

# Predictors of parasocial interaction and relationships in live streaming

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## Abstract

The purpose of the current article was to explore parasocial phenomena in the unique and interactive context of live streaming. Specifically, the predictors of parasocial interactions (PSIs) and parasocial relationships (PSRs) were compared. In the past, the terms ‘parasocial interaction’ and ‘parasocial relationship’ have been used interchangeably, even though they are distinct constructs – which has confused researchers’ understanding of these phenomena. The current study aims to begin to disentangle our understanding of these two constructs by studying the predictors for each construct separately. An online survey was utilized to collect data on PSRs, PSIs, and various parasocial predictors that fell into three categories: streamer (source) characteristics, viewer characteristics, and behavioral (relationship) characteristics. Results indicate that streamer characteristics were the most important predictors of both PSIs and PSRs in the live streaming context, although characteristics of the viewer and relationship were also influential. These findings indicate that message sources can modify their content to encourage parasocial phenomena in their audience. This is encouraging, as research suggests that parasocial phenomena lead to many positive repercussions for the media and so are generally considered a goal of media personae.

## Keywords

Live streaming, online relationships, parasocial interaction, parasocial predictors, parasocial relationship

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Live streaming is the act of broadcasting video in real time over the Internet and is a new genre that encompasses both interpersonal and mass media interactions. While the technology has been available for quite a while, it has only been a few years since live streaming has become a popular activity, especially among gamers (Hamilton et al., 2014; Taylor, 2018). This form of media is in between mass media and interpersonal media, which is referred to as masspersonal (O'Sullivan and Carr, 2018): the streamer is broadcasting to a general, unknown audience, similar to mass media such as legacy television, which means that streams have a performative element (e.g. Bingham, 2017; Cata, 2020; Freeman and Wohn, 2020; Pellicone and Ahn, 2017; Ruberg and Lark, 2020; Woodcock and Johnson, 2019; Zhang and Hjorth, 2019). At the same time, the streamer is also able to have one-on-one interactions with the people who are typing live comments, which can be considered interpersonal. Yet even if the streamer is aware of the person they are interacting with, the medium is very asymmetrical in that the streamer knows very little about his or her viewers while the viewers have access to a great deal of information about the streamer (Johnson and Woodcock, 2019; Wohn and Freeman, 2020). Thus, the nature of the interaction that occurs on live streaming platforms puts it squarely into the domain of a hybrid type of medium.

Evidence suggests that viewers can develop feelings of closeness with a streamer that are parasocial in nature (Blight, 2016; Leith, 2021; Lim et al., 2020; Wohn et al., 2018; Wulf et al., 2021), with parasocial being defined as a situation in which a media audience member has a conflated sense of closeness with a media figure because of either a perceived relationship with the media figure or a perceived interaction with the media figure (Horton and Wohl, 1956). Research has often explored what leads to parasocial phenomena (e.g. Auter, 1992; Baek et al., 2013; Hartmann and Goldhoorn, 2011; Rosaen et al., 2011; Rubin et al., 1985; Schiappa et al., 2007; Xiang et al., 2016). However, much of this research has led to contrasting results due to inconsistent measurement and definition of various constructs. Thus, this article aims to thoroughly explore parasocial predictors in the masspersonal, asymmetrical context of live streaming.

Social media has afforded a greater deal of interactivity than legacy television, as media figures are able to retweet or respond to fans' comments. However, live streaming affords an even greater level of intimacy due to a number of additional technical affordances. Specifically, the ability of the streamer to 'bring the fans into the conversation' by responding to them immediately (and while making eye contact) has increased the possibility for parasocial phenomena – something that cannot be matched in a Twitter or Facebook comment. This technological affordance has led to an experience that more closely mirrors an interpersonal conversation – and yet the relationship is still asymmetrical, and so the relationships and interactions remain, largely, parasocial.

All of these additional factors are affordances of the technology that raise questions as to how parasocial constructs can be applied and interpreted in a live streaming context. Hu et al. (2017) explored parasocial phenomena in live streaming and found that it led to higher levels of identification with the streamer. Furthermore, Wohn et al. (2018) and Chen (2021) demonstrated that parasocial phenomena were positively related to gift-giving behavior between viewers and streamers. However, parasocial phenomena in live streaming remain largely understudied from a theoretical perspective, specifically the theoretical distinction between parasocial interactions (PSIs) and parasocial relationships (PSRs) as separate phenomena. The current study explores the factors that explain parasocial phenomena – but does so by measuring both constructs and then determining what characteristics of the streamer, the viewer, and the relationship are the most effective at encouraging these two separate constructs. By doing so in the livestreaming context, we are better able to understand how new media with greater interactive capabilities can contribute to both PSRs and PSIs.

## Literature review

### *Parasocial phenomena*

PSRs were first defined by Horton and Wohl (1956) as a ‘seeming face-to-face relationship between spectator and performer’ (p. 1). These authors then went on to speak about PSIs where performers ‘break the fourth wall’ and directly address the audience rather than acting like the audience is not present. These interactions were later defined by Schramm and Hartmann (2008: 386) as ‘the interpersonal processes between the persona and user that take place during media exposure’.

Unfortunately, Horton and Wohl (1956) did not distinguish between the two parasocial phenomena, and thus, PSIs and PSRs were often treated as one phenomenon in the literature (e.g. Blight, 2016; Rubin and McHugh, 1987; Rubin et al., 1985). However, research has since discussed the importance of discussing and researching PSIs and PSRs as distinct phenomena (e.g. Dibble et al., 2016; Giles, 2002; Gleich, 1997; Schiappa et al., 2007) to avoid confusing results and interpretations.

