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Effects of Celebrity Endorsements on Consumer Attention and Emotional Responses: An Eye-Tracking Study in Theme Park Advertising

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Abstract: *Celebrity endorsements have increased dramatically over the past few decades as a marketing strategy to capture consumers' attention. Despite some potential risks, this approach has been proven to be highly effective. The theme park is a popular form of entertainment nowadays which usually have strong emotion engagement with consumers. The present study focuses on explore the effect of celebrity endorsements for theme parks. The eye-tracking technology is adopted to accurately capture the subjects' visual responses when viewing the corresponding advertisements. A post-trial survey is also used to collect the participants' subjective evaluation of the advertisements. Participants were randomly assigned to two experimental groups: Group A viewed theme park advertisements with celebrity models, while Group B viewed advertisements with non-celebrity models. In both Group A and B, the models are further divided by genders and numbers. The results revealed that, compared to non-celebrity models, participants devoted significantly more visual attention to the celebrity models, who got higher Fixation Counts. However, this increased focus on models was accompanied by reduced attention to brand-related information of the theme park, as reflected by longer Time to First Fixation in branding information areas. Gender was also discussed during the analysis. Following differences were observed: female participants fixated longer on models' faces who showed longer Total Fixation Duration; whereas male participants showed more interests in models' bodies, with significantly shorter Time to First Fixation in this region. Post-trial survey results further indicated a preference for single celebrity endorsers or female celebrity endorsers in advertisements. These findings provide important insights for advertising design, offering evidence of how celebrity endorsements influence consumer cognition, attentional allocation, and emotional responses.*

Keywords: *celebrity endorsement, advertisement, marketing strategy, eye-tracking, gender differences*

1. Introduction

In business and marketing, advertising is a key way of promoting products and services to the public. Over time, advertising design has evolved through the integration of increasingly creative and engaging elements. A widely used approach is celebrity endorsement, which leverages the influence of public figures to attract consumers and enhance brand recognition. Prominent individuals, such as athletes, actors, and musicians, can strengthen brand image and affect purchasing decisions[1]. The origins of celebrity endorsement can be traced back to the nineteenth century. In 1882, Pears Soap became the first brand to feature a public figure, the London West End actress Lily Langtry, in its advertisements. This marked the earliest known case of a commercial product being endorsed by a celebrity. In the 1930s, the American advertising agency Thompson institutionalized this strategy by systematically incorporating Hollywood stars into its Lux soap advertisements. With the development of digital technologies and the rise of the internet, celebrity endorsements have evolved from traditional, one-way promotional messages into dynamic, interactive, and data-driven marketing strategies. Social media has further expanded their global reach, enabling brands to target broad and diverse audiences[2] .

Despite their effectiveness, celebrity endorsements have also been recognized as a double-edged sword. The rapid dissemination of information online can amplify negative publicity about celebrities, which in turn can damage the image and value of the brands they represent[3]. Companies may suffer stock price declines or market capitalization losses due to celebrity scandals[4][5]. Nevertheless, celebrity endorsements still remain a prevalent strategy in competitive markets. Hence, it also continues to attract research interest in academia. Prior studies have examined both the benefits and risks of such endorsements. For example, Elbers and Verlen demonstrated that celebrity endorsements can increase sales by an average of 4% during campaigns[6]. In contrast, Spry found that celebrity scandals lead to a

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21% decline in brand favorability and a 15% reduction in purchase intent[7]. Liu reported that scandals involving criminal offenses cause high-fit brands to experience even greater losses, with purchase intent decreasing by an average of 28%[8].

