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Analyzing the Impact of Emotional Cue and Color Tone on Film and Drama Posters with Eye Tracking

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Abstract:

Starting from the 19th century, posters have been a primary means of visual communication in advertising. The design of posters can have different impacts on the audience. The factors that influence the communication effectiveness of posters and how to enhance their promotional capabilities have been a focus for both scholars and designers. Posters are also extensively utilized in the film and theater industries as promotional tools. This study investigates the effects of emotional cue (positive and negative) and color temperature (warm and cool) in film and theater posters on viewers. Two posters with positive emotions and two with negative emotions were used as stimuli. Each poster was then adjusted to represent both warm and cool color tones. Participants were presented with four types of posters: positive mood with warm color, positive mood with cool color, negative mood with warm color, and negative mood with cool color. An eye tracker was incorporated into the experiment to record the participants' viewing process. The gaze data reflects and quantifies individuals' responses to the different poster types. Data analysis revealed that posters with negative moods attracted attention more quickly from viewers, as indicated by a shorter Time to First Fixation value. Posters with positive moods received more overall attention during the viewing process, which have higher Total Fixation Duration and Fixation Counts. However, the analysis of color temperature showed that there was no significant difference between cool and warm toned posters in any of the eye-tracking metrics, suggesting that the impact of color temperature on the effectiveness of posters was not significant. This study advances the understanding of the mechanisms by which emotional-driven visual attention operates and offers insights and guidance for poster designers in film and theater industries.

Keywords: Emotion, Color Temperature, Drama, Film, Poster, Attention, Eye Tracking

1.Introduction

Posters are important in film and theater publicity, functioning as a visual medium through which audiences obtain information about the work and a key method for engaging potential viewers. Since the 19th century, posters have evolved significantly with the development of technology and the changes of audience needs (Hollis, 1994). Nowadays, the rise of the Internet and social media has added new dimensions to poster design and enhanced its interactivity (Miller, 2015). Various factors could influence the communicative capability and promotional success of a poster, such as the right targeted audience, market trends, cultural context, and the format or design (Goffman, 2016; Thompson & Wexler, 2020). Among these factors, poster design elements—including mood, visual components, and typographic arrangements—directly affect the poster's quality (Hogg & Garrow, 2013; Moran et al., 2018). Mood and color tone are particularly significant in poster design; they can influence each other and significantly impact viewers (Harrison et al., 2018). Mormann and Zhang (2017) have shown that design elements like color and composition can triger emotional responses from viewers. Huang et al. (2020) considers that emotional appeal not only draws viewers' attention but also strengthens the connection with the audience, thereby enhancing the propensity to engage with the content.

The interplay between mood and color in poster design is complex and essential. Many designers and scholars have explored this topics. Previous studies mainly relied on questionnaires to evaluate the impact of a poster's mood and color tone on viewers' preferences, which, while effective in collecting responses, are subject to personal bias and may not capture the subtleties of subconscious reactions (Harrison et al., 2018). To address these limitations, this study employs eye-tracking technology, which provides a more objective measure of how viewers interact with posters. This method offers precise, quantitative data that directly reflects the viewer's response to different poster designs by tracking the entire browsing process. This approach not only yields accurate outcomes but also allows for a deeper understanding of how design elements influence emotional engagement and viewing intentions. By investigating the influence of emotion and color tone on viewers' attention to film and drama posters, this study aims to contribute to the theoretical understanding of emotion-driven and color-driven visual attention mechanisms and offer practical insights to poster designers. The findings could facilitate to enhance the communicative efficiency and effectiveness of posters, ensuring they resonate with and captivate their intended audience. This study, therefore, not only advances academic discourse but also has practical implications for the design and use of posters in promotional campaigns.

2.Method

2.1 Participants

In this study, a sample of 21 subjects, with a mean age of 27.62 years old (SD=10.18), was randomly recruited at a shopping mall in Shanghai, China. The sample consisted of 7 males and 14 females. Upon recruitment, all subjects were informed that they would be viewing a series of posters displayed on a computer screen, and that an eye-tracking device would be utilized to monitor their viewing behavior. Participants were also made aware of any potential risks associated with the use of the eye tracker to ensure their informed consent. All subjects willingly agreed to participate in the experiment, demonstrating a voluntary engagement in the research process. This approach to recruitment and informed consent is crucial for maintaining ethical standards and ensuring the validity of the study's findings.