Research demonstrates that PSRs are distinct from two-way relationships – but they are still quite important to the individuals who form them. For example, Lobler and Raschpichler (2009) found that PSRs were quite often rated as similar to relationships formed in real life. In their study, they found that individuals with whom participants had formed a PSR were rated as more similar to real-life friendships than they were to relationships with neighbors. Similarly, Koenig and Lessan (1985) found that PSRs held a position between friend and acquaintance. Additionally, a ‘breakup’ of a PSR (because of the show being canceled or some other reason) has been related to distress for viewers (Eyal and Cohen, 2006). Rubin and Rubin (1985) discussed the importance of understanding how media can perform the same functions as interpersonal relationships for many people – and so a study of how a masspersonal media channel such as livestreaming can add greatly to our understanding of how people achieve their motivations when they choose media.

Not only are these PSRs important to those who enter into them, they have real-life consequences for society, businesses, and the media. For example, PSRs have been related to media objectives, such as attention paid to the program (Perse, 1990), exposure to the media (Grant et al., 1991), brand loyalty (Labrecque, 2014), celebrity endorsement effectiveness (Gong and Li, 2017; Kirvesmies, 2018), motivation to watch (Gregg, 2021), and brand attitudes (Huang and Mitchell, 2014; Knoll et al., 2015). In the context of live streaming, PSRs were positively related to willingness to give money to the streamer (Chen, 2021; Wohn et al., 2018). Clearly, parasocial phenomena have an impact on people’s experience of media and are an important topic to communications researchers.

As previously noted, the difference between PSRs and PSIs has often been confused in the literature, which has led to a great deal of confusion with regard to the causes of parasocial phenomena. Furthermore, multiple scales have been developed (and often only used once) to measure the two parasocial phenomena – which only added to the confusion regarding the constructs. After all, using different measures raises the question of whether or not any differences found are due to measurement differences or actual differences. However, Dibble et al. (2016) tested Rubin et al.’s (1985) PSI scale and found that it effectively measured PSRs, while Hartmann and Goldhoorn’s (2011) scale effectively measured PSIs. These authors undertook this study to find a measure that accurately measured each of the parasocial phenomena, so that parasocial researchers could compare and contrast their findings more effectively. By consistently using the

same scales to measure these two separate phenomena, we can begin to better understand the differences between the two constructs – what causes parasocial phenomena and what results from parasocial phenomena. The aim of the current article was to utilize these two scales recommended by Dibble et al. (2016) to better understand the unique predictors of PSIs and PSRs within the context of live streaming, a medium particularly suited to exploring parasocial phenomena due to the high degree of direct interaction, which is an understudied area in parasocial research.

### *Parasocial in new media*

In the digital context, individuals can form PSRs with a wide variety of entities. For example, Jin and Park (2009) found that players formed PSRs with their avatars while playing Wii. Furthermore, Goldberg and Allen (2008) found that participants formed PSRs with interactive websites as they formed emotional attachments to the sites themselves. Additionally, Chen (2014), Rihl and Wegener (2019), and Ferchaud et al. (2018) all found that YouTube celebrities inspired PSRs in their viewers. In fact, Rihl and Wegener (2019) found that utilizing the like/dislike and commenting features on YouTube increased reported PSRs, which further demonstrates the importance of understanding how interactive livestreams can encourage these important parasocial phenomena. After all, PSRs are desirable from a marketing perspective – followers of blogs on social media formed PSRs with the bloggers, which increased the bloggers' source credibility and attitudes toward products endorsed (Colliander and Dahlen, 2011; Gong and Li, 2017) or encouraged viewers to purchase more in live streaming shopping sites (Xu et al., 2020). Similar findings were reported by Kirvesmies (2018) and Labrecque (2014) regarding social media influencers in general and Men and Tsai (2015) found that PSRs with corporate social networking sites' agents increased organizational–public relationships.

PSRs have also been discussed regarding traditional celebrities who use digital media to connect with audience members (Bond, 2016; Lin et al., 2016; Thorson and Rodgers, 2006), and the research suggests that the perceived intimacy of the medium increases followers' feelings of connectedness and the strength of PSRs with celebrities. Cohen and Metzger (1998) studied how people use both interpersonal relationships and mass media to achieve social integration, and specifically stated the importance of intimacy and accessibility in achieving our goals – which further implies the importance of understanding masspersonal media such as livestreaming. Overall, there are several new entities available for study within the digital sphere and these media are just as good at creating parasocial phenomena as traditional media – possibly even more so.

### *Livestreaming as a parasocial context*

The tools available in the digital sphere that allow for increased direct interaction between the media persona and the audience member, the new types of PSRs, and the ability to directly study these phenomena (because nothing in the Internet disappears) opens up a new and interesting area of study for parasocial phenomena. As such, a digital medium with masspersonal capabilities – live streaming – was selected for the current study of the unique predictors of PSI and PSR.

