

How live stream shopping influences brand loyalty on Taobao Live:

A perspective of parasocial interaction

the effects of affective commitment, real-time interactivity, visual complexity, live streamer type

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Abstract

Purpose – Live stream shopping became popular in the last few years. Companies in China use it as a promotion tool to attract consumers' attention through the live streamer attractiveness. This study aims to find consumers' attitude to live streamer and brand under the influence of live streamer type, real-time interactivity, visual complexity, and affective commitment. This study also tries to explore the influence of live stream shopping on brand loyalty, and the mediating role of parasocial interaction.

Design/methodology/approach – The effects of independent variables on brand loyalty are measured. The effect of affective commitment is measured. A 2 (live streamer type: independent live streamer vs branded live streamer) x 2 (real-time interactivity: high vs low) x 2 (visual complexity: high vs low) factor between-subject experiment is used to study the effect of live streamer type, visual complexity and real-time interactivity. The mediation effect of parasocial interaction is measured. Respondents (N=277) join to one of the eight experimental conditions. This study empirically measures the model by targeting consumers with shopping experience on Taobao Live.

Findings – Results of this study showed that brand loyalty was significantly influenced by high real-time interactivity, and independent live streamer. Affective commitment to live streaming channel also influences brand loyalty. Parasocial interaction has a mediation effect between real-time interaction, live streamer type, affective commitment and brand loyalty. Not as hypothesis, live streamer type has no moderation effect.

Originality/value –The findings of this study underline that live streamer has a powerful influence to enhance brand loyalty in live stream shopping. Marketers could use this study to design live streaming be a useful promotion tool.

Keywords *Parasocial interaction, Brand loyalty, Live stream shopping*

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1. Introduction

Live stream shopping has become popular over last few year. In China, many commercial retailers have adopted live streaming as a marketing tool to improve sales performance, including individual business owners and large companies. International brands such as Proctor & Gamble, Estee Lauder, and Zara have built own brand live stream channel on Taobao Live and hire live streamers to reach their customers. Taobao Live, the largest Chinese live stream shopping platform, owned by the company Ali, already has many live streamers to promote all kinds of commercial activities (Cai & Wohn, 2019). Based on the Ali research 2020 Taobao Live new economy report posted in April 2020, by the end of 2019, users who bought from Taobao Live had increased by 190% compared to 2018. Being a live streamer on Taobao Live is a new career. More than twenty thousand people work as a full-time live streamer in February 2020. These live streamers work for themselves as independent live streamer, or work for a brand company as branded live streamer.

Audiences become followers of the favorite live streamer. Famous live streamers with million followers on personal live stream channel show business value to investors just as influencers on other social medias (Zhao, et.al, 2019). The popularity of live stream shopping relates to the attraction of live streamers and advantageous features of live stream (Cai et al., 2018; Chen, 2019). Consumers show interest to continue watching the live streamer who is authentic and attractive in the real-time interaction (Lu, 2019).

Live stream shopping enhances purchase intention (Zhang, Wang, & Luo, 2019). However, it is unclear if live streaming enhances consumers' loyalty intention or the streamer's attraction is beneficial for repurchasing. Previous studies were about the influence of live stream on e-commerce (Zhao et al., 2019; Zhang et.al, 2019), the design improvement of live stream platform (Heo, Kim, & Yan, 2020), and the factors influence purchase intention in live stream shopping (Cai & Wohn, 2019; Wongkitrungrueng & Assarut, 2018). Rare studies are about the influence of live stream

shopping on loyalty intention. Wongkitrungrueng and Assarut (2020) mention that live stream increases sales, but companies face the challenges of using live stream to attract consumers to repurchase. Based on the Parasocial Interaction Theory, this study assumes consumers show repurchase intention to the brand when they build parasocial interaction with the live streamer. The live streamer's authenticity enhances consumers' intimate engagement with the streamer (Liu, Sun, & Lee, 2020). This study further explores what factors enhance parasocial interaction with the live streamer, and how to improve brand loyalty in live stream shopping. This study targets the factors that may affect consumers' interaction with a live streamer. The practical purpose of this study is to improve live stream shopping experience.

Audiences feel happiness and pleasure from engagement in the live streaming (Chen & Lin, 2018). Suppose consumers feel affective commitment to the live streaming. In that case, they may want to continue following the live streamer and continue purchasing the brand from the live streamer. This study analyzes if consumers feel affective commitment during live streaming. Additionally, Real-time interactivity with live streamer strengthens consumers' enthusiasm to immerse and purchase in live stream shopping (Chen, 2019). This study analyzes whether real-time interactivity also strengthens loyalty intention and improves interaction with the streamer to be more acceptable by audiences.

Wongkitrungrueng and Assarut (2020) suggest that live streamers should create visual content to heighten customers' continuous watching. Consumers may lose focus during live stream shopping. In each live broadcast, the live streamer presents more than twenty products in about four hours. Long time watching of multiple brands with various discount tags and advertisement tags on the screen may result in a lack of attention to one brand. The visual design of each live streaming on Taobao Live may cause visual complexity. This study tries to seek which kind of visual design is more beneficial for attracting audiences during live stream shopping, a simplified one or a complex one.

This study also explores if a brand must invest in building a brand live stream channel and employ branded live streamers. Although Cai, Wohn, Mitt, and Sureshababu (2018) suggest that building a brand's live stream channel is beneficial for traditional brands to start e-commerce (Cai, Wohn, Mittal, & Sureshababu, 2018), the study didn't compare the effects of brand live stream and non-brand live stream. This study compares the impact of two types of live streamer and finds out which one is preferable by consumers. Most famous independent live streamers with a high reputation are sponsored to sell various brands to followers. They are good at increasing revenue for commercial companies. Audiences prefer to watch a live streaming from a famous influencer to know the popular shopping trend before purchasing (Cai & Wohn, 2019). However, the lack of continuous connections results in consumer dissatisfaction, which influences loyalty intention (Ho & Rajadurai, 2020). Continuous brand engagement through interaction with the branded live streamer may increase brand loyalty, because consumers show more loyalty to the brand when they increase brand engagement (Hapsari, Clemes, & Dean, 2017). However, another study shows that consumers' participation with the brand on social media not results in long-term brand loyalty (Apenes & Solem, 2016). To find answer to this paradox, this study explores consumers' attitudes to two kinds of live streamer and finds out which one leads to stronger brand loyalty intention. Consequently, above discussions reflect a reality that commercial companies need to face: are live streamers able to attract consumers for a long-term brand loyalty.

In this study, the research questions are:

1. To what extent do affective commitment, real-time interactivity, and visual complexity influence brand loyalty in live stream shopping?
2. To what extent are parasocial interaction effects on brand loyalty interacting with live streamer type?

This study aims to investigate how live stream shopping influences brand loyalty. First, the study proposes the influence mechanism of live streaming on brand loyalty from

the perspective of parasocial interaction. Second, the study tries to find the effect of several factors of live streaming on live streamer-consumer relationships. Third, the study aims to determine if live streamer types cause influence. This study also provides practical suggestions for sellers and brand managers to better leverage live streaming for effective brand-consumer relationships.

2.Literature framework

This study's hypotheses were based on the assumption that consumers feel parasocial interaction during the live stream shopping. That is how they intend to be loyal to the brand. Variables were discussed in the following section to form a comprehensive understanding of the conceptual structure.

2.1 Live stream shopping

A live stream website or app is a platform to provide real-time communication amongst a live streamer and users (Zhao, Hu, Hong, & Westland, 2019). For example, music fans watch a live stream show on digital platforms. For commercial companies, live stream shopping is a useful marketing tool to increase retailer sales, reduce costs, and bring special marketing effects (Chen, 2019).

Cai et al., (2018) definite live stream shopping as “having attributes of social commerce that integrates real-time social interaction into e-commerce” (p.82). Live stream shopping is beneficial for bringing consumers rich-content visual experience and real-time interaction. Consumers show trust in the product when they earn vivid information and knowledge from high-quality visualization in live stream shopping (Ho & Rajadurai, 2020). Real-time interaction is an advantageous feature of live stream. Consumers' immersive, interpersonal connection enhanced by the instant feedback from the live streamer can reduce their uncertainty to the live streamer and increase perceived control (Wongkitrungrueng & Assarut, 2018; Liu, Sun, & Lee, 2020). On Taobao Live, the live streamer uses the product while chatting with audiences and

answering audiences' questions. Consumers trust a live streamer who is immediately answering questions (Wongkitrungrueng & Assarut, 2018). Live streamers let consumers have a more natural engagement than YouTubers with a prepared script for recorded videos.

Most brands use the limited-time discount to grab consumers' attention first. Then the live streamer does the main job to attract consumers to continue watching the live broadcast. Live streamers are capable of making consumers feel close. Individuals build identification with others sharing the same trait on Live stream, and each audience perceives enjoyment when seeing the live streamer and other audiences in a good mood. (Streeter, 2016). This study assumed that consumers are able to build parasocial interaction with live streamers in live stream shopping.

2.2 Parasocial interaction

Horton and Wohl (1956) define parasocial interaction (PSI) as a reaction the audience has to a media performer. The audience treats the performer as an intimate conversational partner. Parasocial interaction theory is about the relationship between audiences and personas (celebrities, characters). Audiences see the persona as a real friend (Stern, Russell, & Russell, 2007). Audiences emotionally feel close to the media performer with a sense of friendship and intimacy. On social media, the followers treat the influencer as a close friend. The regular following of the influencer's updated content may enhance their intimate illusion with the influencer (Gong & Li, 2017). Social media makes followers feel a real connection with the influencer. Comments and posts make the followers feel they can directly communicate with the influencer. Live streaming can increase the feeling of a face- to -face interaction. Streamers can instantly communicate with audiences, simultaneously exchange their opinions, generate positive emotion, warm feelings, and decrease consumers' doubt (Sun, Shao, Li, Guo, & Nie, 2019).

In this study, parasocial interaction referred to consumers' perception of intimacy to the live streamer during the live stream shopping. It is different from parasocial relationship.

Dibble et al., (2015) suggest that parasocial interaction refers to “a sense of mutual awareness that can only occur during viewing; on the contrary, parasocial relationship refers to a longer-term enduring association or a socioemotional bond between user and persona”. (p.25). This positive or negative relationship extends beyond the media exposure situation.

Parasocial interaction is guided by the media performer in exposure situations (Horton and Strauss, 1957). Audiences perceive a parasocial experience when they view a physically and verbally attractive performer in a TV program (Hartmann & Goldhoorn, 2011). Repeated exposure to the media performer through the mass media creates parasocial relationships (Levy, 1979). Additionally, parasocial interaction can be fostered through influencer's sharing of personal feelings and experiences to the public (Sanz-Blas, Bigné, & Buzova, 2017). Audiences want to follow an influencer when they think she shows strong persuasiveness and credibility in self-disclosure (Djafarova and Rushworth, 2017). When audiences identify self as similar to the influencer with same feelings, they are likely not to just follow her, but to interact with her on social media (Shan, Chen, & Lin, 2019).

