

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/334168868>

Live Streaming, Playing, and Money Spending Behaviors in eSports

Article in Games and Culture · July 2019

DOI: 10.1177/1555412019859184

CITATIONS

0

READS

97

2 authors:



Donghee Yvette Wohn

New Jersey Institute of Technology

90 PUBLICATIONS 1,614 CITATIONS

[SEE PROFILE](#)



Guo Zhang Freeman

Clemson University

43 PUBLICATIONS 648 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Understanding User Behaviors Within Online Communication [View project](#)

Live Streaming, Playing, and Money Spending Behaviors in eSports

Games and Culture

1-16

© The Author(s) 2019

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/1555412019859184

journals.sagepub.com/home/gac

Donghee Yvette Wohn¹  and Guo Freeman²

Abstract

Live streaming has enabled eSports to become more accessible, ranging from professionally organized tournaments to individuals hosting from their bedroom. While different aspects of eSports have been investigated in separate contexts, in this article, we report findings of two survey studies to explore eSports as a holistic media ecosystem that includes playing, streaming, viewing, and spending. Study 1 looks at cross-platform patterns between playing and spending within the game as well as between viewing, streaming, and spending on live streaming platforms in the context of Fortnite. Study 2 examines the relationships between viewing and spending patterns on live streaming platforms. Results indicate that playing, viewing, and in-game spending are strongly related. Yet none of these behavioral metrics explain why people spend money on live streaming platforms to support streamers. Rather, psychological factors such as emotional attachment to the streamer and appreciation of the streamers' talents are what drive streamer support.

Keywords

eSports, live streaming, virtual items, spending, social support

¹ College of Computing Sciences, New Jersey Institute of Technology, University Heights, Newark, NJ, USA

² School of Computing, Clemson University, Clemson, SC, USA

Corresponding Author:

Donghee Yvette Wohn, College of Computing Sciences, New Jersey Institute of Technology, University Heights, G1TC 5100, Newark, NJ 07102, USA.

Email: yvettewohn@gmail.com

As playing and watching competitive gaming is rapidly gaining worldwide popularity, eSports has evolved into an emerging game genre, a new form of mainstream entertainment, and a key activity in youth culture. It involves different levels of gameplay (e.g., professional vs. amateur), describes a variety of gaming behaviors (e.g., competition, collaboration, coordination, interaction, streaming, spectating, and casting), and covers various game types (e.g., first-person shooter, sports, fantasy), player groups (e.g., skilled players vs. average players), and forms of teams (e.g., random, matchmaking teams vs. long-term and socially bonded teams). Due to the multidimensional nature of eSports, in our previous work (Freeman & Wohn, 2017a), we have noted that while the term of eSports is widely used, researchers approach this area from various perspectives, with different emphases, and do not have consensus with regard to its definition. For example, Turtiainen, Friman, and Ruotsalainen (2018) focused on the sportification of eSports in the context of tournament broadcasts; Block and colleagues (2018) studied the content production and delivery process in eSports; and Freeman and Wohn (2017b, 2018) explored the formation and coordination of eSports teams as well as experiences of social support emerging in their team activities.

Yet many researchers agree that as a high-level understanding, eSports usually refers to competitive multiplayer gaming that involves spectating real time or asynchronous gameplay, team competitions, and tournaments either online or off-line. In particular, some have highlighted how live streaming has coevolved with the rise of eSports and directly attributed to the growing popularity and success of the latter (e.g., Hamilton, Garretson, & Kerne, 2014; Li, Kou, Lee, & Kobsa, 2018; Sjöblom & Hamari, 2017; Wulf, Schneider, & Beckert, 2018).

As a unique new form of interactive media, live streaming combines public broadcast of high fidelity live audio and video through Internet and low fidelity shared text-based channels open to both streamers and viewers (Hamilton et al., 2014). It started as a niche, nonmainstream media platform for video game players to share their gameplay in real time and communicate with other players. Since 2009, live streaming has increasingly become a broader social media trend due to advanced network technology and the growing public interests in user-generated digital content (Hilvert-Bruce, Neill, Sjöblom, & Hamari, 2018; Li et al., 2018). Now various live streaming platforms and services such as Twitch.tv, YouTube Live, and Facebook Live are offering a wide range of live content from gameplay, painting, eating, to cooking to millions of daily viewers. For example, Twitch.tv, one of the primary live streaming platforms, has approximately 10 million daily active users and more than 2.2 million creators of content per month (Twitch, 2017). Although live streaming has been extended to broadcast nongaming content, it is still considered one of the most important features of today's gaming culture (Li et al., 2018).

