



Brand Sponsorship on Follower Engagement: A Difference-in-Difference Analysis of Social Media Influencers on Douyin

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Abstract. As influencer marketing gains significance, comprehending the effects of brand sponsorship disclosure on follower engagement is essential for marketers and companies alike. This research examines the impact of official brand sponsorship announcements on follower engagement, specifically likes and comments, utilizing the Douyin platform as a case study. The analysis used a Difference-in-Difference (DID) methodology to examine two prominent influencers, Zhenzi and Haoge, during pre- and post-sponsorship eras. The results indicate that an official sponsorship disclosure markedly improves engagement, as evidenced by Zhenzi's account receiving substantial gains in both likes and comments following the announcement

Keywords: Influencer marketing, brand sponsorship disclosure, social media engagement, Douyin, parasocial relationships

1 Introduction

As the media environment becomes increasingly fragmented, brands recognize the necessity of promoting products through the creation of viral and non-disruptive advertisements on social media platforms. As a result, marketers are increasingly concentrating on promoting the brand through social media influencers [1]. In China, marketers have started to cooperate with influential social media users, known as influencers, as a new advertising strategy in their brand's arsenal, distinct from traditional celebrities [2]. The celebrities' endorsement advertisement mostly use official media channels, including television, mass media, and streaming platforms, in a typical manner. Influencers create sponsored content to engage their extensive social networks and ordinary social media users, distinguishing their audience from that of celebrities [3]. Via local social media sites such as WeChat, Sian Weibo, Xiaohongshu, and Douyin, which have experienced significant growth [2]. The efficacy of influencer marketing may rely not only on the discernible traits of influencers but also on the degree of consumer identification with them [2].

In influencer marketing, the credibility of both the company and the influencer will profoundly impact customer reactions to advertising and brand promotion [1]. The

corporation for brands and influencers through sponsorship disclosure has two patterns: first, the brand's official social media account will promote its collaboration with the influencers or endorse them. This results in a gamified interaction among brands and the social media followers of influencers. Secondly, there has been no official statement; influencers will directly promote the brand and its products, however the videos or postings may be labeled as "ad" by platforms (e.g., on Xiaohongshu). However, the effects of the patterns of sponsorship disclosure for influencers on followers' responses to promotional contents remain questionable and require further investigation.

This study aims to examine the mechanism of influencer marketing and brand promotion on social media by identifying the causal relationship between the variables of influencers, brand sponsorship disclosure, and follower responses. I also propose that the official announcement of the brand's sponsorship be seen as a treatment. Consequently, to assess the causal effect of this specific sponsorship disclosure method. This study employs a causal inference approach, namely Difference-in-Difference, to effectively identify and estimate the aims outlined. The study also collects observational data from the social media platform Douyin, focusing on the influencers "Zhenzi" and "Haoqe". To summarize, the current study seeks to address one primary question:

Research question: In China, how does the official announcement of a brand's sponsorship for social media influencers affect followers' responses to promotional contents?

2 Parasocial Relation Between Followers and Influencers

The efficacy of influencer marketing in social media contexts depends on consumers' establishment of parasocial identification, characterized as the perceived, unidirectional quasi-relationship between a media user and a media figure [4], with social media influencers. Parasocial identification is motivated by an unfulfilled need for belonging and a reliance on media consumption, prompting individuals to pursue alternate forms of interpersonal relationships, particularly inside social media [5]. Three theoretical principles argue that customers develop parasocial identification with influencers. Uncertainty reduction theory posits that media users' uncertainty regarding media characters diminishes over time as they consume more content featuring such characters and engage in imagined interactions with them. Secondly, personal construct theory posits that media consumers utilize interpersonal construct systems, which they employ to interpret and connect with others, to engage with media characters. Third, social exchange theory compares the manifestation of parasocial identity to an evaluation of costs and rewards. In this context, costs encompass worry and significant cognitive exertion, while rewards consist of any pleasurable outcomes derived from the activity [2].

Consumers typically employ the same cognitive processes used in interpersonal interactions to evaluate the conduct of influencers [6]. Social media facilitates effortless and engaging access, enabling contemporary consumers to closely monitor influ-

encers, so allowing them to discern the influencer's personality and regard them as familiar, even as a friend [5]. Consequently, customers may develop a sense of familiarity with influencers, as engaging with them on social media entails minimal trade costs and fulfills the desire for social connection [7]. Consumers consequently cultivate parasocial connection with influencers, and these experiences are inherently gratifying as they provide significant rewards.