Live streaming is a form of interactive media that combines a public broadcast of live audio and video along with text-based chat channels available to those who are watching (Hamilton et al., 2014). Early live streaming services were mainly independent sites that only offered live streaming, but the technology is increasingly becoming a feature in most social media platforms (Hilvert-Bruce et al., 2018; Li et al., 2019). Twitch is one of the largest sites for streaming content

where anyone can set up an account for free and broadcast to a global audience (Taylor, 2018). Unsurprisingly, many researchers have found that streaming has a highly performative component (Li et al., 2019; Lu et al., 2018; Pellicone and Ahn, 2017, Ruberg et al., 2019; Woodcock and Johnson, 2019). In fact, Pellicone and Ahn (2017) called the act of streaming on Twitch a type of cultural production where streamers have a specific persona that they assume for their viewers, distinguishing practices on Twitch from other more interpersonally oriented live streams such as videoconferencing with friends. The unique aspect about Twitch, however, is that it is not just a place for broadcasting but also for viewers to interact with the streamer and each other through a live (text) chat function – this interactive chat is a key feature of most live streaming platforms (Haimson and Tang, 2017; Lessel et al., 2017) – and utilization of these interactive elements leads to stronger PSRs (Rihl and Wegener, 2019). Indeed, Partin (2019) found that sociality was a large part of the appeal of live streams – and that sociality depended upon becoming visible to the streamer and other people within the stream via functions such as chat.

Live streaming represents a somewhat gray area in terms of relationships between media characters and the audience. In traditional media, the media character has absolutely no direct interaction with the audience; in live streaming, however, viewers can type comments for the streamer to see. The streamer can choose to respond to some of these comments, sometimes even naming specific viewers and making eye contact with the camera while they do so (Wulf et al., 2021), so the interaction between the audience and the media character is very much real rather than perceived. At the same time, like celebrity–fan interactions on social media, these interactions take place in a public setting and are very much one to many, meaning that the streamer has to interact with multiple viewers (e.g. Bond, 2016; Weller and Butt, 2016; Yang, 2017), which lends itself to parasocial situations.

Although live streaming research has not often discussed parasocial phenomena, various researchers have explored how social elements of live streaming lead to positive outcomes. Hilvert-Bruce et al. (2018) found that entertainment and social interaction, among other factors, led to higher viewer engagement. Similarly, Wulf et al. (2018) found that social aspects led to greater levels of enjoyment while watching live streams – which is in alignment with the findings of Partin (2019). Furthermore, Chen and Lin (2018) found that charm was positively related to viewers watching a live stream channel. Finally, Gregg (2021) found a positive relationship between PSR strength and motivation to watch a vlog. However, no research has explored how to encourage parasocial phenomena – which is a desirable outcome for media, as demonstrated by previous research (e.g. Grant et al., 1991; Perse, 1990).

### *Predictors of PSRs and PSIs*

With the previous confusion related to the measurement and definition of PSIs versus PSRs, there has been difficulty understanding which variables truly predict these two phenomena. The goal of this study was to measure both constructs separately and examine several possible predictors to determine which predictors were correlated with each construct. Bad measurement in the past has led to misunderstandings regarding what leads to parasocial phenomena and what does not, and so the current study aims to explore this fully. Understanding these predictors better will allow media content creators to encourage more PSIs and PSRs, which will lead to a variety of positive effects for society, businesses, and the media (e.g. Hoffner and Cohen, 2012; Huang and Mitchell, 2014; Perse, 1990; Sood and Rogers, 2000).

Before discussing the different PSR and PSI predictors, it is important to understand from where some of the confusion originates. Dibble et al. (2016) stated that poor measures have led to inconsistency in findings and difficulty in truly understanding PSRs and PSIs. Blight (2016) further stated that issues have arisen because of the confusion regarding these two phenomena. To solve this issue, Dibble et al. (2016) recommended that Rubin et al.'s (1985) PSI scale be used to measure PSRs and that Hartmann and Goldhoorn's (2011) Experience of Parasocial Interaction (EPSI) scale be used to measure PSIs. Simply looking at the names of these scales helps us to understand the confusion – after all, the scale that measures PSRs is called the PSI scale.

To determine which independent variables to test, a literature search was performed. Based on this search, the authors extracted many of the variables that had been utilized more than once as predictors to be tested in the current study. The list of variables tested was not exhaustive of all predictors of parasocial phenomena used over the years, but it represented the most commonly discussed factors discovered and the variables deemed most relevant for the live streaming context.

*Characteristics of the media character.* In a meta-analysis of PSRs with television characters, Schiappa et al. (2007) found that there was a positive relationship between attractiveness of television characters and PSRs, a finding supported by Hartmann and Goldhoorn (2011). Attractiveness is not confined to physical beauty, though: likability (Xiang et al., 2016) has also been positively related to PSRs. Thus, both physical and interpersonal attractiveness were selected as predictors to be tested. Based on this literature search, the following hypotheses are proposed:

**H1:** Physical attractiveness is positively related to (a) PSI and (b) PSR.

**H2:** Social attractiveness is positively related to (a) PSI and (b) PSR.

Direct interaction was also selected as a predictor because live streaming is unlike other types of mass media in that it also fosters direct, two-way, interpersonal-like communication, unlike the general perception of interactivity explored in prior work. The literature distinguishes between interactivity and direct interaction, with evidence for both factors being related to PSI. For example, Auter (1992) found that higher content interactivity resulted in higher levels of PSI. Many other studies, particularly in marketing, found interactivity to be a predictor of PSI (e.g. Thorson and Rodgers, 2006; Labrecque, 2014). Hartmann and Goldhoorn (2011) found that directly addressing the audience on a verbal and body level were both positively related to PSI while Wulf et al. (2021) found that streamers' response to comments increased PSI. Because live streaming is a type of medium where direct interaction is possible, unlike other media contexts such as television or movies, we chose to look at the direct interaction between the streamer and viewer, resulting in the following hypothesis:

