

Optimizing live streaming engagement through store atmospheric cues: Exploring prosocial behavior and social comparison—insights from streamers and viewers

Abstract:

Purpose—Live Streaming Marketing has emerged as a transformative medium, facilitating real-time product promotion and brand messaging and reshaping consumer engagement. However, knowledge of the impact of Store Atmospheric cues within live streaming contexts remains scarce. This research delves into the dynamic interplay between streamers and viewers across diverse live streaming platforms, with a focus on the impact of distinct atmospheric cues. It also seeks to explore prosocial behavior and integrate elements of social comparison theory.

Design/methodology/approach—We conducted semi-structured interviews with 14 streamers and 26 viewers. Participants who were active on streaming platforms and had experience of multiple live streaming sessions were purposively identified. The thematic coding approach and NVivo 12 software were employed to gain a nuanced understanding of live streaming dynamics.

Findings—Our findings highlight the significant role of emerging atmospheric cues in shaping immersive streaming experiences and fostering prosocial behavior. Additionally, we observed three formats of upward social comparisons between streamers and viewers, wherein viewers compared themselves with streamers and peers, and streamers engaged in comparisons with more experienced counterparts. This finding contributes to a sense of digital community and positive interactions because of live streaming adoptions.

Originality/value—By extending the application of social comparison theory, this study provides valuable insights for practitioners and scholars, enriching the understanding of both streamers' and viewers' psychological behavior and the dynamics of virtual retail settings.

Keywords: live streaming platform, atmospheric cues, social comparison theory, semi-structured interviews, streamers and viewers, prosocial behavior

1. Introduction

In recent years, the emergence of live streaming (LS) has been propelled by the advancement of the internet. Live streaming marketing (LSM) has revolutionized the ways in which businesses engage with consumers. Defined as the utilization of social media platforms for real-time product promotion and brand messaging (Wongkitrungrueng and Assarut, 2018), it swiftly transitioned from a niche alternative to a mainstream marketing channel, reshaping the dynamics of consumer–brand interactions (Lo *et al.*, 2022; Sun *et al.*, 2023). With its emphasis on interactivity and authenticity, LSM offers an immersive experience, integrating e-commerce functionalities seamlessly within social media platforms (Guo *et al.*, 2021). The interactive and synchronous nature of live streaming sessions, coupled with the implementation of time-sensitive promotions and exclusive deals, generates a sense of urgency, compelling viewers to make instantaneous purchasing decisions (Ming *et al.*, 2021). Concurrently, the significant development of influencer marketing within live streaming has transformed the role of streamers who now play a central role in endorsing products and services and disseminating information, leveraging their credibility and rapport with their audience in virtual chat rooms (Chen *et al.*, 2023).

The concept of Store Atmospheric (SA) cues has long been recognized as an influential factor impacting consumer behavioral dynamics in alternative retail environments (Kotler, 1974; Turley and Milliman, 2000). Extant SA cues are predominantly illustrated in multichannel contexts, including physical elements within brick-and-mortar stores and digital elements within online retail environments (Baker *et al.*, 1994; Cheng *et al.*, 2009). Recent marketing scholars further summarize emerging atmospheric and emotional cues that impact store visitors' perception and responses (Lyu *et al.*, 2022). However, given the rapid pace of LS development, it drives research imperative to investigate whether and how conventional SA cues impact user behavior in such innovative streaming contexts. Existing studies largely examined consumer–influencer interactions (Pradhan *et al.*, 2023) and the parasocial relationship (Wei *et al.*, 2022). Nevertheless, there remains a distinct paucity of research addressing the perspectives from both streamers and viewers across multiple social media platforms. More importantly, previous LS scholars have concentrated on drawing implications from one particular social media platform, such as Instagram (Pozharliev *et al.*, 2022), while failing to accommodate the holistic implications of alternative LS platforms.

In addition to investigating the impact of SA cues on live streams, this study seeks to employ social comparison theory to elucidate the prosocial benefits perceived by both streamers and viewers. The theory posits that individuals evaluate their beliefs by comparing them to those of others (Phua *et al.*, 2017; Shao and Li, 2021). It also suggests that how people evaluate themselves in relation to others, either positively or negatively, can affect in a prosocial behavior. In our research context, if a viewer sees another viewer receiving recognition from the streamer for donating, they might be motivated to donate as well to receive similar recognition. Similarly, engaging in prosocial behavior can influence social comparison; a viewer who frequently helps others in the same virtual chat room might be viewed

positively by other viewers, enhancing their social status within the community. However, despite an abundance of research primarily concentrated on social media platforms in the digital era, there is a crucial gap in comprehending how social comparison theory can influence individuals' interactions with emerging technologies and virtual environments, particularly in the context of live streaming. We further anticipate that diverse social comparisons may drive users' consequent prosocial behavior (PB) wherein streamers and viewers interact, compare, and evaluate themselves with others through upward comparisons. Taken together, the research objectives are formulated as follows:

- (1) To identify emerging store atmospheric cues embedded in LS.
- (2) To capture the different perceptions between streamers and viewers regarding multiple LS platforms.
- (3) To derive new cues that specifically shape overall LS atmospherics and effectiveness.
- (4) To interpret potential connection(s) between diverse social comparisons among streamers and viewers and their prosocial behavior when interacting with others in LS sessions.

To tackle these objectives, we conducted semi-structured interviews with a total of 14 streamers and 26 users. This approach enabled us to delve deeply into the motivational attributes of both streamers and viewers, revealing the central role of atmospheric cues across various LS platforms. The outcome of this research makes notable contributions. First, it suggests a pioneering application of social comparison theory in the LS context. Both streamers and viewers engage in upward social comparisons, fostering a sense of prosocial connection with superior peers and contributing to successful streaming experiences. Second, this study extends the understanding of store atmospheric cues embedded in the LS context from various social media platforms, identifying specific cues (i.e., ambience, background setting, lighting, relaxing vibes, sound quality, visual clarity) that influence the streamers' performance and the viewers' prosocial intentions. We also scrutinized novel cues that impact overall LS effectiveness, known as content of discussion, emotional drivers, ease of use and interactions, and streamers' dynamic attributes. Third, considering prosocial behavior, this study provides insights into how individuals engage in cooperative, helpful, and supportive behavior within virtual communities, particularly in the LS context where the establishment of positive relationships, community building, and the cultivation of a supportive environment are vital for sustaining engagement and promoting a positive user experience. Last, through a comprehensive assessment of the discrepancies and convergences between the streamers and viewers, this research endeavors to offer valuable contributions for both practitioners and scholars.

2. Theoretical Background

2.1 Overview of Live Stream Marketing

In the evolving landscape of digital marketing, Live Streaming Marketing (LSM) emerges as a groundbreaking shift, heralded by the impactful work of Wongkitrungrueng and colleagues in 2020. This new

paradigm, defined by its real-time engagement and personalized approach, disrupts traditional marketing frameworks, urging a fresh perspective on consumer interaction. Guo *et al.* (2021) further amplified this narrative, highlighting LSM's role in setting new benchmarks for consumer expectations through interactive and authentic experiences. This dynamic shift renders traditional marketing tactics insufficient, marking the dawn of a unique marketing ecosystem. The ascent of influencer marketing within LSM signals a crucial transformation in marketing's power dynamics (Zhou *et al.*, 2022). Streamers, now pivotal influencers (Xi *et al.*, 2024), command significant sway over their audiences, shifting the endorsement landscape from celebrity-centric to a more accessible and grassroots level. This change underscores the evolving nature of influence in the digital era. Live streaming commerce, a branch of e-commerce, revolves around real-time interaction through live video streams and text chat. It is popular for its practical, enjoyable, and social aspects, leading to favorable attitudes and consumer actions in this sphere (Wongkitrungrueng *et al.*, 2020). Research in this field primarily follows two directions. The first focuses on what drives viewer participation in LS commerce. Studies by Xue *et al.* (2020) and others have shown that personalization, responsiveness, and other factors in LS encourage viewer engagement. Hu and Chaudhry (2020) examined how relationships between viewers and streamers affect engagement, finding that various bonds enhance it through emotional commitment, while Guo *et al.* (2021) found that trust in streamers can extend to brands, thus boosting engagement.