Many antecedents influence parasocial interaction. Four categories of parasocial interaction's antecedents are found through literature review. The first category is the media performer's personal attraction. A performer physically attracts people with pleasing appearances, such as friendly eye contact and behavioral cues (Hartmann and Goldhoorn, 2011). Audiences want to follow a performer whose physical attractiveness reflects integrity and social competence (Liu, Liu, & Zhang, 2019). The second one is audiences' cognitive motivations. Audiences prefer a performer when they think she brings useful and appropriate information (Quan, Choe, & Im, 2020). Audiences want to follow the performer when they perceive proximity from the performer (Kim et al., 2015). Balance theory suggests that audiences feel comfortable interacting with a performer with similar values, personalities, and attitudes (Russell et al., 2004). Furthermore, followers show purchase intention and positive brand attitude to the brand promoted by the performer seen as credible and semblable (Sokolova & Kefi, 2020).

In live stream shopping, antecedents of parasocial interaction also enhance the consumer-brand interaction (Sanz-Blas, Bigné, & Buzova, 2019).

The third category is audiences' affective motivations. Interacting with a performer online satisfies the need for entertaining or socializing (Chung and Cho, 2017). The fourth one is about the information quality. Followers value information they receive, and prefer the informational content. Consumers decrease uncertainty to performer when they get detailed-information from the performer (Quan, Choe, & Im, 2020). Besides, engaging message content can be designed by the performer to facilitate the sense of parasocial interaction (Labrecque, 2014). In her study, she finds transparency of content and openness in communication positively influence parasocial interaction through a multi-method approach. To develop the Parasocial Interaction Theory, she suggests that future research should find other factors that may strengthen the sense of parasocial interaction. This study tested the effect of real-time interactivity, visual complexity, live streamer type and affective commitment on parasocial interaction in live stream shopping.

2.3 Brand loyalty

The definition of brand loyalty has two aspects—behavioral loyalty and attitudinal loyalty. Behavioral loyalty is about consumers repurchase behavior for a brand, and attitudinal loyalty is about consumers' attitude towards a brand (Kumar and Reinartz, 2006). Brand loyalty is considered as a critical measure to test brand preference and brand success (Keller, 1993). It is a standard used to evaluate how strong the brand is. High brand loyalty means that consumers have a strong brand attachment, and they are not easily changing to switch to another brand (Keller, 1993).

Brand loyalty can be measured by repeat purchase and word of mouth (Keller, 2008). Different constructs are built to measure brand loyalty. The first kind of construct is created based on the multi-dimensions of brand loyalty. Moolla and Bisschoff (2015) develop a brand loyalty model with nine antecedents, including culture-oriented brand performance, repeat purchases, relationship proneness, customer satisfaction, brand

relevance, perceived value, brand benefits, switching costs, and involvement. Each of them can be operationalized to create a scale. The second kind of construct is created based on the conceptualization of brand loyalty. For example, two-dimensional construct (behavioral, attitudinal) is used a lot (Morais et al., 2004; Li & Petrick, 2008).

Although there is no direct study of brand loyalty in live streaming, previous studies showed that the social media influencer positively facilitates brand attitude. Brand managers are suggested to work with an influencer, who is perceived to generate a high level of parasocial interaction with followers, is good for building a positive brand image (Breves, et.al, 2019). Influencers who are trusted by consumers on Instagram are more likely to enhance a high brand attitude, high purchase intention, and willingness to recommend the brand to others (Tabellion & Esch, 2019). This study assumed that a live streamer, who builds parasocial interaction with consumers, is more likely to enhance repurchase intention.

2.3.1 The relationship with parasocial interaction

The intimate relationship between followers and an influencer is positively related to consumers' purchase intention to the endorsed brand (Hung, Chan, & Tse, 2011). Spinda et al. (2009) found that PSI can increase the audience's involvement, intimacy, and intentionality to join the influencer's activities. When audiences increase involvement with an influencer, they can more easily keep a positive attitude to the influencer's presentation of a brand (Knoll, Schramm, Schallhorn, & Wynistorf, 2015). Brand activity on social media is a key driver of brand loyalty, especially in a social media brand community where brand consciousness and brand love have strong influence (Ismail, 2017).

Users' active participation in social media can enhance brand-related e-WoM. Brand immerses consumers into intimate communication and makes them feel belonging. In this way, consumers are more likely to increase brand love, which results in brand loyalty (Kim & Kim, 2018). To achieve brand love, the brand needs influencers to attract consumers on social media. The brand strengthens the eWOM endorsed

influencers who positively engage consumers to the Facebook brand page (Evans, Phua, Lim, & Jun, 2017; Sanz-Blas, Bigné, & Buzova, 2017). EWOM is influenced by the influencer's credibility, attractiveness, and consumer attachment (Bambauer-Sachse & Mangold, 2013). A live streamer positively influences consumers' brand evaluation if she is trusted and liked by followers (Zou, Guo, & Liu, 2020). Celebrities who sell products in live streaming have intimate fan followers on Taobao Live (Zou, Guo, & Liu, 2020), and they may positively strengthen brand loyalty. The brand endorsed celebrity can enhance brand awareness and lead to positive brand evaluation for the long term on Instagram (De Veirman, Cauberghe, & Hudders, 2017). Therefore, parasocial interaction with social media influencers in live streaming may positively influence brand loyalty.

H1. Parasocial interaction with the live streamer positively influences brand loyalty.

2.4 Real-time interactivity

The real-time interactivity with the streamer in live stream shopping delivers more information to consumers than traditional online shopping. (Xu, 2019). The difference between live TV shopping is that an online live streamer cannot present the product based on the script. The live streamer needs to immediately change the way how she presents the product when audiences suddenly require the live streamer to do it. Audiences sometimes do this to ensure the product is in good quality and decrease doubt about the streamer. The two-way interaction brings more precise information for consumers to evaluate whether to trust the product and the influencer (Chen, Yeh, & Chang, 2018).

Real-time interactivity is an advantageous feature of live streaming (Sun et al., 2019). Consumers ask questions and get a response immediately. Live streamers make consumer engagement in online shopping with more immersion, presence, and perceived realism. Immersion leads consumers to see the streamer as a real retailer and talk to the streamer as if shopping in a real store (Y. Sun et al., 2019).

Real-time interactivity may positively enhance parasocial interaction. Through the

instant response and vivid presentation, consumers feel strong immersion and sociality in the shopping environment. Consumers can interact with the live streamer and other customers while watching the live streaming. This is a way to improve consumers' identification in a live stream group (Haimson & Tang, 2017). Meanwhile, the live streamer can provide precise information through real-time interaction to decrease consumers' psychological distance and perceived uncertainty (Zhang, et.al, 2019). The live streamer not only attracts consumers' attention through rich-content experience. The live streamer also earns trust by bringing instant presentation and immediate response (Chen, 2019). Consumers think the influencer is credible when reading the influencer's facial expression during the live broadcast (Zhang, Qin, Wang, & Luo, 2019). Consumers are able to perceive credibility through real-time interactivity. Real-time interactivity may build parasocial interaction in live stream shopping.

Interactivity leads to brand loyalty through consumers' engagement on social media (Coelho, Rita, & Santos, 2018). Interpersonal communication on social media is user-to-user interactivity. The advantage of this kind of interactivity is that users perceive more control to media through modifying content in real-time (McMillan & Hwang, 2002). High perceived interactivity on social media positively results in brand loyalty when consumers earn enjoyment, perceive efficient information, and receive satisfaction from the brand (Cyr, Head, & Ivanov, 2009). Satisfying consumers' need to control content and instantly respond is beneficial for brand loyalty (Paul, Strong, & Pius, 2020). This study assumed real-time interactivity in live stream shopping is also beneficial for brand loyalty.

In this study, real-time interactivity was manipulated through controlling content. Consumers have low interactivity with the message sender when they get an automatic message (Eridon, 2011). Consumers may perceive less interactivity when they get an answer from the live streamer without utilitarian value. Labrecque (2014) manipulated interactivity through personalizing the message. In her study, participants got a low interactive message with a general opening, participants got a high interactive message starting with each one's ID name. In this study, participants in high interactivity group

got the message with detailed information and sounded like a personal letter. Participants in low interactivity groups got an automatic message.

H2a. High real-time interactivity in live stream shopping leads to higher parasocial interaction with the live streamer.

H2b. High real-time interactivity in live stream shopping leads to higher brand loyalty.

2.5 Visual complexity

Deng and Poole (2010) define visual complexity as referring to the number of elements in a visual image and the amount of information these elements deliver. There are six dimensions of visual complexity: quantity, irregularity, dissimilarity, details, arrangement asymmetry, and arrangement irregularity (Pieters et al., 2010, p.48). Generally, visual complexity describes the amount, diversity, and discriminability of visual cues in an advertising photo or video (Sohn, Seegebarth, & Moritz, 2017). An advertising image is a visual complex when the ad has many objects, provides too much information, and is full of visual richness (Kusumasondjaja & Tjiptono, 2019).

Visual complexity may negatively influence loyalty intention. Consumers perceive the brand's advertisement is attractive when the advertisement's visual design is proportional, unified, ordered, and simplified (Veryzer, 1993). On the contrary, an advertisement with high visual complexity negatively influences brand attention and brand attitude (Pieters, Wedel, & Batra, 2010). A negative brand attitude is associated with low brand loyalty (Rajumesh, 214). It can be supposed that high visual complexity results in low brand loyalty. Hur and Watkins (2018) also mention the negative effect of visual complexity on consumers' perception of the brand, the brand content may be less persuasive because consumers are distractive and less focused on the brand information when the visual complexity is high. Lee et al. (2018) find that consumers are more willing to repurchase a familiar brand product when they perceive the advertisement as less visual complex. During live streaming, consumers see the streamer's full-decorated live stream room with many small decoration items in background. Most of these decoration items are not relevant to the brand in the live

streaming. Consumers also see small advertisement pictures and bonus coupons on the screen. Over advertisements may cause audiences to lose attention. The information load causes poorer purchase intention (Jacoby, Speller, & Berning, 1974). On the contrary, an excellent visual experience leads to a favorable brand attitude (Li, Daugherty, & Biocca, 2002). The affective and sensory brand experience results in brand loyalty (Brakus, Schmitt, & Zarantonello, 2009). Therefore, it is necessary to know how consumers perceive the visual design of the recent live streaming.

Visual complexity influences consumers' attitude to a live streamer. To attract consumer attention effectively, the live streamer needs to ensure that a live streaming holds consumers' attention long enough to process the brand information cognitively. The live streamer needs to design the live streaming be more easy-reading, coherent and neat. However, Hur and Watkins (2018) find that consumers show favorable responses to an Instagram post when the endorsed influencer increases visual complexity by designing the image with more asymmetric items, colors, and objects. This finding can be explained by the use and gratification theory. Users of media satisfy entertainment motivation when they perceive the post as joyful and engaging (Madan et al., 2018). Therefore, it's hard to make a conclusion about consumers' attitude to the visual design of live streaming without an experiment. This study tested one aspect of visual design. This study was to prove if consumers perceive visual complexity in live stream shopping. In this study, visual complexity was manipulated through the items on the screen.

H3a. Low visual complexity in live stream shopping leads to higher parasocial interaction with the live streamer.

H3b. Low visual complexity in live stream shopping leads to higher brand loyalty.

