

# Eye-Tracking Analysis: Examining the Impact of Fan Culture and Entertainment News on Engagement with Social Justice Information

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## Abstract:

Celebrity culture and idolatry are prevalent nowadays. The development of online social media facilitates the distribution of entertainment news, fan culture has become increasingly prevalent. On the other hand, the extreme fan culture brought negative impacts to people which affects their psychological and physical status. This also leads to a negative stereotype of fan culture, i.e. addicted to entertainment news and not concern themselves of public affairs. This study aims to investigate the impact of fan culture on individuals' attention to public affairs. Social justice news refers to news that reports and reveals inequality, injustice and oppression in society. Public attention to social justice news can help promote fairness and justice, social progress and change. This study utilized eye-tracking to collect data to investigate the effect of idolatry on social justice news attention. In the experiment, subjects were randomly divided into two groups; Group A subjects would view images of news web pages containing entertainment news and social justice news, while Group B subjects' material consisted of social justice news and other types of news. Subjects were asked if they are a fan of any celebrity after the trial. The entire browsing process was recorded by an eye-tracker. The eye-tracking data revealed that, generally, people paid less attention to social justice news than to entertainment news and other unrelated topics. This is evidenced by shorter total fixation duration (TFD), fewer fixation counts (FC), and longer times to first fixation (TFF) for social justice news. Analysis of the two categories of subjects' gender and whether or not they were stargazers revealed that, contrary to the stereotypes commonly perceived by the general public, fans and females would pay more attention to social justice information, exhibiting more TFD and FC. The present study's use of eye-tracking to measure abstract concepts into quantitative data is expected to provide inspiration for future scholars in this area of research. The public to abandon stereotypes and view fans and females in a fair and rational way. At the same time, the media should increase the exposure and weight of social justice news and direct viewers to pay more attention to social news.

**Keywords:** celebrities, news, eye tracking, gender, media, fans, entertainment, social news

## 1. Introduction

Celebrities are common features in our daily lives, appearing in advertisements, news, and television shows. They attract a significant following, especially among younger audiences where admiration for celebrities is quite common (Xiaozhong, 2006). With the ongoing development of digital media and the entertainment industry, the enthusiasm for celebrity worship has intensified. This culture of celebrity adoration has deeply influenced fan communities and their members' lifestyles (Wang, 2021). The increasing prevalence of fan culture has also highlighted potential negative consequences of excessive idolization. For example, extreme forms of fandom are sometimes associated with negative psychological effects, including anx-

iety, obsession, and depression (McCutcheon & Argueta, 2021). These negative perceptions are often associated with the passionate activities of fan communities, leading to a stereotyped view of fans. There is a perception that fans can be overly devoted, irrational, and more focused on entertainment news than on important social issues. Social justice news, a subset of social news, reports on societal inequalities, injustices, and oppressions. It addresses key social issues, including poverty, racial discrimination, gender inequality, and environmental concerns, with the goal of raising public awareness and fostering social advancement (Quan, 2007). This type of news serves a dual purpose: it unveils obscured social problems and enhances the public's sense of social responsibility. It encourages

governments and organizations to implement effective solutions. Engaging with social justice news enables the public to deepen their understanding of societal inequities and critically assess social policies and practices. Such engagement is important for advancing social equity and inclusion, ensuring that all individuals have access to fundamental rights and opportunities (Salmon, 1989).

In the typical stereotype, people think that fans who are only obsessed with showbiz gossip and celebrities, don't care about social issues as a serious matter. However, there is no convincing and real evidence for such stereotype-based speculation, and therefore, this study aims to examine the impact of idolatry and entertainment news on social justice news concerns. In the past, many scholars have used interviews, questionnaire, and document analyses to study news preference (Xie, 2016; Hong, 2016), and this type of data tends to be heavily influenced by irrelevant factors, such as the one-sidedness of questionnaires, self-correction of subjects, and so on. Therefore, this study utilizes eye-tracking method to collect news preference information. The use of an eye-tracker can help collect real-time visual data when subjects browse various types of news. This could reflect people's attention allocation among various kinds of news. The eye-tracking method is more direct and accurate which also provides quantitative results. This research transforms abstract concepts into measurable quantitative data which expects to provide ideas and inspirations for future research. In addition, while advocating for the public to abandon stereotypes, the media should also improve the exposure of social justice news so that could improve the public's attention to social justice news.