This new social phenomenon of live streaming has drawn researchers' attention to understand its role in (re)shaping interactive experiences, social engagement, and sense of community in online social spaces (e.g., Hamilton et al., 2014; Li et al.,

2018; Sjöblom & Hamari, 2017; Wohn, Freeman, & McLaughlin, 2018; Wulf et al., 2018). It has also opened new research frontiers with regard to viewer–streamer interaction (e.g., Wohn et al., 2018), content moderation (Seering, Kraut, & Dabbish, 2017, Wohn, 2019), and privacy issues in cyberspace (e.g., Li et al., 2018). In general, previous research has described live streaming platforms such as Twitch as virtual third places where participatory communities emerged and encouraged members to engage in shared activities (Hamilton et al., 2014) or as authentic, unedited views of streamers’ personal lives (Tang, Venolia, & Inkpen, 2016). Younger streamers and viewers (e.g., teens) even consider live streaming part of their everyday practices to hang out with others online or spend time with small group of friends (Lottridge et al., 2017). People watch live streaming for various reasons but social interaction, sense of community, meeting new people, entertainment, information seeking, and a lack of external support in real life were considered main motivations (Hilvert-Bruce et al., 2018; Sjöblom & Hamari, 2017). In particular, parasocial relationships, suspense of the video game outcome, and using the chat function predominantly contribute to viewers’ enjoyment (Wulf et al., 2018).

It is thus important to perceive eSports as a multidimensional media ecosystem that is at the intersection of playing, viewing, spending, and live streaming from the media consumption perspective (of course, there are other administrative things such as organizing, moderating, and so on). In this sense, studying gaming or live streaming independently, while still valuable, does not provide a comprehensive understanding of how people engage in all of these activities across different platforms and mediums. Are people who watch eSports also the ones who are playing? How do behavioral patterns such as time spent and frequency of engagement correlate across the different activities and different media? In this article, we report findings of two survey studies to address these issues. Specifically, Study 1 explores *What is the relationship between playing, viewing, streaming, and spending in both the game and live stream?* And Study 2 explores *What are the factors that explain people’s willingness to give money to the streamer?*

Background

We explore our research questions based on two strands of previous studies: spending behaviors in live streaming and spending behaviors in gaming.

Spending Behaviors in Live Streaming

Spending and gifting behaviors are emerging phenomena in live streaming, including cheering, subscribing, or other ways of donations and giving. In June 2016, Twitch introduced “bits,” a digital currency that can be purchased using real money. Viewers can then use bits to purchase special emoticons that can be used in their text chat during live streaming. This is known as “cheering.” Since a portion of a viewer’s purchase will be paid to the streamer, “cheering” has enabled viewers to support

the streamer and, to a certain degree, influence the content that they are watching (e.g., the streamer may acknowledge and thank viewers who cheer). Since its launch, this mechanic generated \$12 million USD revenue in less than 10 months, \$10 million of which has gone to the streamers (Spangler, 2017). In addition, viewers can make a monthly payment to subscribe to their favorite streamers and channels, which provides streamers with a recurring monthly income and offers viewers benefits such as subscriber-only emoticons, exclusive chatroom, and ad-free viewing.

These spending and gifting behaviors, though completely voluntary, have become a unique business model in live streaming and greatly affected interactions and relations between streamers and viewers. However, only a small number of studies have explored spending and gifting in live streaming. Sjöblom and Hamari (2017) found that social integrative motivations (e.g., to deeply involve in the community and the shared experiences) are the sole predictor of subscription behavior in live streaming. Findings from other studies are also similar. For example, Yu, Jung, Kim, and Jung (2018) concluded that the demand for socialization has a high correlation with gift-giving behavior, making spending a commoditization of a viewer's social interaction while consuming live streaming. Hilvert-Bruce, Neill, Sjöblom, and Hamari (2018) showed that viewers' pursuit for social interaction and a sense of community primarily led to their subscription and donation to streamers. In addition, Zhu, Yang, and Dai (2017) suggested that only a small number of viewers and streamers sent and received gifts and that witnessing others sending gifts could also made a viewer more likely send gifts. In particular, Wohn, Freeman, and McLaughlin (2018) focused on gift giving as social support for streamers. Their research show that some viewers perceived and interpreted their activities of money giving as a form of tangible support—either for the educational or entertainment value of the content, supporting the streamers for personal growth or stream improvement, or to support issues presented by the streamers, such as charitable causes. While the socially oriented nature of spending behaviors in live streaming are documented, these studies are not necessarily specific to eSports.