**H3:** Direct interaction is positively related to (a) PSI and (b) PSR.

*Characteristics of the viewer.* Loneliness as a predictor of parasocial phenomena is a complex issue that has resulted in conflicting findings. For example, Baek et al. (2013) found that addiction to social networking sites and loneliness were both positively related to PSRs – a finding in line with the early assertions of Horton and Wohl (1956). In contrast, Rubin et al. (1985) found that there was no significant relationship between loneliness and PSRs and Rosaen et al. (2011) found that maltreated youth (who are likely more lonely than nonmaltreated youth) were no more likely than

other youth to form PSRs. Wang et al. (2008) found that different types of loneliness had different correlations to PSRs. Furthermore, these authors discovered that gender interacted with loneliness to influence PSRs. There have not been any livestreaming studies that have looked at loneliness as a predictor for PSR other than some anecdotal reports in reputable media about lonely men in China buying gifts for female live streamers (e.g. Weller and Butt, 2016; Yang, 2017). Due to these conflicting findings and uncertainty as to how loneliness would be related to parasocial constructs in a live streaming context, we have an open research question:

**RQ:** How is loneliness related to (a) PSI and (b) PSR?

Schiappa et al.'s meta-analysis (2007) found that shyness (commonly associated with introversion) was positively related to PSRs. However, Jarzyna (2008) studied the impact of extroversion on parasocial phenomena and found no relationship. Thus, extroversion is another predictor that has an uncertain relationship to PSRs and PSIs. However, the research suggests it has either a null or negative effect on parasocial phenomena. Thus, to test this ambiguous relationship, the following one-tailed hypothesis is proposed:

**H5:** Introversion is positively related to (a) PSI and (b) PSR.

Schiappa et al.'s meta-analysis (2007) found that gender was related with PSRs such that women were more likely to form PSRs than men. Thus, the following hypothesis is proposed:

**H6:** Women are likely to report higher levels of (a) PSI and (b) PSR.

Finally, Schiappa et al.'s (2007) meta-analysis found conflicting findings regarding age. Overall, there was a positive relationship between age and PSRs. However, the findings were varied and relatively small. Thus, the following hypothesis is proposed to test the true relationship between parasocial phenomena and age:

**H7:** Age is positively related to (a) PSI and (b) PSR.

*Characteristics of viewing behavior.* In general, we found multiple studies pointing to time and frequency as predictors of parasocial phenomena. Schiappa et al. (2007) found that there was a positive relationship between time spent viewing and PSRs. Furthermore, Rasmussen and Ewoldsen (2016) found that frequent exposure was positively associated with the development of PSRs.

Rubin et al.'s (1985) scale to measure 'Parasocial Interaction' (which really measures PSRs) shows that PSR has been positively predicted by length of time viewing the character and length of relationship (Perse and Rubin, 1989). Based on this review, length of relationship, average hours spent watching in a given time frame, average hours spent watching per session, and how often they watched the streamer were selected as predictors to be tested and the following hypotheses were formed:

**H8:** Length of relationship (in weeks) is positively related to (a) PSI and (b) PSR.

**H9:** Average hours spent watching per week is positively related to (a) PSI and (b) PSR.

**H10:** Average hours spent watching per viewing session is positively related to (a) PSI and (b) PSR.

**H11:** The frequency with which the viewer signs on to watch the streamer (Viewing Frequency) is positively related to (a) PSI and (b) PSR.

Overall, a number of variables were selected as possible predictors of PSIs and PSRs based on the most commonly discussed and relevant phenomena in the parasocial literature. The goal of this study was to determine which predictors were the strongest for each type of parasocial constructs in the live streaming context and to also better understand conflicting findings with regard to predictors (e.g. loneliness and age). For viewer characteristics, two demographic variables (gender and age) were measured to determine their impact on PSRs and PSIs along with two personality traits: loneliness and extroversion. Four behavioral variables related to the relationship were measured: length of the relationship, hours per week spent watching the target, hours spent watching per viewing session, and the frequency with which the participant watched the target. Finally, three characteristics of the media character were measured: direct interaction, interpersonal attractiveness, and physical attractiveness.

## **Methods**

### *Data collection*

Data were collected online utilizing a 15-min survey that included both open and closed-ended questions. The survey began by asking participants to identify their favorite live streamer so that we could ask follow-up questions regarding their PSIs and PSRs with this particular streamer. Subsequent questions asked about their PSIs and PSRs with the streamer in addition to characteristics of the streamer, the participant, and the participant's viewing habits.

Online platforms such as Mechanical Turk, Facebook Pages dedicated to Twitch or live streaming, and Reddit forums related to live streaming were utilized to recruit participants. Additionally, direct messages were sent to Twitter users who posted about Twitch. Only English-speaking adults (18 or above) who had watched a live stream in the past month and could identify a favorite live streamer were allowed to take the survey. Response rates from most online platforms were relatively low, and so most of the participants were recruited from Mechanical Turk. All participants were paid US\$3.00 for their participation in the survey. At the end of the collection period, 250 responses had been recorded. Twenty participants were removed for answering attention check questions wrong or typing gibberish in open-ended questions.

### *Participant characteristics*

Participants were predominantly male (71%) with an average age of 30 (SD = 7.17) and an age range of 18–57. Most of the live streamers described by participants were male (83.5%) and the majority of participants watched their favorite live streamer on Twitch (68.1%), Facebook Live (10.8%), YouTube Live (5%), and Periscope (3%). The most common topic of live streamers was digital gaming (68.1%), followed by creative (e.g. painting, music, cooking; 6.9%), random things in real life (6.5%), talk shows (5.6%), board games (4.3%), and social eating (1.7%).