2.6 Types of live streamer

There are two types of live streamers in Taobao. The first one is independent live streamers, who work as independent influencers promoting various brand products

during live streaming. Right now, the most popular live streamers are independent ones. They promote sponsored brands in their own live stream room. An independent live streamer presents more than twenty brands in a five-hour live streaming video for profit. The brand companies want to work with famous independent live streamers with more than a million followers for authenticity and publicity (Sun, Shao, Li, Guo, & Nie, 2019). An independent live streamer is able to successfully attract consumers to follow his channel and continue watching daily live streaming if the live streamer is perceived credible, friendly and, attractive.

The second one is the broadcasters hired by a brand to sell its products in a brand live stream channel. Five or six branded live streamers work for one brand channel. They are not as famous as independent live stream influencers. They do not have personal live stream channel as an independent live streamer. However, they can attract audiences to follow the brand live stream channel. A branded live streamer's daily work is to increase brand followers, who are interested in the brand and may continue purchasing from the brand live stream channel. This study assumed that branded live streamer is able to attract consumers to build parasocial interaction with them.

Live streamer types may cause different influences on consumers' brand attitude, just like influencer-generated ads and brand-reposting ads. Two kinds of ads affect brand attitude differently. A previous study showed that influencer-generated ads enjoy significantly higher brand attitude and higher brand engagement than brand-generated ads on Instagram (Lou, Tan, & Chen, 2019).

This study assumed that a branded live streamer strongly influences brand loyalty than an independent live streamer. Because a brand live stream channel may have a more direct influence on brand attitude than a live streamer's personal live stream channel. Compared with an independent live streamer, branded live streamer should directly influence this brand's repurchase intention. Brand live stream channel is supposed to be a brand community, which is a place for brand lovers to gather together and communicate about the brand (Muniz & O'Guinn, 2001). An online community is good

for building brand loyalty (Balakrishnan, Dahnil, & Yi, 2014). Consumers build an enduring and pervasive engagement with a brand when they have intense immersion and presence in the brand community on social media (France, Merrilees, & Miller). Through multiple brand experiences in a brand community, consumers increase brand attachment, leading to positive brand evaluation and brand loyalty (Kim & Kim, 2018; VanMeter et al., 2015). The brand community lets consumers share information, entertainment, and feelings, which increases community engagement and brand use (Laroche, Habibi, & Richard, 2012). Followers inside the brand community generate positive word-of-mouth (Li & Petrick, 2008). The influencer in such a brand community is meaningful to lead fans to purchase endorsed products (Liu, Liu, & Zhang, 2019; Thorson & Rodgers, 2006). Labrecque (2014) finds that PSI in a brand community increases loyalty intentions. This study assumed that a branded live streamer running the brand community is more influential on brand loyalty.

Users of live streaming like to engage with similar friends and find self-identification with the live streamer (Lu, 2018). Thorson and Rodgers's (2006) redefine parasocial interaction as “a user's interpersonal involvement with a media persona (a branded communicator of the brand's account on Facebook) through mediated communication” (p.37). A branded communicator often acts as “a friend” to closely connect with followers while remaining an anonymous brand representative at the same time. A brand communicator represents the brand to post content showing brand value and speaks in the tone that sounds like someone at followers' age (Tsai & Men, 2013). Brand companies are suggested to hire live streamers who have similar characteristics as the target audiences. Branded live streamers express brand positioning to fit consumers' personalities and make consumers feel similar to the brand (Wongkitrungrueng & Assarut, 2020). In this way, consumers easily build parasocial interaction with a branded live streamer than an independent live streamer while watching the streamer introduce a brand.

H4a. Branded live streamer positively influence parasocial interaction in live stream shopping than independent live streamer.

H4b. The relationship between parasocial interaction and brand loyalty can be positively strengthened by the branded live streamer.

2.7 Affective commitment

Affective commitment is a force of psychological attachment to an organization or a marketing relationship based on shared values, trust, and benevolence (Fullerton, 2005). Affective commitment refers to each one's attitude to a community (Schmitt & Zarantonello, 2013). Affective committed fans have an attitudinal loyalty to a relationship, which is about an enduring desire to keep the relationship (Sashi, 2012). Affective commitment can be used to explain the fans' eagerness to keep an enduring relationship with an organization, whether to a football team or an influencer community.

One benefit of affective commitment is the significant influence to loyalty intention. A study about the relational marketing concluded that affective commitment should result in more enduring marketing relationships (Marshall, 2010). When consumers keep affective commitment to a service provider, a free will to maintain a relationship based on their perceived benefit, consumers are more willing to keep an enduring relationship and show loyalty intention. (Evanschitzky, et.al, 2006). When the service provider is a brand online store, consumers are satisfied with a brand experience, such as watching an advertisement or join in a brand-related communication, they have affective commitment to the online store (Iglesias, Singh, & Batista-Foguet, 2011). When the service provider is a digital channel, consumers are likely to trust it and continue this relationship when they build affective commitment to the digital channel (Boateng and Narteh, 2016). This study assumes that consumers are able to build affective commitment to the live streaming channel, which they are joining in and want to continue following.

A live streaming channel as a community is beneficial for building affective commitment. Same as live community for game players, live streaming channels on

Taobao Live are for shopping lovers. Consumers join different channels on Taobao Live based on their interest in different brand. Each channel on Taobao Live is a virtual community where consumers can interact with other admirers with the same interest. The feeling of belonging in a virtual community increases affective commitment to the community (Royo-Vela & Casamassima, 2011). An online community is good for enhancing followers' engagement (Jang, Ko, & Koh, 2007). It is good for heightening a sense of parasocial interaction with the influencer (Tsai & Men, 2013). When consumers have an emotional bond in an online community, they are more willing to follow the sponsored influencer. (Schmitt & Zarantonello, 2013). Meanwhile, live streamers are sponsored by the brand to provide various brand experiences and increase satisfaction to the brand in live stream shopping (Chen, 2019). It is possible that when consumers have affective commitment to a live streaming channel, they want to continue following the live streamer in this channel, and show interest to repurchase the brand promoted by this live streamer. This study assumed affective commitment positively influences parasocial interaction in a live streaming, and also influences brand loyalty. In this study, the effect of affective commitment was measured through participants' self-report.

H5a. Affective commitment to the live streamer's streaming channel positively influences parasocial interaction with the live streamer.

H5b. Affective commitment to the live streamer's streaming channel positively influences brand loyalty.

2.8 The mediating effect of parasocial interaction

In this study, parasocial interaction with a live streamer mediates the effect of affective commitment, real-time interactivity, and visual complexity on brand loyalty. Media users feel intimate to a media persona through viewing or listening. This illusion is triggered when media personas design performance to attract audience attention, adapt the conversation to be like face-to-face, and bodily and verbally attract their users

(Horton and Wohl, 1956). And this intimate interaction has many influences.

Thorson and Rodgers (2006) suggest that increased interactivity between audience and personas can lead to parasocial interaction, and this sense of mutual awareness can increase the intention to support personas. Liu et al. (2019) find vlog video on YouTube positively affects consumers' evaluation to the brand when the vlogger develops a parasocial interaction with consumers. Labrecque (2014) finds that consumers increase the sense of parasocial interaction when they get personalized message and be contacted fluently in the brand community. This feeling goes beyond the interaction itself and leads to loyalty intention.

The previous parts have already suggested that affective commitment, real-time interactivity and visual complexity may positively influence parasocial interaction, and that parasocial interaction, in turn, may positively influence brand loyalty.

H6a. Parasocial interaction mediates the effect of affective commitment on brand loyalty in live stream shopping

H6b. Parasocial interaction mediates the effect of real-time interactivity on brand loyalty in live stream shopping

H6c. Parasocial interaction mediates the effect of visual complexity on brand loyalty in live stream shopping

2.9 The research model

Based on the theoretical framework, this study's research model was developed to explore the effects of live stream shopping on brand loyalty. The independent variables were affective commitment, real-time interactivity, and visual complexity. The dependent variable was brand loyalty. The mediation variable was parasocial interaction. The moderation variable was live streamer type.

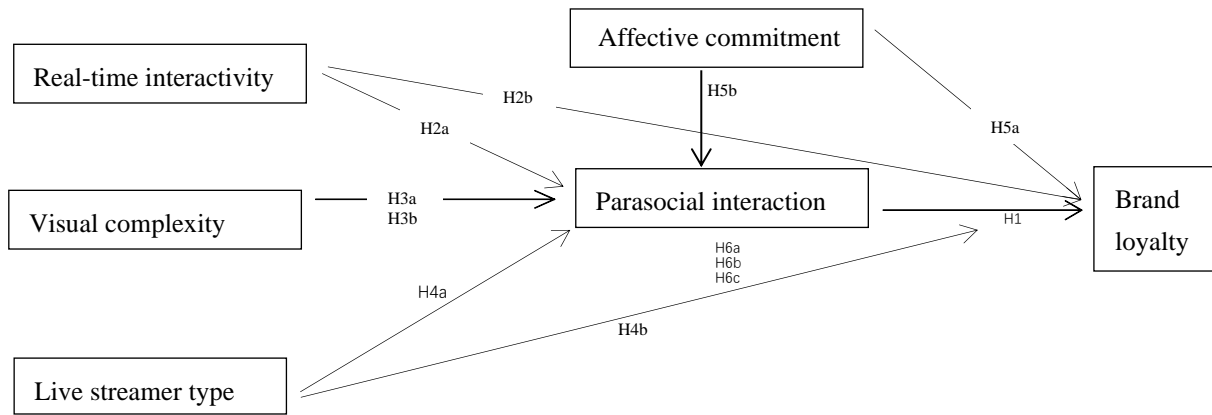


Figure 1 shows the research model.

3Methodology

3.1 Research design

This study's objective was to explore the influence of live stream shopping on brand loyalty on Taobao Live. The independent variables were real-time interactivity, visual complexity, affective commitment, and live streamer type. The dependent variable was brand loyalty. To answer the research questions and test the research hypotheses, this study used 2 (live streamer type: independent live streamer vs branded live streamer) x 2 (real-time interactivity: high vs low) x 2 (visual complexity: high vs low) 2 (live streamer type: independent live streamer vs branded live streamer) x 2 (real-time interactivity: high vs low) x 2 (visual complexity: high vs low) factor between- subject experiment. Three independent variables, real-time interactivity, visual complexity and live streamer type were manipulated. One independent variable, affective commitment was measured. The mediating effect of parasocial interaction was also tested.

Table 1 Groups of conditions

Condition	Live streamer type	Real time interactivity	Visual complexity
1	independent live streamer	high	low
2	independent live streamer	low	low
3	independent live streamer	high	high
4	independent live streamer	low	high
5	branded live streamer	high	high
6	branded live streamer	low	low
7	branded live streamer	high	low
8	branded live streamer	low	high

3.2 Pre-test

26 participants joined in the pre-test. They are Chinese students in Netherlands. They were able to advice how to design the survey. First, the pre-test verified that the experimental procedure was understood well and the construct items were understood. Instructions and questions were clearly labeled and written.

