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Understanding the Role of Streamer Emotion in E-Commerce Livestreaming

Short Paper

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Abstract

The combination of e-commerce and livestreaming video (e-commerce livestreaming) offers an unprecedented opportunity for streamers (salespeople) to show their emotional displays to viewers (consumers) in real-time. However, it remains unclear how and to what extent streamer emotion influences purchase intentions, especially in the context of different product types where consumers have different decision-making considerations. Based on the stereotype content model, which considers two basic dimensions of social judgments (i.e., warmth and competence), this study intends to explore the impact of the interaction effect of streamer emotion (happiness vs. neutrality) and product type (utilitarian vs. hedonic product) on consumers' purchase intentions and behaviors. Both laboratory experiment and secondary data analysis will be conducted to test our hypotheses. We hope this study can not only extend the livestreaming and emotion-related literature but also provide suggestions on emotional expressions for streamers in their marketing campaigns.

Keywords: E-commerce livestreaming, emotional displays, stereotype content model, product type

Introduction

E-commerce livestreaming is a new term used to describe the combination of e-commerce and streaming video, which is expected to bring dramatic changes to the development of consumer shopping habits and even the retail industry (Hu & Ming, 2020). In China, e-commerce livestreaming is more popular and widespread, with leading e-commerce platforms (e.g., Taobao and Jingdong) embedding live streaming channels in their platforms (Lu & Chen, 2021; Zhang et al., 2020). From the business perspective, according to the 2021 China E-commerce Live Streaming Industry Report, by the end of 2020, China has newly registered 6,939 e-commerce livestreaming-related companies, with a total of 8,862 registered, and the number of streamers in the industry has reached 1.234 million (iResearch, 2021). From the customer perspective, according to the report of the China Internet Network Information Center (CNNIC), the

number of users of e-commerce livestreaming was 464 million, accounting for 44.9% of the Chinese Internet population as of December 2021 (CNNIC, 2022).

A typical livestreaming features one streamer who creates and delivers content to the audience in real-time (Lin et al., 2021; Sun et al., 2019). Unlike traditional online shopping, e-commerce livestreaming provides more social features, which not only enables real-time interactions between the streamer and viewers, but also among viewers (Kang et al., 2021; Li et al., 2020). What's more, e-commerce livestreaming overcomes the separation of time and space, showing the faces and emotional expressions of the streamers in real-time (Bharadwaj et al., 2022; Guo et al., 2022). In traditional marketing, marketers often use facial expressions to persuade and engage customers (Mueser et al., 1984; Söderlund & Sagfossen, 2017; Wang et al., 2017). A similar situation will happen in e-commerce livestreaming, where consumers can only see what the streamer expresses and make decisions accordingly. Therefore, it is necessary and meaningful to examine the role of streamer emotion in the context of e-commerce livestreaming.

Extant studies on e-commerce livestreaming have predominantly employed self-reported data to examine how e-commerce livestreaming (e.g., social factors and technological factors) influences consumers' various behaviors (e.g., Li et al., 2020; Lu & Chen, 2021; Sun et al., 2019; Wongkitrungrueng & Assarut, 2020). However, little prior literature has examined the impact of streamer-related factors (Chen et al., 2022b; Liao et al., 2022) and none of them has revealed the effect of streamer emotion on consumer online purchasing decisions and the mechanisms through which streamer emotion exerts this impact (*i.e., Does streamer emotion in product presentations impact purchase intentions and behaviors? If so, how?*).

We focus on emotional displays not only because they are readily available in social interaction, but also because they are often regarded as the diagnostic source of social inference (Cheng et al., 2020). In particular, happiness (smile) is believed to help people live in groups by promoting cooperation between unrelated individuals (Wang et al., 2017). However, virtually no research has examined the role of happiness in e-commerce livestreaming, and studies outside of this area have reported mixed results, documenting both positive (Lin et al., 2021) and negative (Bharadwaj et al., 2022) effects. This paper aims to address these mixed findings by taking different product types into consideration and considering that streamers are often evaluated on two basic social judgment dimensions (*i.e., warmth and competence*). We will address this issue using mixed methods (laboratory experiment and secondary data analysis).

