

Interpersonal Relations and Social Actions on Live Streaming Services. A Systematic Review on Cyber-social Relations

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Abstract

This article provides a systematic review on interpersonal relations and social actions on live streaming services as, for instance, Twitch, Chaturbate, YouNow, or Taobao Live. Are those relations social, parasocial, or is there another specific kind of relation? Based on 77 articles, we give a short bibliometric overview and discuss interactions on live streaming services, social actions of streamers, social actions of viewers, shopping relations on live streaming services, and the streamers' and viewers' intentions to continuous actions leading (also supported by elements of gamification) the audience to a kind of stickiness towards individual streams, streamers, and services. Due to highly interactive communication between audience and broadcasters and among the viewers, social actions on live streaming services take a middle position between social and parasocial relations and—concerning shopping—also a middle position between physical event-shopping and ordering on an e-commerce platform. They form a new human-human relation, which we name “cyber-social relation.”

1. Introduction

There are millions of user-generated videos on streaming services, distributed asynchronously through sharing platforms or synchronously via live streaming services [1], mostly for entertainment, but also for information, education, or shopping. Does the production of live streaming content and its consumption lead to interpersonal relations between the producers, consumers, and other participants? If yes, is it a social relation? Is it a parasocial relation? Or is it another variant of interpersonal interaction? Are there special interaction roles of micro-celebrities and influencers?

Social relations are one of the fundamental connections in every social unit, be it in the family, the peer group, at school, or at work; indeed, in the entire

society. Without relations to other humans we are merely able to survive. Social relations are well-studied in the social sciences; however, social interactions on live streaming services with user-generated content are very special. Even though we were able to identify several research studies on interpersonal interactions on video streaming services, we miss a clear, summarizing, synthetic, and comprehensive picture on all the single scattered research results. There is a clear research gap calling for an overview enabled through a literature review.

What is new in this article? It is a systematic review of the research literature on human-human interaction on/via live streaming services, i.e. synchronous services as, for instance, *Twitch*, *Chaturbate*, *YouNow*, or *Taobao Live*. We focused on services, which provide user-generated content as here the personal human aspect is always present. Our research question is: What is the international scientific evidence about interpersonal relations and social actions on live video streaming services?

2. Methods

The reasons for providing our literature review are—following Aromataris and Pearson [2, p. 53]—to present the state of knowledge about interpersonal relations on live video streaming services, to identify where evidence may be lacking, contradictory, or inconclusive, to establish whether there is consensus or debate on our topic, to identify characteristics or relationships between key concepts, and, finally, to justify why this research area is worthy of further studies. A systematic review is defined as “research synthesis” in order to “identify and retrieve international evidence that is relevant to a particular question ... and to appraise and synthesize the results of this search to inform practice, policy and in some cases, further research” [3, p. 2].

The basic method of our systematic review is PRISMA, which defines an evidence-based minimum

set of items which should be considered in the review process [4].

We searched literature applying Web of Science (WoS), Scopus, EconBiz, ACM Digital Library, IEEE Xplore, Sociological Abstracts, and PsycInfo as well as additionally snowball sampling by analyzing the References and Citations sections of found literature records.

Due to limited institutional access, we could only work on WoS with the Science Citation Index Expanded, the Social Sciences Citation Index, the Arts & Humanities Citation Index, the Emerging Sources Citation Index, the Korean Journal Database, the Russian Science Citation Index, and the SciELO Citation Index.

Literature was retrieved in the first weeks of April, 2021. We considered the items published and indexed in information services until March, 2021. The search argument was constructed in English, but we considered all found documents in all languages and all publication years. The search argument for all scientific information services was:

("para social" OR parasocial OR influencer OR celebrit* OR microcelebrit*) AND ("live streaming" OR YouNow OR Twitch OR Chaturbate OR Periscope OR Taobao OR "facebook live" OR "instagram live" OR "qq.live" or nicovideo OR "panda.tv" OR "yy.com")* in the TITLE field.

For scientific search engines, the search strategy was modified as there is no option to search with Boolean operators. For Google Scholar, we formulated a search with the two phrases *"live streaming"* *"social relation;"* in Microsoft Academic we worked with the topics *"social relation"* and *"live streaming;"* and, finally, in Dimensions, the search argument was *social AND relation AND "live streaming"* in title and abstract.