Second, the pre-test was to select an independent live streamer and a branded live streamer for the main study. Three independent live streamers were chosen in the pre-test based on the numbers of subscribers, views per video, and popularity rank on Taobao Live. The popular top 3 independent live streamers with followers over ten thousand were selected. Because they didn't promote the same brand. Three different brands were chosen in pair of each independent live streamer. Three brands were selected based on their posted live stream broadcast of cosmetic brand in the last month. These brands are all start-up makeup brands. All three brands hire branded live streamers. Audience numbers of each brand live broadcast are over 500. Compared with the videos of three independent live streamers, three branded live streamers were chosen in pair with the same viewers, same product, similar visual content, and similar visual narrative. Three pairs of six videos were shown to participants. Participants chose a pair of independent live streamers and branded live streamers whose videos they want

to watch. The most popular streamers were used as the experimental stimuli. Based on the pre-test results of the question “which group of live streamers you want to view”, 13 participants chose the first group (valid percent=50%), 5 participants chose the second group (valid percent=19.2%), and 8 participants chose the third group (valid percent=30.8%). Meanwhile, 15 participants kept a strong positive attitude to the brand in the second group, and 16 participants were already followers of the independent live streamer in the third group. Pre-test showed the independent live streamer, the branded live streamer and the brand in the first group were not too popular, but participants were interested to watch their videos. Therefore, the brand, the independent live streamer and the branded live streamer in the first group were used in the main study.



Figure 2 three pairs of independent live streamer, branded live streamer, brand product

3.3 Stimuli design

The stimuli material was eight live stream videos. Two original videos were recorded from Taobao Live. One was from the independent live streamer, and another one was from the branded live streamer. Different content was added or deleted from the original video to fit the manipulation requirement in each video.

This study manipulated live streamer type, real-time interactivity, and visual complexity while controlling other variables, including the brand name, brand product, live streaming date, and video recording time duration.

The brand in the video was chosen based on some criteria. First, the brand category was cosmetic. Based on the 2020 Taobao Live new economy report, cosmetic products are

the most popular category on Taobao Live. Second, the brand was not virtual. Creating a virtual brand name and virtual brand story is a way to control the influence of brand knowledge, brand love, brand familiarity (Van den Brink, Odekerken-Schröder, & Pauwels, 2006). The study suggested it is easier for the researcher to measure attitudinal brand loyalty without considering different behavior loyalty. However, in this study, it was impossible to create an original brand product in the stimuli video because original videos were from live streamers who sold real brand products. Third, the brand is not too famous or hard recognized. Consumers have high interactivity with a famous brand; they may have many brand experiences before the experiment (Yi & Jeon, 2003). Audiences may already have built strong brand loyalty or parasocial relationship with the branded live streamer of a famous brand. Not famous brands may not attract participants' intention to repurchase. Therefore, the brand was chosen from three start-up cosmetic brands, which are popular these few years but don't contain too much marketing. Brand attitude was asked at the beginning of the main study. Responders with a neutral brand attitude continued to take the experiment.

Brand attitude has a strong influence on attitudinal brand loyalty. Attitude becomes different when people receive, evaluate, and integrate stimulus information with their existing attitudes (Anderson 1981). Mazodier and Merunka (2011) used brand attitude to ensure that participants have the same brand evaluation level before the experiment. In this study, participants with a too positive or too negative attitude to the brand were excluded.

Two live streamers' presentation in the live streaming was similar in the stimuli videos. This is to control the effect of other antecedents on parasocial interaction. The sense of parasocial interaction is influenced by the media persona's physical attraction, verbal attraction, and time spent on the media (Horton & Wohl, 1956; Liu et al., 2016). In this study, the independent live streamer and branded live streamer faced the camera straightly without extra physical movements. Both of them introduced the product in the same narrative order while using the product (product advantage, product price, discount activity, product indigents, brand concept). The video recording should be long

enough to cause a sense of parasocial interaction, but too long may cause participants to lose attention. Therefore, each video was over five minutes, not longer than seven minutes.

3.3.1 Selection of live streamer type

Live streamers were chosen for the experiment based on the following criteria. First, followers for the independent live streamer's account and the brand live stream account on Taobao Live are both over ten thousand. The independent live streamer should be favored to cause influence. But she is not the famous one with over ten million followers seen as the representative of live stream shopping. The independent live streamer should not have been seen as a close friend by most Taobao Live consumers. The branded live streamer herself cannot be well-known. She only is hired by one brand to work for the brand live stream channel, and she doesn't have personal social media accounts. Second, both live streamers provide good quality and interesting visual content to attract audiences' attention. Therefore, the independent live streamer and the branded live streamer with over 500 audiences for each live streaming were accepted for this study. Third, the independent live streamer should sell the same brand product in the stimuli video as the branded live streamer.



Figure 3 Identification of Independent live streamer (left) is different from Identification of branded live streamer (right)

3.3.2 Manipulation of real-time interactivity

Labrecque (2014) designed high interactivity as receiving a personalized response in real-time. Manipulation of interactivity in this study was not targeted on response time but targeted on personalizing the message. Compared with the traditional user-computer platform, the live stream is already a social media platform for two-way communication with a continuum in real-time (Fortin & Dholakia, 2005). In this study, participants who immediately received a personalized response from the live streamer

to their questions have a high level of real-time interactivity. Manipulation of real-time interactivity was designed as:

- high condition: when the participant asked the live streamer a question about the brand, the live streamer immediately sent a personalized letter, and the message was full with detailed information to the question, and it sounded like the streamer is talking to a familiar audience.
- low condition: when the participant asked the live streamer a question about the brand, the live streamer immediately sent a computer-edited automatic message without a detailed answer, just invited the audience to continue watching.



Figure 4 high real-time interactivity (left) is different from low real-time interactivity (right)

3.3.3 Manipulation of visual complexity

Pieters et al. (2010) indicated the visual complexity in an advertisement image includes six dimensions: (1) the number of objects; (2) the number of irregularly shaped objects;

(3) the dissimilarity of those objects (e.g., shapes, textures, orientations, or colors); (4) the amount of detail within objects (e.g., fine edges, intricate textures, or color variations); (5) asymmetry; and (6) the irregularity (p.48). Previous studies manipulated this variable of a stimuli picture by controlling the object numbers, background color, irregularity, or similarity of a picture (Kusumasondjaja & Tjiptono, 2019; Lee, Hur, & Watkins, 2018).

The intention to manipulate visual complexity in this study was to determine whether consumers feel distractive seeing advertisement tags and discount tags during live streaming. In this study, the manipulation of visual complexity by changing the detail of objects (numbers of the advertisement tags, size of the advertisement tags, the background decoration, numbers of products in video).

- high condition: discount tags and advertisement tags were added to the video. Decorations in the live stream room were not removed from the screen. Another product was presented in the video. High visual complexity was similar to a real live streaming situation.
- low condition: there were no discount tags and advertisement tags on the screen. After Effect was used to remove brand-irrelevant decorations in the live stream room background. The color of the background was still the brand identity color. Only one brand and one product in the video.



Figure 5 high visual complexity(left) is different from low visual complexity (right)

3.4 Procedure

The survey was created using the online survey Qualtrics. An anonymous link was spread to groups on WeChat and Weibo. Participants were informed that all pre-test and main study information was confidential and it was about live stream shopping. Participants agreed to take the survey. Once participants clicked through to the survey link, participants were randomly directed to one of the eight experimental conditions.

First, participants answered the questions about brand attitude and purchase habits, including “Do you have purchase experience on Taobao Live”, “Did you purchase <brand name>”, “how do you think about this brand, ranking from strongly disagree (unfavorable/dislikable/bad) to strongly agree (favorable/likable/good)”. Participants who did not use Taobao Live or those who did not purchase the brand were excluded. Participants who chose 1 or 7 to the question of brand attitude were excluded from the survey. Eighty-three participants were excluded. Participants who had purchased the brand’s product on Taobao Live and kept a neutral attitude to the brand continued the experiment. Second, they were instructed to imagine joining into a new live stream room on Taobao Live with a new ID name. They imagined asking two questions about the brand and got answers in text from the streamer as in a real live stream shopping. They were required to imagine the experimental video as a real live streaming broadcast. They were asked to watch videos and read texts carefully.

After watching the video, they answered questions related to all variables. The questionnaire consisted of three parts and forty questions. The first part was to test whether parasocial interaction in live stream shopping is affected by affective commitment, visual experience, and real-time interaction; and the relationship between parasocial interaction and brand loyalty. The second part was to check manipulation. After answering questions, participants were required to answer six questions of manipulation check. The last phase of the survey was that participants answered questions about a short set of background demographics. They also informed their watching habits (“how much time do you spend on watching streaming on Taobao Live every day”, “how often do you watch a streaming in a week”).

3.5 Participants

This study focused on testing hypotheses rather than analyzing population projection. Randomly selected population may not accurately represent the population of interest. Just as the study made by Fetscherin (2014), samples were selected based on the homogeneous characteristics to get sample comparability. In this study, participants are people who have experience of live stream shopping and purchased the stimuli brand before. 360 respondents joined the data collection for this study and evenly were assigned to one of eight conditions. Each participant was randomly assigned to one of eight conditions. This study combined convenience sampling and snowball sampling. The survey link was spread to groups on WeChat and Weibo. Three groups consisted of people who like live stream shopping on Taobao Live. Other five groups consisted of people with different hobbies, such as doing live stream makeup, live stream cooking, live stream studying. Each group has more than two hundred people. The participants were asked to distribute the questionnaire to friends who use Taobao Live.

Based on the 2020 Taobao Live new economy report, 80% of the audiences are female, and almost 70% of audiences are 18-30 years old. In the main study, demographic features of participants fit the results of this report. 87.7% of participants were female, 12.3% of participants were male. 76.9% of participants were between 19 to 29 years old. Meanwhile, valid participants purchased the brand before, and they kept a neutral brand attitude to the brand (Mean= 4.77, SD= 0.72, min=2, max=6). Results showed that 50.2% of participants watch live stream shopping for four to six times a week, and 45.5% of participants spend more than thirty minutes on watching the live stream shopping in one day.

3.6 Measure instruments

The survey items were measured on a 7-point Likert scale (1 = strongly disagree; 7= strongly agree). The measurement scales of brand loyalty, parasocial interaction, affective commitment, real-time interactivity, and visual complexity were adapted from existing literature. All scale items are in the Appendix.

This study followed the study made by Fetscherin (2014), the construct of attitudinal loyalty was used as a measurement tool, and the behavioral loyalty scale was not used. The behavioral approach is better to measure observable repurchase behavior. However, this study was to reflect loyalty intention, which is about consumers' attitudes. The behavioral loyalty may be influenced by many other uncontrolled factors, such as personal motivations and the surrounding environment (Quester and Lim, 2003). Therefore, this study only measured repurchase intention, but not repurchase behavior. The scale of attitudinal loyalty was borrowed from Quester and Lim (2003) in this study, including items “I love < Hua xizi>”, “I intend to continue purchasing <Hua xizi>”.

The scale of parasocial interaction was borrowed from Liu, Liu, & Zhang (2019) and Reynolds, Woods, & Baker (2006), including items “This streamer makes me feel comfortable, as if I am with friends”, “I want to follow this streamer on Weibo”. The scale of affective commitment was borrowed from Evanschitzky et al., (2006) and Rather, Tehseen, & Parrey (2018), including items “I feel emotionally attached to this streamer’s live streaming”, “I feel personally satisfied when I watch this streamer’s live streaming”.

