

Research on the Impact of Visual and Auditory Effects of Live Streaming on Purchase Intention

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ABSTRACT. With the development of the internet industry, China's social media platforms for short videos, such as Douyin and Kuaishou, have gradually become the most popular social media platforms. After the rise of short video platforms, the live e-commerce has also gradually become one of the most popular marketing methods on the internet. After a series of questionnaire surveys and comparative analyses, I have drawn the conclusion that highly saturated colors and visual elements in a live streaming are more likely to generate purchasing intention among audiences. Additionally, e-commerce streamer speaking at a slower pace generate the strongest purchasing intention among consumers. Consumers tend to make purchases from streamers who have interactive engagement with their audience.

Keywords: E - Commerce, Live Streaming, Purchase Intention.

1 Introduction

E-commerce is one of the thriving industries in China in recent years. According to the statistics from the National Bureau of Statistics of China, the online retail sales of physical goods continued to grow, reaching a total of 6.5 trillion yuan in 2022. Meanwhile, with the development of e-commerce, the express delivery industry has also grown rapidly. In 2022, the national express delivery volume reached 110.58 billion pieces. In addition, e-commerce has also promoted the development of rural economy, with the network retail sales of agricultural products in China reaching 531.4 billion yuan in 2022. This has taken an important step towards China's goal of "rural revitalization." After three years of the impact of the epidemic, relevant departments across the country have put the recovery and stimulation of consumption in a priority position. "E-commerce" as an important industry promoting consumption in modern society has been highly valued by various departments. This study aims to combine academic research with reality through investigation and analysis, hoping to help more e-commerce practitioners stimulate consumption and make a contribution to the strategic goal of revitalizing the national economy.

Experts in related fields at home and abroad have scientifically studied the relationship between consumer purchasing behavior and dimensions such as color saturation,

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advertising copy, promoter comprehensive quality, consumer perception, and language attributes. However, previous research mainly focused on a specific element in the visual or auditory effects of marketing. Research on live streaming e-commerce mainly focuses on the whole industry or explores the marketing methods and future development trends for some key opinion leaders (KOLs). Existing research has not yet covered the impact of both effects on consumer purchasing intentions in live streaming e-commerce. This study expands on existing theories by combining two key elements for comparison and analysis.

Based on previous research methods and practices, this survey selected eight live streaming e-commerce video clips and conducted analysis and research through questionnaires. In order to ensure the accuracy and rigor of the survey information, the selected video all aimed at food categories, and the gender of the main streamer was primarily female. The survey mainly investigated the relationship between the language speed and words of the main streamer, the color saturation and visual elements in the live streaming, and the customer's purchasing intentions respectively, and conducted a special analysis according to the differences in the background information of the interviewees. This study was divided into two research groups: a visual group and an auditory group, aiming to analyze the impact of visual and auditory effects on customer purchasing intentions in live streaming e-commerce from two perspectives and then infer the importance of each element's impact on consumer purchasing behavior. This includes the impact of high and low color saturation on consumer purchasing intentions, the influence of the number of visual elements in the live streaming, the influence of the streamer 's language speed on consumer purchasing intentions, and the impact of whether the streamer 's language style establishes a connection with the audience on consumer purchasing intentions.

Many scholars have focused on applying independent visual and auditory effects in the business field, but existing research has not yet covered the application of both visual and auditory effects in live streaming e-commerce or even in business and their impact on consumer purchasing intentions. This paper expands on existing research by combining both perspectives for comparison and analysis, and in addition, the importance of advertising's auditory-visual effects in business is self-evident. However, few scholars have applied previous research findings to research the emerging field of live streaming e-commerce. Therefore, this study combines existing theoretical knowledge and survey results to focus on this new industry. By conducting this survey, we will understand the audience's preferences for live streaming e-commerce visual and auditory styles in the current stage. The innovation of this survey is its comprehensive analysis of the role played by visual and auditory perspectives in live streaming ecommerce. Based on previous research on angles such as color, copy, and language styles, this study selected four elements that may have a greater impact on consumer purchasing intentions: color saturation, visual element quantity, language speed, and language interaction, and analyzed the usefulness of these four elements in live streaming e-commerce and their impact on customer purchasing intentions. This survey and analysis are conducted from the professional perspective of market marketing on the current trend of live streaming e-commerce auditory-visual styles.

