



The Impact of Visual Social Presence on the Popularity of Recommended Videos on Douyin

* Jiahui Li

WeBank Institute of Fintech, Shenzhen University, Shenzhen, Guangdong, 518000, China
*18711355410@163.com

Abstract. Recommended videos as one form of influencer marketing, is gradually becoming an important means of advertising implantation in e-commerce. This study investigates how visual social presence, influencer characteristics and video features respectively influence the dissemination effect of recommended videos. We measured the influencer's face distance variation and the richness of head posture through image processing and face detection technology to quantify the influencer's visual social presence in recommended videos. Based on the analysis of 1857 recommended videos posted on Douyin, we prove from a visual perspective that social presence can significantly enhance the likes, comments, favorites, and shares of recommended videos. Our study reaffirms the application of social presence theory in the e-commerce marketing field and provides practical guidance for e-commerce marketing activities.

Keywords: recommended video; social presence; face detection

1 INTRODUCTION

The prosperous development of short video industry pushes influencer marketing to new heights. As one of the important forms of influencer marketing and e-WoM, the recommended video has gradually become an important way for merchants to implant advertising. In recommended videos, influencers showcase particular products or service to viewers by sharing consumer experiences, product reviews, or integrating it into a storyline, aiming to recommend and induce consumer consumption. A research report from CITIC Securities in 2021 revealed that 64.3% of Generation Z are influenced by "recommend" when shopping. Some studies have focused on the driving factors behind the dissemination effectiveness of recommended videos. For instance, Hung et al. (2022)^[4] proposed a dual-route to exploring how influencer stature, video titles, and comments influence the dissemination effectiveness of e-commerce videos.

However, the expressions, actions, and body language of the influencer in the video can also convey information, making the character more vivid and bringing a sense of interaction to the audience in front of the screen. This sense of interaction is the social presence that has an important influence on consumers' attitudes and behavioral intentions. Through face detection technology, we can capture the degree of dynamism of the influencer in the video to measure their sense of social presence, rather than the

traditional scale. We utilized data from Douyin in China and employed face detection API to measure the distance variation between the influencer and the camera as well as the richness of head gestures (Wu et al., 2021)^[8], to reflect the level of social presence. We comprehensively investigated how influencer characteristics, video features, particularly the social presence conveyed through visual information affects the dissemination effectiveness of recommended video.

2 LITERATURE REVIEW

2.1 Recommended Video

Existing research on recommended videos mainly focuses on exploring how influencers' characteristics and video content features influence consumer attitudes and behavioral intentions. Ge et al. (2021)^[2] studied the impact of the social and vivid nature of social media videos on product sales. Hung et al. (2022)^[4] proposed a dual-path model to investigate how e-commerce influencers influence video likes, shares, and product sales. Chan et al. (2023)^[1] also analyzed e-commerce videos to explore the influence of influencer charm and video content on consumer engagement. Researches have proved that factors such as influencer type and number of fans (Hung et al., 2022)^[4], professional knowledge, etc., have a significant positive impact on the communication effect of videos. As for video content features, text features such as title length (Garcia & Estrella, 2021)^[3], the mood (Zhao et al., 2023)^[10] and the personal pronouns of the title (Munaro et al., 2021)^[6] have been identified as important factors affecting marketing effectiveness. Visual features including basic visual features (Zhang & Luo, 2018^[9]; Kwon et al., 2022^[5]) and the presence of human faces in videos (Munaro et al., 2021)^[6].

2.2 Visual Social Presence

Social presence refers to the degree to which a person is perceived as a "real person" and the degree to which he or she is perceived to connect with others in the process of using media communication, which is mainly caused by two aspects: vividness and interactivity. Nonverbal symbols such as facial expressions, gestures, and body language make influencers more vivid, creating a sense of interaction with the audience in front of the screen, that is, a sense of social presence. This social presence is positively correlated with consumer brand engagement (Osei-Frimpong & McLean, 2017)^[7]. Wu et al. (2021)^[8] also proposed that the vividness of influencers in short videos, including the richness of head posture, body movements and expressions, significantly improved the like rate of videos. Face distance and face roll variation reflect the vividness and dynamic degree of influencers in videos and directly affects the real perception of influencers and the connection perception with audiences. With reference to the study of Wu et al. (2021)^[8], this paper measures the social presence of recommended videos by calculating the face distance variation and head posture richness of influencers, and explores how it affects the dissemination effectiveness of recommended videos.