The scale of real-time interactivity was borrowed from Labrecque (2014), including items “I prefer to get answer from this live streamer quickly”, “This streamer listens to what I say”. These items are about participants' perception of controlling content and controlling navigation. The scale of visual complexity was borrowed from Sohn et al., (2017), including items “I think visual items in this live streaming is easy to view---hard to view”, “I think the visual appeal in this live streaming is simple---rich”.

The scale of perceived interactivity was borrowed from McMillan and Hwang (2002) to check manipulation, including items “I can easily get information that I need from the interaction with this live streamer”, “The interaction with this live streamer keeps my attention”.

3.7 Construct reliability and validity

To ensure the reliability of these constructs, scales of each variable from existing literature were selected. These scales already have been used in online shopping studies as introduced before. Reliability test was used to ensure five constructs are reliable and valid for this research model. All the constructs have been tested with high reliability in previous studies. When the value is higher than .80, the construct was considered to have high reliability. A construct validity can be improved unless it has a higher reliability (Litwin, 1995). All constructs' reliability was improved to be higher based on each construct's item-total statistic, which showed Cronbach's alpha value if each item is deleted. In this study, two items which turned Cronbach's alpha value to be lower were deleted, including one item of affective commitment "I feel that I can trust this streamer's live streaming", and one item of real-time interactivity "I found that a real-time interactivity within this streamer's live streaming is enjoyable". After removing items, each constructs' value was over .80. The lowest measured construct value was .83, and the highest value was .91.

A factor analysis was conducted for variables' items to determine the construct validity. The KMO and Bartlett test evaluate all available data together to indicate whether a single variable is correlated with other variables (Emin Öcal, Oral, Erdis, & Vural, 2007). A KMO value was .71, and the Bartlett's test statistic was large and significant ($p < .001$). This means the sampling was adequate and factor analysis was allowed to be used. Meanwhile, Orthogonal rotation (Varimax) method was used to test the correlation among items and the relationship with each construct. A construct with validity coefficient value over .35 is beneficial (Odom & Morrow, Jr., 2006). All items loaded in the scales as proposed. This means each construct measured a concept as the study required. The factor analysis for this study showed that all items have factor loading score more than .40. This means all items were valid to measure the constructs.

Table 2 factor analysis measurement with 21 items for 5 constructs

Construct	Item	VC	RI	PI	A C	BL
Visual complexity Cronbach's alpha: .91	I think visual items in this live streaming is unorganized---organized	.86				
	I think the visual items in this live streaming is easy to view---hard to view	.79				
	I think the visual appeal in this live streaming is simple---rich	.86				
	I think product and visual view in this live streaming is coherent---incoherent	.83				
	I think the visual appeal in this live streaming is neat---messy	.84				
Real-time interactivity Cronbach's alpha: .86	This live streamer talks back to me directly not through a computer assistant		.91			
	This live streamer keeps me well-informed with not an automatic answer		.93			
	This live streamer responds to me quickly		.89			
Parasocial interaction Cronbach's alpha: .88	This streamer makes me feel comfortable, as if I am with friends			.71		
	If this streamer works for another live stream channel, I would watch that video			.78		
	I want to follow this streamer on Weibo			.77		
	I want to watch this streamer again in her live streaming			.61		
	I would like to meet this streamer in person when she has an offline meeting			.76		
	I feel this streamer understands me and talks about what I want to know			.56		
Affective commitment Cronbach's alpha: .84	I feel emotionally attached to this streamer's live streaming				.45	
	I agree with what she says in this live streaming				.67	
	I feel personally satisfied when I watch her live streaming				.69	
Brand loyalty Cronbach's alpha: .83	I intend to continue purchasing <Hua Xizi>					.62
	I feel excited to know <Hua Xizi> has new products					.76
	I think <Hua Xizi> is a better Chinese cosmetic brand than other cosmetic brands					.82
	I feel upset <Hua xizi> is not available anymore					.77

3.8 Results of manipulation check

To ensure the manipulation of live streamer type, real-time interactivity, and visual complexity works, the manipulation check was done in the main study.

The manipulation checks showed that participants can perceive significant differences among all conditions in the main study. In the main study, all participants were required to watch the stimuli video carefully and answered the questions of manipulation check.

To check the manipulation of the live streamer type, participants answered question, "who is the branded live streamer in the video ". Most participants correctly pointed out the branded live streamer (BLS) in the brand live stream video and the independent live streamer (ILS) in her video. 42% of participants pointed branded live streamer, 56.2% participants pointed independent live streamer, 1.9% participants did not give right

answer.

To check the manipulation of the real-time interactivity, three questions were used from the scale of perceived interactivity created by McMillan and Hwang's (2002). "The communication with the live streamer is easy" "I can easily get information that I need from the interaction with the live streamer". Perceived interactivity is sufficient to be used to check the manipulation of interactivity in experimental study (Sicilia et al, 2005; Fortin & Dholakia, 2005). A one-way ANOVA showed a significant effect ($F(6,266) = 4.431, p = .003$). This means there was a difference between the group of high real-time interactivity and low real-time interactivity. Participants that observed a streaming with high real-time interactivity were rated greater ($M = 5.60, SD = 0.83$) than participants that watched a streaming with low real-time interactivity ($M = 2.87, SD = 0.92$). This indicates that the manipulation of real-time interactivity worked. Participants perceived the personalized message in the stimuli video as high interactivity with the streamer. Oppositely, they perceived the automatic message in the stimuli video as a difficult interaction with the live streamer.

To assess the manipulation of visual complexity, participants answered questions that confirm the visual complexity be high or low. The scale of perceived visual complexity created by Sohn et al., (2017) was used. "The order of objects in the video is easy to view—hard to view; simple—rich ". A one-way ANOVA showed significant results ($F(6,266) = 2.270, p < .037$). When a live stream video with a lot of advertisement tags was shown, participants perceived visual complexity was higher ($M = 4.87, SD = 0.95$) than a live stream video with a cleaner background was shown ($M = 3.01, SD = 0.89$). In this study, changing the image items in the background of live stream videos was a valid manipulation of visual complexity.

Table 3 Manipulation check per each condition

	Condition							
	ILS	ILS	ILS	ILS	BLS	BLS	BLS	BLS
	lowRI	lowRI	highRI	highRI	highRI	lowRI	lowRI	highRI
	highVC	lowVC	highVC	lowVC	highVC	lowVC	highVC	lowVC
Real-time interactivity								

mean	3.17	2.27	5.60	5.64	5.33	3.33	2.78c	5.86
SD	1.31	0.78	0.89	0.78	0.89	0.97	0.62	0.75
Visual complexity								
mean	5.34	2.96	4.38	3.21	4.39	2.83	5.38	3.02
SD	0.88	0.94	0.87	0.98	1.19	0.86	0.84	1.14
Numbers	36	31	34	38	35	34	34	35

4. Results

In order to test the hypotheses of this study, three tests were conducted with the software IBM SPSS 23. Firstly, a regression analysis was conducted to test the effect of parasocial interaction on brand loyalty (H1). Then, another regression analysis was conducted to test the effect of affective commitment on parasocial interaction and brand loyalty (H5a H5b). Secondly, a univariate analysis of variance was conducted to test the effects of live streamer type, visual complexity and real-time interaction on parasocial interaction (H2, H3, H4a). Thirdly, the moderation effect of branded live streamer was tested (H4b). Lastly, a mediation analysis was conducted to test the mediation effect of parasocial interaction (H6a H6b H6c).

4.1 Regression analysis

Hypothesis 1 predicted parasocial interaction with live streamer positively influences brand loyalty. The regression model showed 41.5% of brand loyalty was explained by parasocial interaction (Adj. $R^2=0.42$, $F(1, 276)=191.40$, $p < .01$), and there was a positive relation between two variables ($\beta =0.74$, $t(272)=15.09$, $p<.01$). Hypothesis 1 was supported.

Hypothesis 5a predicted that affective commitment to the live streamer's streaming channel has a positive effect on parasocial interaction. The liner regression indicated that affective commitment significantly predicted parasocial interaction ($b = .35$, $t(272) = 6.15$, $p < .001$). Affective commitment explained 11.9% of variance in parasocial interaction in live stream shopping (Adj. $R^2 = .12$, $F(1, 271) = 37.85$, $p < .001$). Hypothesis 5a was supported.

Hypothesis 5b predicted that affective commitment to the live streamer's streaming channel has a positive effect on brand loyalty. The linear regression indicated that affective commitment significantly predicted brand loyalty ($b = .56$, $t(272) = 7.79$, $p < .001$). Affective commitment explained 9.8% of variance in parasocial interaction in live stream shopping (adjusted $R^2 = .098$, $F(1, 271) = 30.48$, $p < .001$). Hypothesis 5b was supported.

Table 4 Regression analysis of affective commitment

Predictor	Dependentvariable	<i>B</i>	SE <i>B</i>	β	<i>t</i>	<i>p</i>
Affective commitment	Parasoical interaction	.32	.05	.35	6.15	.000
	Brand loyalty	.59	.07	.56	7.79	.000

4.2 Univariate ANOVA analysis

The univariate ANOVA was used to test the influence of three independent variables on one dependent variable and between subjects' effects. The Shapiro-Wilk's test showed data was not normally distributed ($W(1,276) = 0.98$, $p = .001$). The values for skewness and kurtosis between -2 and +2 are considered as normal univariate distribution (George & Mallery, 2016). Levenet's test of equality of error variances showed the results fit the condition to use ANOVA analysis ($F(7, 269) = 2.022$, $p = .053$).

Hypothesis 2a predicted high real-time interactivity has a more positive influence on parasocial interaction than low real-time interactivity. The univariate ANOVA was showed that the main effect of manipulation of real-time interactivity on parasocial interaction was statistically significant ($F(1, 273) = 39.30$, $p < .001$, partial- $\eta^2 = .10$). Participants that observed the live stream video with a message of high real-time interactivity ($M = 5.49$, $SD = .83$) achieving higher parasocial interaction than participants that received a message of low real-time interactivity ($M = 4.91$, $SD = .95$). Hypothesis 2a was supported.

Hypothesis 3a predicted lower visual complexity has a more positive influence on parasocial interaction than higher visual complexity. Univariate ANOVA showed that the main effect of manipulation of visual complexity on parasocial interaction was statistically significant ($F(1, 273) = 11.37, p = .001, \text{partial-}\eta^2 = .04$). However, there is no significant difference between low visual complexity (Mean = 5.39, SD = .86) and high visual complexity (Mean = 5.02, SD = .97) on parasocial interaction. Partial Eta squared value is small. The partial eta-squared value, which is smaller than .06, means a small effect size (Cohen, 1988). Hypothesis 3a was not supported.

Hypothesis 4a predicted branded live streamer has a more positive influence on parasocial interaction than independent live streamer. The univariate ANOVA showed that the manipulation of live streamer type on parasocial interaction was statistically significant with a large effect size ($F(1, 273) = 85.07, p < 0.001, \text{partial-}\eta^2 = .24$). However, branded live streamer (Mean = 4.78, SD = .95) was not better at building parasocial interaction compared with independent live streamer (Mean = 5.62, SD = .71). Hypothesis 4a was not supported.

The interaction of the manipulation of visual complexity and live streamer type has a really small effect size ($F(1, 273) = 4.83, p = .029, \text{partial-}\eta^2 = .02$). No other interaction effects were found on parasocial interaction.

