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Short Research Paper

Does an AI Streamer Have Feelings? The Influence of the Positive Emotions of AI Streamer on Consumers’ Purchase Intention

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Abstract: Streamers have become significant participants in pushing sales as the livestreaming commerce sector is growing rapidly. However, livestreaming commerce businesses are currently constrained by the high expense of human streamers and their limited online time. As a result, the AI streamers began to enter the studio, resulting in increased trading chances. But can AI streamers satisfy consumers and produce good sales performance? In this paper, projecting from both emotional and cognitive perspectives, we examine the impacts of AI streamer’s positive emotions on consumers’ purchase intention. This study has the potential to provide guidance for the development of livestreaming commerce platform and AI streamer design technology.

Keywords: AI streamer, livestreaming, positive emotions, purchase intention

1. INTRODUCTION

Under the catalysis of COVID-19, the livestreaming commerce industry has been developing rapidly. At present, AI Streamer can realize 7*24 hours livestreaming, continuously bring recommendation traffic and transaction opportunities, and finally realize the improvement of GMV (Gross Merchandise Volume). According to iQiyi’s 2019 Virtual Idol Observation Report, nearly 400 million people in China are following various types of AI streamers. Until 2020, the virtual idol market revenue has reached 200 billion, doubling in just two years. The Commission of AI streamer Luo Tianyi in livestreaming commerce is as high as nine hundred thousand RMB, far more than Li Jiaqi and other top human streamers.

AI streamer has many advantages in the livestreaming commerce industry. But for consumers, can they accept this type of streamer? More specifically, can they be induced by the positive emotions of the AI streamers to purchase just like watching livestreaming by human streamers? Only limited efforts have been made to address this issue. Existing studies on the livestreaming commerce have suggested that streamers’ characteristics can influence consumers’ purchase intention through trust and social interaction (Awad & Ragowsky, 2008)[1], whereas few studies have examined such effects from an emotional perspective. In addition, the few studies adopting an emotional view have argued that streamers’ positive emotions influence consumers’ purchase intention through emotional contagion (Meng et al., 2021) [2]. However, whether the AI streamers’ positive emotions can play a similar role remains unknown.

Apart from the emotional contagion perspective, consumers might not expect that the AI streamers, as a robot, can express positive emotions before they watch the livestreaming. Based on the expectation disconfirmation theory, when AI streamers express positive emotions, consumers’ ex-ante expectations will be disconfirmed and thus are more likely to feel satisfied and purchase the products (Brill et al., 2019) [4]. Therefore, from a cognitive point of view, the positive emotions of the AI streamers can also affect consumers’ purchase intention through expectation disconfirmation. However, no studies have tried to examine such an effecting path. Moreover, several studies suggested
that individuals’ expectations might be influenced by their personal sense of power (Duanmu et al., 2018) [3]. Hence, it is also imperative to know whether the sense of power will moderate the effect of positive emotions on purchase intention through expectation disconfirmation.

Therefore, the current study aims at examining the effects of positive emotions of AI streamer on consumers’ purchase intention through both the emotional contagion and expectation disconfirmation perspectives. The research questions of this study are:

1. How do AI Streamer’s positive emotions affect consumers’ purchase intention through emotional contagion? How is such effect moderated by individual differences in emotional contagion?
2. How do AI Streamer’s positive emotions affect consumers’ purchase intention through expectation disconfirmation? How is such effect moderated by the sense of power of consumers?

The contributions of this paper are as follows: First of all, we extend the emotional contagion theory to the context of AI streamers in livestreaming commerce. We expect that the positive emotions of AI streamers will enhance consumers’ purchase intention through the contagion of positive emotions of pleasure and arousal. Secondly, we propose that in the specific context of AI streamers, the expectation disconfirmation will also play an important role in explaining the effects of streamers’ positive emotion on purchase intention. Thirdly, we also considered the contingent conditions of emotional contagion and expectation disconfirmation by introducing the level of emotion assimilation competency and sense of power as the moderators.