## 2. Method

### 2.1 Participants

In this study, 29 participants with the mean age of 26.89 (SD=9.10) are randomly recruited in Shanghai, China. Among them are 15 females and 14 males who are divided into two groups: A and B. At the very beginning, all participants are already informed about the general contents and procedures. They were also informed that the whole process is recorded by an eye tracker. During the study, they are asked to browse several news pages. A post-trial survey is conducted afterward.

### 2.2 Stimuli

All participants were asked to view five news pages. Each page contains six news items including headlines and images. The news items were selected from diverse categories and were varied between the two participant groups. In Group A, the news items were divided into

three categories: social justice (S), entertainment (E), and other news (O). Each news page in Group A consisted of two social justice news items, two entertainment news items, and two other news items. The placement of these news items on the screen was not fixed and was presented in a random manner. Group B's news pages replaced entertainment news (E) with other types of news (O) while maintaining social justice news (S). Each page in Group B has two social justice news items and four other category news items. Similarly, the arrangement of the news items in Group B was not fixed and was randomly displayed. It should be noted that the format and size of all news items presented were consistent across both groups.

### 2.3 Design and procedure

The study design is a between-group design where participants are randomly assigned to Group A or B. Firstly, participants are required to read and sign the consent form. Then, they are led to the seat in front of the eye tracker (Tobii 4C) and the screen which are connected to the computer. Five-point calibration is done before showing instructions and stimuli to ensure accuracy. Then, all participants would view 5 news pages and each page would display for 15 seconds on the screen. The content shown depends on the group they are assigned to. At the end of the browsing session, a post-trial survey was conducted regarding if the subjects were fans of any celebrities. Upon the experiment's official conclusion, each participant was presented with a gift. In Group A, social justice information, entertainment news, and other news were designated as areas of interest (AOIs). Group B's AOIs comprised social justice news and other news categories. Eye tracking data were derived for time to first fixation (TFF), total fixation duration (TFD) and fixation count (FC) parameters.

### 2.4 Data analysis

After the trial, TFF, TFD and FC of AOIs were exported. T-tests of total fixation duration and fixation count between and within the two groups are carried out to analyze participants' gazing behavior. To be more specific, the between-group t-test is done to study the effect entertainment news has on participants' focus. Also, different interests in social justice news and entertainment news are identified through t-tests within groups. The comparison between participants who are fans (F) and those who are not (NF) are made to identify how participant's identity would affect their behavior. To find out the possible effect that gender has on the attention to various kinds of news, TFD and FC analysis based on gender identity is carried out. Furthermore, the Time to First Fixation (TFF) for

subjects in both Group A and Group B was compared separately when viewing social justice news versus entertainment news and other news. This comparison was conducted to identify the participants' prioritization of different news categories.

### 3. Results

#### 3.1 Within group t-test of Group A

According to Table 1, within Group A, a significant difference is shown between the TFD of social justice news and entertainment news. In detail, the TFD of entertainment news ( $M=5.19, SD=1.41$ ) is higher ( $p>0.05$ ) than that of social justice news ( $M=4.50, SD=1.50$ ). Additionally, for those who are not fans, the TFD of entertainment news ( $M=5.23, SD=1.45$ ) is higher ( $p>0.05$ ) than that of social justice news ( $M=4.39, SD=1.54$ ), this difference has not yet reached statistical significance, but the p-value is very close to 0.05. It could also be found out that TFD for male participants is higher ( $p<0.05$ ) on entertainment news ( $M=5.42, SD=1.61$ ) than on social justice news ( $M=3.82, SD=1.47$ ). For social justice information, female participants ( $M=5.42, SD=1.41$ ) have greater ( $p<0.05$ ) TFD compared to males ( $M=5.42, SD=1.41$ ).