Table 5 Tests of between-subject effects on parasocial interaction

predictor	df	F	<i>p</i>	partial- η^2
visual	1	15.92	.000	.04
interactivity	1	30.80	.000	.10
streamer type	1	85.08	.000	.24
visual*type	1	4.83	.029	.02
visual *interactivity	1	.03	.875	.00
type*interactivity	1	3.54	.061	.01
visual*type*interactivity	1	.057	.812	.00

Hypothesis 2b predicted high real-time interactivity has a more positive influence on brand loyalty than low real-time interactivity. The univariate ANOVA showed that manipulation of real-time interactivity on parasocial interaction has a small effect ($F(1, 273) = 5.14, p = .025, \text{partial-}\eta^2 = .02$). The manipulation of real time interactivity on brand loyalty did not approach significant difference. Hypothesis 2b was not supported.

Hypothesis 3b predicted lower visual complexity has a more positive influence on brand loyalty than higher visual complexity. The univariate ANOVA showed that the manipulation of visual complexity on parasocial interaction was statistically significant, but the effect size is small ($F(1, 273) = 11.89, p = .001, \text{partial-}\eta^2 = .04$). The manipulation of visual complexity on brand loyalty did not have strong difference. Hypothesis 3b was not supported.

Results showed that the manipulation of live streamer type has significant influence on brand loyalty ($F(1, 273) = 53.31, p < .001, \text{partial-}\eta^2 = .17$). Independent live streamer ($M = 5.63, SD = .70$) has more influence on brand loyalty than branded live streamer ($M = 4.78, SD = .95$).

There was an interaction between the manipulation of visual complexity and live streamer type on brand loyalty ($F(1, 273) = 5.90, p = .016, \text{partial-}\eta^2 = .02$). There was an interaction between the manipulation of visual complexity, real-time interactivity and live streamer type on brand loyalty ($F(1, 273) = 14.18, p < .001, \text{partial-}\eta^2 = .05$).

Table 6 Tests of between-subject effects on brand loyalty

predictor	df	F	<i>p</i>	partial- η^2
visual	1	11.89	.000	.04
interactivity	1	5.14	.025	.02
streamer type	1	53.31	.000	.17
visual*type	1	5.90	.016	.02
visual *interactivity	1	4.01	.045	.02
type*interactivity	1	2.52	.114	.01
visual*type*interactivity	1	14.18	.000	.05

4.3 Moderation effect of live streamer type

Hypothesis 4b predicted that branded live streamer moderates the relationship of parasocial interaction on brand loyalty. This study used SPSS PROCESS v 3.5 to test moderation effect. Results showed the interaction term was statistically not significant ($B = .09$, $t(273) = 1.341$, $p = .18$) in this model, indicating that branded streamer type was not a significant moderator of the effect of parasocial interaction on brand loyalty. The table of "conditional effects of the focal predictor at values of moderator(s)" was not shown when interaction p value above .10 (Hayes, 2017). The R-square changed value from model 1 without the moderator to model 2 with the moderator was .02. The moderation analysis of independent live streamer also did not show statistical significance. Hypothesis 4b was not supported.

Table 7 The moderation effect of branded live streamer and independent live streamer

predictor	β	SE	t	p
PSI	.42	.05	17.91	.000
Branded LS	-.39	.37	-1.07	.285
Independent LS	.39	.37	1.07	.285
Interaction	.09	.07	1.34	.180

4.4 Mediation effect of parasocial interaction

Hypothesis 6a predicted that parasocial interaction mediates the effect of affective commitment on brand loyalty in live streaming. The mediation model of SPSS PROCESS Andrew F. Hayes (2017) was based on Baron and Kenny's (1986) three steps for mediation. In the first step, the effect between affective commitment and parasocial interaction was significant ($b = .72$, $SE = .05$, $t = 15.14$, $p < .001$). In the second step, the effect of parasocial interaction on brand loyalty was significant ($b = .38$, $SE = .05$, $t = 8.32$, $p < .001$), and the affective commitment positively influenced brand loyalty ($b = .14$, $SE = 0.05$, $t = 2.88$, $p = .004$). This means parasocial interaction

was not the only mediator between affective commitment and brand loyalty. In the third step, when controlling for the mediator of parasocial interaction, the total effect of independent variable of affective commitment positively influenced brand loyalty ($b = .42$, $SE=0.04$, $t=10.37$, $p < .001$). These results showed that parasocial interaction had a partial mediation effect to the relationship of affective commitment and brand loyalty. Hypothesis 6a was partially supported.

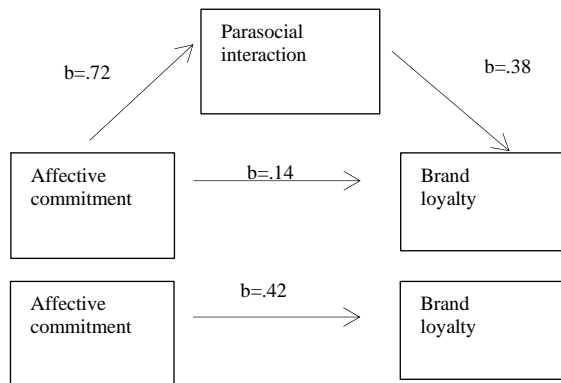
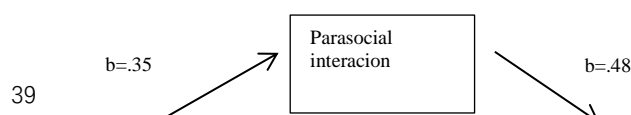


Figure 6-1 Mediation effect of parasocial interaction

Hypothesis 6b predicted that parasocial interaction mediates the effect of real-time interactivity on brand loyalty in live streaming. The effect between real-time interaction and parasocial interaction was significant ($b = .35$, $SE=.03$, $t=10.49$, $p = < .001$). Second, the effect of parasocial interaction on brand loyalty was significant ($b = .48$, $SE=.04$, $t=11.79$, $p = < .001$), and direct effect of real-time interactivity on brand loyalty was not significant with the mediator ($b = -.05$, $SE=0.03$, $t=-.18$, $p = .852$). When controlling for the mediator of parasocial interaction, the total effect of real-time interactivity positively influenced brand loyalty ($b = .16$, $SE=.27$, $t=5.87$, $p < .001$). These results showed that there was a significant relationship between real-time interactivity and parasocial interaction. However, real-time interactivity in live stream shopping didn't influence brand loyalty directly. Real-time interactivity influenced brand loyalty through parasocial interaction. The result means parasocial interaction had a full mediation effect between real-time interactivity in live stream shopping and brand loyalty. Hypothesis 6b was supported.



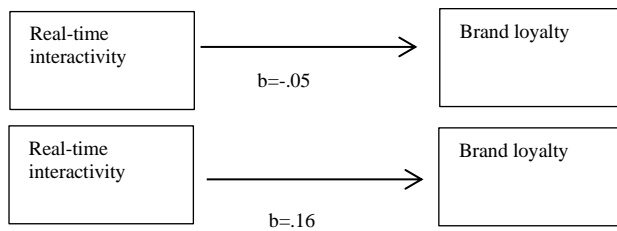


Figure 6-2 Mediation effect of parasocial interaction

Hypothesis 6c predicted that parasocial interaction mediates the effect of visual complexity on brand loyalty in live streaming. SPSS PROCESS showed that there was no relationship between visual complexity and parasocial interaction ($b = -.07$, $t = -1.76$, $p = .08$). Second, the effect of parasocial interaction on brand loyalty was significant ($b = .73$, $t = 14.67$, $p < .001$). the direct effect between the independent variable visual complexity and brand loyalty was not significantly ($b = -.06$, $SE = .03$, $t = -1.93$, $p = .057$). When controlling for the mediator of parasocial interaction, the total effect of visual complexity on brand loyalty was not significant ($b = -.12$, $SE = .05$, $t = -2.61$, $p = .096$). These results showed that parasocial interaction didn't mediate the relationship between visual complexity and brand loyalty. Hypothesis 6c was not supported.

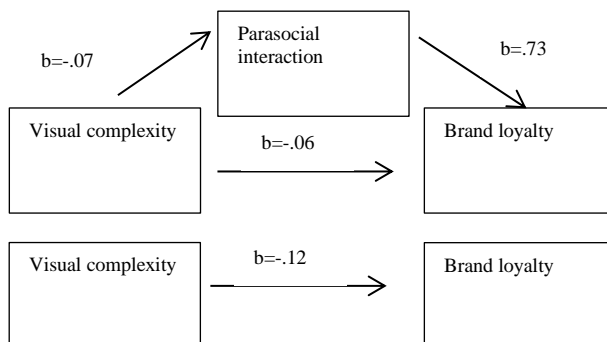


Figure 6-3 Mediation effect of parasocial interaction

Table 9 Hypotheses Overview

	Hypotheses	Result
H1	Parasocial interaction with the live streamer positively influences brand loyalty.	Supported
H2a	High real-time interactivity in live stream shopping leads to higher parasocial interaction with the live streamer.	Supported

H2b	High real-time interactivity in live stream shopping leads to higher brand loyalty.	Not supported
H3a	Low visual complexity in live stream shopping leads to higher parasocial interaction with the live streamer.	Not supported
H3b	Low visual complexity in live stream shopping leads to higher brand loyalty.	Not Supported
H4a	Branded live streamer positively influence parasocial interaction in live stream shopping than independent live streamer.	Not supported
H4b	The relationship between parasocial interaction and brand loyalty can be positively strengthened by the branded live streamer.	Not supported
H5a	Affective commitment to the live streamer's streaming channel positively influences parasocial interaction with the live streamer.	Supported
H5b	Affective commitment to the live streamer's streaming channel positively influences brand loyalty.	Supported
H6a	Parasocial interaction mediates the effect of affective commitment on brand loyalty in live stream shopping	Partial supported
H6b	Parasocial interaction mediates the effect of real-time interactivity on brand loyalty in live stream shopping	Supported
H6c	Parasocial interaction mediates the effect of visual complexity on brand loyalty in live stream shopping	Not supported

5. Discussion

This study's primary purpose was to investigate how live stream shopping influences brand loyalty through parasocial interaction. For this purpose, a research model was built based on live stream features and parasocial interaction theory. An experiment was designed to explore customers' attitudes to live stream shopping videos with different levels of streamer type, visual complexity, and real-time interactivity.

This study showed that affective commitment and low real-time interactivity significantly impacts parasocial interaction. Parasocial interaction with live streamer is positively associated with customers' brand loyalty. Live streamer type does not have a moderation effect, neither branded live streamer nor independent live streamer. The theoretical and practical implications of this study are as follows.

5.1 Discussion of results

The present study showed that consumers could build parasocial interaction with a streamer in live stream shopping. Live stream shopping is useful to build the relationship between consumers and a live streamer. Previous studies can explain this conclusion. Users of the live stream platform engage in a small online group and found self-identification with the live streamer (Lu et al., 2018). They quickly feel connective and trustworthy to the streamer because consumers perceive authenticity through the streaming engagement (Wongkitrungrueng & Assarut, 2020).