As consumer preferences shift toward emotional consumption and experiential economies, theme parks have transcended their traditional role as entertainment venues for children. They integrate immersive performances, intellectual property (IP)-themed attractions, photo spots, and social experiences for audiences of all ages. In 2023, 86 major theme parks in China accommodated 130 million visitors and generated 30.389 billion yuan[9] (China Theme Park Research Institute, 2024). This rapid expansion in visitor numbers has directly driven increases in industry marketing budgets. Theme park advertising has emerged as a dominant segment of outdoor advertising, accounting for 38% of cultural tourism outdoor advertising expenditures by 2025[10]. Expenditure in this sector reached 477 million yuan in 2024, a 64% increase from 2023, with a projection of 530 million yuan in 2025, representing an additional 11% growth [11]. Such growth has created new opportunities for celebrity endorsements in theme park advertising and public relations strategies, positioning theme parks as a frontier for celebrity collaborations and brand ambassadorships. For instance, Chimelong Resort appointed Chinese actor Wang Yibo as its "Chimelong Planet Renewal Ambassador" in 2021[12]. Happy Valley collaborated with the band Times Boys in 2023 to launch the event "Youthful Wonder Night"[13]. These partnerships generated significant consumer engagement, increased attendance during endorsement periods, and enhanced brand exposure.

Though the developments in commercials is fast, celebrity endorsements of theme parks have received limited academic attention, with most studies focusing on traditional areas. To address this gap, the present study introduces a psychological perspective by systematically examining differences in audience gaze patterns and emotional responses to advertisements featuring celebrity versus non-celebrity models. The eye-tracking technology was employed to accurately capture and quantify participants' visual attention, providing an objective measure of responses. A post-trial survey is also introduced to evaluate the subjects' subjective feelings. The findings aim to improve the understanding of how celebrity endorsements affect the advertisement of theme parks. It could provide insights for the development of more effective and targeted advertising strategies.

2. Methods

2.1 Participants

In this study, 24 individuals (Mage= 29.63) were randomly recruited in Shanghai, China, including 11 males and 13 females. Participants were assigned to two groups (Group A or Group B). Each participant was instructed to view a series of theme park advertisement posters, while their visual attention was recorded using an eye-tracking device. Prior to participation, all individuals were informed of the study procedures, potential risks, and their rights as participants. They volunteered to participant in the experiment.

2.2 Stimuli

Theme park advertisement posters were used as the experimental materials. Each image was presented in a 16:9 ratio and systematically manipulated along three independent variables: (1) celebrity models vs. non-celebrity models, (2) male vs. female models, and (3) single vs. multiple models. The celebrity endorsers were well-known Chinese actors aged from 20 to 40 years old who were widely recognizable to audiences.

Two different backgrounds were designed for single-model posters, and two different backgrounds were used for multiple-model posters, each depicting theme park scenarios. For each background, four versions of advertisement posters were created. In the single-model condition, the four posters were: (a) a female celebrity model, (b) a male celebrity model, (c) a female non-celebrity model, and (d) a male non-celebrity model. In the multiple-model condition, the posters featured: (a) female celebrity models, (b) male celebrity models, (c) female non-celebrity models, and (d) male non-celebrity models. This design had 16 advertising posters in total.

The materials were divided into two sets: Group A (celebrity models) and Group B (non-celebrity models). Each set contained eight single-model and eight multiple-model posters with different backgrounds. The poses of the models were kept identical across groups to control the visual factors. To

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minimize brand-related effects, a neutral theme park brand was used consistently across all posters. To avoid repeated exposure bias, the materials for both groups were further divided into two subsets using a Latin square design (four posters per subset). The order of poster presentation within the Latin square was randomized during the trials. Each subset contained one poster presenting a male model, one presenting a female model, one with multiple male models, and one with multiple female models, with different backgrounds.

2.3 Design and Procedure

This study adopted a between-subject design. Participants were randomly assigned to one of the two groups. To avoid duplicate measurement and repeated exposure, each participant viewed four of the eight posters assigned to their group. Participation was voluntary, and all individuals were informed of the procedures and potential risks before providing written consent.

After signing the consent form, participants seated in front of a display screen equipped with a Tobii 4C Pro eye tracker, which was connected to the experimenter's computer. The experimenter's computer controlled the experimental procedure, while the display screen presented the instructions and stimuli. Following a successful five-point calibration, the experiment officially began. The eye tracker recorded participants gazing data during the trial. Each participant was presented with four images corresponding to their assigned group, displayed in randomized order. Each image remained on screen for 15 seconds.Theme parks typically have strong emotion engagement which are designed to provide positive experiences, so a post-trial survey was carried out to collect participants' subjective feedbacks. After viewing each image, participants rated their level of preference using a 5-point Likert scale via keyboard input. The entire experiment lasted approximately 5–10 minutes, after which participants received a small gift as a token of appreciation.

