF in Group A and Group B

	TFD(s)	FC(freq)	FFD(s)	TFF(s)
A	5.55	18.53	0.20	2.88
B	7.11	21.59	0.19	1.12

Table 2. The TFD, FC, FFD, and TFF of Male and Female in Group A and Group B

		TFD(s)	FC(freq)	FFD(s)	TFF(s)
A	Male	5.21	21.45	0.29	2.29
	Female	5.89	15.6	0.21	2.84
B	Male	8.25	21.75	0.14	1.53
	Female	6.16	21.4	0.24	0.61

4. Discussion

This study delves into individuals' gender stereotypes within the context of household product advertisements,

employing an eye tracker to quantify attention bias during viewing. Participants were randomly assigned to two groups, with one viewing household product advertisements presenting female models and the other viewing advertisements presenting male models. Analysis of the experimental data provides valuable insights into prevailing gender stereotypes. The inter-group T-test results indicated a significantly shorter total fixation duration (TFD) towards the female model in Group A compared to the male model in Group B. Consistent results were observed in statistical analyses based on participants' gender, revealing longer fixation duration when viewing advertisements featuring male models for both male and female participants. Female participants also exhibited a significantly faster attentional response to male model stimuli (TFF), with a speed approximately 2.5 times quicker than the male participants within the same group.

Additionally, females sustained a longer fixation during the first gaze (FFD). Conversely, male participants demonstrated a higher visual retrieval speed for male model stimuli (TFF) than female models, with a speed approximately twice that when retrieving female advertisements. However, this difference did not reach statistical significance.

The analysis of TFD, FFD, and TFF indicates that individuals subconsciously associate household elements with women. Including men in these scenes is perceived as inappropriate, prompting heightened initial and overall gaze attention. This combination of men and housework is considered novel and uncommon, capturing attention and curiosity. Notably, female participants in this study exhibited a stronger attention bias, potentially influenced by self-involvement effects, indicating heightened awareness of this perception. This contrasts with the findings of Li Jianing (2020), who observed generally higher gender stereotyping for men. A potential explanation is that Li investigated social bias-related occupations for both genders, while this study focused solely on traditionally female-related household chores.

The results of this experiment quantify the existence of implicit gender stereotypes, revealing that both men and women hold stereotypical impressions of women, believing that women should perform specific tasks and adhere to customary labor roles, even if they are not consciously aware of their biases. In traditional Chinese culture, the unequal division of labor and resources persists, with men traditionally taking on more rewarding "big jobs" such as outdoor work and women handling less profitable "small jobs" like childcare and cooking. This unequal division is perpetuated through the patriarchal social system, linking women strongly to family,

emotional labor, and caregiving responsibilities. Despite contemporary efforts to promote gender equality, the persistent influence of the patriarchal system, entrenched over thousands of years, is reflected in enduring views on the division of labor. Such deep-seated perceptions are transmitted culturally and gradually reinforced, solidifying into rigid gender stereotypes (Eagly & Wood, 2012).

Gender stereotypes impede individual freedom and development, leading to unfair treatment and unequal opportunities for both genders, exacerbating gender discrimination and social prejudice, and hindering societal fairness, justice, and development (Lou, 2007). The early emergence of gender stereotypes, as found by Gettys and Cann (1981), suggests that children as young as two years old acquire gender stereotypes under the influence of parents and mass media. Results from implicit association tests by Yu (2003) and Hou (2009) among high school and college students indicate prevalent gender stereotypes, particularly in career aspirations. Thus, it is crucial for society to widely advocate for gender equality, offer comprehensive gender equality education, strive for gender equality in power and opportunities, and establish policies and laws to promote gender equality. This will contribute to the reduction and elimination of gender stereotypes.

Additionally, the results of this experiment underscore the role of advertisements in shaping stereotypes. Advertising, a significant aspect of popular culture with broad reach and influence, should align with social and cultural norms and cognitive patterns. Advertisements should not adhere to outdated concepts that do not align with current societal values but should instead reflect societal progress. Advertisers must consider the impact of gender awareness and the portrayal of gender equality when creating advertisements, striking a balance between social and commercial values.

It's essential to acknowledge that this study has limitations. As a preliminary study, this study included a comparatively small sample size. Future studies could recruit more participants to generate more generalized results and higher statistical significance. Additionally, the environment influences behaviors, thoughts, and habits. People from different geographical and cultural backgrounds may have varied perceptions of gender roles. The study, conducted only in Shanghai, China, did not incorporate cultural background factors into its interpretations. Last, household products typically related to females are adopted as stimuli in the present study. Future research efforts could aim to investigate diverse stimuli to optimize, enrich, and refine the study's conclusions.

5. Conclusion

The study assessed people's gender stereotypes when exposed to advertisements showcasing household products, using models' gender as the independent variable. The gaze attention of the participants while viewing the advertisements served as the dependent variable. The innovative utilization of eye-tracking technology offered insights into people's implicit attitudes regarding gender stereotypes. The experimental findings not only reaffirm the prevalence of gender stereotypes among both male and female groups but also introduce a novel methodology for future researchers exploring this area. Moreover, it's important to encourage advertising practitioners to discard outdated gender biases, navigate the delicate balance between social culture and audience identity, approach gender differences through the lens of gender justice, and responsibly leverage the influential role of media in shaping societal perspectives.

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