This study showed that parasocial interaction positively influences brand loyalty (H1). A positive coefficient ($\beta = .74$) indicates that the value of parasocial interaction increases, the value of brand loyalty also tends to increase. A live streamer is able to attract consumers to repurchase a brand. This finding against the conclusion that consumers watch live streaming for following the popular trend, but do not have a motivation to continue shopping in live streaming (Cai & Wohn, 2019). This result supports a conclusion (Zou, Guo, & Liu, 2020) that consumers show a more positive attitude to the brand when they have more involvement with the live streamer. Consumers are more likely to show brand loyalty when they like the live streamer. This study proved that Taobao Live is a useful marketing tool to increase brand loyalty.

Univariate ANOVA analysis showed that high real-time interactivity leads to higher parasocial interaction (H2a). The result is in line with previous experiences made by Eridon (2011) and Labrecque (2014) that consumers are more likely to build parasocial interaction when they perceive high interactivity from a personalized message. This result can be explained by perceived trust. High perceived interactivity on social media increase trust and decreases perceived risk (Merrilees & Fry, 2003; Park et al., 2005). Consumers immediately get a response from the streamer and consider the streamer trustworthy (Wongkitrungrueng & Assarut, 2020). Consumers with high perceived trust increase parasocial interaction (Choi et al., 2019). Therefore, the finding that consumers build parasocial interaction through real-time interactivity with the streamer is reasonable.

High real-time interactivity leads to higher brand loyalty (H2b). There was a significant difference between high real-time interactivity and low real-time interactivity on brand loyalty. This finding is in line with the conclusion that perceived interactivity is beneficial for brand loyalty on social media (Coelho, Rita, & Santos, 2018). Consumers perceive high usability from high interactivity, and usability positively influences brand loyalty (Lee, Moon, Kim, & Yi, 2015).

Univariate ANOVA analysis showed that visual complexity on parasocial interaction has a small effect. There was no significant difference between low visual complexity and high visual complexity on parasocial interaction. H3a was rejected. This result is not in line with a conclusion that a stronger visual attraction requires a visual design to be more relevant and simplified (Shore, Baek, & Dellarocas, 2018; Veryzer, 1993). Sun (2019) advised that improving live stream shopping visibility strengthens streamer's authenticity and increases consumers' engagement. This finding proves that designers do not need to decrease visual items on Taobao Live streaming.

This study showed visual complexity did not affect brand loyalty in live stream shopping. The mean score of low visual complexity was closer to the mean score of high visual complexity. The difference is too small to cause beneficial influence. H3b was rejected. Not as the assumption in this study, the stimuli video with irrelevant brand information did not drive consumers to lose interest in the brand. Participants did not show dissatisfaction with visual complexity. This result can be explained by the conclusion made by Chen (2019) that consumers show continuous purchase intention when they gain satisfaction in live stream shopping.

The result showed that live streamer type had little influence to moderate the parasocial interaction and brand loyalty. Both branded live streamers and independent live streamers do not have a moderation effect. H4b was rejected. There was a direct effect of live streamer type on parasocial interaction and brand loyalty. However, participants built more positive parasocial interaction with the independent live streamer than the branded live streamer during live streaming. H4a was rejected. Not

as assumption, independent live streamer ($M = 5.63$, $SD = .70$) has more influence on brand loyalty than branded live streamer ($M = 4.78$, $SD = .95$). The result was different from studies that a branded communicator is able to build intimacy with consumers, and consumers are more likely to build brand attachment in the brand community (Labrecque, 2014; Kim & Kim, 2018; VanMeter et al., 2015). Not as expected, the brand live stream channel is not a mature brand community. Brand live stream channel run by the branded live streamer on Taobao Live is not as practical as assumption. This may because the independent live streamer has a higher level of authenticity and publicity (Sun, Shao, Li, Guo, & Nie, 2019).

Parasocial interaction had a partial mediation effect between affective commitment and brand loyalty (H6a). This finding means that parasocial interaction is among many mediators between affective commitment and brand loyalty (Veloutsou, 2015). Affective commitment positively influences parasocial interaction with the live streamer (H5a). This result supports a conclusion that consumers with a strong affective commitment are more willing to preserve interaction with the brand and choose the brand rather than competitive brands (Giovanis & Athanasopoulou, 2018). This study demonstrated that consumers also show brand loyalty when they feel an affective commitment to a live streaming channel, where they think of the streamer as a friend. H5b was supported. This result can be explained by Chen's (2019) study that consumers are likely to have a high repurchase intention when building a high level of trust in the live streaming. Boateng and Narteh (2016) mention that consumers are likely to continue use a digital channel when they build affective commitment. Consumers' psychological attachment to the live streaming enhances intimacy with a live streamer and leads to brand loyalty. In conclusion, when consumers feel an emotional bond to a live streaming channel while watching, they are more willing to continue following this live streamer. This intimacy is beneficial for consumers to build brand loyalty.

In this study, parasocial interaction had a full mediation effect between real-time interactivity and brand loyalty in live stream shopping (H6b). Real-time interactivity

did not directly influence brand loyalty. This finding is different from the conclusion made by Wei et al. (2014) that consumers show brand loyalty when consumers perceive high interactivity from the brand. This study showed that real-time interactivity with a live streamer does not immediately enhance a positive brand attitude. Consumers do not directly connect with the brand during live streaming, even though a branded communicator working in a brand live stream channel. High perceived interactivity on social media positively results in brand loyalty when consumers are satisfied with the brand (Cyr, Head, & Ivanov, 2009). Just as satisfaction works as a mediator, this study found parasocial interaction also works as a mediator. Immediate interaction indirectly influences brand loyalty when consumers have parasocial interaction with a live streamer. Consumers with high perceived interactivity satisfy the need to earn enjoyment and high-quality information from a live streamer (Cai & Wohn, 2019; Sykes, Venkatesh, & Gosain, 2009). Trust and satisfaction are mediators of brand loyalty (Lee, Moon, Kim, & Yi, 2015). The feeling of trust and satisfaction from parasocial interaction with a live streamer increases brand loyalty.

5.2 Theoretical and practical implications

Live stream shopping significantly influences customer purchase intention. This study showed that live stream shopping also influences customer repurchase intention. This study explained how live stream shopping influences customer repurchase intention from the perspective of parasocial interaction.

Theoretically, this study contributed to the e-commerce research by being one of the first empirical studies on the influence of parasocial interaction on brand loyalty in live stream shopping. Live stream shopping is useful for a brand to promote its products and communicate with consumers (Wongkitrungrueng & Assarut, 2020). This study adopted parasocial interaction theory to see whether building parasocial interaction in live stream shopping is a beneficial marketing strategy. This study made several improvements to develop the application of parasocial interaction. First, this

study explored three antecedents of live stream shopping. This study combined antecedents from different perspectives. Affective commitment is a factor of organization communication. This study found that it can significantly lead to parasocial interaction with a streamer. Visual complexity is an aspect of visual design in photography. This study found that lower visual complexity does not have a significant influence. Real-time interactivity is a feature of live stream. High real-time interactivity significantly influences parasocial interaction with a streamer.

Second, an independent live streamer is better to build parasocial interaction among audiences in live stream shopping than a branded live streamer. This finding can be used as a starting point to explore the function of different live streamers. In conclusion, this study ensures parasocial interaction theory can be applied to live-stream shopping.

Practically, this study could be used to improve brand loyalty through parasocial interaction in live stream shopping. Marketers must find new strategies to improve consumers' shopping experience on live streaming, which has changed many aspects of traditional social commerce (Sun et al., 2019). This study aimed to give directions to make live streaming more attractive. Live streamers can provide consumers with a more useful shopping experience and optimize services to increase commercial benefits and create a more competitive marketing advantage. This study provides people who want to develop live stream shopping as a reference for efficient usage in the future.

First, the live streamer could work on enhancing intimacy with audiences. Being friends with audiences is a useful strategy. The streamer may show the product in a way to make consumers feel sincere. For example, showing the product been used for a long time. The live streamer should also interact with audiences on the topics they like and introduce the product as an expert. This is a way to make audiences enhance parasocial interaction to the streamer while watching. Audiences are more likely to trust the live streamer herself when they trust the live streaming channel.

Second, Taobao Live could add a function on the app to ensure the live streamer sends a personal message to audiences. In reality, audiences directly get an automatic message in the chatting box after asking a question. This is a way to ensure consumers' involvement when the live streamer is too busy to answer all questions immediately during live streaming. However, the automatic message with low personalization is not enough for audiences to feel close with the streamer. In other words, consumers build parasocial interaction when they immediately earn a piece of useful information to their questions. Providing personalized responses is a way to gain consumers' interest to continuously watch the live streaming (Wongkitrungrueng & Assarut, 2020). Therefore, the automatic message in the chatting box is useless. A competitive live streamer should respond to audiences with a more detailed answer.

Personalization of the response may earn the audience's attention through consistent interaction. The response with more detailed information may change the reality that most live streamers adopt the same interaction style, which lacks customization. A live streamer could design a personalized response in a different style to fit each audience's interest. In this way, the streamer could better to understand consumers. This may increase consumers' parasocial interaction with the live streamer.

Third, the brand could build a brand live stream community with an independent live streamer. A live stream community allows audiences to communicate with others with the same concerns and form a social network (Heo, Kim, & Yan, 2020). Results showed that consumers' loyalty to the brand was not specifically influenced by the branded live streamer or the independent live streamer. However, consumers are more willing to build parasocial interaction with an independent streamer. Branded live streamer cannot replace independent live streamer. A live stream channel run by the branded streamer is not a mature brand community to directly make consumers feel closer to the brand. It seems like an influencer community on Taobao Live is still more influential than brand live stream community. This finding is different from the conclusion made by Jang, Ko, & Koh (2007) that online brand community significantly moderate community commitment to enhancing brand loyalty than the

general brand community. It is better for the brand to take advantage of independent live streamers' influence and invite popular influencers to work with branded live streamers for the brand live stream community.

Furthermore, the most important thing both live streamers should do is to develop community interaction. A live stream community can satisfy followers' need for immersion, engagement, interactivity, and sociality with the streamer (Lu et al., 2018). As long as the streamer improves interaction to make audiences feel engaging and immersive, audiences are willing to be a stream community member to continue communicating with the streamer. The brand should increase investment to the independent live streamer to enhance consumer involvement. In conclusion, marketers could adopt live streaming as a marketing tool to increase consumers' involvement with the brand. The brand could develop the live stream community to be more useful in the future.

5.3 Limitations and recommendations for future research

This study has shown some useful results but also has some limitations. Several aspects of this study can be improved and be used for future research as a recommendation.

First, most participants were female; only 3.97% of the participants were male. Almost 40% of participants were between 20 and 29 years old, and 12% were 30-39 years old.

Because this study required all participants bought the brand product before. The demographic characteristics fit this study and demographic features of Taobao Live.

However, this study's results may not be applied to other live stream shopping APP with a different distribution of age and gender.

Second, only one cosmetic brand was used in the experiment. Although the brand attitude was a controlled variable, the brand type was the most popular one on Taobao Livestream. Cosmetic products are fast-moving consumer goods. The results of this study may not be applied to other kinds of products. Future studies can compare different brand types, such as mobile phones.