Three areas of interest (AOIs) were defined in the adverting posters: the park brand and slogan area (P), the model's face (F), and the model's body (B). Eye-tracking data for these AOIs were exported for subsequent analysis. Three primary eye-tracking parameters were employed: total fixation duration (TFD), fixation count (FC), and time to first fixation (TFF). After categorizing by AOIs, the data were subjected to statistical analysis to examine attention distribution patterns under the different experimental conditions.

2.4 Data Analysis

To examine differences in participants' gaze behavior across groups, a series of between-group independent-sample t-tests were conducted on total fixation duration (TFD), fixation count (FC), and time to first fixation (TFF). These comparisons were made across areas of interest (AOIs) — the face area, the body area, and the theme park related elements. In addition, participants' self-reported preference ratings were analyzed using t-tests to assess the influence different variables. These analyses aimed to determine the impact of advertisement design on visual attention patterns. At the same time, consumers subjective rating levels is also analyzed. To explore potential gender-based differences in gaze behavior, within-group t-tests comparing male and female participants were conducted for each of the three eye-tracking metrics.

3.Results

3.1 Between-group T-test Analysis of Group A and Group B

Independent-sample t-tests were conducted to compare total fixation duration (TFD), fixation count (FC), and time to first fixation (TFF) between Group A and Group B across the advertisement posters. The results are summarized in Table 1.

For TFD, no statistically significant differences were observed between the two groups across all variations ($p > 0.05$).

For FC, a significant difference was found in the body region of advertisements with a single model ($p = 0.03$). Group A exhibited a higher FC ($M = 27.62, SD = 8.14$) compared to Group B ($M = 21.00, SD = 8.44$). A marginal difference was also observed for the face region under the same condition (Group A: $M = 14.80, SD = 7.25$; Group B: $M = 11.58, SD = 4.14; p = 0.09$). No other comparisons for FC reached statistical significance ($p > 0.05$).

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For TFF, participants in Group A (*M = 6.97, SD = 7.38*) showed shorter duration to the model's face compared to Group B (*M = 10.46, SD = 3.95*). Conversely, TFF for brand information was longer in Group A (*M = 2.78, SD = 4.13*) than in Group B (*M = 0.89, SD = 0.35*). Although this difference did not reach statistical significance (*p = 0.06*), the p-value approached the 0.05 threshold.

3.2 T-Test Analysis of Female and Male Participants

Independent-sample t-tests were conducted to compare total fixation duration (TFD), fixation count (FC), and time to first fixation (TFF) between female participants (F) and male participants (M) across the advertisement posters. The results are presented in Table 2.

For TFD of multiple models, male participants (*M = 1.52, SD = 0.84*) exhibited significantly lower values in face region than female participants (*M = 2.06, SD = 0.75; p < 0.05*). Though TFD in the face region of single model didn't reach statistically significant level (p>0.05), female paid obviously longer time (*M=4.81, SD=3.08*) on viewing the models faces than males (*M=4.27, SD=4.81*).

For FC, no statistically significant differences were observed between female and male participants across any regions or conditions (*p > 0.05*).

For TFF, a significant difference was found in the body region of multiple models (*p = 0.04*). Male participants (*M = 0.33, SD = 0.46*) showed shorter TFF than female participants (*M = 1.08, SD = 1.27*). For single model posters, a marginal difference was also found. Males paid quicker attention (*M=0.58 SD=1.04*) to the body region than females (*M=1.31, SD=1.40*).

3.3 Self-report Scores between Group A and Group B

In addition to eye-tracking trials, participants' self-reported scores, rated after viewing each advertisement, were compared between the two groups. The results are presented in Table 3.

The independent-sample t-tests indicated that participants in Group A reported significantly higher rating scores when viewing advertisements with single celebrity models (*M = 5.62, SD = 1.61*) compared to Group B (*M = 4.67, SD = 1.30*). Similarly, for advertisements with female celebrity models, Group A participants (*M = 6.00, SD = 1.29*) scored significantly higher than Group B participants (*M = 5.00, SD = 1.35*).