2 Literature Review

Research on consumer purchasing intention can be traced back to Li Jing (1984) [1], who proposed the relationship between visual design of products and consumer psychology. Tung-Zong Chang (1994) [2], presented that perceived price is positively affected by objective price and negatively affected by reference price. They supported the positive relationship between price and perceived quality that was found in previous research and further indicated that the influence of price on perceived quality would be weakened when there is a large amount of direct product information. Finally, the research results showed that the balance between perceived price and perceived quality would lead to perceived value, which is the main factor affecting purchasing intention. Subsequently, scholars have studied the impact of advertising on consumer purchasing behavior from the perspectives of presentation style, language style, color, and further refined the angle of research into the impact of a specific element on consumer purchasing intention. From the perspective of auditory and copywriting, Shixiong Liu (2012) [3] and others proposed that the advertising language image has a positive impact on purchase intention and product evaluation, and the reliability and validity of the scale have passed the test, providing measurement support for subsequent research on advertising language. Rui Chen (2020) [4] proposed three linguistic characteristics that make a streamer most attractive to viewers: first, when promoting a product, the streamer briefly highlights its relevant features, speaks at a fast speed, and uses concise language. This often attracts the attention of live broadcast viewers and avoids awkward silences; secondly, the spoken language used by e-commerce streamers presents a networked feature, with frequent use of some network. The use of popular words reflects the closeness to the online environment, which helps to narrow the social distance with the audience of online live broadcast.; third, the language characteristics of excellent streamers are strong emotions and the exaggerated way of expressing one's feelings directly to express one's praise for the goods. The streamer has a rich feeling for the goods, which stimulates the emotions of the language, resulting in a strong desire to express. The use of modal particles in the language of the streamer also helps enrich the emotional color. These emotional methods are not only suitable for selling goods, but also help to shape brands. Regarding the visual effects of advertisements, Jun Pang and Yansu Wang (2022) [5] proposed that red is more likely to trigger the dominant concept, leading individuals to exhibit stronger competitive consciousness to pursue dominant status. Individuals with highly competitive consciousness are more eager to show their ability rather than sincerity, and therefore prefer brands with an ability-type rather than a sincerity-type. Jing Huang and others (2022) [6] proposed that low saturation colors are more likely to make consumers feel the subdued and calm characteristics of the brand, while high saturation colors are more likely to make consumers feel the stimulating personality of the brand.

Due to different economic levels and cultures in different countries and regions, consumers have different preferences for the saturation of brand logos. For the live streaming e-commerce model, the key opinion leader (KOL) plays an important role. Pingsheng Liu and Yongdong Shi (2020) [7] were the first to propose that the personal

style and charm of web celebrity streamer s play a decisive role in promoting fan shopping. Traditional enterprises and brands can promote the effectiveness of live streaming e-commerce by optimizing content, strengthening promotional incentives, creating streamer characteristics, increasing interaction frequency, and accumulating and utilizing trust advantages. In addition to the key opinion leader and marketing strategies, the visual feedback in the live streaming also has a significant effect on the live streaming e-commerce. Daocheng Yan and Fei Li (2020) [8] proposed that e-commerce live streaming mainly awakens consumers' purchasing memory through three forms: the restoration of offline store scenes, the fiction of social scenes, and the merger of foreground and background scenery. That is, using virtual technology to create live streaming scenes that are as close to real life as possible and provide idealized visual experience to attract more consumers.

3 Research Method

The two groups of questionnaire videos were taken from the Chinese social media Douyin, and there are eight non-celebrity or internet celebrity videos were randomly selected, all of whom had similar online viewership and were selling commodities at similar prices. Furthermore, in order to ensure impartiality of the investigation results, I selected food e-commerce live stream videos, given that food is the most sold commodity in e-commerce live streaming. To minimize potential biases during the interview process caused by the characteristics of the streamer, I exclusively selected female streamers who possessed relevant experience. The questionnaire was divided into two stages. The first stage was the pre-experiment, in which 20 questionnaires were randomly distributed to check for defects and gather feedback from respondents. After confirming that the questionnaire had the desired effect, the formal distribution was launched after modifying the ambiguous words and phrases. The questionnaire distribution was conducted entirely online and produced by Tencent questionnaire platform, which was promoted through social media and Tencent's questionnaire distribution tool, and the survey was a non-discriminatory, random sample. In total, 400 questionnaires were distributed (200 for the auditory group and 200 for the visual group), of which 176 were collected for the auditory group, and 170 were collected for the visual group. There were 193 male respondents, accounting for 55.78%, and 153 female respondents, accounting for 44.22%. The age range was from 25 to 45 years old, and the survey was conducted in two batches: respondents aged 25 to 35 were in one batch, while respondents aged 35 to 45 were in another. The respondents were relatively concentrated in the age range of 25 to 35, accounting for 66.47%, while those aged 36 to 45 accounted for 33.53%.