2. THEORETICAL FOUNDATION AND HYPOTHESES

2.1 AI streamer in livestreaming commerce

Scholars have begun to pay attention to the influence of streamers on consumers’ purchase intention in livestreaming commerce. For instance, Eroglu et al (2003) used the SOR model for the first time to explore the influence of various stimuli on consumers' purchase intention in a live streaming commerce environment [6]. They found that there are multiple stimuli such as streamers, real-time bullet screen and product information. For another example, Fei (2021) adopted an eye movement tracking experiment and found that audiences would give priority to the features of streamers [7]. Chen (2021) empirically found that streamers disclose themselves and possess high expertise knowledge will attract their followers to impulse buying [8]. From the perspective of emotional contagion, Meng (2021) found that the language and behavior of e-commerce streamers, especially those of Internet celebrities, would affect consumers' emotions, thus driving more purchase intention [2].

As discussed in the above studies, streamers’ characteristics, such as language and emotions, have been proved to have an impact on consumers’ purchasing behavior. However, the research subject in the above studies are all human streamers, and there is no research investigating the question of whether and how the language or emotional characteristics of AI streamers affect consumers’ purchase intention. At present, the livestreaming commerce industry is desperate for 24-hour non-stop live streaming capability. With the maturity of AI streamer technology, more and more AI streamers will take over the sales task of human streamers. Therefore, this problem needs to be solved urgently.

2.2 Effects of AI streamer’s positive emotions on purchase intention: emotional contagion perspective

Emotional contagion is the process by which one person (or group of people) influences the emotions of another person or group of people through the induction of conscious or unconscious emotional states (Rymarczyk et al., 2019) [9]. In social interactions, people tend to capture the emotions of others, such process is known as emotional contagion. As scholars enrich the theory of emotional contagion, the application of emotional contagion has been extended from psychology to service and marketing. This stream of research focuses on the emotional contagion between marketers and consumers (Meng et al., 2021) [2].

In the process of marketing and selling products, the emotion of marketers will affect the purchase decision of consumer. It has been found that the positive emotions of sales person can transmitted to consumers and invoke their purchase behaviors (Meng et al., 2021) [2]. However, in the context of livestreaming commerce, whether and how the
positive emotions of AI-based streamer can be transmitted to consumers and impact their purchase intention remain unknown. Without a deep understanding of the underlying mechanisms, it is difficult for programmers to design effective AI streamers for livestreaming commerce.

2.2.1 Pleasure and arousal as positive emotions

Many psychologists have described emotion as a series of dimensions, with pleasure-displeasure, arousal-nonarousal, and dominance-submissiveness being the three bipolar dimensions of emotion (Russell & Mehrabian, 1977)[10]. Russell (1980) suggested that the dominance-submissiveness dimension can be eliminated[11]. By analyzing the influence of shopping emotion on shopping behavior, Donovan (1994) confirmed that pleasure emotion and arousal emotion are sufficient to represent the positive emotional response to external stimulus [12]. In subsequent studies, the positive emotion model then has only two dimensions, pleasure, and arousal (Wirtz & Bateson, 1999) [13].

Pleasure is the degree to which a person feels good, happy, contented, or joyful in a situation (A. & A., 1974). Arousal is the degree to which a person feels excited, alert, stimulated, awake, or active in a situation (Monsuwé et al., 2004)[14].

When AI streamers display positive emotions such as pleasure and arousal, consumers might be infected and feel happy and excited as well, which makes them satisfied and boost their purchase intention. Therefore, we postulate:

H1a: Pleasure and satisfaction play a chain mediating role in the relationship between AI streamers’ positive emotions and consumers’ purchase intention.

H1b: Arousal and satisfaction play a chain mediating role in the relationship between AI streamers’ positive emotions and consumers’ purchase intention.

2.2.2 Different levels of consumer emotion assimilation competency

Literature on emotional contagion also suggested that different individuals will have various competencies to feel and assimilate emotions. Verbeke (1997) explored the differences in emotional contagion among individuals in a sales context and classified individuals into sympathetic and numb based on their ability to be emotionally contagious by others [15]. Sympathetic individuals are more easily infected by the emotions of others, and numb individuals are more indifferent in interpersonal interactions. Similarly, Gountas & Gountas (2007) found that from the consumers’ side of the service interaction, it is reasonable to assume that personality differences cause consumers to experience different responses to emotional stimuli [16].