On average, participants had been watching their favorite live streamer for about 15 months. Participants' frequency of interaction was fairly diverse, with 9.5% of participants reporting that



they watched once a month or less, 20.7% watching 2–3 times a month, 18.1% watching once a week, 34.5% watching 2–3 times a week, and 17.2% watching more than 3 times a week. On average, participants reported watching their favorite streamer for 6.14 h (SD = 7.09) per week.

## Measures

**Streamer characteristics.** Before participants filled out questions regarding the streamer, they were prompted to think about their favorite streamer. This reminder was repeated before each scale that was focused upon understanding perceptions of the streamer and their actions, as well as measures of participants' PSIs and PSRs with the streamer.

Interpersonal attractiveness ( $M = 5.41$ ,  $SD = 1.09$ ,  $\alpha = 0.89$ ) was measured using Reysen's (2005) 9-item likability scale, which is well established in the literature as a reliable scale that has been used hundreds of times with excellent reliability (e.g. Lewis and Weaver, 2013; Li et al., 2010; Wieber et al., 2014; Witt et al., 2009; Xiao et al., 2018) and has also demonstrated convergent validity (e.g. Edlund and Sagarin, 2014; Reysen, 2005) and divergent validity (Reysen, 2005). Response options were ordered as a 7-point Likert-type scale with endpoints *strongly disagree* (1) and *strongly agree* (7). The scale included items such as 'This person is friendly' and 'This person is likable'.

Physical attractiveness ( $M = 4.66$ ,  $SD = 1.15$ ,  $\alpha = 0.80$ ) was measured using McCroskey and McCain's (1974) 8-item scale, which has been utilized many times in the literature since its inception with high reliability scores (e.g. Batool and Malik, 2010; McCroskey et al., 1975; Rubin and McHugh, 1987) and convergent validity (e.g. Batool and Malik, 2010; Croucher et al., 2011; Lo, 2008; McCroskey et al., 1975; Rocca and McCroskey, 1999; Rubin and McHugh, 1987). It included items such as 'I think he/she is quite handsome/pretty' and 'he/she is very sexy looking'. Responses were ordered as a 7-point Likert-type scale with endpoints *strongly agree* (7) and *strongly disagree* (1).

Direct interaction ( $M = 2.80$ ,  $SD = 1.08$ ,  $\alpha = 0.92$ ), defined as the degree to which the streamer interacted directly with the viewer, was the average of 3 items measured by asking participants how often the streamer (1) acknowledged them specifically, (2) mentioned them by name, and (3) responded to something they wrote in chat. Respondents rated each of these three things on a scale of 1 (*never*) to 5 (*always*). This scale was developed based on 200 h of observation of various channels on Twitch and was highly reliable ( $\alpha = 0.92$ ).

**Participant characteristics.** Loneliness ( $M = 2.27$ ,  $SD = 0.78$ ,  $\alpha = 0.97$ ) was measured using the University of California Los Angeles (UCLA) 20-item loneliness scale (Russell et al., 1978), which was thoroughly vetted by several authors (e.g. Austin, 1983; Hartshorne, 1993; Russell, 1996) for its reliability and validity. Furthermore, since its inception, it's been used by many researchers successfully (e.g. Cacioppo et al., 2006; Gross, 2004; Rubin, 1983). It included items such as 'I am unhappy doing so many things alone' and 'I have nobody to talk to'. Participants were given four possible response options for each question: *often* (4), *sometimes* (3), *rarely* (2), or *never* (1).

Extroversion ( $M = 0.47$ ,  $SD = 0.37$ ,  $\alpha = 0.92$ ) was measured using the shortened Eysenck Personality Questionnaire (Eysenck and Eysenck, 1975) which has been utilized with high levels of reliability (e.g. Francies and Jones, 2000; Karanci et al., 2007; Lewis et al., 2002) and convergent validity (e.g. Eysenck and Zuckerman, 1978; Francis and Jones, 2000; Lorr and Wunderlich, 1985; Mynard and Joseph, 1997) in the past. Participants were asked 12 *yes* (1)/*no* (0)

questions such as ‘Are you rather lively?’ and ‘Do you enjoy meeting new people?’ and the scores were averaged.

**Behavioral characteristics.** Participants were also asked four additional questions regarding the nature of their behavior in the relationship between the streamer and participant. To determine the length of the relationship, participants were asked an open-ended question ‘How long have you been watching your favorite streamer?’ Then, participants were asked how frequently they watched their favorite streamer to determine the frequency of interaction. Next, participants were asked to describe how long they typically watched a streamer in one session. Finally, participants were asked ‘On average, how many hours per week do you spend watching your favorite streamer?’ to determine the time spent ‘interacting’ with the streamer.

**Parasocial interactions and relationships.** Although PSI and PSR have often been measured after single exposures, these constructs have also been studied in longer term relationships (e.g. Dibble and Rosaen, 2011; Hu, 2016; Lee, 2013). Since PSRs are likely to form over time, it seemed relevant to study these variables for media characters with whom participants had already formed relationships.

Based on Dibble et al.’s (2016) recommendation, PSR ( $M = 3.78$ ,  $SD = 0.61$ ,  $\alpha = 0.91$ ) was measured using Rubin et al.’s (1985) 15-item scale on PSRs in television viewing and was modified to be appropriate to the live streaming context. The scale included items such as ‘The stream shows me what the streamer is like’ and ‘I think the streamer is like an old friend’. Responses were ordered as a 7-point Likert-type scale with endpoints *strongly agree* (7) and *strongly disagree* (1).