For found records by the search argument, we additionally checked the citing and the cited papers; in the references, we additionally checked their citations. We always marked articles as relevant, if the title or the abstract suggest that the paper is on human-human relations. In WoS, we opened every record found, and scrolled through the citations and the references (in the Cited References page), we marked relevant items and stored them in the Marked List. As there were records found in the references and the citations which we had found previously through the search argument, we skipped those duplicates. In Table 1, the column (1) exhibits the number of all documents found in the database, followed by the number of documents found directly through the search argument in column (2), then (3) the number

of documents additionally found by citations of documents in (2), and, finally, in (4), the number of additionally to (2) and (3) found documents in the References sections of (2) including pertinent citations of these papers.

All in all we intellectually selected 77 publications from all applied information services (Table 1). The multidisciplinary commercial services WoS and Scopus returned more than 20 hits each; similarly large hit sets were found on the free search engines Google Scholar, Microsoft Academic, and Dimensions. In all five systems, the consideration of citations of and references in the found documents was successful. Specialized databases as EconBiz, ACM Digital Library, IEEE Xplore, Sociological Abstracts, and PsycInfo yielded very few hits. Due to only few hits on WoS (24 in contrast to 77 in the complete set) it seems to be very problematic to rely exclusively on WoS as, for instance [5] did.

Table 1: Number of records by information service and snowball sampling from references and citations

Service	Number of Records			
	(1)	(2)	(3)	(4)
	All	Search argument	Citations	References
WoS	24	6	11	7
Scopus	23	6	2	15
Google Scho.	31	11	20	--
Microsoft Ac.	27	4	4	19
Dimensions	24	2	18	4
EconBiz	1	1	--	--
ACM DL	3	3	--	--
IEEE Xplore	0	0	--	--
Soc Abstracts	0	0	--	--
PsycInfo	1	1	--	--
All hits	134			
Hits without duplicates	77			

3. Basic terms

Many human actions are social actions. For Max Weber, "action is 'social' insofar as its subjective meaning takes account of the behavior of others and is thereby oriented in its course" [6, p. 4]. Information behavior on live streaming services is mostly oriented on the behavior of others, be it streamers (or broadcasters) or other users. So it is social action. If there are concrete interactions between two or more persons, we speak of "social interaction." In contrast to some "classical" literature [e.g., 7 or 8], we use the term "social interaction" as a broader term for "social

relation,” “parasocial relation,” and other forms of human-human interaction. If two or more people have contact and acknowledge that they are connected, it is “social relation” [7, p. 6.]. Basic elements of social relations are bodily contact, proximity, orientation, gesture, facial expression, eye-movement as well as verbal and non-verbal aspects of speech [8]. In mediated contexts—for instance, a TV show, a movie, or on social media—an audience member does sometimes not only passively consume the content, but he or she builds up a kind of relationship to an actor, streamer, presenter, or celebrity. The “media figure” is not (or not always) aware of a relationship, but the spectator. Horton and Wohl [9] named such mediated social interactions “parasocial interactions.” The crucial difference between social interactions and parasocial interactions “lies in the lack of effective reciprocity,” establishing an “intimacy at a distance” [9, p. 215] as bodily contact is not given as well. In media and communication science, “parasocial relationship” is an established concept to name the relations between media users and media figures [10]. Nowadays, parasocial relations are seen as an extension of social relations rather than a substitution [11]. There are scales for measuring the extent of parasocial interactions [12]. We differentiate between active social behavior (here: streaming and participating) and passive behavior (here: watching streams without further actions).

Following Shao [13], there are three user types on social media, namely actors (on live streaming services the streamers with active social behavior), consumers (on live streaming services the purely passive viewers), and, finally, participants (on live streaming services, consumers with active social behavior). Special groups of streamers are micro-celebrities, influencers, and *wanghongs*; however, these groups partly overlap. A micro-celebrity is a star on social media or on a specific service [14]; influencers are endorser shaping audience attitudes through the use of social media [15]. In China, *wanghongs* are influencers or micro-celebrities acting as social media entrepreneurs [16]. As some influencers and *wanghongs* make money with both, the actual number of viewers of a post as well as the number of their followers, fan loyalty acts as currency for them [17].