The Empathetic types are receptive to emotions by other people and the Expansives are not able to feel empathy and they do not feel nor receive emotions from others, that is, they are unaffected by emotions. Extrapolating such logic to the context of livestreaming by AI streamers, consumers’ difference levels of emotion assimilation competency will play a critical role in regulating the influence path of AI streamers’ positive emotions on their purchase intention. Based on that, it is necessary to study the moderating effect of different levels of emotion assimilation competency on the effecting path between AI streamers and consumers’ purchase intention.

We believe that sympathetic consumers are more easily infected by the positive emotions of the AI streamers during livestreaming commerce, which leads to their pleasurable and arousing emotions. Numb consumers, on the other hand, are less susceptible to emotional contagions. Therefore, hypotheses H2a and H2b are proposed:

H2a: Different levels of consumer emotion assimilation competency have a positive moderating effect on the effect of AI streamers’ positive emotions on consumers’ purchase intention through pleasure and satisfaction. That is, the stronger the consumer’s emotion assimilation competency, the stronger the effect of AI streamer’s positive emotions on consumers’ pleasure emotion, satisfaction and purchase intention, vice versa.

H2b: Different levels of consumer emotion assimilation competency have a positive moderating effect on the effect of AI streamers’ positive emotions on consumers’ purchase intention through arousal and satisfaction. That is, the stronger the consumer’s emotion assimilation competency, the stronger the effect of AI streamer’s positive emotions on consumers’ arousal emotion, satisfaction and purchase intention, vice versa.
2.3 Effects of AI streamer’s positive emotions on purchase intention: expectancy disconfirmation perspective

2.3.1 Expectation disconfirmation model

Marketing and consumer behavior researchers use expectation disconfirmation theory as a root theory (Oliver, 1977) \cite{17}. The expectation disconfirmation model shows that satisfaction is achieved through a two-stage process. Before purchase, consumers have expectations about the performance of the product. And after purchase, the consumer will compare the real performance of the product with the expectation before purchase, thus forming the gap between the two that is called "disconfirmation". This is the first stage.

In the second stage, the consumer reacts with different "satisfaction" from the "disconfirmation": when the actual performance is the same as the expectation, the consumer is "moderately satisfied"; when the actual performance exceeds the expectation, the consumer is satisfied; and "dissatisfaction" when actual performance does not meet expectations. Therefore, the expectation disconfirmation model includes three basic variables: expectation, disconfirmation, and satisfaction, where the expectation is the consumer's expectation of product performance, disconfirmation is the difference between performance and expectation. The direction and intensity of expectancy disconfirmation have a significant effect on satisfaction (Au & Tse, 2019) \cite{18}.

In the current study, consumers normally expect that the AI streamer, as a robot, cannot express positive emotions before they watch the livestreaming. After watching the marketing process of the AI streamers, consumers will compare the actual experience of watching AI streamers with their ex-ante expectations. When the AI streamers express positive emotions, consumers’ ex-ante expectation of the AI streamer will be positively disconfirmed, which induces their satisfaction. The greater the AI streamer express positive emotions, the higher satisfaction consumers have, and thus the higher their purchase intention. Within such process, the disconfirmation of consumers’ ex-ante expectation by AI streamers’ positive emotions works as an important driver for consumers’ satisfaction and subsequent purchase behavior. Based on that, hypothesis H3 is proposed:

\textit{H3: Expectation disconfirmation and satisfaction play a chain mediating role in the relationship between AI streamers’ positive emotions and consumers’ purchase intention.}

2.3.2 Agentic-Communal model of power

Power is defined as the “perceived asymmetric control relative to another (Rucker et al., 2012) \cite{19}. Research shows that individuals with a high sense of power tend to have an initiative orientation, which leads to more attention to self-expression, self-improvement and self-protection (Lammers et al., 2011) \cite{20}. Conversely, individuals with a low sense of power tend to develop communal orientations, leading them to focus more on relationships with others.