The second research area concentrates on how LS influences viewer purchasing and gift-giving behaviors (Lou *et al.*, 2022). Studies by Kang *et al.* (2021) and others have shown that social factors and streamer popularity impact gift-giving among viewers. Lin *et al.* (2021) noted that streamers' positive emotions can boost gift-giving, while Zhang *et al.* (2022) reported that sales in live streams surpass those on other online channels, suggesting that LS can enhance buying intentions by reducing psychological distance and uncertainty. However, existing research often overlooks the impact of the streamer's speech content on viewer behavior, focusing more on broadcaster and consumer traits. This gap highlights the need for more field data to understand how atmospheric cues and other attributes in LS sessions facilitate user behaviors. While traditional retail has long recognized the importance of environmental stimuli, the challenge lies in translating these cues into the digital realm of live streaming. Lyu *et al.* (2022) and Tong *et al.* (2023) have recently investigated how visual and auditory elements in LSM can influence consumer behavior; yet, there is still much to learn about their role in this new marketing ecosystem.

2.2 Store atmospheric cues in alternative retail channel

The concept of Store Atmospheric (SA) cues, long recognized in traditional retail, is now facing new challenges in the LS arena. Lyu *et al.* (2022) investigated the complexities of translating these environmental stimuli into the digital presences, a setting where continuous evolution and user interaction are the norms. Moreover, they reiterated that pivotal SA cues are documented as retail background, store layout, ambience, noise, and crowd which impact retail patronage in online and

offline settings. Certain cues are applied across different retail channels, wherein more recent implications of essential atmospheric cues are advocated in LS settings. Hence, marketing scholars denote various attributes of atmospheric cues in LS commerce that impact shopping patterns such as telepresence and social presence (Ming *et al.*, 2021), bullet and guidance information (Wang *et al.*, 2022), visual appeal and pleasant live atmosphere (Yang *et al.*, 2022), music design and information navigation (Shi *et al.*, 2023), background visual complexity and music tempo (Tong *et al.*, 2023), and background fitting (Shang *et al.*, 2024), among others. We reviewed the literature to identify recent debates related to our research proposition (see Table 1). Interestingly, these scholars concentrated on investigating the LS e-commerce context in East Asia cultures where commercial-oriented LS platforms are largely employed by consumers in their daily purchasing patterns. Moreover, most atmospheric cues research prefers to adopt the Stimulus–Organism–Response (SOR) model as the theoretical vehicle in driving users’ emotional and behavioral implications as a result of interactions on LS platforms. Methodologically speaking, quantitative methods are frequently employed to examine causal relationships between established atmospheric cues and consequent variables, inviting more hidden insights to be uncovered through the interpretivism paradigm.

Insert Table I here

Based on the identified research gaps above, the present research does not concentrate on the commercial LS platforms; rather, it investigates alternative LS platforms to generate multiple atmospheric cues that encourage interactions for different purposes. The challenge lies in adapting these cues effectively to the LS context, which is dynamic and interactive. It is not just about replicating physical retail cues but innovating and evolving them to fit the digital landscape; it could also involve experimenting with virtual reality, augmented reality, and other immersive technologies to create a unique shopping experience. Therefore, it is crucial to explore how SA cues are developed and applied across different retail channels, especially in the context of LS e-commerce. This involves understanding the transition from physical to digital environments, the role of cognitive perceptions, and the potential of alternative platforms.

2.3 Social comparison theory and prosocial behavior

Social comparison theory (SCT), initially introduced by Festinger (1957), posits that individuals assess their own beliefs and preferences by comparing themselves to others. With the advent of digital technologies, a considerable body of research has primarily focused on social media platforms, which provide ample information for individuals to compare themselves with others (Ballantine *et al.*, 2010; Phua *et al.*, 2017). However, there exists a critical gap in understanding how social comparison theory and its orientations can either facilitate or impede individuals' encounters with novel technologies and virtual environments. In LS marketing, SCT takes on new dimensions and is influenced by the digital

context's immediacy and reach. This theory becomes pivotal in understanding user psychology within LS, where interactions extend beyond passive observation to active, real-time engagement, amplifying the frequency and impact of social comparisons. These social comparisons in LSM have far-reaching implications. As Jiang *et al.* (2020) suggested, such comparisons can directly affect viewer behavior, impacting everything from engagement metrics to purchasing decisions, and even altering self-esteem and consumer loyalty. The streamer-viewer dynamic in LS is particularly intricate, influenced heavily by social comparison. Viewers may find themselves caught in a complex web of admiration, emulation, envy, or inadequacy, all of which significantly impact their engagement and satisfaction (Zhou *et al.*, 2022). Moreover, viewer comparisons extend to their peers, fostering either a sense of community or triggering competition and anxiety in LS contexts. The number of likes or comments can inadvertently become a benchmark for social standing within these digital communities. For streamers, social comparisons can be motivational or burdensome, driving content enhancement or leading to burnout, especially in a highly competitive LSM environment. This duality emphasizes the nuanced impact of social comparison in LSM.

Essentially, the application of SCT within LS provides a nuanced view of digital consumer behavior, stressing the amplified and modified dynamics of social comparison in real-time interactive and digital environments. This understanding is vital for comprehending how viewers and streamers interact, engage, and influence each other on LSM platforms. This perspective not only enriches LS's theoretical framework but also offers practical insights for streamers and marketers to optimize engagement strategies and content creation. Applying the SCT to LS schools provides a novel understanding of digital consumer behavior, highlighting how the dynamics of social comparison are amplified and altered in interactive real-time digital environments. This insight is crucial for comprehending the interplay and influence between viewers and streamers on LSM platforms. It not only enriches the theoretical stances of LS but also offers practical implications for streamers and marketers to optimize engagement strategies and content creation.

Prosocial behavior (PB) has emerged as a subject of great interest nowadays, it is defined as actions that are intended to benefit others, regardless of the objective (Eisenberg and Fabes, 1998). Numerous studies have primarily concentrated on offline prosocial behavior, linking them to increased social capital and overall well-being (Martí-Vilar *et al.*, 2019). However, limited attention has been given to exploring online prosocial behavior. Such behavior involves various actions, including responding supportively and receiving likes, reactions, and comments on one's or others' posts via social media platforms (Marshall *et al.*, 2023). Furthermore, with the pervasive use of social media and the rising prominence of live streaming platforms, the exploration of prosocial behavior remains notably constrained within the live streaming marketing domain. While recent scholars such as Marshall *et al.* (2023) underscore the impact of prosocial behavior in both offline and online communities, its manifestation and implications within the dynamic LS environment remain largely unexplored. For

instance, influencers or opinion leaders strive to facilitate interactions with their followers when broadcasting in a live session, and their source credibility and physical attractiveness largely impact on other followers' subsequent reactions (Yan *et al.*, 2023). Followers may develop a sense of prosocial engagement and satisfaction (Wang *et al.*, 2022), or they may develop contradictory behavior where they embrace disappointment in the purchasing process via live streaming e-commerce channels (Picot-Coupey *et al.*, 2023). Given that many scholars have appraised the advantages of LS practices, in a similar vein, this research explores specific prosocial interactions in multiple LS platforms. Moreover, emerging engagement dynamics between streamers and viewers will be observed. It is anticipated that valuable insights into streamer-viewer interactions may inspire the viewer's initial prosocial behavior, which subsequently fosters healthy and engaging LSM communities. In conclusion, this research contributes to the LSM field by elucidating the nuanced interplay between atmospheric cues, social comparison dynamics, and prosocial behavior in shaping viewer engagement and behavior in the LSM ecosystem.

3. Methodology

3.1 Method

Given the underexplored nature of the topic, we employed qualitative interviews to disclose the trending practices of LS from expert users including professional streamers and frequent viewers. There were two reasons for employing a qualitative approach. First, existing LS research largely draws statistical insights which lacks deeper investigation of implicit interpretations of users' experience. Thus, conducting interviews allowed us to explore complex phenomena by engaging directly with participants, eliciting rich, detailed narratives that reveal insights into both streamers and viewers' thoughts, feelings, and experiences in the LS settings. Second, this research attempts to disclose new variables that are not documented by previous scholars; therefore, this approach helps us to explore under-researched areas of SA cues on LS platforms. Given that the qualitative approach in the context of this study may allow considerable doubts and bias to take root (Shufutinsky, 2020), the research team, therefore, fostered a credible and valid procedure. An inductive research approach was adopted through the semi-structured interview method in a similar vein to existing information systems research (Banerjee and Pal, 2023), thereby using open-ended questions to probe deeper and collecting distinct answers from the relevant target audience. To address the accuracy of the interview questions, a pilot study was conducted with five marketing researchers, who were not part of the final sample, as a preliminary test to evaluate the usability of our interview guide before proceeding with full data collection. This allowed our research team to assess the effectiveness of the guide in achieving the research objectives and to gather feedback on its content and structure. By linking the initial findings and themes to the research objectives, we were able to identify areas for improvement and refinement. Although a few changes were needed based on the pilot study, it provided valuable insights and ensured that the final interview guide was well-prepared for the main data collection phase.