The surveyed sample of occupations was divided into seven categories, namely students, corporate staff, government personnel, individual merchants, freelancers, retirees, and others. The surveyed sample was relatively concentrated in the corporate staff and freelancer categories. The sample's educational levels were divided into no education, primary school, junior high school, senior high school/vocational school, junior

college, undergraduate, and master's and above. The respondents were relatively concentrated in the undergraduate and junior college educational levels. Respondents' monthly income was divided into five groups: below 5000 yuan, 5000 to 10,000 yuan, 10,001 to 15,000 yuan, 15,001 to 20,000 yuan, and above 20,000 yuan.

Regarding the four research videos in the visual group, the saturation of the first and second videos was referenced based on the saturation values measured by the Photoshop software in the live screenshots. Since there were various colors in the images, and the same color can appear differently due to factors such as light sources, the saturation values were extracted only from the brightest parts of the four main visual elements in two video screenshots, namely streamer clothing, main background, product appearance, and virtual images which had the same quantity and characteristics. Then, the chromaticity component values were calculated through a formula. Among them, video 1 had two streamer s dressed in solid-colored clothing, while video 2 had two streamer clothing with two different colors, so they offset each other and there was no need to take an average value. The chromaticity component calculation formula as below:

$$U=0.1687*r-0.3313*g+0.5*b+128.$$

U represents chromaticity, and the higher the chromaticity component value, the higher the color saturation. r, g, and b respectively represent the proportions of red, green, and blue in the selected color blocks, and the three sets of values in the two videos were obtained by Photoshop's color picker function.

After measurement and calculation, the following values were obtained: the chromaticity U of the main background color in the first video was 168.98; the chromaticity of clothing colors was U1=200.06 and U2=190.77; the chromaticity U of the product appearance was 119.68; the chromaticity U of the virtual image was 159.29. Therefore, the average chromaticity U of the first video was 167.76. The chromaticity U of the main background color in the second video was 145.74; the chromaticity of clothing colors was U1=153.01 and U2=150.82; the chromaticity U of the product appearance was 148.30; the chromaticity U of the virtual image was 158.60. Therefore, the average chromaticity U of the second video was 151.29. This indicates that the color saturation of the main visual elements in video 1 was higher than that of video 2.

In the visual group's third and fourth sections, the distinction was based on the number of visual elements. The statistics of the element number were based on people, objects, or text that the audience would pay attention to in the picture. The third video had a total of 25 visual elements, including 13 background decorations, 9 displayed products, 2 streamer s, and 1 picture. The fourth video had a total of 6 visual elements, including 3 advertisement banners, 1 displayed product, 1 streamer, and 1 assistant. It can be inferred that the visual element quantity in video 3 was much higher than that in video 4. Additionally, to ensure accuracy of the specific investigation data, videos 1 and 2 had a relatively large number of visual elements, while videos 3 and 4 had relatively low color saturation.

For the four videos in the auditory group, the analysis of the first two videos focused on the streamer 's speech rate. By counting the number of words spoken by the streamer in two videos (20 seconds each), the streamer in video 1 spoke a total of 54 words,

while the streamer in video 2 spoke a total of 118 words. Therefore, it can be inferred that the streamer in video 2 spoke at a much faster rate than the streamer in video 1. The third and fourth videos focused on the frequency of interaction between the streamer and the audience in their conversations. In video 3, there was no interaction between the streamer and the audience, while in video 4, the streamer interacted with the audience a total of 4 times, with an average of 5 seconds per interaction. Thus, it can be concluded that the streamer interaction in video 4 was more frequent than that in video 3. Moreover, the streamer s in video 1 and 2 interacted with the audience, while both streamer s in video 3 and 4 had relatively fast speech rates.

4 Figures and Tables

4.1 Cross-Analyzing From the Visual Group Questionnaire

A total of 170 valid samples were received from the auditory group questionnaire.