Spending Behaviors in Gaming

Gaming involves unique opportunities for spending behavior that are particular to the affordances of the technology. Games have their unique economy (Lehdonvirta, 2009) and their own macroeconomic trends (e.g., Castronova, 2005; Castronova et al., 2009) that include a complex system of trade (e.g., exchanging in-game items), production (e.g., creating items), and labor (e.g., fighting monster for loot), among others. Purchasing items within games is a type of economic behavior that has become especially popular with the proliferation of free-to-play games. Free-to-play games, unlike many previous games that require players to purchase the game to play, require no money to play but have stores where one can purchase (optionally) items. Sometimes, these items are purely cosmetic, such as changing the

clothes on one's avatar, but other times have functional values as well. Examples of these functional purposes include items that enhance a certain skill, that give more time to play in the game, or that unlock features that require social reciprocation from other players (e.g., when one needs an item or favor from another player to proceed). Wohn (2014) discussed how people's spending patterns differ between these two categories of items, finding that people who are high spenders spend more money on cosmetic items, while those who spend little money are usually spending it for functional purposes.

While there has been research on the motivations for spending in games (e.g., Lehdonvirta, 2009; Nojima, 2007; Oh & Ryu, 2007), less is known about how these spending patterns are related to other aspects of play, including viewing patterns and playing patterns. With these concerns, we conducted two survey studies to investigate (1) relationship between playing, viewing, streaming, and spending in both the game and live streaming and (2) factors that explain people's willingness to give money to the streamer.

Study 1: Playing, Viewing, Streaming, and Spending in Both the Game and Live Streaming

Method

In Study 1, we collected data using a 15-min anonymous online survey that focused on Fortnite players' different patterns of viewing, playing, and spending. Fortnite is a player versus player battle game (known as the Battle Royale genre) for up to 100 players. Players have the options to play alone or as a duo or a small team (usually three or four players). Once the game starts, they must compete with others to collect weapons, items, and resources for survival and combat with one another. The last player, duo, or team alive would be the winner. We focused on Fortnite players because this game, which was released in 2017, has become the most popular eSports game in 2018—it had 78.3 million players in the month of August 2018 alone (Jones, 2018). It also accounted for more than a third of streaming digital game views globally in May 2018 across all major streaming platforms including Twitch, YouTube, and Facebook (Molla, 2018). Its popularity among players, streamers, and viewers makes it an excellent context to explore how, if at all, playing, viewing, and spending behaviors are associated.

This survey included both closed and open-ended questions. Participants were first asked whether they had played Fortnite in the past month and what their Fortnite ID was (to make sure they indeed were Fortnite players). Only English-speaking adults (18 or above) who have played Fortnite in the past month were allowed to take the survey. The subsequent main questions focused on how they played Fortnite, their in-game purchases (if any), how they watched and/or streamed Fortnite (if applicable), and their gift giving to the Fortnite streamers

(if any). Participants who completed the survey and correctly answered the attention question (e.g., “please choose strongly agree for this question to show you are paying attention”) were paid \$3.

We used multiple online and off-line platforms to recruit participants, including Mechanical Turk, Facebook groups, Reddit, Twitter, and direct contact with collegiate eSports clubs. As a result, 298 responses were collected. After eliminating people who did not write legible responses to open ended questions, 246 were used for the data analysis.

Results

Participants were 28.6 years old on average ($SD = 7.79$), with 71% male and 20% female. There were also two transmale, one transfemale, and three people who identified as nonbinary. More than half of our participants identified as White (67%), followed by Asian (19%), Black (12%), Native American (2%), and Pacific Islander (1%). Four percent said they were mixed race and 18% said they were Hispanic.

Our participants were diverse in terms of their experience with Fortnite and how long they played. A 10th of participants had less than 1 month’s experience playing, 28% reported playing for 1–3 months, 30% had been playing for 4–6 months, 13 were playing for 7–9 months, and 20% reported more than 9 months. On average, participants played 4 hr a week ($SD = 7.76$). Of all participants, 63% said that they also watched Fortnite live streams. The most popular platform for watching Fortnite live streams was Twitch (45%), YouTube Live (42%), Facebook Live (10%), and Mixer (4%). Thirty percent of participants said that they also stream Fortnite. Those who did stream did so for an average of 4.93 hr per week ($SD = 6.55$). The maximum number of hours reported was 40.

Only 31% said that they bought in-game items. The average amount spent on these items was 7,652 V-Bucks (\$76; $SD = 18,259$).

Research Question 1 asked about the relationship between playing, spending, viewing, and streaming. We found that people who watched Fortnite streams did not necessarily play more or less of the game, $t(245) = .64, p = .52$, but among those who did watch streams, time spent playing Fortnite was correlated with time spent watching Fortnite live streams. Participants who played a lot of Fortnite did not make them more likely to spend money in the game, $t(245) = .91, p = .37$, but among those who did spend money on V-Bucks (Fortnite’s in-game currency), their spending was proportional to the number of hours they spent playing. For those players who also streamed the game, time spent playing was correlated with time spent streaming. Giving money to the streamer, however, was not related with time spent playing the game, time spent watching, or time spent streaming. Table 1 shows the full correlation matrix between playing, spending, viewing, and streaming.