The paper proceeds as follows. After reviewing the existing studies on e-commerce livestreaming, we briefly present stereotype content model as our theoretical foundation. Based on the above theoretical background, the research model and hypotheses are carefully developed. Next, the primary research method is proposed and potential theoretical and practical contributions are discussed.

Literature Review and Theoretical Background

E-Commerce Livestreaming

E-commerce livestreaming is a new term used to describe the combination of streaming video and e-commerce (Hu & Ming, 2020). A large body of this literature mainly focuses on understanding the antecedent factors of viewers' various behaviors in e-commerce livestreaming, including watching, social sharing, and shopping (e.g., Hou et al., 2020). Specifically, its main antecedents can be classified into the following three categories: (1) social factors (e.g., social presence (Sun et al., 2019), relationship between streamers and viewers (Hu & Chaudhry, 2020; Zhang et al., 2020), trust (Guo et al., 2021a; Wongkitrungrueng & Assarut 2020)); (2) technological factors (e.g., interactivity (Chen et al., 2022a; Kang et al., 2021), affordances (Sun et al., 2019)); (3) psychological factors (e.g., motivations (Cai & Wohn, 2019), perceived value (Guo et al., 2022; Wongkitrungrueng & Assarut, 2020), perceived uncertainty (Chen et al., 2022a; Lu & Chen, 2021)).

Notably, compared with traditional online shopping, a significant feature of e-commerce livestreaming is that it overcomes spatial and temporal separation and reveals the faces and emotional expressions of streamers, and shows the interactions between streamers and products in real-time (Guo et al., 2022; Liao et al., 2022). However, existing research has paid less attention to the influence of streamer-related factors in e-commerce livestreaming (Guo et al., 2022; Lu & Chen, 2021). To date, researchers focused on the effect of streamer credibility (a multidimensional construct containing expertise, trustworthiness and

attractiveness) on viewer behaviors by adopting the survey method (Chen et al., 2022b; Guo et al., 2022; Liao et al., 2022). Our study contributes to this literature by empirically examining the role of streamer emotion on customers' purchase intentions and behaviors.

Stereotype Content Model

The stereotype content model (SCM) was developed by Fiske et al. (2002), and it was originally used to account for different perceptions of social groups. Later, with continuous development, the SCM was also used to judge individuals and organizations (Cuddy et al., 2007). The SCM suggests that there are two key dimensions of human social judgments: warmth and competence (Fiske et al., 2007; Fiske et al., 2002). Specifically, warmth judgments are related to perceived intentions, including perceptions of friendliness, kindness, trustworthiness, helpfulness and sincerity (Aaker et al., 2010; Fiske et al., 2007), whereas competence judgments are related to perceived ability, including perceptions of intelligence, effectiveness, power, creativity, skillfulness and efficacy (Liu et al., 2022). According to Fiske et al. (2007), taken together, these two basic dimensions almost completely explain how people describe others.

Several studies have shown that people can make social judgments about others simply by their physical appearance and facial expressions (Liu et al., 2022). For instance, researchers have found that individuals with childlike faces are generally perceived as warmer and friendlier, while individuals with adult-like faces are perceived as more competent (Zebrowitz, 2018). Extending research focusing on fixed and stable facial structures, Wang et al. (2017) suggest that dynamic facial expressions (i.e., smiles) also have significant effects on social judgments and reveal that compared with marketers with light smiles, marketers with bright smiles are more likely to be regarded as warmer but less competent by consumers. In line with this study, we plan to explore the influence of streamer emotion (i.e., happiness vs. neutrality) on the following viewer behaviors in the context of e-commerce livestreaming.