3.2 Sampling and participants

In order to recruit appropriate target participants, the present study applied the purposive sampling technique (Denzin and Lincoln, 1994), wherein each participant was selected based on their established understanding and streaming experience of multiple LS platforms. Those eligible respondents were chosen based on specific criteria. For viewers, participants had to be located in the UK and have some experience participating in or watching live streaming sessions on various social media platforms such as TikTok, Instagram Live, YouTube, Facebook Live, and Twitch. For nano-streamers' recruitment, the criteria included being based in the UK, hosting LS broadcasting sessions on similar social media platforms, and being classified as nano-influencers with more than 5000 followers on their social media accounts.

To ensure greater reliability, research assistants (RAs) first screened for eligibility by asking each potential interviewee about their prior usage experience to ensure that the participants could understand and answer the questions properly. Such a tactic enabled the RAs to conduct interviews with 14 streamers and 26 viewers, respectively, and each interview lasted 20 minutes on average (see Appendix 1). The themes and thematic patterns were consistently reviewed until theoretical saturation was reached, prompting the researchers to cease inviting new respondents at that point. All participants signaled their agreement with the consent forms before the interviews. The interviews were conducted and recorded using the Microsoft Teams application, which included scripted prompts and functional edits for RAs to facilitate data cleaning.

The interview guide comprised four parts aimed at addressing the research objectives (see Appendix 2). First, respondents were prompted to recall their recent experiences with live streaming. Second, they were asked to identify any visible atmospheric cues and background settings encountered during their LS sessions, providing specific examples. Third, respondents were prompted to identify any invisible attributes influencing their live streaming experiences with sound examples. Fourth, they were asked general questions about their overall LS experiences that were not covered previously and to discuss their future expectations.

3.3 Thematic analysis using NVivo 12

The study adopted thematic analysis to analyze, code, and organize the qualitative data. We began by initially screening the scripts intensively and repeatedly to obtain a solid understanding of the participants' answers (Farinloye *et al.*, 2019). NVivo 12 was utilized to record and analyze the data; moreover, the editor function was helpful in highlighting similar and different answers to each question. It allowed us to detect codes and then group these codes into relevant themes that pertained to the objectives. We recruited experienced RAs and two external LS scholars to perform cross-checks of the codes so that subjective comprehensions were minimized. The research team also inspected the trustworthiness of the qualitative data including their credibility, dependability, confirmability,

transparency, and authenticity (Guba and Lincoln, 1994). We cautiously assessed each criterion by collecting answers from real LS users, ensuring that each interview was completed independently, offering direct quotes from participants, and rigorously interpreting the results with clarifications (Lyu *et al.*, 2023). In line with Gioia *et al.* (2012), we examined the first-order nodes (Corbin and Strauss, 2015) by identifying emerging store atmospheric cues and psychological dynamics that occurred in different LS platforms. All authors contributed to identifying the first-order codes which assured the data credibility (Mero *et al.*, 2023). Second, these codes were further labeled and grouped into the second-order themes to reach a narrative concept by identifying similarities and differences drawn from streamers and viewers. The most rigorous step was to distil emerging codes to aggregate thematic dimensions (Corbin and Strauss, 2008; Lyu *et al.*, 2023). Conclusively, we showcase some examples of the codification process in Table II. More detailed quotes are set out in the Findings section.

Insert Table II here

4. Findings

4.1 What do streamers perceive?

Live streaming platforms and usages. We interviewed 14 nano- and micro-streamers, aged 20 to 43, with followers ranging from 5000 to 65,000 on various platforms, such as Instagram (n=10), TikTok (n=4), and YouTube (n=5). Nano-streamers are believed to encourage more authentic content feed during LS sessions and followers are more likely to nurture supportive attitudes toward information disseminated by such small-scaled influencer segments (Yadav *et al.*, 2022). The research team prioritized streamers' perceptions and performance, allowing for diverse backgrounds and locations. The average age of streamers, around 30, aligns with the target young users of LS platforms. Twitch (n=3) and Facebook Live (n=3) were used for gaming sessions. Our findings extend existing LS research by examining multiple platforms, enabling an inspection of platform variances. Notably, half of nano-streamers prefer sessions under 30 minutes weekly, citing viewer interest decline. Some professional gaming streamers opt for longer sessions, suggesting that streaming content influences performance and session frequency.

Live streaming background and atmospheric cues. When questioned about their understanding of the LS background, nano- and micro-streamers presented a variety of attributes that accounted for successful sessions. First and foremost, 11 streamers answered that they would prepare professional settings taking into account background sound (n=9), visual effects (n=6), audio quality (n=6), lighting (n=10), Internet connectivity (n=4), and other assisting tools before going live. More specifically, general background and lighting elements were considered significantly by streamers as they valued how audiences view the streaming sessions in terms of brightness, lighting, and other visual effects.

Streamers are mindful of how their appearance, gestures, and streaming background impact viewer engagement. As interpersonal interactions increasingly shift online, examining the emerging background factors of LS platforms becomes crucial (Zhou *et al.*, 2022).

Some conventional store atmospheric cues, such as lighting (n=10) and background setting (n=9), are adapted to LS contexts. Similar to consumers assessing a physical or online store's ambience, streamers focus on these attributes to enhance the streaming experience. Notably, streamers consider lively engagement with viewers through live chats and synchronous responses as essential atmospheric cues in LS sessions. For example, one said:

“When I go live, I think that engaging the audience is more than just sitting in a room. For example, when I was streaming on my holiday, I would maintain good engagement and content, despite there being noise outside. I would always inspire interesting content and humbly share my opinion with my audience in each session...I believe that the audience would feel engaged whenever I address their live chats or comments” (S3, male, 30).

The second atmospheric cue is recognized as the voice clarity of LS sessions by streamers, because they are concerned about their audiences' experience regarding sound and vocal clarity in a live session. If vocal quality is strong, streamers formulate a more appealing attitude to their content whilst viewers develop similarly positive engagement. One streamer said:

“I consider the virtual background and good quality of sound whenever I stream on YouTube. I have ordered a professional headphone and microphone to support my speaking...I just wanna make sure that people can follow me clearly; hence they join my session longer” (S1, male, 32).

The third atmospheric cue is perceived as ambience, which is commonly emphasized in other alternative retail channels. Participants exhibited their streaming background effects; one illustrated:

“The ambience is very important. It could be natural or artificial settings, depending on the content of the streaming sessions...I choose to facilitate an appropriate ambience fitting the topic of the day, so that viewers can relate to them more” (S13, male, 29).

Due to the Internet of Things (IoT), streamers indicate that the fourth atmospheric cue pertaining to impact engagement is so-called Internet connectivity (n=12). They stressed that connectivity was essential throughout the live sessions; however, they also experienced disruptive sessions because of poor networks. Such technical disturbance may discourage streaming satisfaction and streamers may even lose existing followers over the long term.

Finally, interestingly, streamers suggested that a relaxing vibe may be the reason for retaining loyal followers since viewers pursue enjoyable streaming vibes rather than streamers disseminating content only. Moreover, relaxing vibes can be achieved when streamers perform sincerely and in a friendly

manner; moreover, the visual presence of the streamer and the virtual setting are well-prepared before streaming. One streamer added,

“I understand that I should be friendly and conducive to a relaxed atmosphere. When I want to present something to my audience, I stand in the shoes of the audience because I want them to feel peaceful and valued during my streaming sessions...I also make sure to be authentic of myself, presence, content, and camera setting...in the end, the audience will feel relaxed” (S4, female, 20).

Live streaming emotional appeals and interactions. When it comes to human–computer and interpersonal communications, emotional drivers should not be neglected. We questioned streamers to find out whether there were any emotional or motivational factors of hosting streaming sessions and whether their emotions changed before, during, and/or after the sessions. Around half of the streamers sample (n=7) expressed that they were inspired to share information when streaming. Four streamers wanted to stay active and connected with other peers and their followers so that streaming identity could be strengthened.