In livestreaming commerce, consumers with high sense of power are function-oriented and pay more attention to the professional introduction of commodities by AI streamers, whereas consumers with low sense of power are social-oriented and are thus more easily persuaded by the friendly and emotional words of AI streamers. That is to say, ceteris paribus, consumers with higher sense of power will pay less attention to the emotions of AI streamers, hence being less likely to be influenced by the positive emotions of AI streamers. As a result, the positive emotions of AI streamers will be less likely to increase their purchase intention through expectation disconfirmation and satisfaction. Based on that, hypothesis H4 is proposed:

\textit{H4: The sense of power has a negative moderating effect on the effect of AI streamers’ positive emotions on consumers’ purchase intention through expectation disconfirmation and satisfaction. That is, the stronger the consumers’ sense of power, the weaker the effect of AI streamer’s positive emotions on consumers’ expectation disconfirmation, satisfaction and purchase intention, vice versa.}

The full research model of the current study is presented in Figure1. below.
3. RESEARCH METHOD

3.1 Research design

We plan to adopt the scenario-based experiments to address our research questions. Such method is appropriate because it allows us to better control the demographics of the participants and manipulate the independent variables (Carroll & Rosson, 2009) [21]. We plan to conduct the study through an online survey agency (www.wjx.cn). We employ a 2x (high positive emotion vs. low positive emotion) between-subject design. In the scenario of high (vs low) positive emotion, participants will be presented with a scenario in which the AI streamers express (vs do not express) positive emotions during the marketing process. Then the participants will be asked to fill in a survey questionnaire that contains measurement items of the research variables. Since the process of consciously reporting participants’ emotional and cognitive experience may alter their subsequent behavior, this research will measure participants’ positive emotions and expectation disconfirmation after measuring their purchase intention. Considering that consumers’ emotional assimilation competency and sense of power are two moderators in the research model, which are both consumers’ characteristics, irrelevant of the AI streamer, we will measure these two variables through questionnaires before the formal experiment. After that, the whole sample will be divided into control group and experimental group using match techniques, to make sure the two groups are balanced on demographic variables and these two moderators.

3.2 Manipulation of AI streamers’ positive emotions

Speech emotion recognition, face-based emotion recognition, text emotion recognition, and physical behavior emotion recognition are the key areas of AI robot emotion recognition research (Martinez & Cruz, 2002) [22]. Humans use speech to transmit their feelings and thoughts in one of the most natural and effective ways possible. Speech signals may carry more contextual information than face-based emotion recognition. As a result, we will use speech emotion to assess AI streamer’s capacity to articulate positive emotion. We will use the number of adjectives, interjections, and address words in the AI streamers’ language to measure the positive emotions of AI streamers.

Liebenthal (2016) investigated the relationship between language, tone, and emotion from the perspective of Neural Substrates, who argued that language can convey emotional states more accurately and subtly than non-verbal stimuli such as facial expressions [23]. Lüdtke & Jacobs (2015) by studying the use of nouns and adjectives in simple declarative sentences, found that adjectives are rich in emotional information and can express the emotional color of the speaker [24]. Moccia (2020) found that a decrease in hedonic tone correlated with the severity of depressive symptoms.
The emotional rhythm of the hedonic tone increases the activity of the auditory superior temporal cortex and activates the perception of vocal emotion. Based on this, we believe that people use more tone words when they want to express positive emotions, and this is also true for AI streamers. Pronouns are markers of interpersonal and emotional communication and can reflect a certain attitude emotion of the speaker towards the listener.

We manipulate the emotion of AI streamers by the number of emotional words in Livestreaming. Also, we will keep the speech length, the information like production introduction balanced between the control and experimental groups. In the condition of positive emotion, AI streamer will use as many adjectives, address words and mood words as possible in the live streaming. Before the experiment, we will collect subjects’ perceptions of positive emotion of AI streamer as a manipulation check.