PSI ( $M = 3.25$ ,  $SD = 0.99$ ,  $\alpha = 0.93$ ) was measured using Hartmann and Goldhoorn’s (2011) 6-item scale. It was modified to be appropriate to the live streaming context and included items such as ‘The streamer knows I am there’ and ‘The streamer reacts to what I say or do’. Responses were ordered as a 7-point Likert-type scale with endpoints *strongly agree* (7) and *strongly disagree* (1). Zero-order correlations of all variables can be found in Table 1.

## Results

### *Predictors of PSI*

To test the predictors of PSI, a linear regression explaining Hartmann and Goldhoorn’s (2011) EPSI scale was conducted. Gender, age, loneliness, extroversion, length of the relationship, frequency of watching, average hours spent watching per session, average hours spent watching per week, interpersonal attractiveness of the streamer, physical attractiveness of the streamer, and direct interaction were entered as predictors. Overall, the model explained 57.3% of the variance in PSI ( $F = 18.83$ ,  $df = 11$ ,  $p < 0.001$ ), which is considered to be strong (Funder and Ozer, 2019). Results indicated that direct interaction and hours spent watching were positively related to PSI (as predicted), and loneliness was negatively related to PSI (contrary to predictions). All other predictors were nonsignificant.

After determining that these three things had an effect on PSI, we wanted to understand if any of them was more important than others in explaining experience of PSIs. To do this, each standardized coefficient’s 95% confidence interval was estimated utilizing bias-corrected bootstrap (1000 resamples). Based on this analysis, direct interaction was more important than time spent

**Table 1.** Zero-order correlations of variables.

	2	3	4	5	6	7	8	9	10	11
(1) Parasocial interaction	0.47***	0.69***	0.36***	0.26***	-0.12	0.24***	0.03	0.05	-0.05	0.04
(2) Parasocial relationship		0.39***	0.75***	0.44***	-0.02	0.24***	0.08	0.18**	-0.02	-0.07
(3) Direct interaction			0.23***	0.15*	0.07	0.19**	-0.01	0.18***	0.13	0.11
(4) Interpersonal attractiveness				0.42***	-0.12	0.24***	0.02	0.13	-0.13	-0.10
(5) Physical attractiveness					-0.10	0.09	-0.04	0.10	-0.02	-0.03
(6) Loneliness						-0.41***	0.04	-0.20*	-0.09	-0.08
(7) Extroversion							-0.03	0.12	-0.08	0.21**
(8) Length of acquaintance								0.05	0.10	0.21**
(9) Frequency of viewing									0.16*	0.17*
(10) Time per week viewing										0.36***
(11) Avg time per session										

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

**Table 2.** Predictors of PSI and PSR (based on 95% distribution estimates).

	PSI lower bound CI	PSI upper bound CI	PSR lower bound CI	PSR upper bound CI
Hours spent watching	-0.363	-0.069		
Direct interaction	0.596	0.854	0.014	0.245
Loneliness	-0.334	-0.067	0.053	0.329
Interpersonal attractiveness			0.513	0.795
Extroversion			0.033	0.270
Length of relationship			0.015	0.223

Note: PSI: parasocial interaction; PSR: parasocial relationship; CI: confidence interval.

viewing per week and loneliness when predicting PSI. Refer to Table 2 for more detail on these bootstrapped coefficients.

### Predictors of PSR

To test the predictors of PSR, a linear regression explaining Rubin et al.'s (1985) PSI scale was conducted. Gender, age, loneliness, extroversion, length of the relationship, frequency of

**Table 3.** Regression of the predictors of parasocial interaction and parasocial relationship.

	Parasocial interaction ( $\beta$ )	Parasocial relationship ( $\beta$ )
Streamer characteristics		
Interpersonal attractiveness	0.073	0.662***
Physical attractiveness	0.095	0.078
Direct interaction	0.711***	0.126*
Viewer characteristics		
Age	0.078	0.049
Sex <sup>a</sup>	0.056	-0.062
Loneliness	-0.188**	0.176**
Extroversion	-0.004	0.152**
Behavioral characteristics		
Length of streamer acquaintance	0.017	0.118*
Frequency of viewing	-0.005	0.028
Time per week viewing	-0.148*	0.024
Average time spent per viewing session	0.023	-0.008
R (adjusted R <sup>2</sup> )	0.605 (0.573)	0.812 (0.632)

<sup>a</sup>0 = female, 1 = male.

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

watching, average hours spent watching per session, average hours spent watching per week, interpersonal attractiveness of the streamer, physical attractiveness of the streamer, and direct interaction were entered as predictors. Overall, the model explained 63.2% of the variance in PSR ( $F = 24.09$ ,  $df = 11$ ,  $p < 0.001$ ), which is considered to be strong (Funder and Ozer, 2019). Loneliness, extroversion, length of relationship with the streamer, direct interaction, and interpersonal attractiveness were associated with stronger PSRs. Thus, support was found for hypotheses 2b, 3b, 4b, and 8b. Furthermore, extroversion was positively related to PSRs – a significant correlation in the opposite direction to that predicted by hypothesis 6b and previous literature. All other predictors were nonsignificant.

Next, we wanted to determine whether any predictors were more important than others in the formation of PSRs. To study this, each standardized coefficient's 95% confidence interval was estimated utilizing bias-corrected bootstrap (1000 resamples). Based on this analysis, interpersonal attractiveness was stronger than direct interaction, loneliness, extroversion, or length of streamer acquaintance when explaining PSR. Refer to Table 2 for more detail on these bootstrapped coefficients.