3 DATA AND METHODOLOGY

The data used in this paper is sourced from Douyin. Following the methodology of Ge et al. (2021), we collect recommended videos on the Douyin using "zhogcao" as a keyword from July 24th to August 23rd, as well as publishing time, video duration, title, account authentication, the number of likes, shares, comments, and followers for each video. After excluding invalid data, a total of 1857 recommended videos were collected. Table 1 shows the descriptive statistics for all variables.

Title readability calculated using the Python represents the readability of the video title. Title score indicates the emotional tendency of the video title, obtained from Google Natural Language API, with values ranging from -1.0 (negative) to 1.0 (positive). As for the basic visual features of the videos, we extracted frames from the videos and calculated the average values of all the photos in the video. For the key independent variable visual social presence, we used the Baidu face detection API to obtain the face area and face rotation angles, and then calculated the standard deviations of face distance and face roll for each video where faces are detected. The speed of the video is calculated by converting the video into text using the iFlyTek, followed by calculating the total number of Chinese characters in the text divided by video duration.

Table 1. Descriptive Statistics

	Variables	N	Mean	Sd	Min	Max
Visual social presence	Face distance variation	1,857	5.898	8.612	0.00205	72.28
	Head posture richness	1,857	21.85	28.84	0.099	209.2
Influencer characteristic	Authentication	1,857	0.909	0.976	0	2
	Followers (in 100,000)	1,857	9.588	25.54	0.00018	354
	Gender	1,857	0.481	0.5	0	1
Video content features	Hue	1,857	154.9	22.27	51.94	219.1
	Saturation	1,857	68.03	21.65	11.59	184.8
	Colorfulness	1,857	36.68	12.67	5.751	131.3
	Contrast	1,857	103.2	68.72	2.847	849.3
	Title length	1,857	36.14	12.7	5	146
	Title readability	1,857	15.74	7.933	1.5	63
	Title score	1,857	0.621	0.31	-0.85	1.5
	First-person pronouns	1,857	0.317	0.602	0	4
	Published weekend	1,857	0.719	0.449	0	1
	Video length	1,857	60.02	65.13	4	476
	Speed	1,857	4.476	1.689	0	13.52
Dependent variables	# of likes	1,857	7,182	41,716	0	820,000
	# of comments	1,857	287.9	2,153	0	62,000
	# of favorites	1,857	890.9	5,145	0	77,000
	# of shares	1,857	667.9	5,797	0	175,000

4 ANALYSIS AND RESULTS

The dependent variables in this paper are non-negative integers. In Table 1, it can be observed from the descriptive statistics that the variances of the dependent variables are much greater than their means. The original data exhibits excessive dispersion, so we construct the following negative binomial regression model.

$$\Pr(Y = y|X) \sim \beta_0 + \beta_1 \times \text{face distance variation}_i + \beta_2 \times \text{head posture richness}_i + \beta_3 \times \text{Published weekend}_i + \beta_4 \times \text{authentication}_i + \beta_5 \times \text{video length}_i + \beta_6 \times \text{speed}_i + \beta_7 \times \text{followers}_i + \beta_8 \times \text{gender}_i + \beta_9 \times \text{title score}_i + \beta_{10} \times \text{title length}_i + \beta_{11} \times \text{title readability}_i + \beta_{12} \times \text{hue}_i + \beta_{13} \times \text{saturation}_i + \beta_{14} \times \text{colorfulness}_i + \beta_{15} \times \text{contrast}_i + \varepsilon_i \quad (1)$$

λ_i in formula (1) indicates the dependent variable such as likes. Columns (1) to (4) in Table 2 respectively present the regression results with likes, comments, favorites, and shares as dependent variables. The coefficient of face distance variation is positive across all columns and significant at the 1% level, indicating that face distance variation significantly enhances the dissemination effectiveness of recommended videos. Head posture richness is positive and significant in columns (2)-(4), suggesting it significantly boosts comments, favorites, and shares, but has no significant impact on likes. This finding is consistent with Wu et al. (2021)^[8], although they proposed that features such as head posture richness could increase video likes, empirical research does not support this hypothesis, as the coefficient of head posture richness is also negative and insignificant. Regression results prove our hypothesis that influencer's visual social presence, measured as face distance variation and head posture richness, can significantly enhance the dissemination effectiveness of recommended videos.