Recognizing their motivations for LS sessions, we also observed emotional shifts at various streaming stages. Initially, five streamers expressed pre-stream nervousness and anxiety, citing concerns like hosting large events, inability to see viewers' expressions with the camera off, worry about performance, lack of interaction, shyness, and a desire for passionate conversations. In contrast, eight streamers experienced happiness and entertainment during streaming, especially when engaged with an interested audience due to compelling content. S10 further described,

“Before I go live, I always make sure that I am in a good mood because your mood is contagious to your followers...I am in high spirits despite some audience members making negative comment; they also ask for my advice. I felt happier after answering them and it gave me fulfilment” (S10, female, 43).

Post the LS sessions, streamers commonly felt positive emotions like relaxation, worthiness, comfort, and fun. This suggests a satisfying overall streaming experience, regardless of platform, with emotional changes linked to session initiation, content, and interaction levels.

Interaction emerges as a crucial aspect, with all streamers acknowledging interpersonal engagement, including collaborations (n=6), information sharing (n=3), and follower acquisition (n=2) with peer streamers. This interaction enhances streaming topics, viewer engagement, learning from experienced peers, and gaining insights. We further investigated the interactive differences between peers and viewers. Streamers reflected that the types of question/content, engaging and probing skills, and professional presence were essential drivers when interacting with streamers and viewers, respectively.

Overall streaming feature and performance. Unlike conventional store atmospheres, LS platforms prioritize different attributes to attract viewers and stimulate interactions. Streamers emphasized the

impact of virtual chats, comments, and viewing functions (n=9), noting that better functions and assistive tools facilitated prompt interaction and feedback. Third-party tools and built-in functions—including avatar icons, animations, emojis, images, notifications, pop-up chats, quizzes, polls, virtual filters, backgrounds, and virtual currency/rewards (n=6)—enhanced the streaming experience. Additionally, the quality of streaming devices or smartphones played a role in maintaining smooth interactions. Streaming content (n=6) was considered crucial for attracting viewers and growing followers, with streamers focusing on connecting with viewers through relevant and stress-free discussions to enhance authenticity and prosocial connections. The ambience of the streaming platforms (n=4), visual and sound clarity of the streamer's presence (n=4), and background music (n=4) were deemed helpful LS features, extending the traditional store atmospherics due to the synchronous nature of LS sessions. Streamers highlighted the importance of creating an engaging session with better ambience and clarity. Interaction and engagement (n=6) were highlighted as key factors, with streamers actively communicating with viewers and peers to retain longer LS sessions. This fosters a sense of recognition and value for viewers, increasing their interest and the potential for positive comparisons with peers. Last, the streamer's individual characteristics, such as a considerate personality (n=2) and confidence (n=2), played a role in driving higher responses. Streamers stressed that maintaining an adequate level of confidence improved streaming outcomes and influenced viewers to follow their attitude and behavior, ultimately leading to more subscriptions.

Satisfying factors of live streaming. Streamers further consolidated significant factors driving satisfying experience and sessions. As stated above, Internet connectivity was recognized by many streamers (n=7) as the primary condition for a joyful session. Emphasizing network priority, streamers highlighted that background setting (n=5), content (n=4), and viewer engagement (n=4) were key to a successful LS experience. An attractive setup not only prolonged interactions but also fueled streamers' passion, providing entertainment for viewers. Streamers acknowledged the importance of interesting and relevant content (Giertz *et al.*, 2022), and regularly featured trending topics. Responding promptly to viewers' comments and requests was a shared practice, creating engaging LS sessions. Three streamers also noted that user-friendly streaming tools contributed to a satisfying experience, emphasizing accessibility for viewers of various age groups.

*“I believe the **background setting**, some features and functions used to make streaming **visually attractive**, is an intelligent way of communication...good use of **lighting system**, **virtual background**, **clear presence and sound of streamers**”* (S1, male, 32).

*“I did some live streaming because my followers want to hear stories about my daily life, my work activities, and then me sharing some tips about working in X Company. They are only interested in the **content of my streaming** in general”* (S5, male, 30).

*“I think what contributed more to being a good experience is **engaging the viewers** such as liking their comments, or some emojis. If it’s not engaging enough, they will leave your online streaming, so we are staying relevant, and having **engaging conversation** is the most important thing”* (S6, female, 27).

4.2 What do viewers perceive?

Live streaming platforms and usages. The identified LS viewers, ranging in age from 20 to 49, with an average age of 33, primarily represented the millennial and younger demographics. Among the 26 participants, over half reported experience with Instagram Live (n=14) and YouTube (n=13), with others favoring platforms like Facebook Live (n=5), TikTok (n=4), and Twitch (n=2) for their weekly streaming activities. Instagram was highlighted as the most accessible platform for celebrity and influencer streams (Barta *et al.*, 2023). Generation Z viewers leaned toward TikTok, while Twitch attracted gaming enthusiasts. Approximately half of the participants engaged in LS sessions weekly to stay updated and connected with influencers. Viewing durations varied, with many participants capping their sessions at 30 minutes (n=10) while others extended them to one hour (n=7) driven by the allure of interesting content. Notably, some viewers engaged in sessions spanning a couple of hours (n=9) for various activities such as concerts, gaming competitions, remote education, networking, sports matches, shopping, webinars, and other tasks. These viewers emphasized that live streaming became a new norm during the COVID-19 pandemic, serving as a vital means for networking and exploring diverse online activities (Chen *et al.*, 2021). University students, for instance, attended live lectures, while charity organizations utilized webinars for donation events. The digitalization surge during the pandemic has significantly enriched online presences, with people increasingly preferring live streaming under various circumstances.

Live streaming background and atmospheric cues. Viewers further demonstrated their perceptions regarding streaming background and diverse atmospheric cues that impacted their experience. Lively background setting was mentioned by the majority of viewers (n=16) as an important driver to participate in streaming sessions; lighting (n=14), in particular, contributed to a more positive attitude which would make viewers feel more comfortable. In a similar vein, viewers stressed the necessity of visual clarity (n=11) and sound quality (n=8); they preferred to follow a streamer whose voice and visual presentation were sensible without background noises (n=5). Some viewers raised the point that overall ambience (n=5) in a virtual chat room would influence their decision to stay or whether to bounce to another streaming session. To enhance LS engagement, viewers highlighted a number of key factors. Content quality (n=15) was paramount, ensuring a meaningful connection with streamers. Internet connectivity issues (n=7) were a concern, impacting viewers' experience. Additionally, viewers considered the streaming platform (n=2), session time (n=2), and technology support (n=2) to enhance their viewing experience. When evaluating atmospheric cues, viewers appreciated live chats and comment functions (n=10) for interactive engagement, emphasizing the importance of streamer

responsiveness. An attractive setting (n=6) and a cheerful, entertaining atmosphere (n=4) were identified as crucial for drawing and retaining viewers in LS sessions.

*“I actually like the **virtual chat room** and I like the **interaction**. Because I know what everyone is thinking, and I like how they influence each other. It makes it more interesting because streamers don't just talk about themselves, but they also interact with others” (V4, female, 26).*

Viewers' emotional and motivational attributes of live streaming interactions. Compared with previously recorded videos, viewers have acknowledged that LS sessions embrace synchronous nature (n=10), true experience (n=8), and real-time interactions (n=7), consolidating existing denotations that users participate in LS for the interactive experience (Bründl *et al.*, 2022). For example, V1 asserted that “live streaming is more real, you have a real expression that you could not edit, or fake comments, because it's live; streamers cannot edit anything, and it is transparent for us”. Given such technological advances, three types of motivational drivers were detected from communicating with our viewers' sample.

First, many viewers enjoyed live streaming pertaining to information relevant to their interests (n=10). In line with streaming content, information or knowledge searching would stimulate more viewers to stay in a virtual chat room. Second, some viewers aimed to keep connected with like-minded people through different streaming platforms (n=11). Moreover, they stated that it was inspiring to socialize with peers and streamers in LS sessions during lockdown restrictions caused by the COVID-19 pandemic. Like-minded peers could share related insights and understand the discussions instantly in a live session, and viewers may compare information and receive support from others, leading to a smoother streaming experience.

*“The emotional driver that will inspire me will be the **interaction between the streamer and the viewers**. I don't like it when one can only get information, when you relate more through chats, this inspires me to keep watching and believe that I can obtain information and connections” (V9, male, 35).*

Third, LS viewers sought for entertainment and excitement (n=6) as the extended social media platforms to engage with others (Zheng *et al.*, 2023). They developed such gratification from compound perspectives such as enthusiastic, inspiring and responsive streamers, interesting content, and user-friendly chat rooms.