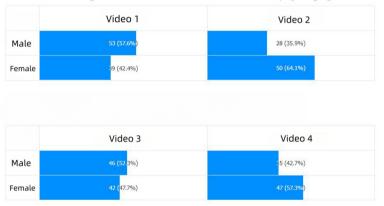


Fig. 1. Gender Distribution

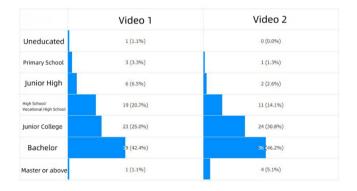


Fig. 2. Educational Background Distribution (1)



Fig. 3. Educational Background Distribution (2)

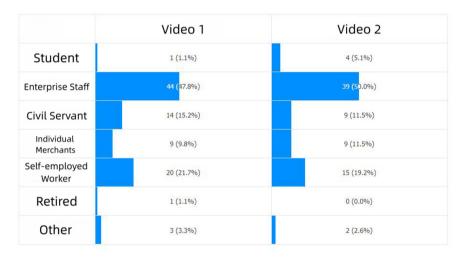


Fig. 4. Occupational Distribution (1)

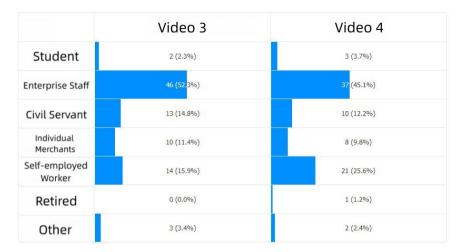


Fig. 5. Occupational Distribution (2)

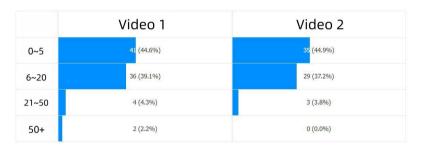


Fig. 6. Frequency of Purchasing Through Live Streaming Distribution (1)

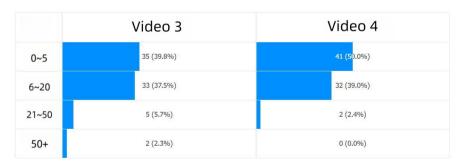


Fig. 7. Frequency of Purchasing Through Live Streaming Distribution (2)

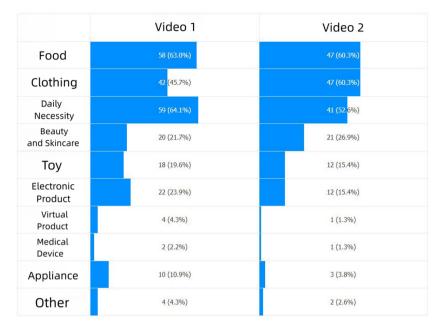


Fig. 8. Categories Purchased Through E-commerce Live Streaming Distribution (1)

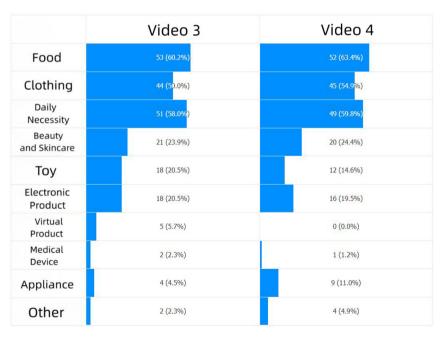


Fig. 9. Categories Purchased Through E-commerce Live Streaming Distribution (2)

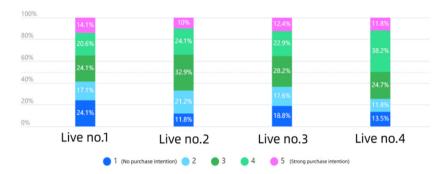
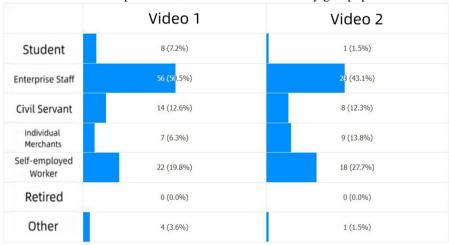


Fig. 10. Respondents' Intention to Purchase Distribution

This survey is used to compare the overall impact of four groups of live streaming styles on consumers' purchase intention. After calculation, the average purchase intention of live streaming on the 1st is 2.37, the average purchase intention of live streaming on the 2nd is 2.52, the average purchase intention of live streaming on the 3rd is 2.48, and the average purchase intention of live streaming on the 4th is 3. Based on the above data, the respondents' intention to purchase the four live streaming is in the order of 4>2>3>1.