Previous research has shown consumers' parasocial identification with influencers through various approaches. Parasocial identification and support for public student-athletes, whereas content analysis demonstrated that consumers synchronize their opinions and identities with microcelebrities, attaining parasocial gratification within a social media community [8]. Survey research demonstrated that the professional and personal self-disclosure of influencers, together with consumers' retweeting behavior, influences perceived social presence, hence facilitating parasocial interactions [9]. Other research have found parasocial identity as a predictor or a mediator in fostering positive relationship outcomes, including social media loyalty and customer lifetime value, respectively. Customers' attitude homophily towards influencers significantly enhances their parasocial identification, resulting in heightened purchase intentions [9]. Customers' perceived resemblance to influencers and the equity of their interactions with them enhance parasocial identification, hence augmenting their interest in products endorsed by influencers [10].

Previous studies on sponsorship disclosure in media, grounded in the concept of Persuasion Knowledge, have identified its impact on conceptual persuasion knowledge and brand attitude [11]. The impact of sponsorship disclosure in television episodes and blogs, revealing that product placement disclosure heightened negative perceptions of the brand across both platforms. However, as previously indicated, in China, sponsorship disclosure employs two distinct strategies that received insufficient scholarly attention. Specifically, based on the parasocial relationship that exists between influencers and followers, the precise effect of these sponsorship strategies remains ambiguous and requires additional empirical research on social media platforms.

Hypothesis 1: The endorsement advertising within influencers' content will not affect their followers' attitudes due to the parasocial relationship established between them.

Hypothesis 2: The official announcement of the brand's sponsorship for influencers has a positive effect on their followers' attitudes and responses.

3 Methodology

3.1 Data

The observational data for this study were collected from the Chinese social media platform Douyin, focusing on two well-known influencers, Zhenzi and Haoge. Zhenzi represents the treatment group as she received an official brand sponsorship announcement, whereas Haoge represents the control group as no such announcement was made for him. Data was gathered across nine time periods: six pre-treatment

periods and three post-treatment periods. Each period represents a week of influencer content from both Zhenzi and Haoge. The primary metric of interest is the average number of likes received by their posts during each period. Post-treatment period: three weeks after the announcement. Zhenzi had approximately 10 million followers on Douyin and typically received an average of 100,000 likes per video.

3.2 Measurement

3.2.1 Dependent Variable.

The key dependent variable is followers' engagement, operationalized as the number of likes received per post. This metric reflects the audience's immediate response to the influencer's content.

3.2.2 Independent Variable.

The independent variable is the brand sponsorship disclosure, categorized into two conditions: Treatment Group: Zhenzi, whose brand sponsorship was officially announced by the brand on social media. Control Group: Haoge, who continued to post content without any official sponsorship announcement.

3.2.3 Model.

$$Y_{it} = \alpha + \beta_1 Post_t + \beta_2 Treat_i + \beta_3 (Post_t \times Treat_i) + \varepsilon_{it}$$

3.3 Findings

This section presents the detailed results of the Difference-in-Difference (DiD) analysis on the effect of official brand sponsorship disclosure on followers' engagement, measured through the number of likes per post on Douyin. To evaluate the effect, we analyze the data for both Zhenzi (treatment group) and Haoge (control group) across six pre-treatment periods and three post-treatment periods.

3.3.1 Descriptive Statistics.

The Table 1 presents the average number of likes per post for both influencers during the pre- and post-treatment periods:

Table 1. Descriptive statistics of likes.

Period	Zhenzi (Treatment Group)	Haoge (Control Group)
Pre 1	90126	80724
Pre 2	92459	81044
Pre 3	93860	79638
Pre 4	96294	82121
Pre 5	98130	78466