Viewers' emotional changes occurred before and during the LS sessions. We also noted multiple psychological attributes as follows. More than half of the viewers (n=14) felt happy and entertained; they felt that they were being respected by streamers when exchanging opinions on interesting debates. Some viewers showed satisfaction (n=8) and fulfilment (n=2) after live streaming sessions; they felt that they became more informed (n=2) and confident (n=1) from engaging with streamers. However,

viewers might develop negative emotions such as boredom and sadness (n=3) when they realized that the streaming content or presentation was poorly delivered, or they were disconnected because of network disturbance during the sessions. This infers that the majority of viewers encompass positive moods when they view well-prepared LS sessions.

Live streaming benefits and atmospheric cues impacting viewers' attitude. We also examined a holistic picture of LS benefits embraced by viewers. Similarly, information searching was primarily considered (n=13) as the leading benefit. Viewers also sought entertainment (n=6) and interactions (n=6) through participating in synchronous discussions with different streamers. Live streaming enabled users to stay updated with the latest interesting topics (n=4). They preferred to know the information in the first place and their opinion was then easily influenced by streamers. Some viewers joined streaming platforms for the benefit of convenience (n=3) because they could access streaming sessions whenever they had spare time. When probed on whether they paid more attention to streamers' performance or content, we found that the viewers outweighed streaming content (n=16) over streamers' performance (n=7). The reasons were twofold: first, viewers only followed attractive and relevant content when joining live sessions and, second, viewers felt a greater sense of belonging when they were able to comment and engage with others. Nevertheless, some viewers supported their preferred streamers regardless of streaming content or platforms.

We extracted additional insights on whether atmospheric cues would impact viewers' attitude toward LS sessions. Less than half of the viewer sample (n=11) denoted that streaming ambience, background setting, sound, and virtual filters would encourage more viewers and interactions. Moreover, streamers would attract more followers who just bounced from other streaming sessions due to attractive atmospheric cues.

"I would say yes. If streamers make minimum effort with their virtual background, or have less lighting, with some noises, I will just leave the session and skip the sessions of similar atmosphere"
(V24, female, 32).

In addition, streamers' professionalism (n=10) was assessed by viewers that might impact attitudinal and behavioral responses. For example, V10 stated:

"For instance, if he did not coordinate or discourage a few followers, or if his performance is immature or misleading, I just go off and I don't think I would stay long—no benefit" (V10, female, 24).

Viewers' interactions and overall evaluation of live streaming platforms. Most viewers described their interactions with streamers (n=16) through the means of chatting, liking, responding, and participation. Some viewers also enjoyed interacting with other viewers (n=6) for exchanging thoughts and networking purposes. They felt comfortable talking with like-minded people in the same virtual chat

room. However, a few viewers reported no interaction with others (n=6); they simply posted questions and observed live comments on screen. We exhibit their thoughts here:

*“I prefer **interacting with the streamer** because I trust their content. I don’t have time for viewers whether their views are posted or not—not my priority. I just focus on the streamers”* (V11, male, 37).

*“**Viewers** probably, the reason is that I also love making friends and getting a quicker response to information needed. So I like to chat with other audience members in the session”* (V15, female, 42).

*“**No, I don’t interrupt the session** or other people’s chats, that’s because of data privacy or fear of being recorded. Just to put myself out from today’s session so that no one bothers me”* (V16, male, 39).

Last, in the viewer assessments of specific streamers, it was found that the majority (n=19) followed streamers across platforms, prioritizing the presenter and content over the specific streaming platform. This suggests a strong viewer–streamer relationship that transcends platform differences. It was recorded that viewers follow their preferred streamers regardless of the streaming time and platforms, supporting that streamers’ characteristics and performance attract viewers’ engagement. Consequently, we noted dynamic streamer–viewer relationships through the lens of social comparison theory, wherein both parties seek communication and unconscious comparison with others in an LS session built on continuous interactions. Trust was an additional factor, with viewers expressing greater trust in preferred streamers (n=13) built through consistent streaming experiences, while content credibility influenced trust for some viewers (n=11).

5. Discussion

To delineate a holistic picture of atmospheric cues in the LS context, we further assessed discrepancy between streamers and viewers, and initialized a map showcasing an insightful LS journey (see Figure 1). Moreover, we began with displaying the motivational attributes of hosting/joining LS sessions, followed by multiple determinants taking place during LS, and concluded with beneficial gains from streamers’ and users’ stances. This map presents the most valuable attributes that impact successful LS sessions from several perspectives, and it also positions the significant atmospheric cues across various streaming platforms that impact the LS experience.

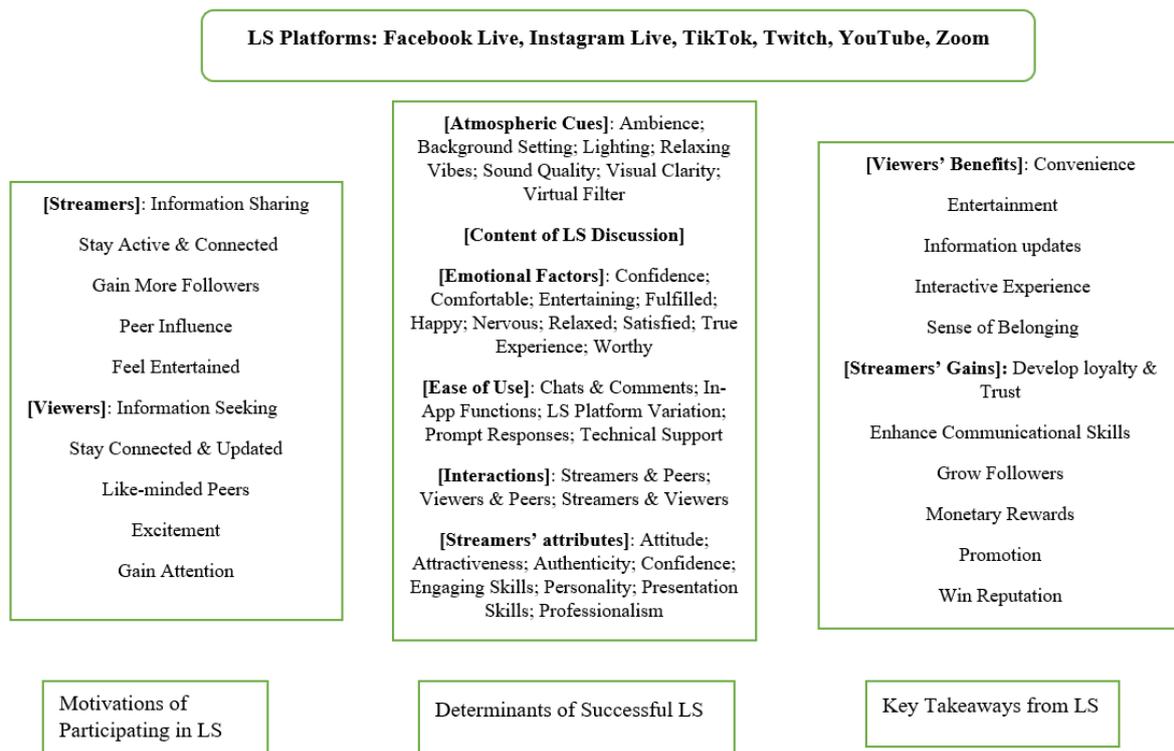


Figure 1 Streamer's and Viewer's LS Journey Map

For instance, predominant social media platforms including Instagram and TikTok facilitate communication and socialization activities between streamers and viewers; Twitch attracts millions of gaming users to interact with professional gamers and extend the community; and YouTube seems to be an educative channel for followers to grasp the latest information and knowledge of an innovation, where users would believe a streamer's demonstration during LS sessions. Streamers host LS sessions for information sharing, staying active, and connecting with others, aiming to entertain and gain new followers. Likewise, viewers join LS sessions to search for information, stay connected and updated with like-minded individuals, and seek attention and excitement.

Atmospheric cues play a crucial role in enhancing streamer effectiveness in virtual chat rooms, while viewers evaluate their participation experience based on diverse factors such as streaming content, emotional engagement, platform usability, interaction formats, and streamer attributes, alongside the atmospheric cues of live streaming sessions. These cues, reminiscent of store atmospherics in omnichannel marketing, are vital for attracting and engaging viewers. Unlike other social media channels, LS sessions offer greater autonomy and synchronicity, allowing widespread participation with minimal restrictions.