4. Short bibliometric overview

Now we are arriving at the systematic review. Our research subject is highly topical. In the first quarter of 2021, 13.2% of the 77 papers were published. In 2020 and 2019, there were 26.3% each

year, in 2018 21.1%, in 2017 7.9%, and before 2017 only 5.3% of the found articles were published. Nearly all papers are in English; we found only three non-English articles, namely two papers in Korean and one in German. 36.8% of the papers appeared in conference proceedings, 1.3% as a book chapter, and 61.8% as journal articles. The most preferred journals are *Computers in Human Behavior* (6 articles), *Telematics and Informatics* (5 articles), and *Social Media + Society* (3 articles). Conferences most connected to the subject are *Human-Computer Interaction International* and its sub-conferences (6 articles), *Hawaii International Conference on System Sciences* (5 articles), and *Pacific Asia Conference on Information Systems* (3 articles). *Twitch* is mentioned most frequently in the article titles (15 times); followed by *Chaturbate* (2 times) and *YouNow* (1 time).

5. Interactions on live streaming services

Live streaming services enable real-time interaction between streamers and viewers and, additionally, among viewers. The streamers run their performances; the audience is able to interact with the broadcasting users via chats (partly also via camera), and the viewers may reward the performers with, e.g., points, badges, or money [18]. Next to boredom, socializing, and with this the human-human interaction is a frequently found motivation to use live streaming services for both, streamers [19] as well as viewers [18]. Viewers’ intentions to continuous watching are led by their experience of the interaction, mainly the social identification with the streamer and the co-experience with other viewers [20]. The ties between a streamer and his or her audience form the performer’s social capital. The more interaction ties a streamer has, the higher is his or her intention to continue contributing content [21].

Interaction on live streaming services is by no means a social relation, as there is no spatial proximity between the participants. However, it is also no parasocial relation, as there is always temporal proximity and reciprocity. Hence, live streaming-mediated interaction is an interpersonal relation on its own right [22] and has a middle position between social and parasocial relations [23] (Table 2). This kind of social interaction is, next to searching for knowledge, entertainment, and self-presentation, nearly always found on live streaming services as sought gratification, be it theoretically based upon the Uses & Gratifications Theory [24], or be it by means of clustering empirical data [25]. As all those human-human interactions happen online in the digital

world, i.e. in “cyberspace,” we name live streaming-mediated interaction “cyber-social relations.”

On live streaming services, there are different forms of interaction, namely the broadcaster’s stream, the viewers’ and streamers’ chat messages, the viewers’ gifts or tips, and, finally, large amounts of text messages floating across the screen, a technique called *danmaku* in China [26]. All these techniques allow for highly interactive communications on those services [27].

Table 2: Elements of social, parasocial, and cyber-social interactions

	Reciprocity	Spatial Prox.	Temporal Proximity	Bodily Contact
Social Relation	Yes	Yes	Yes	Yes
Parasocial Relation	Sometimes	No	No	No
Cyber-social Relation	Yes	No	Yes	No

Source: [23, p. 439; modified].

Live streams (here, on *Twitch*) may act as virtual so-called “third places” (next to home and work place), in which informal communities emerge and users socialize and participate [28]. Interpersonal interaction on live streaming services is highly correlated with the sense of community, and the affective interactions are highly connected with comfort and emotional connection [29]. The strengths of the relations between viewers and streamers and among viewers are different as streamer-targeted messages score higher in verbal immediacy than viewer-targeted messages [30]. It is possible to apply the approach of center-peripheral attention to study the interplays between streamers and viewers, where the producers occupy the center and the consumers as well as participants the periphery [31]. Frequently reported interactive features are the communication between broadcasters and audience members as well as giving and receiving gifts [32]. Social affordances may lead to perceived flow as well as to active and passive user engagement [33]. Information behavior on live streaming services supports new shopping relations [34]—in the very middle between physical event shopping and anonymous selling and buying on e-commerce platforms.

6. Streamers’ social actions

Social actions of the broadcasters are dependent on the applied service. Streamers behave differently on, for instance, *Twitch*, *Chaturbate*, *YouNow*, or

Taobao Live. Therefore, streamers on different platforms perform different social actions and have—if any—different influences on their audiences.

On *Twitch* (owned by Amazon), broadcasters comment video games, e-sports events (for instance, League of Legends or FIFA 21), or just chat, using a microphone and a camera and presenting the stream on a screen (or sometimes, using an overlay). On a further screen, viewers see the recent commented game. *Twitch* presents several notifications across the presentation, as, among others, chats, top donators, subscriber and donator notifications, and sometimes sponsor banners [35].

Streamers on *Chaturbate* are webcam models broadcasting sexual performances from flirting via striptease to pornographic shows in the categories women, men, couples, and trans. Models may use a professional studio for their broadcasting. Sometimes, there is a moderator for the chat [36]. Viewers and streamers may interact through chats and remote-controlled vibrators [37].