Regression models for both PSI and PSR are included in Table 3.

## Discussion

Overall, results indicate that attributes of the streamer have a greater impact on the likelihood of parasocial phenomena than the viewer's personal characteristics or behavioral characteristics related to watching the stream. This indicates that regardless of who is viewing, the strength of the parasocial phenomena is more dependent on the personality and presentation of the streamer than anything else.

The strongest predictor for PSRs was interpersonal attractiveness. Conversely, the strongest predictor for PSI was direct interaction. The relationship between interpersonal attractiveness and PSR was also found by Schiappa et al. (2007) – which makes sense given the strength of the relationship found in the current study. Clearly, the onus is on the parasocial target (in this case, the streamer) to create an attractive persona that draws in the viewer – though certain viewers are more likely to form these types of relationships, and longer relationships are more likely to result in PSRs. Thus, it is within the power of the streamer to have a great impact on the parasocial phenomena that they inspire in their viewers – which is important, because these relationships can lead to several important repercussions for the streamer, such as financial support (e.g. Gong and Li, 2017; Grant et al., 1991; Huang and Mitchell, 2014; Kirvesmies, 2018; Knoll et al., 2015; Labrecque, 2014; Perse, 1990; Wohn et al., 2018).

Direct interaction had a significant and positive relationship to both PSR and PSI. However, as expected, direct interaction (the streamer acknowledging and responding to the audience members) had a far stronger relationship to PSI than it did to PSR. These findings are in line with those of Auter (1992) and Hartmann and Goldhoorn (2011). Once again, the live streamer/media character has the ability to have a large impact on the likelihood of PSI.

Viewer loneliness was related to both types of parasocial phenomena. However, loneliness was positively related to PSR and negatively related to PSI. Furthermore, the effect was small but statistically significant for both. This small, inconsistent relationship is likely the reason that findings have been inconsistent regarding loneliness and its impact on parasocial phenomena. For example, Baek et al. (2013) found a relationship between PSR and loneliness, while Rubin et al. (1985) and Rosaen et al. (2011) found no such relationship. If people have been talking about parasocial phenomena as though PSRs and PSIs were interchangeable, it's no wonder that people aren't sure how loneliness impacts parasocial phenomena. Thus, it is extremely important to be sure that PSIs and PSRs are measured accurately and separately in the future.

Furthermore, Baek et al.'s (2013) findings discuss the negative repercussions of *dependency* on PSRs within social media. This wording is important – it implies that if PSRs are the only relationships, then that is likely correlated to loneliness. However, if PSRs supplement in person relationships, then loneliness is likely not a predictor of PSRs. Other researchers have suggested that lonely individuals consume media to pass time and so they are consuming it more passively, which hinders the formation of PSRs and PSIs (e.g. Perse and Rubin, 1990; Tsao, 1996). Thus, this would influence the relationship between loneliness and parasocial phenomena because it indicates that increased viewing by lonely people does not necessarily lead to increased PSRs or interactions. Another interpretation could be that the seemingly mixed results compared to prior research could be due to a unique attribute of the live streaming context, in that the streamer characteristics overshadow any effects related to the viewer. If, indeed, the affordances of the media are relevant to the inconsistencies in the effect of loneliness, this may mean that future research should focus on cross-media investigations.

Overall, the findings indicate that the relationship is not necessarily strong or consistent enough to be present in all academic studies of loneliness and parasocial phenomena. Furthermore, these findings suggest that loneliness has a different impact on PSI than PSR – and that treating the two phenomena as one would lead to greater confusion. Given the similarity between the perception of face-to-face relationships and PSRs (Koenig and Lessan, 1985; Lobler and Raschpichler, 2009), it makes sense that those who are lonely are more likely to form these relationships to supplement their face-to-face relationships. However, PSRs are most definitely formed by a large number of people and so loneliness is not a strong predictor (e.g. Gleason et al., 2017; Knowles, 2007).

Contrary to the findings of Jarzyna (2008), extroversion was positively associated with PSR. This suggests that extroverts, who are more likely to form multiple face-to-face relationships and regularly spend time with a wide variety of people, were also more likely to form PSRs in a live streaming context. Thus, the tendency to connect seems to be strong across both forms of relationships (interpersonal and parasocial) for extroverts. This could be because of the real-time nature of live streaming and viewers' ability to interact synchronously with their beloved media figure. This kind of interaction may require some level of boldness or courage that explains why extroverts experience more PSR. While our cross-sectional survey is unable to explain time-series relationships, it could also be that over time, extroversion contributes to higher PSR because the relationship is intensified by the nature or amount of interaction between the viewer and streamer.

Jarzyna (2008) predicted a negative relationship between extroversion and PSR based on the hypothesis that belongingness needs not met by traditional relationships for introverted individuals could be fulfilled by PSRs. However, introversion and loneliness are not the same thing (Burger, 1995; Hills and Argyle, 2001), though a positive correlation has often been found between the two constructs (e.g. Kaiser and Berndt, 1985; Levin and Stokes, 1986; Saklofske and Yackulic, 1989). Loneliness was defined by Rook (1984) as 'an enduring condition of emotional distress that arises when a person feels estranged from, misunderstood, or rejected by others and / or lacks appropriate social partners for desired activities, particularly activities that provide a sense of social integration and opportunities for social intimacy' (p. 1391) while introverts were defined by Susan Cain (2012) as those individuals who 'feel at their most alive and their most switched-on and their most capable when they're in quieter, more low-key environments'. This tendency to work well on your own is quite different from a propensity for loneliness.