Furthermore, technological advances allow LS platforms to provide ultimate interactions between users such as virtual filters, in-app gamifications and quizzes, virtual gifting and rewards, networking with in-group and out-group users, real-time video sharing, and photoshop functions that combine most of the useful attributes of leading social media platforms. Such features shed light on atmospheric cues in

LS platforms that application developers should constantly accommodate to improve the in-app experience by giving more consideration to the overall atmospherics and vibes across distinct platforms. Taken together, effective atmospheric cues boost engagement with people and the LS platforms; hence, more prosocial behavior arises.

Both streamers and viewers expressed their attitude and willingness in relation to prosocial activities; in particular, upward social comparisons were observed between streamers and viewers. Upward social comparison describes when people compare themselves with those whom they perceive to be superior (Hendrickse *et al.*, 2017). In social media marketing, upward comparison can either inspire positive self-evaluations (Kim, 2022) or undermine one's self-esteem in terms of certain abilities or attributes (Ameen *et al.*, 2022). People intentionally or unintentionally compare themselves with superior identities, especially in the online contexts (Appel *et al.*, 2016). Moreover, social media influencers and live streamers are believed to be the main objects of people's comparison. According to Figure 1, both streamers and viewers embrace positive intentions of engaging with peers for multiple benefits, leading to unintentional comparison with others in terms of a particular aspect. For example, nano-streamers compare their authenticity over well-known streamers due to their proximity with followers; likewise, viewers appreciate more engaging comments than a quiet virtual chat room during LS sessions.

We, therefore, identify three formats of social comparison in LS sessions. First, the viewers asserted that they would follow streamers' content and behavior after the LS sessions and that they support what the streamers have illustrated and recommended. As summarized in Figure 1, streamers' physical attractiveness, attitudes, confidence, presentation skills, and overall professionalism would appeal more to viewers' engagement. During LS sessions, viewers compare themselves with streamers and they believe that the streamers offer a better broadcasting performance. Meanwhile, viewers become more objective in assessing the streamer's content, and contribute to discussions in virtual chat rooms. Previous research suggested that upward social comparison can cause depression among viewers (Keles *et al.*, 2020; Sharma *et al.*, 2022) due to reduced self-confidence from comparing themselves with 'ideal' identities on social media platforms. Surprisingly, our findings do not indicate negative well-being; rather, they report prosocial attitudes when viewers automatically compare their own identities and capabilities with those of the streamers in the LS sessions.

Second, viewers are seen as being more collaborative with peers by responding to streamers in a LS session, where they exchange opinions and extend their social network. In this way, a mutual social community is nurtured through peer interactions. This enables viewers to examine their own characteristics and compare them with those of peer viewers in the same virtual chat rooms. The participants further asserted that they often observe other viewers' comments and reflect on whether the same or different viewpoints are applicable to them when interacting with others in LS sessions. Viewers

will feel comfortable and prefer being on the same page as their peers; therefore, a sense of prosocial engagement arises when viewers compare themselves with other more engaging viewers.

The third upward social comparison lies in the fact that streamers compare and connect with other experienced streamers to advance their streaming effectiveness, simultaneously learning from superior fellows and expanding their followers. Online learning via virtual platforms has provided profound support for user interactions (Xu *et al.*, 2024) due to the immersive technologies, streamers continuously adopt the latest streaming tools to engage with others. In contrast to previous denotations where upward comparison on social media contexts undermines one's well-being and drives jealousy (Appel *et al.*, 2020; Sharma *et al.*, 2022), our findings indicate a motivated attitude when nano-streamers compare themselves with micro-streamers who are more influential and persuasive in their digital presences. Rather than underestimating their own shortcomings, nano-streamers often seek advice and mimic the streaming approaches hosted by micro- or macro-streamers. They invest time and effort by ensuring satisfying atmospheric cues when going live; consequently, such upward social comparison invites more partnership with peers and prospective viewers.

6. Conclusion

This research employed an inductive approach, gathering data through in-depth interviews with 14 streamers and 26 viewers. Thematic analysis using NVivo 12 was employed to ensure a meticulous examination of the intricate nuances within the data, providing an in-depth understanding of the LS sessions and uncovering key themes revealing streamers' and viewers' perspectives. The findings of this research demonstrated that live streaming background settings and atmospheric cues significantly shape the immersive and engaging live streaming environment. Notably, factors such as lighting, visual clarity, sound quality, and interactive ambience emerge as pivotal elements influencing both streamers' and viewers' decisions to participate and remain engaged in live streaming sessions. Furthermore, emotional, motivational, and interactive atmospheric cues in live streaming platforms were identified as pivotal drivers of streaming effectiveness, influencing viewers' participation experiences and streamers' broadcast performances. These cues encompassed various elements, including streaming content, emotional factors of both viewers and streamers, platform accessibility, multiple formats of interactions, and streamers' attributes, all contributing to enhanced engagement and fostering prosocial behavior. Additionally, the findings highlighted the prevalence of upward social comparisons in the live streaming context. Viewers compared themselves with streamers, considering their broadcasting performance, presentation skills, and overall professionalism, thus contributing to the development of positive prosocial attitudes. Similarly, viewers were observed participating in comparisons with their peers, cultivating collaborative interactions and nurturing a sense of community within virtual chat rooms. Furthermore, streamers engaged in comparisons with more experienced counterparts, using these

comparisons as a source of motivation to improve their streaming effectiveness and expand their follower base.

7. Theoretical contributions

This research contributes to Internet research and marketing literature from three angles. First, to our best knowledge, this study is the first to extend both social comparison and prosocial theoretical applications in the LS context. Our findings reveal that both streamers and viewers expressed their attitude and willingness in relation to prosocial activities. Recent psychology scholars indicate that upward social comparison leads to users' envy and reduced re-esteem on social commerce platforms (Tran *et al.*, 2023). However, we shed light on the positive impact of upward social compassion wherein streamers and viewers acknowledge their prosocial engagement with superior peers, thereby leading to successful streaming sessions. Due to the prevalence of information systems and marketing technologies, LS platforms offer the ultimate interactive experience between persuasive senders and convinced receivers who compare and evaluate themselves with others. Second, our study stands among the pioneering research efforts to center Store Atmospheric (SA) cues in Internet research of the live streaming phenomenon. In line with existing cues (i.e., ambience, background setting, lighting, relaxing vibes, sound quality, visual clarity), LS effectiveness particularly takes into account the content, emotional drivers, ease of use and interactions, and streamers' dynamic attributes. We believe that such holistic cues would initialize more upward positive comparisons between streamers and viewers. Third, this exploratory research investigates hidden perceptions among both streamers and viewers whilst existing research focused on analyzing one party's views. We specifically approached nano- and micro-streamers who have a multitude of followers on their social media platforms, attracting viewers' engagement and inspiring interactions across different LS platforms. This allowed us to scrutinize the comprehensive and sophisticated LS journey from the perspective of both parties—streamers and viewers.

8. Managerial implications

We also provide practical implications for live streamers, Internet platforms, marketers, and technology developers under different circumstances where reasoned practices are evolving at a rapid pace. First, we encourage streamers, regardless of their scale of followers, to accommodate emerging atmospheric cues during LS sessions. Platforms should offer facilities to assist streamers in optimizing their settings. It is revealed that viewers hold higher anticipation toward streamers' overall performance while considering streaming atmosphere, background setting, relaxed vibes, and sound and visual quality as immediate drivers to join a virtual chat room. These stimulate multiple formats of interactions and prosocial activities including streamers-to-streamers, streamers-to-viewers, and viewers-to-viewers. Second, we learnt that viewers seek information and believe the recommendations made by streamers in LS platforms. Therefore, we consistently call for retailers to collaborate with influencers (Cornwell *et al.*, 2023) while being considerate in targeting the appropriate streaming platforms. Moreover, we

notice that LS platforms have become new norm of search engines that alters information seeking and socializing activities. Our research explored multiple streaming platforms that provide commercial-, gaming-, and social-driven practices. Streamers present their content differently, and viewers respond distinctively. Extra benefits can be realized if retailers employ suitable streamers for promotion activities on suitable LS platforms. Last, our viewer participants stressed the concerns of in-app clicks and services, connectivity, perceived ease of use, and virtual filters when joining LS sessions. Several determinants impact users' interest, interactions, and patience if a particular streaming platform does not meet the users' satisfaction. Therefore, the application developers should continuously hear more voices from multiple stakeholders and improve the user experience of LS platforms.