Table 1. Correlation Matrix.

Variables	2	3	4	5	6	7	8
1. How long have you played Fortnite	.30***	.15	-.09	-.14	.18	.28*	-.04
2. Hours spent playing	1	.64***	.01	.11	.48***	.62***	-.06
3. Hours spent watching		1	.06	.08	.47***	.65***	-.04
4. Purchasing bits			1	-.05	-.17	-.07	.01
5. Giving \$ to streamer				1	.61***	-.05	-.01
6. Spending \$ in game					1	.01	-.05
7. Hours streaming						1	-.06
8. Number of streamers subscribed to							1

Study 2: Explaining Likelihood of Providing Financial Support to eSports Streamers

Study 1 aimed to examine the relationship between playing, streaming, viewing, and spending in both the game and live streams. We found that the behavioral factors were all correlated with each except for giving money to the streamer. We thus conducted a second study to further examine factors that may explain provision of financial support to eSports streamers, focusing on both behavioral and psychological factors.

We conceptualized money as form of social support that is tangible in nature. Previous research has described tangible support as one form of the multidimensional aspects of social support (Cutrona, Russell, & Rose, 1986). Yet research on financial support in online communities and gaming contexts is limited, as much of the literature focuses on emotional or informational support (Chuang & Yang, 2010; Freeman, Bardzell, & Bardzell, 2016; Freeman, Bardzell, Bardzell, & Herring, 2015; Huh, 2015; Introne, Semaan, & Goggins, 2016).

In one of the few documented research that examined financial support in the context of live streaming, Wohn et al. (2018) found that parasocial relationships—a viewer's feeling that they have a close relationship with the streamer regardless of whether it is reciprocated—was a strong predictor for not only financial support but also emotional support and instrumental support. This study, however, looked at live streamers of multiple genres, not just eSports. It is unclear whether eSports live streaming would be different from other types of streams where the streamer engages extensively with the audience. Due to the competitive nature of eSports, it may be challenging for streamers to dedicate their full attention to the game as well as the conversation happening on the live streaming platform.

Behavioral and Psychological Factors

Viewers' perception of the streamer. The first factor to consider in understanding why people give money to streamers is characteristics of the streamer. There are many

variables to consider, but we focused on factors that are subjective from the viewer's perspective, especially since behavioral measures did not correlate with streamer support in the Study 1. We first looked at how attached people feel to the streamer. This feeling of closeness is not always explained by time. As Study 1 showed, time has no relationship to streamer support. If one feels closer to the streamer, then that may lead to direct donations of money. The second factor we examined was how much the viewer valued the streamer's worth. Worthiness is the concept of appreciating someone's skills and talents. Both attachment and worthiness are theoretical dimensions of social support (Cutrona & Russell, 1987). We also examined the effect of streamer's attractiveness on viewers' spending behaviors. Attractiveness has two different dimensions—interpersonal attractiveness refers to how likable someone's personality is, while physical attractiveness refers to outward beauty. These elements are commonly known factors for why people like celebrities (Erdogan, 1999).

Viewing metrics. Although behavioral metrics were not correlated with streamer support in the context of Fortnite in Study 1, we decided that it was important to include these in Study 2, as other gaming contexts may have similar or different results. In addition, they can be important variables that control for other variables. These behavioral metrics include how long someone has been watching a streamer, the frequency of their viewing patterns, and how many hours they spend on a weekly basis watching the streamer.

Characteristics of viewer. Characteristics of the viewer should also be taken into consideration, which include loneliness and extroversion. While there are no existing theories that support the claim that lonely people would be more likely to give money, many media reports suggest that lonely men give money and virtual gifts to female streamers (Weller & Butt, 2016; Yang, 2017). To that same logic, we also looked at whether men were more likely to give money to female streamers. In addition, extroversion is a well-known personality trait. Therefore, it is worthwhile to explore whether people who were more outgoing were more likely to contribute financially to streamers.

Method

We used multiple online platforms to recruit participants, including Mechanical Turk, Facebook pages, Reddit, Twitch, and direct messaging people on Twitter who posted about donating on Twitch. As the study required that participants be viewers who had given some form of financial support in the past, only English-speaking adults (18 or above) who had previously given money to a streamer were allowed to take the survey. Participants were paid \$3 for their participation in the survey.