PSIs in live streaming are unique in that they allow audiovisual cues combined with real-time feedback between the audience and the streamer, which makes it appear interpersonal – despite the asymmetric information available. PSRs in the area of live streaming look similar to PSRs audience members form everywhere – but PSIs appear to have a much richer variety of cues and immediacy than other media allow for. This increased ability for direct interaction, which is particularly important for PSIs, is likely to lead to stronger perceptions of PSI for live streaming than almost any other media.

According to D'Anastasio (2020), the majority of live streams still focus upon watching streamers play videogames – but that is shifting. Indeed, the 'chat' format of live streaming where the streamer talks about their day and answers questions is becoming increasingly popular within Twitch and other live streaming sites. Gandolfi (2016) discussed the three main types of live streamers: the challenge, or professional gamer who relies on skill within the game to attract viewers and rarely, if ever, interacts with the audience; the hedonist, who utilizes interaction with the audience (but sparingly) and personality to attract viewers; and the companion, who speaks with the viewers at length and can allow the viewers to guide what they do within the stream. Clearly, the 'challenge' type gamer is unlikely to inspire the feeling of PSIs – which may have an impact on PSRs. The 'hedonist', however, does interact with the viewers – in a limited fashion. Perhaps they inspire more PSIs and PSRs than the 'challenge' style streamers. However, it seems likely that the 'companion' is the most likely to inspire both PSIs and PSRs.

While we note that the current landscape of live streaming is very asymmetrical because the streamer provides visual and audio cues while the audience is only allowed to provide text, in the

future, we may see different platforms emerge where the available cues are more parallel. If viewers are also able to provide visual and audio cues, will this change how they feel about the streamer? It is thus important that these results are interpreted with the understanding of how streamer-viewer communication happens on the Twitch platform. As live streaming platforms evolve, some of these hypotheses may need to be revisited.

## Limitations

The current study was focused entirely on live streaming, which is only one medium in a wide variety of both digital and nondigital media. This was purposeful to explore parasocial phenomena related to media character interactivity in a particularly interactive context. However, this focus limits the generalizability of the findings. Furthermore, the content of the live stream channel was not taken into consideration in the analysis; it could be that content type may have had an impact on individuals' PSIs and PSRs. Finally, the study did not ask participants if they had personal relationships with the streamers about which they answered the questions. Although it is unlikely that participants had interpersonal relationships with the streamers about whom they answered the survey, it is a possibility that this influenced the results regarding parasocial phenomena. Future research should vary and test different content types to explore whether this impacts parasocial phenomena. Furthermore, future studies should conduct research on parasocial predictors within contexts other than live streaming (e.g. celebrities on social media, TV characters) to create more generalizable results.

The context resulted in a sample that was primarily male gaming enthusiasts, which, while reflective of the content proportion on live streaming (which is still primarily gaming), could still have impacted the results and reduced the external validity of the results outside of the live streaming medium. Future studies should test these same relationships in a variety of media to determine if the results are applicable outside of the live streaming context.

This study was carried out as a cross-sectional survey to discover relationships between parasocial phenomena and possible predictors. However, future research should conduct a longitudinal study to definitively determine causal relationships.

## Conclusion

This study extended the field of parasocial predictors into an interactive medium – live streaming – and found the best methods for streamers (and other media characters) to encourage these parasocial phenomena that tend to lead to greater levels of attention (Perse, 1990), source credibility (Colliander and Dahlen, 2011; Gong and Li, 2017), and viewing frequency (Grant et al., 1991). By utilizing a variety of predictors for both forms of parasocial phenomena, this article helps researchers to better understand how to encourage PSIs and PSRs.


By utilizing an online survey and incentivizing live stream viewers across the Internet, we examined how attributes of the streamer (attractiveness and direct interaction), viewer (extroversion, loneliness), and behavior (length of relationship, hours spent watching per week) were associated with PSI and PSR in the context of live streaming. While these two concepts have sometimes been used interchangeably in the past, we found that they were distinct constructs that related differently with the streamer, behavior, and viewer variables. Thus, our research provides further evidence for Dibble et al.'s (2016) emphasis on these two constructs being distinct.

Results indicated that PSRs are more likely to form when the streamer is interpersonally attractive and acknowledges the viewers, when the viewer is lonely and/or extroverted, and when

the viewer has been watching the streamer for a longer period of time. Furthermore, PSIs are more likely to be perceived when the streamer acknowledges the viewer, when the viewer is not lonely, and less time is spent viewing per week. These results indicate that live streamers who utilize the ‘companion’ style of streaming are more likely than their ‘challenge’ style counterparts to inspire PSIs and PSRs – and the ‘hedonist’ style streamers are likely to encourage these parasocial phenomena, but to a lesser degree (Gandolfi, 2016). Furthermore, the increasing tendency of streamers to utilize a ‘chat’ format rather than simply playing the game the whole time is likely to increase the likelihood that audience members will experience PSIs and form PSRs.

Part of the uniqueness of this study was its context – live streaming is a form of social media that enables more interaction between the parasocial target and the viewer than any other form of media studied previously. These interactions go beyond text messages and can include audio and visual elements (e.g. the streamer making eye contact with the camera, which gives the illusion to viewers that they are having a direct conversation). Future research should further explore these relationships in live streaming to examine the different effects of various modalities of communication. Furthermore, future research should compare and contrast the predictors of parasocial phenomena in a wide variety of media to confirm which predictors are consistently important, and which predictors are nebulous in their relationship to PSIs and PSRs.

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