FC of entertainment news ( $M=19.19, SD=4.50$ ) is statistically greater ( $p=0.007<0.05$ ) than social justice news ( $M=15.78, SD=3.95$ ). Specifically, those who are not fans have higher ( $p<0.05$ ) FC on entertainment news ( $M=18.94, SD=4.95$ ) than on social justice information ( $M=14.67, SD=3.91$ ). For social justice news, FC of fans ( $M=18.36, SD=2.83$ ) is significantly higher ( $p<0.05$ ) than those who are not ( $M=14.67, SD=3.91$ ). What's more, the FC of male participants on entertainment news ( $M=20.36, SD=2.22$ ) is greater ( $p<0.05$ ) than social justice ( $M=14.52, SD=4.26$ ). However, there are no other prominent

differences identified within Group A ( $p>0.05$ ).

T-tests comparing participants' Time to First Fixation (TFF) on social justice news, entertainment news, and other news revealed significant differences. Social justice news had a significantly higher TFF ( $M=10.67, SD=3.86$ ) compared to both entertainment news ( $M=8.45, SD=3.96; t=2.13, p<0.05$ ) and other news ( $M=6.21, SD=2.29; t=1.75, p<0.05$ ).

#### 3.2 Within group t-test of Group B

As Table 2 shown below, TFD was significantly ( $p<0.05$ ) greater for females ( $M=5.06, SD=0.62$ ) than males ( $M=3.81, SD=0.74$ ) in terms of viewing social justice news. Similarly, the FC of female participants ( $M=22.55, SD=6.13$ ) is greater ( $p<0.05$ ) than males ( $M=15.92, SD=3.62$ ).

A between-group T-test of subjects' TFF for social justice news and irrelevant news found that Group B subjects' TFF for social justice news ( $M=12.61, SD=3.40$ ) was significantly greater ( $p<0.05$ ) than for irrelevant news ( $M=8.06, SD=4.19$ ).

#### 3.3 t-test between Group A and B

Combining data from both Table 1 and 2, certain findings could be made. There's no significant difference ( $p>0.05$ ) in TFD between Group A and B for social justice news. Instead, the FC of social justice news of Group B ( $M=18.87, SD=5.73$ ) is significant higher ( $p<0.05$ ) than Group A ( $M=15.78, SD=3.95$ ). A between-group T-test of the FC of the two groups of female subjects on social justice news found that Group B had a greater FC ( $M=22.55, SD=6.13$ ) than Group A ( $M=16.80, SD=3.53$ ). Although no statistical difference was found, the p-value was very close to 0.05.

**Table 1. The TFD and FC of Group A**

		Identity		Gender		All Subjects
		F	NF	Female	Male	
S	TFD(s)	4.74	4.39	5.06	3.82	4.50
	FC(freq)	18.36	14.67	16.80	14.52	15.78
	TFF(s)	10.90	10.57	10.74	10.57	10.67
E	TFD(s)	5.10	5.23	5.00	5.42	5.19
	FC(freq)	19.77	18.94	18.24	20.36	19.19
	TFF(s)	11.59	7.10	9.85	6.73	8.45

O	TFD(s)	4.32	4.86	4.23	5.16	4.70
	FC(freq)	14.63	17.29	15.18	19.18	17.09
	TFF(s)	6.20	6.20	6.74	5.56	6.21

**Table 2. The TFD and FC of Group B**

		Identity		Gender		All Subjects
		F	NF	Female	Male	
S	TFD(s)	4.52	4.53	5.41	3.81	4.49
	FC(freq)	20.40	17.64	22.55	15.92	18.87
	TFF(s)	10.70	14.15	12.33	12.84	12.61
O	TFD(s)	4.16	5.59	4.87	5.03	4.96
	FC(freq)	17.25	18.62	17.2	18.66	18.01
	TFF(s)	8.44	7.78	9.30	7.10	8.06