Participants were first asked to name their favorite live streamer, the URL of the channel (to make sure the participants were not making something up), and what

Table 2. Scale Items for Main Independent and Dependent Variables.**Attachment to streamer**

- I feel a strong emotional tie with my favorite streamer
- I have a feeling of closeness with them
- Seeing my favorite streamer makes me feel good
- I have a close relationship with them

Valuing the streamer's worth

- I think my favorite streamer is good at what they do
- I respect what they do
- I value their skills and abilities
- I admire my favorite streamer's talents

Willingness to provide financial support in the future

- If they were hosting a fundraiser, I would contribute
- I would give money to them to help with their livelihood
- I would give them money to support their efforts
- I would give them a gift to show my appreciation

platform they watched the live stream on. The subsequent main questions focused on how they felt about their favorite streamer and characteristics about the streamer, themselves, and their interaction with the streamer, if applicable. Some of participants' favorite streamers did not stream gaming content and were taken out of the data set. The final number of participants was 158.

Measures

Attachment to streamer ($M = 2.54$, $SD = 0.72$, $a = .86$) and valuing the streamer's worth ($M = 3.38$, $SD = 0.56$, $a = .83$) were both 4-item scales that were based on Cutrona and Russell's social provisions dimensions that were reworded to make sense in the context of live streaming. Participants had to rate statements from 1 (*strongly disagree*) to 4 (*strongly agree*). Willingness to provide support in the future ($M = 4.26$, $SD = 0.90$, $a = .85$) was from Wohn et al. (2018). Statements were rated from 1 (*never*) to 6 (*absolutely*). Table 2 provides the detailed items.

Interpersonal attractiveness ($M = 5.35$, $SD = 1.09$, $a = .89$) was based on Reysen's (2005) 9-item Likeability Scale that assesses how much someone likes another's personality, with answer options ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Physical attractiveness ($M = 4.64$, $SD = 1.13$, $a = .80$) was an 8-item scale by McCroskey and McCain (1974), also on a Likert-type scale with endpoints from 1 (*strongly disagree*) to 7 (*strongly agree*). Loneliness ($M = 2.31$, $SD = 0.79$, $a = .97$) was measured using the UCLA 20-item Loneliness Scale (Russell, Peplau, & Ferguson, 1978). It included items such as "I am unhappy doing so many things alone" and "I have nobody to talk to." Participants could respond to each item with one of the four options: *never* (1), *rarely* (2), *sometimes* (3), and *often* (4). Extroversion ($M = .43$, $SD = 0.47$, $a = .92$) was based on the short-form

Eysenck Personality Questionnaire (Eysenck, Eysenck, & Barrett, 1985) where participants answered a battery of questions with “yes” and “no.”

Results

Our participants were 74% male and 26% female, and on average, 28.7 years old ($SD = 6.57$). The most popular platform to watch streamers was Twitch (90.5%), followed by YouTube (5.1%), Facebook Live (2.5%), and other (1.9%). Most of participants' favorite streamers were male (87%). Participants estimated their favorite streamer's age to be an average of 30 years, with the exact breakdown being 17 years old or younger (0.6%), 18–24 years (27.2%), 25–34 years (65.8%), and 35–44 years (6.3%).

About a third of participants (33.5%) had watched their favorite streamer for less than 9 months, 44.3% had been watching for between 9 and 12 months, 42.4% were between a year and 3 years, and 8.9% said that they had watched for more than 3 years. In terms of frequency, 26.6% said they watch 3 times a month or less, 20.9% watch once a week, 34.8% watch 2–3 times a week, and 17.7% watch more than 3 times a week. On average, participants watched their favorite streamer 6.8 hr a week ($SD = 7.78$), with the average viewing time per session around 73 min ($SD = 66.38$). Most participants (94%) reported that they “follow” their favorite streamer (following is a type of bookmark that does not require monetary commitment), while 83% said that they subscribe. Subscriptions, as mentioned above, are monthly payments that are made to the streamer.

Monetary donations made directly to the streamer were done mostly through PayPal (61%), the live streaming platform (35%), Venmo (6%), Kickstarter or other crowdfunding sites (5%), and other (10%). For those who gave cash to their favorite streamer, 34% gave less than \$5, while 18% gave between \$5 and under \$10, 22% reported \$10 and under \$20, 9% said \$20 and under \$40, 10% said \$40 and under \$60, and 3% gave more than \$60. Those who viewed their streamer on Twitch also gave bits—an average of 1,219.61 bits ($SD = 8,062$), which is a little more than \$13. Participants also gave gifts to the streamer, which were not money and mostly game related—these included a skin for the streamer's avatar in the game, *Pokemon*, riot points (in *League of Legends*).

The regression model explaining willingness to give financial support was significant, explaining 73% of variance, $F(12, 96) = 9.41, p < .001$, adjusted $R^2 = .48$. Attachment to the streamer, valuing the streamer's worth, and attractiveness of the streamer's personality were positively related with intention to give financial support to the streamer in the future. Physical attractiveness of the streamer was not significant. How long the participant has been watching the streamer and hours per week watching were not significant, but frequency of watching was positively related. Neither the gender of the participant nor the gender of streamer, or gender interactions were significantly related with willingness to spend money on the streamer. Table 3 shows the β coefficients of the model.