9. Limitations and future research avenues

Our study has some limitations that warrant further investigation. First, we employed a qualitative interview approach which might have introduced response biases and limitations in participants' ability to accurately recall and represent their experiences. To mitigate such biases, future research could consider incorporating observational methods or real-time tracking of user interactions. These strategies could provide a more objective and comprehensive understanding of the behaviors within LS sessions, ensuring a more accurate reflection of participants' engagement and experiences. Moreover, although efforts were made to ensure diversity within the sample, a larger and more diverse sample could offer a further understanding of the dynamics of live streaming, thereby enhancing the generalizability of the findings. Additionally, the exploration of cultural and demographic variables across different LS platforms needs greater attention, as these factors can significantly influence the nuances of communication and reactions within the virtual space, particularly providing a comprehensive view of the cultural and cognitive relationships regarding prosocial behavior and comparison perspectives. Last, a thorough examination is invited to compare how streamers facilitate broadcasting effectiveness and impact viewers' well-being across different streaming platforms. While our research concentrates on outstanding atmospheric cues, we suggest that future scholars should consider each platform's uniqueness and accommodate appropriate cues to deliver successful LS performance.

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Appendix 1: Streamers' and Viewers' Profile

Source: created by authors

Streamers profile

Participant Number	Age	Gender	Occupation
S1	32	Male	Sales assistant
S2	27	Female	University student
S3	30	Male	Engineer
S4	20	Female	University student
S5	30	Male	Employee
S6	27	Female	Employee
S7	32	Female	Employee
S8	27	Male	Engineer
S9	27	Female	Streamer
S10	43	Female	Streamer
S11	25	Male	Customer assistant
S12	26	Female	Streamer
S13	29	Male	Streamer
S14	43	Female	Employee

Viewers profile

Participant Number	Age	Gender	Occupation
V1	32	Female	Manager
V2	28	Female	Student
V3	26	Female	Student
V4	26	Female	Student
V5	26	Female	Student
V6	36	Male	Employee
V7	42	Male	Student
V8	24	Male	Student
V9	35	Male	Student
V10	24	Female	Student
V11	37	Male	Student
V12	49	Male	Employee
V13	45	Male	Manager
V14	35	Male	Student
V15	42	Female	Officer
V16	39	Male	Banking analytics
V17	39	Female	Student
V18	49	Male	Auditor
V19	35	Male	Student
V20	26	Male	Banker
V21	31	Male	Employee
V22	28	Female	Student
V23	25	Female	Student
V24	32	Female	Student
V25	20	Female	Student
V26	27	Male	Student

Appendix 2: Interview guide

Section	Interview questions for streamers	Interview questions for viewers
Live streaming experience	<p>Q1. Do you often initialize (GO LIVE) your own live streaming sessions? If yes, what streaming platforms have you used?</p> <p>Q2. Why do you prefer this platform for live streaming? What made you choose this particular platform?</p> <p>Q3. How often do you stream live on the xx platform?</p> <p>Q4. How long do you spend live streaming on average? (Please state how many minutes approximately.)</p> <p>Q5. What factors do you believe lead to a satisfying streaming performance? Please describe your experience in detail. Give an example if you need to.</p> <p>Q6. Have you considered other live streaming platforms in the past? If yes, could you talk more about this?</p>	<p>Q1. Do you often watch live videos on some streaming channels?</p> <p>Q2. If yes, on which platforms have you participated in live sessions before? Why?</p> <p>Q3. How often do you watch live streaming on social media platforms?</p> <p>Q4. Do you focus on only main live streaming platform, or would you join any live streaming sessions regardless of the platform? Can you talk more about this?</p> <p>Q5. How long do you stay in one live session? (Please state how many minutes approximately.)</p>
Background settings and atmospheric cues	<p>Q7. When streaming online, would you have a professional setting as the background, or do you not mind what the contextual effects are? (Explain, if possible, within an example from your experience).</p> <p>Q8. What factors do you consider as important background elements when streaming online? Why are they important?</p> <p>Q9. If you consider other factors, could you please talk more about these?</p> <p>Q10. Have you used any helpful tools or functions for a better streaming performance when going live? If yes, what did you use?</p> <p>Q11. What do you understand in terms of atmospheric cues when streaming online? How significantly do you assess the virtual atmospheric cues when going live?</p> <p>Q12. What do you consider the most important features of live streaming platforms? Please describe in detail. Do you pay attention to these features each time you go live?</p> <p>Q13. Have you experienced any technical disturbance during a live streaming session? If yes, could you please explain further?</p>	<p>Q6. When watching live videos, how often do you feel that you pay more attention to the streamers than to the streaming content? If so, why?</p> <p>Q7. Recall your recent live streaming watching experience. How well did you pay attention to the streamer's background setting? What intrigued you in the setting?</p> <p>Probe: If no, what were the most impressive elements of your recent watching experience of live sessions?</p> <p>Q8. When watching some social media influencer's live sessions, how has your demeanor been toward evaluating the overall atmospherics in the virtual chat room? Can you explain why?</p> <p>Q9. What factors do you consider as important background elements when streaming online? Why are they important?</p> <p>Q10. If you consider other important factors that impact live streaming contexts, can you describe them?</p> <p>Q11. Among those factors, which ones can inspire you to stay longer and engage more with streamers in a live session?</p> <p>Q12. In the event of technical disturbance whilst live streaming, can you explain the occurrence with an example and how you dealt with it? What were your emotions during that time?</p> <p>Q13. Do any atmospheric cues impact your attitude toward influencers' streaming performance? Please explain specifically how and why.</p>

<p>Invisible attributes</p>	<p>Q14. How do you interact with viewers? Could you talk more about this? Q15. What emotional drivers inspire your live streaming initials? Q16. Were there any emotional appeals or changes before, during, and after live streaming sessions? Probe: Please give an example of your feelings regarding each stage, respectively. Q17. Do you also interact with other live streamers? Probe: If so, why, and how did you interact? Q18. Could you please explain the differences between interacting with fellow streamers and viewers in a live streaming session? Q19. What streaming attributes do you consider as important means to attract more viewers and encourage engagement when going live?</p>	<p>Q14. Explain your thoughts on interactions or not wanting interactions with any streamers in your previous watching experience in live streaming platforms. Why and how do you interact with them? Q15. Based on your experience, do you prefer to interact with streamers or other viewers? If so, why? If you never interact with anyone, can you please tell me more about what stops you from doing so? Q16. What emotional drivers inspire you to participate in live sessions of those influencers? Please explain why? Q17. What is(are) your general motivation(s) to watch a live streaming session rather than other pre-recorded videos/blogs on social media platforms? Q18. Were there any emotional appeals or changes before, during and after live streaming sessions? Probe: Please give examples of your feelings regarding each stage, respectively. Q19. What do you feel are the benefits that you may obtain from watching a live streaming session?</p>
<p>General questions and future expectations</p>	<p>Q20. Have you abandoned using any live streaming platforms in the past? Probe: if yes, could you explain more as to why? An example is appreciated if you could provide one. Q21. Would you stay with the same streaming platform, or would you expand your streaming exposure to other platforms? Please explain in detail. Q22. Would you improve the background settings and accommodate any atmospheric cues to attract viewers? If so, why?</p>	<p>Q20. Do you trust the information disseminated by the streamers? Can you talk more about this? You can use an example to detail your experience. Q21. Have you considered becoming a streamer yourself? If yes, what would you prepare and plan? Why are you interested? Q22. Would you stay loyal to any influencers or just focus on particular live streaming platforms? Please elaborate further.</p>