Third, the current study examined a general influence of interactivity and visual

complexity on parasocial interaction. This study's videos were edited with personalized message and simplified visual design to fit the experiment conditions. Regarding the study results, it seems acceptable to assume that other dimensions of interactivity and visual design could also be influential. For example, whether interactivity with other audiences during live streaming causes different influences. Especially for the visual design, other elements, such as visual components, video style, and visual storytelling, were not included in this study. Persona-focused visual storytelling is essential to create a positive brand performance on social media (Herskovitz & Crystal, 2010). This aspect deserves attention in the future. What's more, live streamers' and consumers' other behaviors may influence parasocial interaction in live stream shopping. For instance, how the consumer's personality enhances parasocial interaction in live stream shopping; or how self-disclosure and privacy facilitate consumers' involvement in live stream shopping. In conclusion, the manipulation of these potential factors may influence parasocial interaction with the live streamer. A future study could explore more aspects of this field.

Fourth, this study did not find live streamer type has a moderation effect, neither branded live streamer nor independent live streamer. This may not because the live streamer type does not influence brand loyalty. Live streamers may influence brand loyalty through brand association and brand experiences. Moreover, previous studies found that the media persona needs to take a long time to cause audiences' inner change to merge self and persona in the process of identification. Repeatedly identifying the self with the persona during media consumption leads to a long-term effect that audiences build worship to the persona (Brown, 2015). This study had the long-term effect of live streamers under control to resist the extra influence caused by the parasocial relationship. However, in reality, the live streamer's long-term effect may affect the brand experience. The live streamer's long-term attraction may affect consumers' attitude to the brand in a way different from this study. Therefore, future studies could focus on the live streamer's long-term influence on consumers' brand experience.

Fifth, it would be better to experiment with real live streaming in the future. In this study, participants watched a recorded video because it is impossible to invite a live

streamer to join the experiment freely. Although the video was designed to imitate real live streaming with the chatting box, participants were required to imagine the stimuli video as real live streaming by the guidance of a scenario. Participants could not chat with other audiences like real live streaming. Interaction with other audiences may influence consumers' attitude to live stream shopping.

6. CONCLUSION

This study aimed to investigate how live-stream shopping influences brand loyalty through parasocial interaction. This study also researched whether affective commitment, real-time interactivity, and visual complexity influence brand loyalty in live stream shopping. Furthermore, the study explored whether the live streamer type has a moderation effect between parasocial interaction and brand loyalty.

One finding of this study was that parasocial interaction significantly influences brand loyalty in live stream shopping on Taobao Live. The live streaming with high real-time interactivity was significant for consumers to build higher brand loyalty. Consumers show brand loyalty when they have affective commitment to the live streaming channel. Consumers kept a more positive attitude to the live streamer when they immediately receive the answer during live streaming.

Another finding was that live streamer type did not have a moderation effect between parasocial interaction and brand loyalty. However, live streamer type significantly influenced parasocial interaction in live stream shopping. The independent live streamer had a stronger influence to build parasocial interaction among audiences than the branded live streamer. This result meant live streamer type was not an unnecessary variable. Independent live streamers and branded live streamers caused different influences on consumers' attitudes. The level of difference depended on the factors in live stream shopping.

In the end, the results of this study could be used in the field related to online shopping. This study could be helpful for marketing executives, branding operators, and designers who develop apps of live stream shopping. Findings could be used as an inspiration for future study of branding. This study brought a direction for the development of live

stream shopping.

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Appendix

Appendix A.

Overview of items to measure constructs

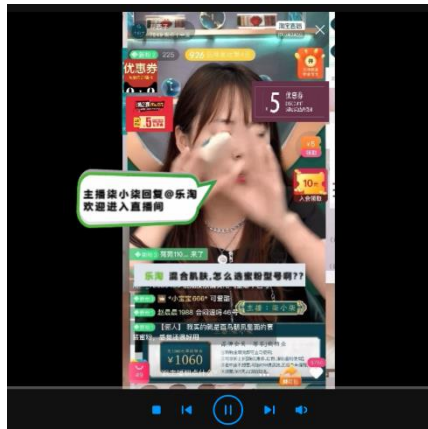
Construct	Item	Source
Brand loyalty	I like <Hua xizi> more than other similar cosmetic brands I intend to continue purchasing <hua xizi> I feel upset if <Hua xizi> is not available anymore	Quester and Lim (2003)
Affective commitment	I think <Hua Xizi> is a better Chinese cosmetic brand than other cosmetic brands I feel emotionally attached to this streamer's live streaming I agree with what she says in this live streaming I feel that I can trust this streamer's live streaming (remove) I feel personally satisfied when I watch her live streaming	Evanschitzky et al., (2006) Rather, Tehseen, & Parrey (2018)
Parasocial interaction	This streamer makes me feel comfortable, as if I am with friends If this streamer appears on another live stream channel, I would watch that video I want to follow this streamer and interact on Weibo I feel this streamer understands what I want to know I want to watch the streamer again I would like to meet the streamer in person	Liu, Liu, & Zhang, (2019) Reynolds, Woods, & Baker (2006)
Real-time interactivity	This streamer responds to me quickly and efficiently This streamer listens to what I say This live streamer talks back to me directly not through a computer assistant I found that a real-time interactivity with this streamer is enjoyable (remove)	Labrecque (2014)
Visual complexity	I think the visual items in this live streaming is organized—unorganized I think visual items in this live streaming is easy to view---hard to view I think the visual appeal in this live streaming is simple---rich I think product and visual view in this live streaming is coherent---incoherent I think the visual appeal in this live streaming is neat---messy	Sohn et al., (2017)
Manipulation check		
Perceived interactivity	The communication with the live streamer is easy I can easily get information that I need from the interaction with the live streamer	McMillan and Hwang (2002)
Perceived visual complexity	The order of objects in the video is easy to view—hard to view simple—rich	Sohn et al., (2017)
Brand attitude	My attitude to the brand is dislikeable--likeable	Mitchell and Olson (1988)

Appendix B

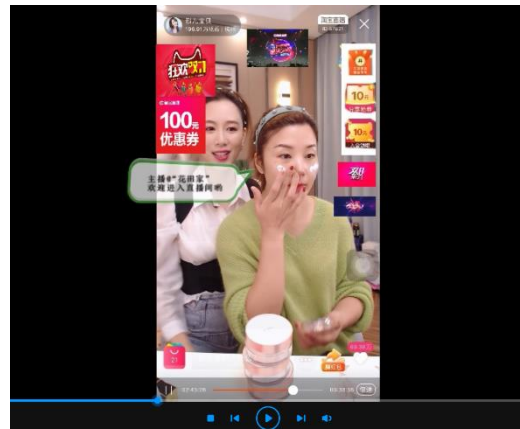
Stimuli materials for main study

An introduction before each stimuli video:

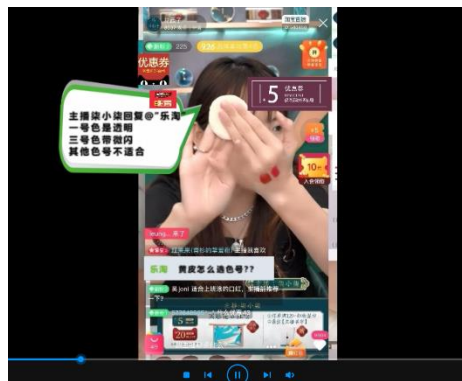
Imagine, at this moment, you are getting into a live stream room on Taobao Live. You didn't follow this live channel before. You have a new ID, you will ask the live streamer questions by this name, and you will get written responses from the streamer. During the live streaming, you know this streamer needs to promote twenty brand products in four hours. Please carefully observe the live streaming.



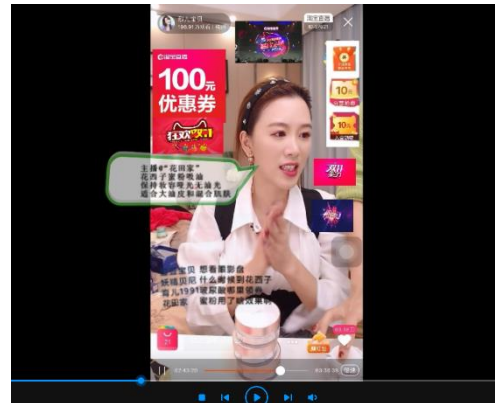
Branded live streamer+high VC +low RI



Independent live streamer+highVC+lowRI



Branded live streamer+ high VC + high RI



Independent live streamer+highVC+highRI



Ma



UNIVERSITY OF TWENTE.


你好,

感谢您花时间完成这项调查。这个调查分。

这是一项匿名调查,您提供的所有信息

Appendix C.

in study survey



关于淘宝直播购物的研究，是我硕士研究的一部

是保密的，只用于本次研究。

Main study survey



想象你进入一个直播间，你以前没有关注过的直播间。你的账号名字是乐淘 和花田家，你会看到别人的留言。
主播今天四个小时要求推广二十个品牌。
你会在直播中问两个问题并且或者主播的文字回复。认真观看画面中的各种元素，并且阅读主播的回复信息。

(本视频编号是8)

<https://v.qq.com/x/page/s3162j75p8y.html>

本视频的编号是

1

2

3

4

5

6

7

8

这场直播中的视觉元素是

容易看清楚

1

2

3

4

5

6

不容易看清楚

7

这场直播中的屏幕上的各种元素是

有序的

2

3

4

5

6

无秩序的

这场直播的视觉画面整体效果

简单的

2

3

4

5

6

丰富的

这场直播的产品和直播间的装修是

和谐的

2

3

4

5

6

不和谐的

这场直播整体画面感

整洁有序的

2

3

4

5

6

混乱繁杂的

主播直播和我沟通，不是机械回复

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

主播有回答我的提问，不是发给我一个电脑自动回复

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

主播快速回复我

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

主播和我的沟通很快

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

主播像朋友一样亲切

Strongly disagree

Disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Agree

Strongly agree

如果她去其他直播间工作，我会关注那个直播间

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

我想在微信关注她


Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

我想再次观看她的直播

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

我想亲自见她，在线下活动中

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

 这个主播很懂我，说的都是我想知道的，和我二观一样

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

我打心里喜欢这场直播

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

我非常信任主播


Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

我同意这场直播中的大部分观点

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

我和主播之间有私人关系

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

 我很满意这场直播

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

我会继续购买花西子

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

我想知道花西子新产品的消息



Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


花西子是国货之光中的佼佼者

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

如果这牌子突然破产了，我会难过

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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和主播的在直播间的互动是容易的

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

我提问，主播会给我详细的回答

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

视觉元素 (小广告, 背景装饰) 让整体画面

简洁的

2

3

4

5

6

繁杂的

☐
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☐

视觉元素 (小广告, 背景装饰) 让整体画面

有序的

2

3

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6

无序的

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☐
☐

这主播是哪种类型

☐ 独立主播
 ☐ 品牌官方旗舰店的

UNIVERSITY OF TWENTE

选择你的性别

☐ 男
 ☐ 女

选择你的年龄

☐ <= 19
 ☐ 20-29
 ☐ 30-39
 ☐ >= 40

你一周看几次直播

☐ < 1 times
 ☐ 1-3
 ☐ 4-6
 ☐ >= 7

一次看多少分钟

☐ 30-60
 ☐ 60-120
 ☐ < 30
 ☐ > 120

你看直播的助力基础, 从高到低排列

打到促销

品牌知名度

主播知名度

购买某个产品

→

66