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

		Multiple			Single		
		FACE	BODY	BRAND	FACE	BODY	BRAND
TFD (s)	A	1.89	10.93	7.66	4.78	7.68	8.53
	B	1.86	10.56	8.66	4.36	6.23	8.27
FC	A	6.38	42	32.69	14.77	27.62	38.38
	B	6.65	43.42	37.67	11.58	21	37.17
TFF (s)	A	6.97	0.51	2.78	3.08	0.63	1.32
	B	10.46	0.84	0.89	3.22	0.98	2.07

Table 2. The TFD, FC, and TFF of Group M and Group F

		Multiple			Single		
		FACE	BODY	BRAND	FACE	BODY	BRAND
TFD (s)	M	1.52	9.92	8.68	4.27	6.89	8.66
	F	2.06	11.25	7.62	4.82	6.82	8.29
FC	M	5.72	41.31	36.46	13.54	24.92	38.15
	F	7.08	44.18	35.09	12.82	23.82	39.18
TFF (s)	M	9.87	0.33	2.06	3.09	0.58	1.34
	F	7.83	1.08	1.14	3.45	1.13	2.14

Table 3. Rating Scores of Group A and B

	Multiple Models	Single Model	Male Models	Female Models
Group A	2.90	2.81	2.69	3.00
Group B	2.79	2.34	2.63	2.50

4. Discussion

This study employed an eye-tracking method to investigate how celebrity endorsements in theme park marketing advertisements influence consumers' visual attention. A post-trial self-reports is used to

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assess participants' subjective feelings and emotional responses. Several key findings have been revealed. First, compared to non-celebrity models, participants allocated significantly more attention to celebrities. In particular, participants exhibited higher fixation counts (FC) on the models' bodies. Although the difference in fixation count on facial regions did not reach statistical significance, the mean values also indicated a notable tendency for participants to pay more attention to celebrities' faces. In addition, the time to first fixation (TFF) was shorter for celebrity models, suggesting that celebrities captured attention more rapidly in advertisements. Second, the theme park brand-related information got shorter TFF values in Group B compared to Group A, indicating that branding elements could be distracted by the present of celebrities. Third, gender differences were observed in visual attention patterns. Female participants exhibited longer total fixation durations (TFD) on models' faces. Whereas male participants demonstrated shorter TFF on body regions, suggesting quicker attention allocation to these areas. Beyond eye-tracking data, the self-report survey revealed that participants provide more positive feedbacks when viewing advertisements with single celebrity models and female celebrity models, compared to non-celebrity conditions. This highlights the positive emotional impact of celebrity endorsements on consumer perceptions.

Overall, these findings suggest that celebrity models could enhance advertisement's visibility and emotional engagement in theme park advertisements. From a cognitive perspective, this can be explained by humans' evolutionary "priority detection" mechanism, which predisposes individuals to attend to human faces and bodies. Facial cues, in particular, rapidly activate social and emotional processing networks, capturing early attentional resources[14]. When the faces belong to celebrities - familiar individuals who often conform to mainstream aesthetic standards - this effect is amplified. Prior research supports this view, showing that celebrity faces attract more attention than unfamiliar ones[15]. Moreover, celebrities' faces carry positive associations and reward expectations: neuroimaging studies have demonstrated that gaze duration on celebrity faces correlates with activation in the ventral striatum, reflecting emotion–motivation signaling[16]. This suggests that celebrities not only capture attention but also sustain it through reward-based processing. From a marketing perspective, prolonged gaze duration is typically associated with higher interest and engagement, which can effectively strengthen consumer responses to advertised products[17]. Therefore, the present findings reinforce the argument that celebrity endorsements enhance the effectiveness of advertisements by increasing both attentional capture and positive emotional appraisal, in line with previous studies[18].