Product Type

Products can be divided into utilitarian goods and hedonic goods based on product attributes and traditionally reflect the main benefits consumers seek when buying these products, which are more functional or more emotional (Garrido-Morgado et al., 2021; Hirschman & Holbrook, 1982; Strahilevitz & Myers, 1998). To be specific, utilitarian goods are products or services that mainly characterized by instrumentality and functionality based on rational cognition (Strahilevitz & Myers, 1998). Hedonic goods refer to products whose consumption process is mainly characterized by emotional and sensory experiences such as aesthetics, fantasy, and pleasure (Hirschman & Holbrook, 1982). In addition to the differences in the main benefits provided by different kinds of products, these categories give rise to different information processing needs and patterns as well as purchasing decision processes (Dhar & Wertenbroch, 2000), which also affect the effectiveness of marketing tools (Garrido-Morgado et al., 2021). Therefore, this paper will consider different product types that evoke different decision-making processes to solve the mixed findings of previous studies.

Research Model and Hypotheses Development

Facial expressions of emotion are social displays strategically deployed by the sender to draw forth the intended response from the receiver (Bharadwaj et al., 2022; Crivelli & Fridlund, 2018). Overcoming the separation of spatial and temporal, livestreaming reveals streamers' faces, expressions, and personalities in real time (Hu & Chaudhry, 2020; Sun et al., 2019) and literature on e-commerce livestreaming often argues that the emotional expressions of streamers would affect livestreaming sessions' atmosphere and viewers' engagement (Guo et al., 2021b; Guo et al., 2022). While all these studies suggest an essential impact of streamer emotion, none has directly examined this effect.

We focus on one particular emotional state of the streamer — happiness, mainly based on the following two aspects: From the theoretical perspective, the proxy for happiness measurement (i.e., smile) has been studied most because smiles are reliably produced in the laboratory, whereas other facial expressions are rarely seen because a typical facial activity is shifting and subtle and eliciting smiles is the least fraught ethically (Crivelli & Fridlund, 2018). From the practical perspective, smiles are frequent and distinctive human facial expressions (Crivelli & Fridlund, 2018) and happy facial expressions or “service with a smile” are ubiquitous in a marketing communications context (Bharadwaj et al., 2022; Söderlund & Sagfossen,

2017). And more importantly, two relevant studies about expressions of happiness have reported mixed findings, documenting both positive and negative effects: In the context of the talent show livestreaming, Lin et al. (2021) have found that a happier broadcaster makes viewers happier and inspires viewers to engage in a variety of activities, both monetary (tipping) and non-monetary (chatting, sending likes). In the context of livestream retail on television channels, Bharadwaj et al. (2022) have revealed that a happy emotional display for salespeople shows a significant negative U-shaped influence on sales, and suggest salespeople to sell with a straight face.

One possible explanation for the above paradox can be attributed to different product types. As mentioned above, when purchasing different types of products, consumers will have different concerns (Dhar & Wertenbroch, 2000; Garrido-Morgado et al., 2021). For utilitarian products, consumers will engage in analytical information processing, focus on the objective attributes and knowledge of products, and collect as much product information as possible to assist decision-making (Kivetz & Zheng, 2017; Park et al., 2018). And this information acquisition and processing is consistent with the suggestion of Bharadwaj et al. (2022): salespeople in livestream should broadcast their sales promotion with a straight face just like news anchors; that is, marketers should adopt a “journalist approach” to answer objective questions about the product, such as who is it for? When can it be used? What does it do? Therefore, we suggest that streamers with neutral emotional displays will make viewers more like to purchase in the context of utilitarian products in e-commerce livestreaming.

For hedonic products, information is also important, but it does not have as much influence on shopping decisions. Consumers mainly evaluate hedonic products as a whole, focusing more on fun experiences, gaining emotional satisfaction, and pursuing spiritual pleasure (Chitturi et al., 2008; Liao & Lin, 2007). And this spiritual pleasure can be satisfied with streamers who broadcast products with a bright smile. In other words, the streamer with neutral expression is contrary to the pursuit of pleasure spirit of hedonic goods. What’s more, the talent show livestreaming is essentially a hedonic service for consumers, which is very similar to the consumption of hedonic products. Therefore, according to the above analysis and the findings of Lin et al. (2021), we suggest that streamers with happy emotional displays will make viewers more like to purchase in the context of hedonic products. To sum up, we hypothesize:

H1: There is an interaction effect between streamer emotion and product type on consumers’ purchase intentions in e-commerce livestreaming, specifically: For the presentation of utilitarian products, streamers with neutral emotional displays will make consumers more willing to buy (**H1a**). For the presentation of hedonic products, streamers with happy emotional displays will make consumers more willing to buy (**H1b**).