On general live streaming services as *YouNow*, *Twitter’s Periscope* (discontinued in March 2021), or *IBM’s Ustream* broadcasters stream a variety of different content including chatting, sharing information, presenting entertainment media, or making music [25].

Streamers on shopping-related live streaming services as, for instance, *Taobao Live* (owned by *Alibaba*), promote customers’ purchase intentions and actions on e-commerce [38].

Streamers are both, content-focused as well as community-focused; and they are interested in non-monetary and monetary outcomes [39]. On *Twitch*, community-focused communication is associated with higher non-monetary outcome (how often users engage with the stream) and with lower monetary outcome (donated money) [39, p. 174]. On *Chaturbate*, the production of authenticity is essential [37, p. 3], i.e. the authentic interplay between content (say, striptease) and the model’s shown personality. On general live streaming platforms as, for instance, *YouNow*, up to 10% of all streamers are hoping to become a micro-celebrity or an influencer [40]; the majority of streamers broadcast motivated by overcoming boredom, having fun, and socializing [19]. Streamers on e-commerce environments (as *Taobao Live*) are mainly interested in making money as digital entrepreneurs or *wanghongs*; here it is important to create social attraction and live streaming mediated interaction [38].

Many streamers are amateurs and broadcasting is a hobby. Some of them are able to develop a fan base

and own social capital, leading to a hybrid form of work and play [41], being now micro-celebrities on a live streaming service [40]. And, in turn, some of them are able to monetarize their actions [42]. For early professional video game streamers the situation was “like a gold rush” [43]. Some professional streamers make their money through donations or tips (many broadcasters on *Twitch* and nearly all on *Chaturbate*); others cooperate with companies and other institutions and act as influencers [44]. We may distinguish between unpaid influencers, influencing their audience, e.g., in the sense of environmental protection, or in online tutoring [45], and paid influencers cooperating with a company in order to influence the viewers’ attention to a certain good, many of them found as *wanghongs* on live streaming services which are connected with e-commerce as *Taobao Live* [38]. However, independent from streamers’ concrete motives to stream, all their social actions are also targeted at the interactions with their audience [46].

7. Viewers’ social actions

How do viewers perceive the interpersonal relations on live streaming services? What are their main motivations to watch and spend time on such services? At a first glance, live streams make people happy and relieve stress. Additionally, people are attracted by the charm of the streamers [47]. Indeed, there are emotional attachments to micro-celebrities [48, 49]. Viewers’ identification with the streamer, liking the streamer combined with interactivity predicts the use of game related live streaming services [50]. Main motive for viewers’ social actions on live streaming services is their enjoyment [51, 52]. Live streams may even help viewers to cope during difficult periods in life as, e.g., problems with their mental health or at work or in school [53]. Besides social interaction, sense of community, meeting new people, and a lack of external support in real life motivate viewers to engage on live streaming services (here, *Twitch*) [54]. Sometimes, it comes to deviant relationships due to deviant behavior of viewers (or also streamers), e.g. abusive behavior or the request for unwanted sexual actions leading to ban of the deviant viewers [55].

Some viewers like to participate actively during the broadcast [56, 57]. They cooperate with the broadcaster as a guest on a split screen [58], they write comments [59], or they interact with both, the streamer and other viewers [60].

For broadcasters, it is essential to get rewards, be it via likes or be it with money. However, what motivates viewers to present such rewards? For viewers (here, on *Twitch*) with social integrative motivations, supporting a streamer is an important factor in fulfilling their needs [61]. For *Twitch* viewers, the type of streamed content (for instance, competitive e-sports matches or lessons on how to play) is more important than the genre of games [62].