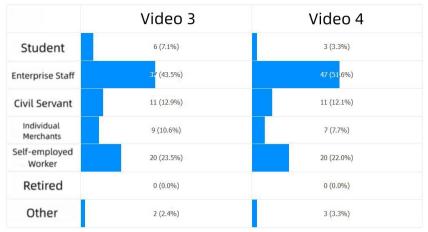
4.2 Cross-Analyzing of the Auditory Group Questionnaire

A total of 176 valid samples were received from the auditory group questionnaire.



Monetary unit: Yuan

Fig. 11. Occupational Distribution (1)



Monetary unit: Yuan

Fig. 12. Occupational Distribution (2)

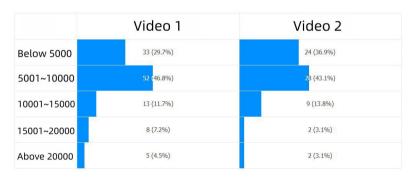


Fig. 13. Monthly Income Distribution (1)

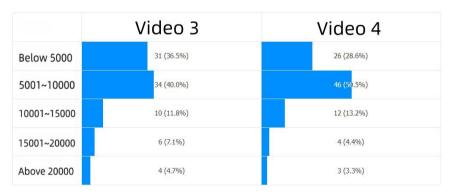


Fig. 14. Monthly Income Distribution (2)

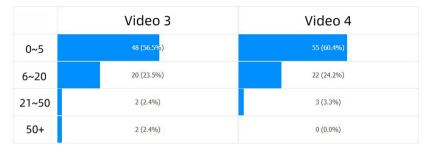


Fig. 15. Frequency of Purchasing Through Live Streaming Distribution (Video 3 and Video 4)

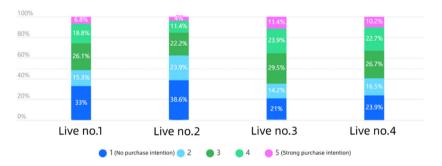


Fig. 16. Respondents' Intention to Purchase Distribution

This survey is used to compare the overall impact of four groups of live streaming styles on consumers' purchase intention. After calculation, the average purchase intention of live streaming on the 1st is 2.07, the average purchase intention of live streaming on the 2nd is 1.48, the average purchase intention of live streaming on the 3rd is 2.50, and the average purchase intention of live streaming on the 4th is 2.36. Based on the above data, the respondents' intention to purchase the four live streaming is in the order of 3>4>1>2.

4.3 Analysis of Investigation Results

4.3.1. Visual Group.

After cross-analyzing the data chart, the following conclusions have been drawn:

First, men are more likely to purchase products in live streaming with high saturation or more visual elements (video 1 and video 3), while women are more likely to develop a purchasing intention in live streaming with low saturation or fewer visual elements (video 2 and video 4). (Figure 1).

Second, respondents with less than a high school education tend to shop in live streaming with high color saturation, while those with a master's degree or above tend to shop in live streaming with low color saturation. There is no obvious preference for other groups. Respondents with college and lower education are more willing to pur-

chase products in live streaming s with fewer visual elements. Respondents with undergraduate degrees tend to purchase products in live streaming with more visual elements. (Figure 2 and figure 3).

Third, white-collar workers in enterprises and civil servants in government agencies are more willing to buy products in live streaming with high saturation and many elements. Such broadcasts can produce stronger visual stimuli. (Figure 4 and figure 5).

Fourth, this study defines users who purchase in live streaming more than 20 times/month as heavy buyers, and those who purchase less as light buyers. By comparison, there is no significant difference in the purchase intention of light and heavy buyers towards the color saturation of live streaming. However, light buyers prefer live streaming with fewer visual elements, while heavy buyers prefer live streaming with more visual elements. (Figure 6 and figure 7).

Fifth, in the cross-analysis of habitual shopping categories, except for clothing buyers tending to low-saturation live streaming, buyers of other categories tend to high saturation live streaming. Buyers of toys and virtual products (such as electronic game props) clearly tend to live streaming with more visual elements, and buyers of home appliances tend to live streaming with fewer visual elements. Buyers of other categories do not have a clear preference for the number of visual elements. (Figure 8 and figure 9).

Buyers of toys and virtual products are mainly students and young people, which may be because such audiences also prefer colorful and complex visual effects. Such broadcasts make it easier for the relevant audience to place orders by stimulating the desire to buy. However, complex visual elements do not necessarily mean that young people prefer high color saturation. In accordance with the cross-analysis of the occupational section, the student group prefers live streaming with low color saturation. By comparing Video 3 and Video 4, the streamer in Video 3 is more like a real-life small vendor who pays more attention to personal interests and the efficiency of both buyers and sellers, while the streamer in Video 4 is more like a helpful neighbor who informs the audience of the advantages of the product through communication.