Previous research has supported that emotional expressions have different effects on the two basic dimensions of social judgments — warmth and competence. Previous research has shown that expressing emotions in a professional setting may indicate a lack of competence (Lewis, 2000), yet positive emotional expressions are associated with interpersonal warmth (Harker & Keltner, 2001). At the same time, another form of emotional information expression — emoticons, has been confirmed that emoticons use has a positive impact on warmth perceptions, but a negative impact on competence perceptions (Li et al., 2019). When focusing on happiness, on the one hand, researchers have found that people with bright smiles have higher social skills (Scarr, 1992), and those who sincerely smile are considered kinder and more likable than those who do not smile (Mueser et al., 1984). The pieces of evidence above are all warmth-related personality traits and further lead to positive relationship outcomes. On the other hand, Wang et al. (2017) have shown that sellers with a broad smile when dealing with consumers are considered as less competent. Kraus and Chen (2013) have found that professional fighters who laugh in pre-match photos are seen as less dominant, less aggressive, and more likely to lose. Following the above logic, we first argue that compared with neutral emotional displays, happy emotional displays will lead to higher perceptions of the streamers’ warmth, while lower perceptions of the streamers’ competence and vice versa.

We further suggest that whether customers infer higher competence or warmth from streamer emotion is related to product type. Several studies have already explored the relationship between different service/brand types (utilitarian vs. hedonic) and social judgments. For instance, Liu et al. (2022) have revealed that in hedonic service situations, customers/visitors prefer to use service robots that are perceived as warm, while in utilitarian service situations, they prefer to use service robots that are perceived as competent. Peter and Ponzi (2018) have suggested that hedonic brands create a pleasant experience for the customer and highlight the warmth dimension; utilitarian brands, on the other hand, emphasize the competence dimension. Similarly, as mentioned above, when making purchase decisions about different

product types, consumers will have different kinds of considerations. For utilitarian products, consumers are more concerned about product information and knowledge (Kivetz & Zheng, 2017; Park et al., 2018) which can be reflected by streamers' competence. Therefore, the relationship between neutral emotional displays and competence judgments should be more prominent in the context of utilitarian products. Meanwhile, neutral emotional displays are unlikely to affect warmth perceptions which are less relevant in gaining information. In contrast, for hedonic products, consumers mainly pay more attention to fun experiences, and pursue spiritual pleasure (Chitturi et al., 2008; Liao & Lin, 2007), which can be satisfied by streamers' warmth. Since judgments of warmth are more salient than judgments of competence in the context of hedonic products, we expect that happy emotional displays will enhance perceptions of warmth but have no effect on perceptions of competence.

Finally, research has suggested that warmth and competence perceptions are essential antecedents of consumer behavioral output (Aaker et al., 2010; Li et al., 2019; Liu et al., 2022). There are also theoretical differences in the relative diagnostic of different decision categories between the warmth dimension and the competence dimension: in decision-making with prominent ability problems, competence is more diagnostic, while in decision-making with prominent relationship problems, warmth is more diagnostic (Güntürkün et al., 2020). To sum up, consumers are likely to pay attention to streamers' competence in the context of utilitarian products. Thus, compared to happy emotional displays, neutral emotional displays are expected to improve consumers' purchase intentions in the context of utilitarian products. In contrast, in the context of hedonic products, consumer attention is expected to shift to warmth. Thus, happy emotional displays should increase consumers' purchase intentions by enhancing warmth perceptions of streamers in the context of hedonic products. Formally, we hypothesize:

H2: Streamers with neutral emotional displays will lead to higher purchase intentions through competence perceptions in the context of utilitarian products (**H2a**), while streamers with happy emotional displays will lead to higher purchase intentions through warmth perceptions in the context of hedonic products (**H2b**).