Supporting a broadcaster can mean to present (non-monetary) gifts (e.g., likes, hearts), to gift money (donation or subscription), or to pay (“tip”) streamers for desired actions (e.g., undress a bra on *Chaturbate*). On general social live streaming services it is desired by nearly all viewers to reward the streamers with special emoticons [24]. Viewers motivated by socialization and having spent money (on *Twitch*) use the service to communicate with others, be part of the community and support the streamer [63]. Cognitive absorption (being deeply involved in using the service), virtual crowd experience, and viewer-streamer interactivity influence the purchase of virtual gifts [64]. Similar effects as cognitive absorption have the experience of flow [65] and the viewer’s emotional attachment [66]. In another article, “virtual crowd experience” is called “sense of virtual community” [67]. This sense of belonging is a main motivation to send virtual gifts [67]. There seem to be connections between *danmaku* (if it is realized in the system) and gift sending [27, 67]. In addition, viewers are motivated by reciprocal acts of broadcasters [68]. They spend (partly huge) gifts to attract attention from the crowd or to promote preferred content [69]. So gift donation is dependent on both, the viewers’ relation towards the broadcaster as well as towards other viewers [70]. The more viewers are engaged in the stream or in the service, the more likely they are to donate gifts [71]. And, not to forget, viewers’ experienced happiness influences donating to the broadcaster [72]; viewers are paying for entertainment [73].

Virtual gifting is one option for streamers to make money on live streaming services (thus forming the online gift economy) [74]; the other is working as an influencer (and thus being part of the influencer economy) [17]. From the viewers’ perspective, the relation to influencers is connected to their shopping behavior.

Especially in China, shopping via live streaming services is very popular [75]. At first sight, it is similar to TV shopping channels; however, it is much more interactive [76]. There are two groups of motivations for customers to view live streaming services

for shopping, namely product-related and streamer-related motives [77]. There seems to be broad evidence that the mediating role of the broadcasters as micro-celebrities is essential for viewers' purchase intentions [75] thus forming a web celebrity economy especially on the market leader *Taobao Live* [78, 79]. Viewers' trust in the streamer also transfers to trust in the advertised products [80]. The immediate interpersonal interactions between viewer and broadcaster, but also between viewers are vital features of this kind of shopping [81] with "celebrity endorsement" [82]. Social and structural bonds between viewers and broadcasters positively affect consumer engagement [83]. The tie's strength plays an intermediary role between interactivity and customer engagement [84]. Besides the important interactions, additionally streamer attractiveness and information quality drive viewers' shopping behavior [85]. However, impulsive consumption is only determined by "emotional energy" [86]. Following [87, p. 11], live stream marketing is a "sustainable strategy to realize corporate growth."

Users' continuous viewing intentions lead to their "stickiness" on a specific show, an individual performer, or a service. What drives viewers' stickiness? Users' loyalty to streamers presupposes broadcasters' loyalty to the service [88]. Gratifications as entertainment and sociability are necessary for viewers' loyalty, and immediate feedback is important for the perception of media richness [89]. Emotional attachment to streamers and platform attachment foster user stickiness [90]. Identification with the broadcaster and emotional engagement have indirect effects on behavioral loyalty; however, moderated through the strength of interpersonal relations [91].

Gamification elements support viewers' motivation to watch live streaming continuously [58, 92]. Applied game mechanics both on live streaming websites [93] as well as mobile apps [94] include—besides monetary and non-monetary gifts (i.e., likes)—leaderboards, badges, points, levels, and progress bars. Especially live streaming services from China apply many game mechanics [93, 94].