However, the results also highlight potential limitations of celebrity endorsements in advertisements. Participants in the celebrity group exhibited longer times to first fixation (TFF) on theme park brand-related information compared to the non-celebrity group. This finding, combined with the observation that participants in Group A devoted more attention to celebrity models, especially their faces, suggests that excessive focus on celebrity models can divert attention away from the brand itself. According to the limited capacity model[19], individuals have a finite attentional capacity in information-rich advertising contexts. Celebrity faces, due to their high familiarity and emotional reward value, act as a "resource sink," reducing the attentional resources available for brand-related elements. This effect is reflected in the extended TFF observed for brand zones. These results are consistent with prior research, which similarly found that participants tend to focus on celebrity images before attending to the endorsed products or brands[20][21][22][23].

Gender differences further shed light on attentional patterns in response to advertisement contents. Female participants consistently focused on the models' faces, regardless of the models' gender or number, exhibiting longer fixation durations. In contrast, male participants directed their gaze toward models' body regions more quickly, showing shorter TFF in the experiment. These patterns might be attributed to evolutionary strategy for mate evaluation. Evolutionary psychology posits that facial cues, such as symmetry and skin quality, serve as indicators of health and genetic fitness, which are particularly salient for females when evaluating potential long-term partners. Conversely, males prioritize bodily cues, including waist-to-hip ratio and secondary sexual characteristics, e.g. chest and torso, to rapidly assess reproductive potential[24][25]. Consequently, men tend to allocate attention primarily to body regions, while women focus more on facial regions.

In terms of post-trial advertisement ratings, participants showed a clear preference for advertisements presenting a single celebrity model and female celebrity models. According to halo effect, individuals with attractive appearances are perceived as more approachable, trustworthy, and friendly[26]. Furthermore, single-model posters provide a clear and non-competitive visual focus, whereas multi-model posters trigger social attention, causing viewers' gaze to shift among multiple figures. Cognitive resources are dispersed to process multiple faces, interpersonal relationships, and the meaning of interactions. Compared to the highly concentrated and intensified emotional signals conveyed by single-

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model posters, the increased cognitive load of multi-person posters interferes with the generation of pure emotions, leading to emotional dilution and a reduction in subjective well-being. This aligns with prior research showing that processing fluency is positively correlated with positive emotions, and that reduced fluency, resulting from high cognitive load, weakens emotional responses[27]. In addition, previous studies indicate that, regardless of sexual orientation, appreciation of female beauty tends to exhibit greater cross-gender and cross-cultural consistency[28]. Female models are typically associated with characteristics such as "gentle," "harmonious," and "harmless," which evoke a higher sense of security. In contrast, male models may elicit subtle associations with "competition" or "threat," potentially diminishing viewers' pure happiness[29]. Theme parks are venues emphasizing emotion engagement with consumers which. They aim providing positive emotional value to consumers via the experience. It is the potential reason why participants preferred female celebrities in theme parks' advertisements.

Several limitations should be considered in future studies. First, the relatively small sample size (n = 24; 12 per group) limits the generalizability of the findings. Future research could recruit larger and more diverse samples. Second, participant background variables, i.e. age, cultural background, and occupation, could be further investigated to provide more detailed insights for targeting advertisements. Third, participants' attitudes toward the celebrities, such as familiarity and fondness, may influence outcomes and should be incorporated in future studies. Finally, this study focused on theme park advertisements. Future research could investigate other industries to explore whether these effects generalize across different advertising areas.

5. Conclusion

This study explored the effects of celebrity endorsements in theme park advertisements, focusing on participants' visual attention and emotional responses to different advertisement designs. Eye-tracking data revealed that celebrity models significantly increased viewers' attention to the models themselves, thereby enhancing the visibility and exposure of the corresponding advertisements. However, this increased focus on celebrities also appeared to divert attention from brand-related information. Gender differences were observed: female viewers tended to focus longer on facial features, whereas male viewers more quickly allocated attention to body regions. Furthermore, participants showed a preference for advertisements with single celebrity model and female celebrity models, suggesting that emotional responses elicited by such endorsements may translate into marketing advantages.

From a psychological perspective, these findings illustrate how social cognition and evolutionary factors shape responses to visual media. From a marketing perspective, the results highlight both the benefits and limitations of celebrity endorsements: while celebrities can increase engagement and evoke positive emotions, they may simultaneously reduce attention to brand messages. These insights have practical implications for advertisement design, indicating that careful consideration is needed to balance attention between endorsers and brand elements to optimize marketing effectiveness.

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