4.3.2. Auditory Group.

After cross-comparing and analyzing the data chart, the following conclusions have been drawn:

First, most respondents in various occupations prefer streamer s with slower speech pace, only the individual merchants group tends to streamer with faster speech pace (Video 2). This is related to individual merchants who pursue higher time utilization and return on investment. Streamer s who speaks faster save time for such audiences and are more likely to stimulate their desire to buy. In addition, the streamer in Video 2 has a higher interaction frequency, which can also improve the efficiency of potential consumers obtaining product information. (Figure 11 and figure 12).

Second, the low-income group with a monthly income of less than 5,000 yuan is more likely to generate a buying impulse in live streaming with no interaction and fast pace. The student group is more inclined to streamer s with a fast pace and no interaction. Two possible conclusions can be drawn from this: first, students and groups with

a monthly income of less than 5,000 yuan highly overlap, and such groups are accustomed to carrying out multiple tasks at the same time. For example, students like to open live streaming and put their phones aside, only screening the needed information through the streamer 's voice, so they do not care whether the streamer interacts with them. (Figure 13 and figure 14).

Third, respondents who have a low frequency of purchasing goods in e-commerce live streaming tend to live streaming where streamer s interact with audiences, because such groups have lower trust in the goods sold in e-commerce live streaming and need to establish trust and increase buying intention through filling the questionnaire. (Figure 15).

5 Conclusion and Discussion

Overall, live streaming with high color saturation and multiple visual elements are more likely to generate purchase intentions among viewers. The purchase intention average value of Video 4 is the highest, which refers to the live streaming with low saturation and fewer visual elements (Figure 10). This means that specific visual styles of live streaming can attract specific potential customers, but live streaming with low color saturation and fewer visual elements have a wider audience and are suitable for the exploration stage or live streaming of products with a broader audience. Respondents lean toward purchasing commodities in live streaming with slower speaking speeds and interaction between the streamer and audience. However, the average purchase intention value of the audience in video 3, which has a faster speaking speed and no interaction, is the highest (Figure 16). Therefore, although live streaming with different auditory-visual styles can attract specific potential customers, live streaming with faster speaking speed and no interaction from the streamer have a wider audience and are suitable for the exploration stage or live streaming of products with a broader audience.

Although many limitations were set in selecting videos and interviewees to ensure the fairness and accuracy of the survey's results before the questionnaire survey was conducted, many unforeseen factors that could affect the survey results to some extents were still found during the actual operation. For example, the cultural differences among different regions in China were significant, and the accents of the four videos in the auditory-visual group were different. Some respondents' prejudices against specific regional residents could affect the fairness of the survey results. In addition, the classification of the questionnaire survey object was not extensive enough, and the number of interviewees from groups such as freelancers and female groups was relatively small, which might also affect the experiment's fairness. Moreover, although all the e-commerce live streaming videos selected for the survey were food, the differences in brand awareness, specific classifications, and audiences were significant. Respondents were biased based on their preferences for product attributes, such as respondents in the Sichuan-Chongqing region being more interested in spicy foods, and diabetics showing less interest in sugary drinks.

The next research direction of this study should focus on improving the experimental defects and expanding the research object. Firstly, as the industry and technology develop, more styles and methods of live streaming with goods will emerge. However, no matter how the live streaming form changes, visual and auditory effects will always be the core elements of the e-commerce live streaming effect. In subsequent experiments, the diversity of survey videos should be expanded, including but not limited to expanding more streamers from different regions, more language styles, and more updated live streaming styles. More comprehensive and diverse videos can reduce the audience's preferences and bias and improve the accuracy of the survey results. Secondly, the overall sample size of interviewees should be expanded, and the interviewees with smaller sample sizes should be increased selectively based on the recovery status of the survey questionnaire. Moreover, more detailed social surveys should be conducted to reduce or eliminate interviewees' prejudices in a more common e-commerce sales field. not just in the food industry. Finally, e-commerce live streaming is a new business model that has emerged in the era of short videos. Although this model is developing rapidly, it has limitations regarding the times. This article hopes that while exploring the style of e-commerce live streaming, the research can return to the market and marketing field. The author hopes that through this study on the visual and auditory style of e-commerce live streaming, more possibilities and academic results can be obtained in the theoretical findings and practical applications in the business field from these two perspectives of visual and auditory for market and marketing.

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