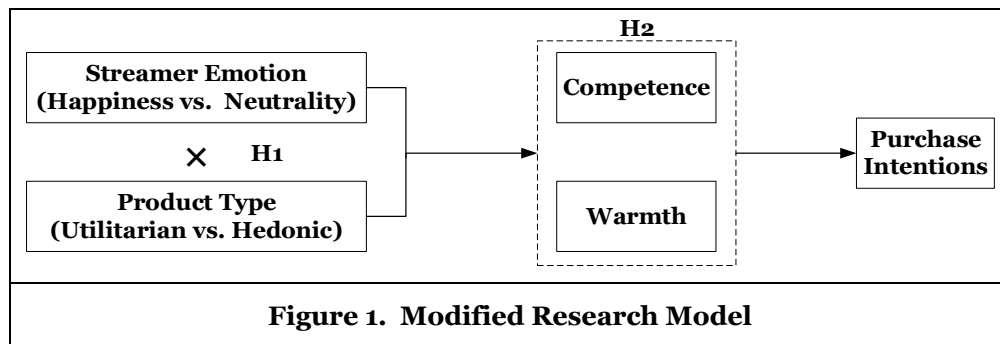


Figure 1. Modified Research Model

Research Plan and Methodology

We plan to conduct research by combining experiment with secondary data analysis to validate our research model (see Figure 1). Firstly, to support the interaction effect and mediating mechanisms, we will carry out a laboratory experiment. In addition, for the external validity of interaction effects, we will conduct an econometric analysis of real data from e-commerce livestreaming.

Study 1: Mediating Mechanism of Interaction Effect between Streamer Emotion and Product Type

Study 1 will employ a 2 (streamer emotion: happiness vs. neutrality) × 2 (product type: utilitarian vs. hedonic) between-subject experimental design. We will demonstrate the effects of streamer emotion and product type with a video (without audio) of a streamer demonstrating a focal product and manipulate emotion by the facial expression of the streamer (smile vs. no smile) (Ferraro et al., 2013). What's more, to confirm our manipulation of product type, we will first conduct a pilot study to select the representative focal product of utilitarian products and hedonic products.

The following steps will be conducted: 1) Manipulation checks: We will test the validity of the product type manipulation in a pretest by informing the participants about the definitions of utilitarian and hedonic goods, and then asking them to rate the demonstrated products by the streamer (1=completely utilitarian, 7=completely hedonic (Jing & Zhu, 2016)). Afterward, we will conduct a manipulation check of the smile (1 = displays no smile, 7 = displays a broad smile (Wang et al., 2017)); 2) Measuring core variables: After viewing the video, participants will be asked to report their perceived competence and perceived warmth of the streamer on two scales of four items (competence: competent, skillful, capable, intelligent; 1 = not at all, 7 = very much so; warmth: warm, sincere, friendly, kind; 1 = not at all, 7 = very much so (Wang et al., 2017)). They also will be asked to report purchase intentions on a three-item scale (i.e., “I would consider buying the products from the streamer in the future,”; “I am very likely to buy the products from the streamer,”; “I intend to buy the products from the streamer”; 1 = strongly disagree, 7 = strongly agree (Lu & Chen, 2021)). 3) Confound checks: We will collect data on three confound checks (i.e., smile authenticity, target attractiveness and product attractiveness (Gramazio et al., 2021; Hennig-Thurau et al., 2006; Mueser et al., 1984)). Besides, we will also collect the demographic data of the participants. 4) Data analysis: The main and interaction effects will be verified by performing ANOVA, and the mediation effect will be verified by referring to the Bootstrapping mediation test method.

Study 2: Interaction Effect between Streamer Emotion and Product Type

Secondary data will be collected from Douyin which is the leading livestreaming platform in China. Douyin sells a wide range of goods, including clothing, cosmetics, snacks, electronics products and so on, which makes it a suitable background for testing our research model. Data will consist four distinct sources: 1) product-level livestreaming video clips, 2) product-level information (e.g., product type, within-session sales, price), 3) session-level information (e.g., session IDs, duration, start time, viewers’ engagement behaviors), 4) streamer-level information (e.g., followers, type, tenure days). Referring to previous studies, we propose to measure constructs in our model as shown in Table 1.