Table 2. Model Results

Variables		(1)	(2)	(3)	(4)
Visual social presence	Face distance variation	0.038*** (-0.006)	0.016*** (-0.006)	0.036*** (-0.006)	0.042*** (-0.006)
	Head posture richness	-0.002 (-0.002)	0.004** (-0.002)	0.010*** (-0.002)	0.011*** (-0.002)
Influencer characteristics	Authentication	-1.102*** (-0.050)	-1.076*** (-0.052)	-1.271*** (-0.058)	-1.421*** (-0.058)
	Followers	0.025*** (-0.004)	0.015*** (-0.003)	0.018*** (-0.004)	0.028*** (-0.004)
	Gender	-0.012 (-0.098)	0.106 (-0.099)	-0.395*** (-0.117)	-0.192* (-0.115)
Video content features	Hue	-0.004 (-0.002)	-0.007*** (-0.002)	-0.002 (-0.003)	-0.023*** (-0.002)
	Saturation	0.003 (-0.004)	0.009** (-0.004)	0.015*** (-0.004)	-0.012*** (-0.004)
	Colorfulness	-0.006 (-0.006)	0.008 (-0.006)	-0.010 (-0.007)	0.047*** (-0.006)

Contrast	-0.002*** (-0.001)	-0.005*** (-0.001)	-0.005*** (-0.001)	-0.004*** (-0.001)
Title length	-0.014*** (-0.005)	-0.005 (-0.005)	-0.005 (-0.005)	-0.007 (-0.006)
Title readability	-0.019*** (-0.007)	-0.024*** (-0.008)	-0.027*** (-0.008)	-0.024*** (-0.008)
Title score	-1.281*** (-0.158)	-1.216*** (-0.159)	-1.119*** (-0.186)	-1.367*** (-0.190)
First-person pronouns	0.358*** (-0.077)	0.387*** (-0.081)	0.161* (-0.085)	0.236*** (-0.085)
Published weekend	0.025 (-0.097)	0.109 (-0.102)	-0.187* (-0.111)	-0.170 (-0.112)
Video length	0.010*** (-0.001)	0.008*** (-0.001)	0.011*** (-0.001)	0.008*** (-0.001)
Speed	-0.151*** (-0.027)	-0.204*** (-0.026)	-0.119*** (-0.030)	-0.117*** (-0.028)
Observations	1,857	1,857	1,857	1,857

*** p<0.01, ** p<0.05, * p<0.1

As for control variables, the results of the number of followers and video length are consistent with previous research. Personal and business authentication will significantly decrease the dissemination effectiveness of recommended videos. The title length and readability will decrease consumer engagement. The use of first-person pronouns can shorten the psychological distance with influencers, increasing consumer engagement. However, the research results regarding title score are contrary to previous studies. This can be explained, since the recommended videos aimed at recommending products to consumers. Subjective positive emotions make the videos appear like advertisements, thereby reducing their credibility and dissemination effectiveness.

5 CONCLUSIONS

The emergence of recommended videos is increasingly prominent in consumers' views, no longer merely user-generated content but gradually becoming one of the advertising channels for businesses. Our research utilize data from Douyin to examine how influencer characteristics and video content features influence the dissemination effectiveness of recommended videos. Importantly, we have utilized face detection technology, to quantify the social presence of recommended videos from the perspective of visual features. Our research results prove that influencer's visual social presence will enhance the dissemination effectiveness and consumer engagement. Our research once again confirms the application of social presence theory in the marketing field. The visual social presence has a significant impact on consumers' attitudes and behavioral intentions. Our study also provides some practical suggestions for influencers and businesses. The dissemination effectiveness of recommended videos is an important measure of marketing effectiveness. Influencers should create a feeling of face-to-face

communication with the audience through their body language and facial expressions when shooting recommended videos to establish a para-social relationship with the audience and enhance consumer engagement.

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