Table 3. Regression Model With Factors Explaining Willingness to Give Financial Support.

variables	Standardized Coefficient	Significance
Viewer's perception of streamer		
Attachment to streamer	.21*	.023
Valuing the streamer's worth	.30**	.002
Attractiveness of streamer's personality	.30**	.008
Attractiveness of streamer's physical appearance	-.08	.303
Streamer's gender	-.10	.402
Viewing metrics		
How long viewer has been watching streamer	-.06	.436
Frequency of watching streamer	.17*	.020
Hours per week watching streamer	-.09	.240
Characteristics of viewer		
Loneliness of viewer	-.00	.981
Extroversion of viewer	.05	.553
Viewer's gender	-.38	.051
Gender interaction	.14	.545
Adjusted $R^2 = .48$		

* $p < .05$. ** $p < .01$.

Discussion

In the context of Fortnite in Study 1, time spent playing a game was an important metric in the game that explained how much a player viewed streams and spent money in the game. As such, it is without doubt that time is an optimal metric that may serve as a stickiness factor. The same, however, cannot be said about time viewing eSports in a live stream, which had no relationship to the amount of money spent in the stream. If spending can be seen as an indicator of passion and/or a source of revenue, it is clear that while eSports encompasses both playing and viewing, these two activities should be not considered interchangeable. It is important to note that in Study 2, we asked participants to discuss how they feel about an eSports streamer. Viewing one person play in their personal channel is certainly different than watching a tournament. Even if the streamer is playing a team-based game, the focus of having a central figure may make interactions with eSports streamers more personal and relationship oriented than watching streams of broadcasted events.

We did not find any evidence of men being more likely to give female streamers financial support or physical attractiveness having any significant effect. This does not mean that people do not donate for those reasons—certainly, there may be certain streamers for whom physical attractiveness is a primary reason why they receive money. However, these results suggest that when looking at patterns across many different types of streamers, physical attractiveness does not have a significant

connection. Rather, participants placed high value on the talents and skills of the streamer. Future research may be needed to look at whether this consideration for skill is also present in streamers who play games but not necessarily eSports.

eSports as a Multidimensional Media Ecosystem

Previous studies briefly discussed the coevolution between playing and spectating eSports games. Yet our study is one of the first to explicate how eSports is no longer merely a form of gameplay but a multidimensional media ecosystem involving different levels of online behaviors (e.g., play, view, spend, and live stream), various groups of online users (e.g., player, streamers, viewers, and donators), and unique forms of mediated relationships (e.g., streamer–viewer interaction, player–streamer relations, player–player relations, and donator–streamer relations). We have shown that it is almost impossible to gain a comprehensive image of eSports as an emerging sociotechnical practice without taking these various stakeholders’ perspectives and social engagement as well as the intertwining relationships among them into account.

In this ecosystem, players and streamers create content for media consumption; streamers and viewers publicize, share, advocate, and distribute the created content; and viewers/donators offer tangible support to the content creators, which encourage them to create more and higher quality of content. As we have shown, playing, streaming, and viewing behaviors are all associated to a certain degree. This highlights how people engage in eSports at various intertwining dimensions. The ways through which they play the game also interlink with their engagement in streaming and viewing the game. For them, immersing in the content (e.g., the game) in person does not necessarily complete their gaming experience. Rather, accessing, sharing, and involving in secondhand experience (e.g., watching others streaming their gameplay) constitute an inevitable part of a holistic eSports experience. In this cycle, relationship development is in fact more significant to sustain this ecosystem than merely engaging in playing, viewing, and live streaming behaviors. While behavioral factors were all correlated with each other, it is viewers’ subjective experiences of the created content and their emotional connections to the content creators that lead to their tangible support, which sustain the foundation of this ecosystem and facilitate its evolution. Therefore, eSports is still experience centric—how players feel about themselves and their connection with others may drive them to sustain, support, or leave this area. In this sense, our findings highlight the role of experiential features and interpersonal relationships in perceiving and interpreting eSports not only as a growing industry but also as an important way through which players live, interact, socialize, and find emotional satisfaction in online social spaces. Understanding eSports, therefore, is of significance beyond the gaming context—it points to the complex nature of producing, consuming, and experiencing the media ecosystem today.