#### 4. Discussion

The purpose of this study was to examine the effects of idolatry on the public’s attention to social justice-oriented information. The results of the data analysis showed that in the presence of both entertainment news and social justice news (Group A), subjects’ total fixation duration (TFD) and fixation count (FC) for social justice news (S) were significantly less than that for entertainment news (E). The between-group T-test, however, found no difference in TFD and FC for social justice news between the two groups of subjects. It can be shown that subjects’ attention to social justice news did not increase even after removing entertainment news. Furthermore, the analysis of Time to First Fixation (TFF) data for subjects in both Groups A and B indicated that the TFF for entertainment news and other news was significantly shorter than that for social justice news. This suggests that participants would notice non-social justice news items more rapidly compared to those concerning social justice issues. It can be inferred that people generally are less interested in social justice news. People are more willing to pay attention to news on other topics, such as science, technology, sports, and livelihood etc. This indicates not only entertainment news has seized the subjects’ attention. Which is similar to the results of the study conducted by Wang Hui (2019), that the general public’s lack of attention to social justice news. As a member of a social group, the public should consciously increase their attention to social justice information. At the same time, news practitioners should enhance the exposure of social justice news and increase its proportion in news pages so that social justice information can be more

easily perceived by the audience.

Comparison of eye gazing data between fans (F) and non-fans (NF) in Group A subjects revealed that the number of Fixation Counts (FC) of fans on social justice news was significantly higher than that of non-fans. This suggests that idolatry does not affect people’s attention to social justice information, instead, fans pay more attention to social news. This is also inconsistent with the negative stereotypes of fans in society. Previous research has often portrayed fan groups in a negative light, with media reports reinforcing this image for its attention-grabbing potential (Zhao, 2014). However, the social responsibility of fans has generally improved. During large-scale social events such as epidemics, floods, and snowstorms, it is not rare for fans to make donations in the name of their idols to enhance their idols’ influence (Zhang, 2023). China Youth Daily (Yang, 2020) reported that fan groups actively disseminate donation information and engage in discussions about epidemic prevention and control, demonstrating their sensitivity to social issues. Additionally, celebrities with a strong sense of social responsibility can serve as role models for their fans. These factors may contribute to the unexpected findings of this study, which effectively challenge stereotypes. It is essential to discard extreme fan culture and, conversely, for the public to abandon the stereotypes.

Gender is another key variable in this study. Analyses of the female and male data of the subjects revealed that female subjects always paid more attention to social justice news than males, regardless of the presence or absence of entertainment news, as proved by greater TFD and FC. Such a result seems to contradict the popular perception

that females favor entertainment news, and males prefer social justice news such as crime and justice ( Nemanja Djuric, 2014). This result also supports to counter the gender stereotype that women do not pay attention to social affairs.

It is worth mentioning that this study still needs to be improved in further research. Firstly, the participant pool was selected from a narrow demographic, and the relatively small sample size may limit the generalizability and applicability of the results. Subsequent studies could recruit a larger and more diverse participant base, potentially including individuals from various cities or background to enhance the representativeness of the sample. Additionally, the study presented only headlines and main images as stimuli, without exposing participants to the full news content. The impact of complete news articles on viewing behaviors deserves to be explored.

### 5. Conclusion

The purpose of this study was to investigate the effects of fan culture on individuals' attention of social justice messages. The utilization of eye-tracking devices allowed the abstract concept of attention preference to be quantified with data, increasing the accuracy of the results. The results of the data analysis showed that the presence of entertainment news didn't cause subjects to pay less attention to social justice information. At the same time, people did not favor socially oriented information. Fans and females pay significantly more attention to social justice news than non-fans and males, which is contrary to the general public perception. The public should change stereotypes and view fans and females in a more fair and rational way. Last but not least, there is no doubt about the importance of social justice journalism, hence the media should increase the exposure of social justice news to let the public allocate more attention to social justice information.

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