2.2 Stimuli

In the study, two posters were used to represent positive emotions, characterized as promising or happy, and served as positive stimuli. Concurrently, two posters depicting negative emotions, such as pessimistic or sad, were chosen as negative stimuli. Utilizing Photoshop, each poster was manipulated to present in both warm and cool color tones, resulting in four differente motional and color tone combinations: Positive mood & Warm color (PW), Positive mood & Cool color (PC), Negative mood & Warm color (NW), and Negative mood & Cool color (NC). To strengthen the emotional impact of each poster, a brief descriptive text about the movie or drama was placed beneath each poster. The font and word count of each description were similar across all posters.

Eight posters, including two PW, two PC, two NW, and two NC) were integrated into poster sets, with each set comprising one target poster and two unrelated posters, all arranged on a single page. The posters within each set were uniform in size, and the unrelated posters were also accompanied by descriptive texts. To prevent any potential order effects, the position of the target poster within each image set was randomized.

2.3 Design and procedure

Prior to the beginning of the experiment, participants read and signed an informed consent form, confirming their understanding and voluntary participation in the study. Following this, participants were seated in front of a screen connected to a laptop and an eye-tracking device, specifically a Tobii 4C Pro. A five-point calibration pro-

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cedure was conducted to ensure the accuracy of the eye tracker, after which instructional slides were displayed to guide the participants through the process. To preserve the experimental blind and prevent the subjects from realizing the study's objectives, the eight poster sets were evenly allocated across two distinct groups. Each group was then presented to separate cohorts of subjects, ensuring that no subkect would browse duplicate poster content. In each experimental group, four poster sets were randomly presented on the screen. Each page would display for a duration of 15 seconds. To prevent carry-over effects from one page to the next, a 1-second blank screen was interposed between each poster presentation. The entire experiment took approximately five minutes to complete, after which participants were compensated with a gift for their time and effort.

The target posters were designated as areas of interest (AOI). Once all participants had completed the experiment, the eye tracking data were extracted and analyzed. Key parameters, such as Total Fixation Duration (TFD), Fixation Counts (FC), and Time to First Fixation (TFF) were used for analyses.

2.4 Data analysis

To assess the impact of emotion and color tone of posters on viewers, within-group t-tests were performed comparing the Total Fixation Duration (TFD), Fixation Counts (FC), and Time to First Fixation (TFF) for negative posters (NT: negative total, combining NC and NW) against those for positive posters (PT: positive total, combining PC and PW). Furthermore, to examine the influence of color temperature on the effectiveness of the posters, within-group t-tests were conducted on the TFD, FC, and TFF for cold-colored posters (CT: cold total, combining NC and PC) in contrast to warm-colored posters (WT: warm total, combining NW and PW).

3. Results

3.1 T-test analysis of NT and PT

As shown in Table 1, the t-tests revealed that TFD, FC, and TFF for NT were significantly lower than those for the PT. For NT, the mean TFD was 4.14 seconds ($SD = 2.06$), the mean FC was 17.67 ($SD = 7.52$), and the mean TFF was 1.04 seconds ($SD = 1.10$). In contrast, for PT, the mean TFD was 5.57 seconds ($SD = 3.40$), the mean FC was 24.14 ($SD = 8.24$), and the mean TFF was 4.91 seconds ($SD = 3.61$). The t-test results were as follows: TFD ($t = -1.64$, $p < 0.05$), FC ($t = -2.25$, $p < 0.05$), and TFF ($t = -4.71$, $p < 0.05$), indicating that negative posters received less overall attention and had a quicker initial fixation time compared to positive posters.

3.2 T-test analysis of CT and WT

As shown in Table 1, there was no significant difference in TFD, FC, and TFF between the CT and the WT. The t-test results were as follows: TFD ($t = 0.57$, $p > 0.05$), FC ($t = 0.93$, $p > 0.05$), and TFF ($t = -0.27$, $p > 0.05$). For CT, the mean TFD was 5.09 seconds ($SD = 2.69$), the mean FC was 21.48 ($SD = 7.15$), and the mean TFF was 2.85 seconds ($SD = 2.55$). For WT, the mean TFD was 4.62 seconds ($SD = 2.50$), the mean FC was 19.33 ($SD = 7.72$), and the mean TFF was 3.10 seconds ($SD = 3.20$).