We will follow the livestream retail analytics framework proposed by Bharadwaj et al. (2022) to measure emotion using the streamers’ facial expressions, which combines the face detection model based on the Haar cascade algorithm and emotion classification model by adopting a pretrained mini-Xception model. We will sum up the likelihood of emotion in each frame, and then all frame-level measures will be aggregated to the product level (Guo et al., 2021b). Drawing on previous research on utilitarian and hedonic products in the fields of psychology, behavioral science, and economic science (Hazari et al., 2017), this study will invite two marketing graduate students who are unfamiliar with the purpose of the study to differentiate and code the products. Sales will be measured by the number of sales of a focal product *j* in an e-commerce livestreaming session *s* hosted by a streamer *i*. In addition, to obtain unbiased estimates of the effects, we will consider heterogeneities across streamers, sessions and products as control variables.

Notably, there are some within-cluster dependences that violate the independence assumption of the ordinary regression model: on the one hand, products within the same sessions may be correlated because they share session-related attributes; on the other hand, sessions hosted by the same streamers may also be related. Thus, to disentangle the within- and between- cluster effects, we will employ a three-level mixed-effects linear model with varying intercepts (Guo et al., 2021b). The model specification is as follows:

$$\ln Sales_{isj} = \beta_0 + \beta_1 StreamerEmotion_{isj} + \beta_2 ProductType_{isj} + \beta_3 StreamerEmotion_{isj} * ProductType_{isj} + Controls\varphi + \mu_i + v_{is} + \varepsilon_{isj}$$

In this model, dependent variable in the model is specified in the logarithmic form to control skewness and for better explanation. β_{1-3} are the coefficients of interest which represent the fixed effect parameters at the product level. Among them, β_3 will reveal the interaction effect, that is, to verify H1. μ_i is the random effect associated with a streamer *i*; v_{is} is the random effect associated with session *s* of streamer *i*; and ε_{isj} is the random error term. Overall, these random effects capture the unobserved streamer, session, and product-specific effects.

	Variables	Descriptions
Independent Variable	StreamerEmotion	The likelihood that the frame shows a particular type of emotion out of two types (happiness vs. neutrality).

Moderator	ProductType	Binary variable on product type (utilitarian vs. hedonic).
Dependent Variable	Sales	Number of sales of a focal product in a session hosted by a streamer.
Control Variables	Streamer Type	Binary variable on streamer type (influencers vs. sellers).
	Streamer Popularity	Number of followers of a streamer.
	Streamer Experience	Number of sessions hosted by a streamer in the past.
	Session Length	Total duration of a session.
	Viewer Engagements	Number of viewers, likes, and comments of a session.
	Product Price	List price of the focal product.
	Time Effects	Time dummies for day effect, week effect, and month.
Table 1. Measurements		

Expected Contributions

We expect this research to bring both important theoretical and practical contributions. Theoretically, first of all, this study will not only enrich the research on e-commerce livestreaming by reconciling the existing paradox surrounding the effects of happiness in livestreaming (Bharadwaj et al., 2022; Lin et al., 2021) (by taking different product types (i.e., utilitarian products and hedonic products) as the boundary condition), but also by drawing conclusions from real-world data rather than only from self-reported data in most existing e-commerce livestreaming literature (e.g., Chen et al., 2022a; Guo et al., 2021a; Sun et al., 2019; Wongkitrungrueng & Assarut, 2020). Moreover, this research will also have implications for current theories on emotions and decision-making by considering two basic dimensions of social judgments (warmth and competence), which are often tested in face-to-face social interactions (Fiske et al., 2002; Wang et al., 2017) as customers' responses to streamer emotion in e-commerce livestreaming context. Practically, the findings of this study will help to provide a possible explanation for the phenomenon in business practices that sometimes smiles are used successfully, while sometimes they are not, thus providing suggestions on emotional displays for streamers in their marketing campaigns.

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