### 3.3 Manipulation check

In order to test whether the AI streamers can convey different emotional signals by the number of adjectives, interjections and appellations in the language, we will make two livestreaming video clips of AI streamer explaining the same product, one of which uses rich emotional words, the other uses fewer emotional words. The Self-Assessment Manikin (SAM) five pointer scale will be used for manipulation check in the current study to directly measure the pleasure, arousal, and dominance related in response to two videos of the AI streamer. Participants in the experiment will be randomly divided into two groups and will be asked to rate their perceived positive emotion of the AI streamer using the SAM scale.

Afterwards, we will process the collected scale data with one-way ANOVA.

### 3.4 Data collection process

We will embed livestreaming videos of AI streamers (positive emotions and general emotions) into online questionnaires, and distribute the questionnaires to participants. Subjects in the group of high positive emotions will be presented with a video in which the AI streamer uses enough adjectives, tone of voice, and address words to show the product, while subjects in the group of low positive emotions will be shown with a video in which these emotional words are eliminated. After watching videos, subjects will be invited to fill up the same questionnaires that measure the research variables.

### 3.5 Measurements of variables

Measurements of variables will be adapted from prior research and adjusted according to the research context of the current study. We will choose the scales proposed by Oiler (1981) to measure consumer’s expectation disconfirmation and satisfaction [26]. The positive emotions of pleasure and arousal will be measured by the scales proposed by Cheng (2009) [27]. Individual’s difference in emotional feeling ability will be measured by the instruments proposed by Verveke (1997) [15]. While the sense of power will be manipulated in the experiments. We will divide the participants randomly into two groups: one group read the high-power text, the other read the low-power text, and then ask them how powerful they feel (Laslo-Roth & Schmidt-Barad, 2020) [28].

From the consumers' perspective, they were unsure whether AI streamers were as reliable as real streamers. During the live stream of an AI streamer, the consumer's satisfaction will affect their purchase intention. We will use the instrument proposed by Dodds (1991) [29].

### 3.6 Plan of data analysis

We will use bootstrapping method to examine the chain mediation hypotheses. The PROCESS plug-in in SPSS software will be used to test the chain mediation effects. The PROCESS plug-in could also handle the moderated mediation analysis well and test the moderated mediation hypotheses.

### 4. EXPECTED CONTRIBUTIONS AND NEXT STEPS

#### 4.1 Theoretical contributions

This study has several important theoretical contributions. First, this study enriches the emotional contagion theory by applying it to the context of livestreaming by AI streamers. Prior research has adopted this theory to examine the
emotional contagion in situations of human-human interactions (e.g., human streamer-consumer interaction) (Meng et al., 2021) [2]. This research is among the earliest ones to examine the emotional contagion between AI and human (i.e., AI streamer-consumer interaction). Second, this study supplements the emotional perspective (i.e., emotional contagion theory) with a cognitive perspective (i.e., expectation disconfirmation theory). Combining the emotional and cognitive perspectives is necessary in that, unlike situations of human streamers, consumers normally do not have ex-ante expectations for the positive emotions of the AI streamers. Therefore, expectation disconfirmation may also play a crucial role in the effecting path between AI streamers’ positive emotions and consumers’ purchase intention. Third, this study extends the emotional contagion theory and expectation disconfirmation theory by incorporating different levels of emotion assimilation competency and sense of power as two important moderators. Past studies have seldom explored the boundary conditions of the emotional contagion and expectation disconfirmation.

4.2 Managerial implications

This study also provides several implications for practice. First, this study indicates that the positive emotions of AI streamers may be transmitted to consumers and foster their purchase behaviors. Therefore, designers of AI streamers should try to infuse more positive emotional elements to the AI streamers to improve their sales performance. Second, this study also implies that expectation disconfirmation plays an important role in driving the sales of AI streamers. Operators of livestreaming commerce platforms could try to lower consumers’ ex-ante expectations for the AI streamer’s emotions, or increase the extent of positive emotions of the AI streamers, so as to enlarge the expectation disconfirmation. Third, considering the boundary conditions of the emotional contagion and expectation disconfirmation, livestreaming commerce platforms could target their AI streamers with positive emotions to consumers with high emotion assimilation competency or with low sense of power.

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