Table 1:TFD, FC and TFF for posters

	TFD(s)	FC(freq)	TFF(s)
NT	4.14	17.67	1.04
PT	5.57	24.14	4.91
CT	5.09	21.48	2.85
WT	4.62	19.33	3.10

4. Discussion

The objective of this study was to investigate the influence of color tone and emotional cue in film or drama posters on viewer browsing patterns, as assessed via eye-tracking technology. The gaze data were expected to provide an accurate and objective measure of the impact of these elements on viewers. Analysis of the data indicated that posters with negative emotions had lower TFF, suggesting that they captured viewers' attention more quickly. Since viewers took shorter durations to direct their gaze toward these posters. Posters with positive emotions exhibited significantly higher TFD and FC compared to the negative ones. Although negative emotion posters were noticed more quickly, viewers allocated more overall attention to the positive emotion posters. Additionally, no significant

differences were observed between warm and cool toned posters across any of the eye-tracking metrics, implying that color tone has a minimal influence on steering viewers' attention.

Negative information has been highly valued in human evolutionary adaptations, and from an evolutionary psychology standpoint, human sensitivity to negative information can be linked to survival needs. Negative information, such as threats or dangers, is often critical for survival, and individuals have evolved to rapidly notice such information to facilitate timely reactions and self-preservation (Babcock, 2013). Moreover, according to information processing theories, negative information is allocated more cognitive resources due to its potential threat, making individuals not only more likely to detect it but also more prone to engage in deeper analysis and encoding into memory (Rozin & Royzman, 2001). Although the negative posters in this study did not contain explicit threats or dangers, the negative emotional cues could still have triggered the viewers' negative emotional bias.

Subjects in this study allocated more visual attention to positive posters, as revealed by significantly higher TFD and FC. This outcome contrasts with some prior research (Van Bockstaele, 2016; Bradley, 2018). While previous studies often utilized images or human faces as stimuli, the current investigation employed movie and drama posters, which typically contain more information, such as texts, potentially requiring different cognitive processing. This difference in material may account for the divergent findings. The Time to First Fixation (TFF) data further suggest that, although participants initially showed a bias toward negative posters, they subsequently allocated the majority of their cognitive resources to positive posters. This pattern aligns with the negative bias theory (Cacioppo, 1999), which posits that while individuals instinctively direct their attention to negative information as a protective mechanism, they may also shift focus toward positive information to seek emotional comfort and support. From an emotion regulation perspective, this redirection can serve as a coping mechanism to manage underlying stress or anxiety (Gross, 1998).

Moreover, the results reveal that cool and warm tones in posters did not significantly influence the subjects' browsing behaviors towards movie or drama posters. Hagtvedt (2016) found that color could affect emotions and attention. However, its impact on browsing behavior was subject to moderation by the relevance of the content. When participants deemed the information to be of high importance, the influence of color on their browsing behavior was reduced. Gorn's (2017) study further supports this finding, indicating that the emotional response to color has a highly context-dependent effect. Consequently, the study concludes that while the color tone is one of several factors that can influence browsing behaviors, it is not the most critical one. Other elements, such as the content and mood could prioritize over it.

This research contributes to the field of film and drama poster design by highlighting that emotional cue plays a more significant role in viewers' visual processing than color tone. Designers could strategically incorporate both positive and negative emotional elements to attract and sustain viewers' attention. Nevertheless, the study has certain limitations that could be improved in future research. The participant sample in this study was exclusively Chinese. Individuals with different cultural background may have different responses. Subjects with diverse cultural backgrounds could be recruited in future. Additionally, segmenting subjects into different demographic groups based on characteristics such as age or occupation could yield more nuanced results. Such detailed segmentation could empower poster designers to customize the work to meet the specific needs of their target audience groups. Lastly, while this study focused on film and drama posters, future research could benefit from exploring a broader range of poster types, as different categories may impact viewer engagement in various ways.

5. Conclusion

This study investigates the influence of color tones and emotional cue in film and drama posters on viewers' visual processing. An eye-tracking device was utilized to record participants' browsing behaviors, generating objective and precise data. The analysis revealed that posters with negative emotional cue attracted initial attention more rapidly, as indicated by a quicker Time to First Fixation. However, posters conveying positive emotions received more overall attention, reflected by higher Total Fixation Duration and Fixation Counts. Meanwhile, the study found no significant effect of warm versus cold color tones on the viewers' gaze behavior, suggesting that color temperature may not be a dominant factor. The results of this study offer more insights into the dynamics of emotion-driven visual attention. Furthermore, this exploration of the effects of poster design provides actionable guidance for designers in the film or theater industry. By understanding how emotional cues and color tones influence visual attention, designers can create more effective promotional materials that resonate with the audiences.

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