Conclusion

We examined the relationship between playing the game, watching others play the game, streaming one's own play, and spending behaviors both in-game and in live streams to capture the myriad of media that constitute eSports. We found that most behaviors were strongly related to the player's own gaming behavior, but that spending money in live streams was a completely different dynamic than viewing and playing. Our results indicate that behavioral and psychological variables explain different aspects of eSports and that conceptualizing eSports as a media ecosystem provides further insights beyond studies of any specific platform.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Donghee Yvette Wohn  <https://orcid.org/0000-0001-5583-4430>

References

- Block, F., Hodge, V., Hobson, S., Sephton, N., Devlin, S., Ursu, M. F., . . . Cowling, P. I. (2018). Narrative bytes: Data-driven content production in esports. In *Proceedings of TVX'18* (pp. 29–41). New York, NY: ACM.
- Castronova, E. (2005). *Synthetic worlds: The business and culture of online games*. Chicago, IL: University of Chicago Press.
- Castronova, E., Williams, D., Shen, C., Ratan, R., Xiong, L., Huang, Y., . . . Keegan, B. (2009). As real as real? Macroeconomic behavior in a large-scale virtual world. *New Media & Society, 11*, 685–707.
- Chuang, K. Y., & Yang, C. C. (2010). Helping you to help me: Exploring supportive interaction in online health community. *Proceedings of ASIS&T'10* Article 9. doi:10.1002/meet.14504701140
- Cutrona, C. E., Russell, D. W., & Rose, J. (1986). Social support and adaptation to stress by the elderly. *Psychology and Aging, 1*, 47–54.
- Cutrona, C. E., & Russell, D. W. (1987). The provisions of social relationships and adaptation to stress. *Advances in Personal Relationships, 1*, 37–67.
- Erdogan, B. Z. (1999). Celebrity endorsement: A literature review. *Journal of Marketing Management, 15*, 291–314.
- Eysenck, S. B. G., Eysenck, H. J., & Barrett, P. (1985). A revised version of the psychoticism scale. *Personality and Individual Differences, 6*, 21–29.

- Freeman, G., Bardzell, J., & Bardzell, S. (2016). Revisiting computer-mediated intimacy: In-game marriage and dyadic gameplay in audition. In *Proceedings of CHI'16* (pp. 4325–4336). New York, NY: ACM.
- Freeman, G., Bardzell, J., Bardzell, S., & Herring, S. (2015). Simulating marriage: Gender roles and emerging intimacy in an online game. In *Proceedings of CSCW'15* (pp. 1191–1200). New York, NY: ACM.
- Freeman, G., & Wohn, D. Y. (2017a). eSports as an emerging research context at CHI: Diverse perspectives on definitions. In *CHI'17 late breaking work* (pp. 1601–1608). New York, NY: ACM.
- Freeman, G., & Wohn, D. Y. (2017b). Social support in eSports: Building emotional and esteem support from instrumental support interactions in a highly competitive environment. In *Proceedings of CHI PLAY'17* (pp. 435–447). New York, NY: ACM.
- Freeman, G., & Wohn, D. Y. (2018). Understanding team formation and coordination in eSports. *Computer Supported Cooperative Work (CSCW): The Journal of Collaborative Computing and Work Practices*, 27, 1019–1050.
- Hamilton, W. A., Garretson, O., & Kerne, A. (2014). Streaming on twitch: Fostering participatory communities of play within live mixed media. In *Proceedings of CHI'14* (pp. 1315–1324). New York, NY: ACM.
- Hilvert-Bruce, Z., Neill, J. T., Sjöblom, M., & Hamari, J. (2018). Social motivations of live-streaming viewer engagement on Twitch. *Computers in Human Behavior*, 84, 58–67.
- Huh, J. (2015). Clinical questions in online health communities. In *Proceedings of CSCW'15* (pp. 1488–1499). New York, NY: ACM.
- Introne, J., Semaan, B., & Goggins, S. (2016). A sociotechnical mechanism for online support provision. In *Proceedings of CHI'16* (pp. 3559–3571). New York, NY: ACM.
- Jones, A. (2018). *Fortnite player numbers reached nearly 80 million in August alone*. Retrieved from <https://www.pcgamesn.com/fortnite/fortnite-battle-royale-player-numbers>
- Lehdonvirta, V. (2009). Virtual item sales as a revenue model: Identifying attributes that drive purchase decisions. *Electronic Commerce Research*, 9, 97–113.
- Li, Y., Kou, Y., Lee, J. S., & Kobsa, A. (2018). Tell me before you stream me: Managing information disclosure in video game live streaming. In *Proceedings of the ACM on Human-Computer Interaction* (Article 107, p. 17). New York, NY: ACM.
- Lottridge, D., Bentley, F., Wheeler, M., Lee, J., Cheung, J., Ong, K., . . . Rowley, C. (2017). Third-wave live streaming: Teens' long form selfie. In *TVX'17* (Article 20). New York, NY: ACM.
- McCroskey, J. C., & McCain, T. A. (1974). The measurement of interpersonal attraction. *Speech Monographs*, 41, 261–266.
- Molla, R. (2018). *Watch Fortnite take over the live video game market*. Retrieved from <https://www.recode.net/2018/6/13/17453210/fortnite-epic-games-video-game-live-market>
- Nojima, M. (2007). Pricing models and motivations for MMO play. In *Proceeding of DiGRA 2007* (pp. 672–681).
- Oh, G., & Ryu, T. (2007). Game design on item-selling based payment model in Korean online games. In *Proceeding of DiGRA 2007* (pp. 651–657).