Pre 6	100095	82238
Post 1	118330	86396
Post 2	124482	77123
Post 3	130135	87871

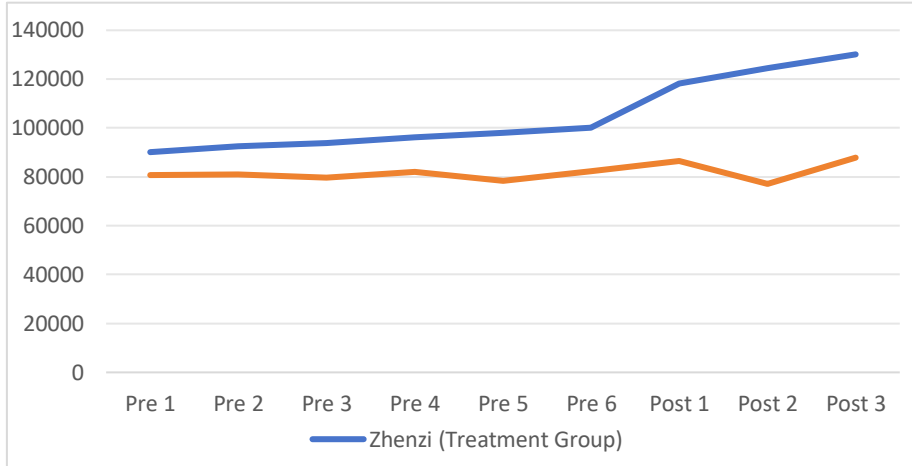


Fig. 1. Results of Difference-In-Difference model for likes.

From Table 1 and Fig. 1, we observe that both Zhenzi and Haoge exhibited a slight upward trend in the pre-treatment period for likes, comments, and reposts. Confirming the parallel trend assumption required for the DiD analysis. However, after the official sponsorship announcement, Zhenzi's likes increased substantially, while Haoge's likes continued to rise at a much slower pace.

3.3.2 Difference-in-Difference Regression Results.

The table below presents the results of the Difference-in-Difference regression model, which quantifies the impact of brand sponsorship disclosure on engagement.

Table 2. Difference-in-Difference of two groups.

	Difference-in-Difference of two groups
Likes	26,060*** (3937.28)
Comments	4,258* (1,821.33)
Reposts	1,863* (829.45)
Robust standard errors are in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$	

The Likes, Comments, and Reposts terms shown in Table 2, represents the main effect of interest in the DiD model. The coefficient of 26,060 likes is statistically significant ($p < 0.001$), confirming that the official sponsorship announcement led to a substantial increase in Zhenzi's likes, over and above the control group's trend.

Pre-treatment Parallel Trends: The pre-treatment periods for both Zhenzi and Haoge show parallel trends, confirming that the parallel trend assumption for the DiD analysis holds. Both influencers saw a gradual rise in likes, with Zhenzi slightly outperforming Haoge, but the trends were consistent between the two groups. After the brand sponsorship announcement, Zhenzi's engagement surged dramatically. The difference-in-difference estimate of 26,060 additional likes for Zhenzi indicates a strong causal effect of the sponsorship disclosure.

The findings confirm hypothesis 2, which predicted that an official brand sponsorship announcement would have a positive effect on followers' engagement. In contrast, hypothesis 1, which assumed no change due to the parasocial relationship between influencers and followers, was not supported, as Zhenzi's followers responded positively to the sponsorship disclosure. In conclusion, the results indicate that official brand sponsorship announcements can significantly enhance follower engagement, demonstrating the effectiveness of transparent sponsorship communication in influencer marketing.

4 Conclusion

This research examined the effect of brand sponsorship disclosure on follower engagement with influencer marketing on social media, employing a Difference-in-Difference (DID) methodology to evaluate data gathered from the Douyin platform. The study concentrated on two notable influencers, Zhenzi and Haoge, aiming to ascertain the causal impact of brand sponsorship announcements on follower engagement, quantified by likes and comments. The results indicated that the formal sponsorship announcement significantly enhanced follower engagement, especially for Zhenzi, whose likes and comments markedly increased following the announcement. The results corroborate Hypothesis 2, which anticipated that an official sponsorship announcement would enhance follower replies. The data indicate that parasocial ties (Hypothesis 1) may protect influencers from adverse changes in follower attitudes, whereas brand endorsements enhance follower trust and engagement.

This study enhances the existing literature on influencer marketing by emphasizing the essential importance of transparency and sponsorship disclosure in influencing consumer behavior. The research presents empirical evidence regarding the efficacy of sponsorship disclosures in enhancing the relationship between businesses, influencers, and their audiences. Future research ought to examine diverse categories of influencers across multiple platforms to generalize these findings and investigate supplementary engagement metrics, such as shares or long-term follower retention, to furnish a more thorough comprehension of the effects of influencer marketing strategies.

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