Source: created by authors

Table I Existing Research on Store Atmospheric Cues in LS Contexts

Scholars	Title	Research Context	Theoretical Ground	Methodology	Atmospheric Cues	Key Findings
Ming et al. (2021)	How social presence influences impulse buying behavior in live streaming commerce? The role of S-O-R theory	LS e-commerce	Stimulus-organism-response (SOR)	Online survey of 405 Chinese Consumers	Telepresence, social presence, flow state	This research demonstrates that the social presence of live streaming platforms, viewers, and streamers, along with telepresence, significantly

						impacts consumer trust and flow state, which in turn triggers impulsive buying behavior. Additionally, a consumer's sense of power moderates the transition from consumer trust and flow state to impulsive buying behavior.
Wang et al. (2022)	Big arena, small potatoes: A mixed-methods investigation of atmospheric cues in live-streaming e-commerce	LS e-commerce	Technology-affordance theory	Mixed-method: 35 semi-structured interviews followed by survey of 457 Chinese LS users	Guidance information, bullen information, parasocial interaction	This study reveals that IT-based atmospheric cues play a crucial role in enhancing customer purchase decisions on brands' self-built live streaming e-commerce platforms. By integrating IT features with customer perceptions, the research provides new insights into how small- and medium-sized enterprises can utilize these factors to effectively compete in larger markets.
Yang et al. (2022)	Effects of interface design and live atmosphere on consumers' impulse-buying behaviour from the perspective of human-computer interaction	LS e-commerce	Stimulus-organism-response (SOR), human-computer interaction	Online experiments with Australia, China, Singapore, New Zealand consumers	Visual appeal, interface design, (pleasant) live atmosphere	The research indicates that interface design and live atmosphere significantly influence consumers' impulse-buying behavior on live-streaming platforms. Visual appeal, perceived arousal, and consumer

						engagement are identified as crucial mediators. Enhancing interface attractiveness and creating a positive atmosphere can encourage impulse purchases, but they require careful management to prevent irrational consumer behavior.
Shi et al. (2023)	The influence of atmospheric cues and social presence on consumers' impulse buying behaviors in e-commerce live streaming.	LS e-commerce	Stimulus-organism-response (SOR)	Online survey of 192 Chinese consumers	Interactive cues, music design, information, navigation, interface design	This research uncovers the roles of atmospheric cues and social presence in influencing consumer impulse buying in e-commerce live streaming. Information, design, and interactive cues positively affect impulse buying, mediated by social presence. However, navigation cues do not significantly impact impulse buying or social presence. This study offers a refined measurement tool for atmospheric cues and highlights strategies to enhance consumer engagement and purchasing behaviors in live streaming contexts.

Tong et al. (2023)	Do atmospheric cues matter in live streaming e-commerce? An eye-tracking investigation	LS e-commerce	Stimulus-organism-response (SOR) based on cognitive load theory	Laboratory experiment using eye tracking tactic	Background visual complexity, music tempo,	This research indicates that atmospheric cues, specifically background visual complexity (BVC) and music tempo (MT), significantly impact user arousal and cognitive load in live streaming e-commerce settings. High levels of BVC and fast-tempo music enhance arousal, which in turn influences consumer behavior positively by increasing purchase intention and continuous viewing intention. Additionally, while high BVC reduces intrinsic cognitive load, it does not significantly influence the cognitive load when combined with music tempo, suggesting a complex interplay of visual and auditory stimuli in influencing consumer behavior.
Zhang et al. (2023)	The rhythm of shopping: How background music placement in live streaming commerce affects consumer	LS e-commerce	Stimulus-organism-response (SOR)	Single-factor experiment with three conditions	Background music	This study explores the impact of background music placement in live streaming commerce on consumer behavior, specifically

	purchase intention					arousal, memory, and purchase intention. Key findings indicate that music plays during the purchase phase increases purchase intention and arousal but does not affect memory significantly. In contrast, continuous music playback increases arousal but negatively impacts memory, leading to lower purchase intentions. The research illustrates the subtle effects of music timing on consumer responses during live sales events.
Shang et al. (2024)	Effects of background fitting of e-commerce live streaming on consumers' purchase intentions: A cognitive-affective perspective.	LS e-commerce	Stimulus-organism-response (SOR), cognitive-affective perspective	Online survey of 424 Chinese consumers	Background fitting (product-background fit and anchor-background fit)	This research explores the influence of background fitting in e-commerce live streaming on consumers' purchase intentions, focusing on the cognitive and affective reactions of consumers. The study highlights the role of product-background fit and anchor-background fit in enhancing consumers' perceived trust and value, which subsequently affects their emotional responses and

						<p>purchase intentions. It also highlights the importance of perceived pleasure in the relationship between cognitive responses and purchase decisions, emphasizing the practical implications for optimizing live streaming settings to boost consumer engagement and sales.</p>
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Source: table created by authors

Table II Codification Process—Taking Streamers’ Insights as Example

First-order nodes		Second-order code		Aggregate themes
Ambience, cleanliness, noises of the virtual chat room	→	Ambience	→	LS Background Factors
The lighting, layout, brightness of LS sessions	→	Background setting		
Streamer’s voice, video sound, background noises of LS sessions	→	Sound quality		
Clear picture of streamer, visual-enabled elements of LS sessions	→	Visual clarity		
Ambience, layout, sound quality, visual clarity, virtual filters	→	LS atmospheric cues	→	Successful LS Features
Topic of discussion, streaming themes, live speeches, games, interesting news and stories of sharing	→	LS content		
Internet breakdowns, unstable connection	→	LS connectivity		
Viewer’s chats, comments, likes, and responses, interactive sessions, address their enquiries, Q&A function	→	LS engagement		
Streamer’s attractiveness, appearance, confidence, credibility, compassion, close relationship, engaging skills, friendly speaker, gestures, presentation skill, professionalism	→	Streamer’s attributes		
Comfortable flow with audience, ease of use, peaceful feeling, relaxing virtual environment	→	LS relaxing vibes		
Emotional willingness, obtaining more followers, information sharing, peer influence, stay active and connected	→	Motivational drivers of hosting LS sessions	→	LS Emotional Cues
Comfortable, entertaining, fun, happy, nervous, relaxed, satisfied, worthwhile	→	Emotional dynamics before/during/after LS sessions		

Source: table created by authors

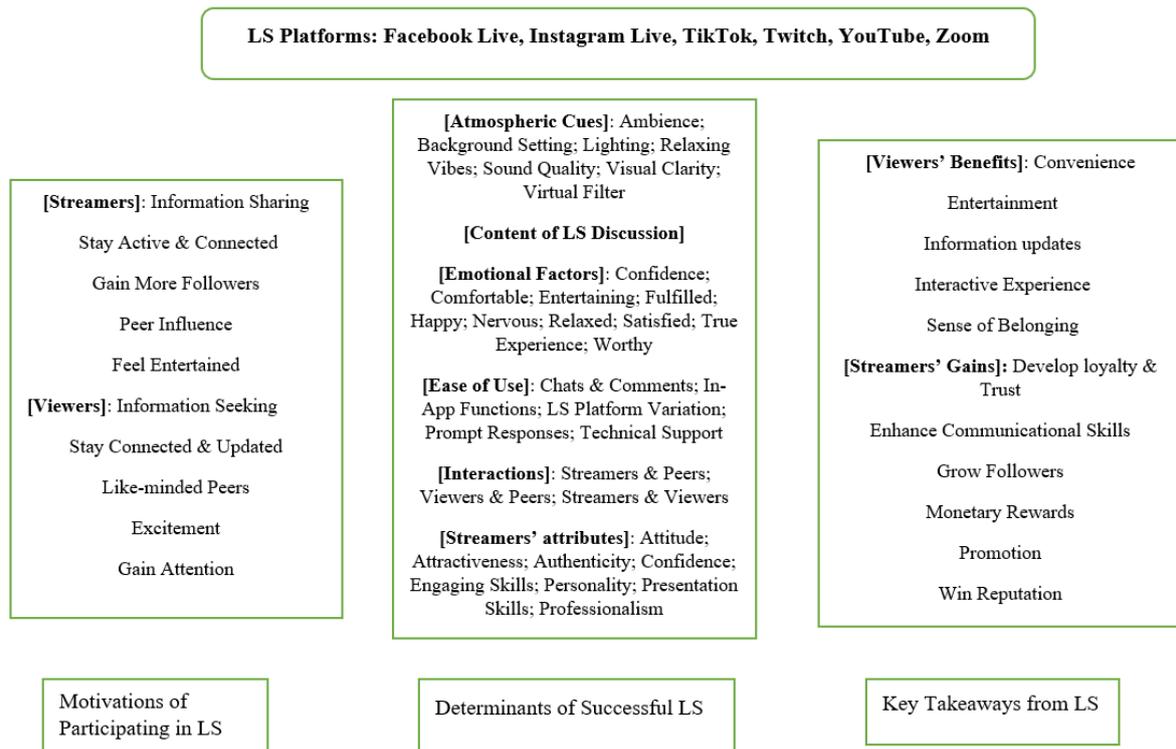


Figure 2 Streamer's and Viewer's LS Journey Map

Source: figure created by authors