- Reysen, S. (2005). Construction of a new scale: The Reysen likeability scale. *Social Behavior and Personality, 33*, 201–208.
- Russell, D., Peplau, L. A., & Ferguson, M. L. (1978). Developing a measure of loneliness. *Journal of Personality Assessment, 42*, 290–294.
- Seering, J., Kraut, R., & Dabbish, L. (2017). Shaping pro and anti-social behavior on twitch through moderation and example-setting. In *CSCW'17* (pp. 111–125). New York, NY: ACM.
- Sjöblom, M., & Hamari, J. (2017). Why do people watch others play video games? An empirical study on the motivations of Twitch users. *Computers in Human Behavior, 75*, 985–996.
- Spangler, T. (2017). *Twitch will let more streamers earn money, after users spend over \$12 million on cheering emoji*. Retrieved from <https://variety.com/2017/digital/news/twitch-affiliate-program-cheering-12-million-dollars-1202392024/>
- Tang, J. C., Venolia, G., & Inkpen, K. M. (2016). Meerkat and periscope: I stream, you stream, apps stream for live streams. In *Proceedings of CHI'16* (pp. 4770–4780). New York, NY: ACM.
- Turtiainen, R., Friman, U., & Ruotsalainen, M. (2018). “Not only for a celebration of competitive overwatch but also for national pride”: Sportificating the Overwatch World Cup 2016. 1–21. doi:10.1177/1555412018795791
- Twitch.tv. About Twitch. Retrieved September 16, 2017, from <https://www.twitch.tv/p/about/>
- Weller, C., & Butt, R. (2016). Millions of lonely Chinese bachelors are turning to live-streams for human contact. *Business Insider*. Retrieved from <http://www.businessinsider.com/chinese-bachelors-livestreams-2016-7>
- Wohn, D. Y. (2014). Spending real money: Purchasing patterns of virtual goods in an online social game. In *Proceedings of CHI 2014* (pp. 3359–3368). New York, NY: ACM.
- Wohn, D. Y. (2019). Volunteer moderators in Twitch micro communities: How they get involved, the roles they play, and the emotional labor they experience. In *Proceedings of CHI'19, 160*. New York, NY: ACM.
- Wohn, D. Y., Freeman, G., & McLaughlin, C. (2018). Explaining viewers’ emotional, instrumental, and financial support provision for live streamers. In *Proceedings of CHI, 474*. New York, NY: ACM.
- Wulf, T., Schneider, F. M., & Beckert, S. (2018). Watching players: An exploration of mediaenjoyment on Twitch. *Games and Culture, 1*–19.
- Yang, Y. (2017, January 5). In China, live-streaming apps soothe lonely souls and create fortunes. *LA Times*. Retrieved from <http://www.latimes.com/world/asia/la-fg-china-live-streaming-20161128-story.html>
- Yu, E., Jung, C., Kim, H., & Jung, J. (2018). Impact of viewer engagement on gift-giving in live video streaming. *Telematics and Informatics, 35*, 1450–1460.
- Zhu, Z., Yang, Z., & Dai, Y. (2017, July). Understanding the gift-sending interaction on live-streaming video websites. In *International Conference on social computing and social media* (pp. 274–285). Cham, Switzerland: Springer.

Author Biographies

Donghee Yvette Wohn is an assistant professor at New Jersey Institute of Technology and director of the Social Interaction Lab (socialinteractionlab.com). Her research is in the area of human–computer interaction where she studies the role of algorithms and social interactions in live streaming, eSports, multiplayer gaming, and social media. Funded by the National Science Foundation, Mozilla Foundation, and Yahoo, her main projects examine (1) content moderation and the creation of safe spaces; (2) social exchange in digital economies, which include the transactions of emotional, informational, and financial support; and (3) news consumption via social media.

Guo Freeman is an assistant professor of human-centered computing at Clemson University. Her research focuses on how interactive technologies (e.g., digital gaming) shape interpersonal relationships and collective behavior. She has over 40 publications in top venues for information science and human–computer interaction and is also the author of the book *Multiplayer Online Games: Origins, Players, and Social Dynamics* (Taylor & Francis/CRC Press). She has extensively published on topics including computer-mediated interpersonal relationships; self-presentation online; computer-mediated communication, social media, and culture; theorizing online communities and online behaviors; and team dynamics and social support in competitive gaming. Her work has been funded by the National Science Foundation.