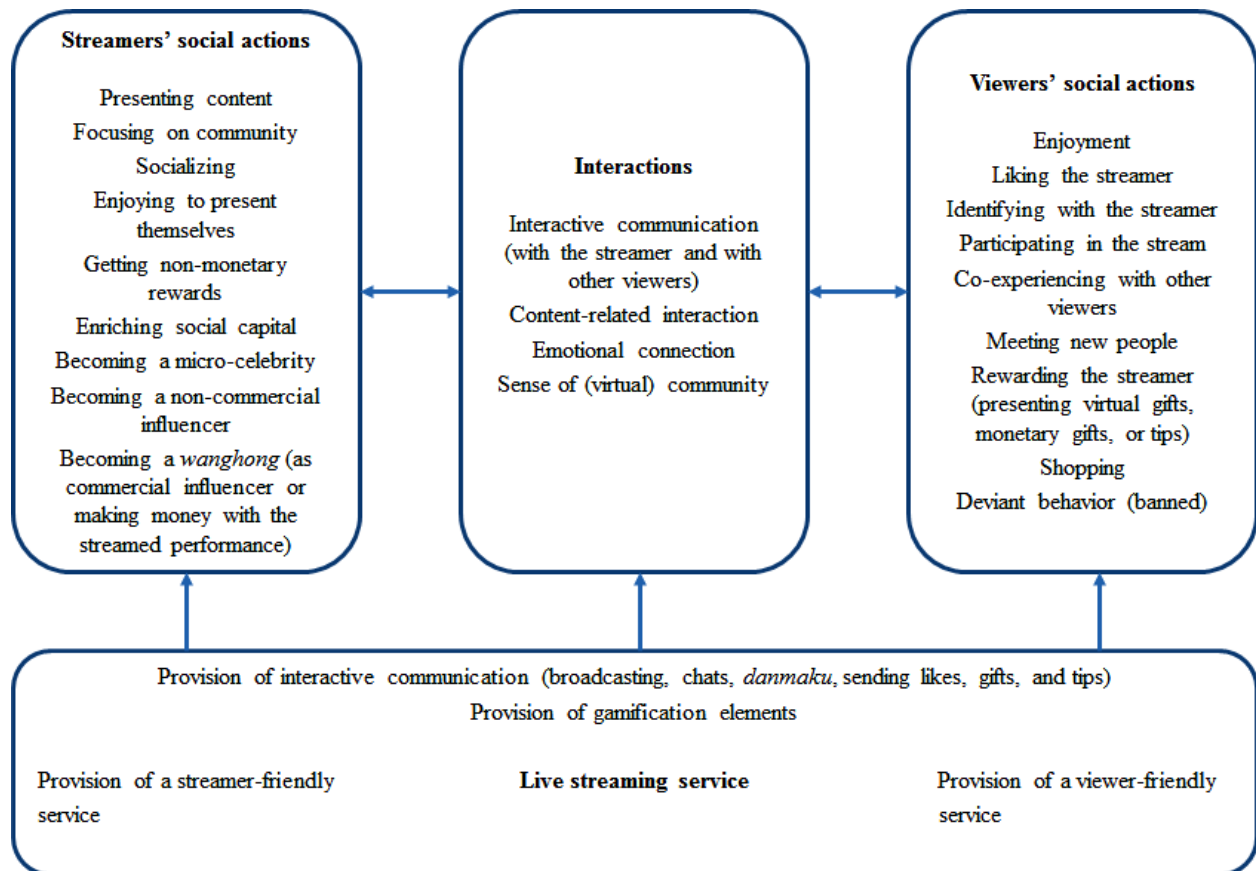


Figure 1: Streamers' and viewers' social actions and their interactions on live streaming services.

8. Conclusion

Interpersonal relations on live streaming services are neither social relations (there are no spatial proximity and no bodily contact) nor parasocial relations (as there is reciprocity and temporal proximity), but cyber-social relations. Cyber-social relations occupy a position in between social and parasocial relations, giving live streaming an exceptional position in the entire landscape of social media. In some articles, the interpersonal relations on live streaming services are called “parasocial.” Due to our results, this terminology is not suitable and should be avoided as live streaming mediated relations are a relation in its own rights. It is a task for the future to develop a scale for the determination of the extent of the respective live streaming mediated interpersonal relation.

Our main results are graphically presented in Figure 1. While the live streaming service’s provisions enable the actions of broadcasters and viewers, the social interests of both actor groups are very different. Streamers’ social actions include, besides the necessary presentation of content, their focus on the virtual community also in order to enrich their social capital by enlarging the fan base, the joy of presenting themselves, and to get non-monetary or monetary rewards. For some broadcasters, these actions are part of their jobs as digital entrepreneurs (*wanghongs*). Viewers’ social actions show their enjoyment; they like the streamers they watch, identify with them, and reward them. Some like to participate in the stream; many like the co-experience with other users and the ability to meet new people in the online world. Most important are the interactions between streamers and viewers and among the viewers leading to highly interactive communication, emotional and content-related connections between all participating players, and their sense of (virtual) community. That is what makes interpersonal relations on live streaming services unique in all social media.

Research on live streaming services and their actors’ information behavior is a fast-growing “hot” topic. Although this review is based upon 77 articles, there could be more papers on special aspects of interpersonal relations, especially studying online shopping. Some articles do not only describe interpersonal interactions, but apply theories or models to structure their study or to explain their observations (e.g., Uses and Gratifications Theory, Self-determination Theory, Affective Disposition Theory, Social Cognitive Theory, or Social Identification Theory). As we have skipped these theories, it should be investigated in further research. Besides this study,

there are two systematic reviews on our topic (however, only on information behavior concerning e-sports services [5 and 46]); but we miss a review on *all* aspects of information behavior (by streamers and by viewers) on *all* kinds of live streaming services in *all* countries and cultures. The next step in our research program is to produce a meta-analysis which includes all aspects of cyber-social relations and social actions on live streaming services.

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