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Streaming Your Identity: Navigating the Presentation of Gender and Sexuality through Live Streaming

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Abstract. The digital presentation of gender and sexuality has been a long-standing concern in HCI and CSCW. There is also a growing interest in exploring more nuanced presentations of identity afforded in emerging online social spaces that have not been thoroughly studied. In this paper, we endeavor to contribute towards this research agenda in yet another new media context -- live streaming -- by analyzing female and LGBTQ streamers' practices to present and manage their gender identity and sexual identity. Our findings highlight streamers' gender representation and sexual representation as a demonstration of controlling their own bodies, an awareness of the audiences and the resistance to their expectations, and an exhibition of the affordances and power structure of the specific online social space. We extend existing studies on live streaming by exploring the understudied gender identity and sexual identity aspect of the streaming practices. We also highlight the less audience/performance-oriented but more self-driven aspect of digital representations and the importance of affirmation and empowerment in this process. We add nuance to the existing HCI/CSCW studies on gender and sexuality by investigating a highly dynamic, interactive, and multilayered self-presentation mechanism emerging in live streaming and point to the need for potential new lenses to analyze technology-supported identity construction.

Keywords: Gender; Sexuality; Self-presentation; Livestreaming

1 Introduction

Digital presentation with regard to gender and/or sexuality has been a long-standing concern in HCI and CSCW as it closely relates to domestic computing, experience design, embodied interaction, and aesthetic interaction (Kannabiran

2011). It also significantly influences emerging HCI research agendas such as feminist HCI (Bardzell 2010; Bardzell and Bardzell, 2011; Rode 2011), queering HCI (Light 2011), and intersectional HCI (Schlesinger 2017). In the past two decades, extensive work has collectively highlighted *selective self-presentation/performance* and *visibility* as two important and mutually complementary lenses to understand how people perceive, construct, and manage their digital presentations of gender and sexuality in diverse online social spaces such as social media sites, forums, virtual worlds, and multiplayer online games. This body of literature has explored issues such as the authenticity of digital identities (Haimson and Hoffmann, 2016; Marwick 2005), audience management on social media (Devito et al., 2017; Kairam et al., 2012; Litt 2012; Litt and Hargittai, 2016), multiplicity in self-presentation within a single platform or across multiple platforms (Dimicco and Millen, 2007; Farnham and Churchill; Panek et al., 2013), gender roles and queerness in gaming and virtual worlds (Ducheneaut 2010; Freeman et al., 2015; Huh and Williams, 2010; Ruberg and Shaw, 2017; Yee et al., 2011), and challenges for marginalized users (e.g., LGBTQ) to disclose and present themselves online in their everyday lives or during important life transitions (Blackwell et al., 2016; Carrasco and Kerne, 2018; Devito et al., 2018; Haimson 2018; Haimson et al., 2016).

These studies have provided solid understandings of presenting gender and/or sexuality in well-established and widely recognized online social spaces (e.g., social networking sites such as Facebook). Yet, with emerging novel social technologies that have not been thoroughly studied, to what degree these findings and analytical lenses can be applied to new research context is unclear.

Therefore, there is a growing interest in HCI and CSCW to explore more nuanced presentations of identity emerging in online social spaces that have not been thoroughly studied, in hopes of 1) shedding light on how these nuanced presentations extend our current understandings of gender and sexuality that are mediated, constructed, and shaped by technology; and 2) exploring how emerging online social spaces can further help online users portray, enact, and experience their online identities in novel ways. Examples include the so-called "throwaway accounts" on Reddit (Leavitt 2015); the creative use of Tumblr's tagging and blog formatting for LGBTQ bloggers' identity construction (Oakley 2016), Instagram's affordance for visualizing identify, life changes, and sensitive self-disclosures (Andalibi et al., Leaver and Highfield, 2018; Newman 2015); and how location-based mobile dating apps for LGBTQ users produce sexuality and the "desiring user" (Birnholtz et al., 2014; Hardy and Lindtner, 2017).

In this paper, we endeavor to contribute towards the above-mentioned growing research agenda in yet another new media context-- live streaming-- by analyzing female and LGBTQ streamers' practices to present and manage their gender identity and sexual identity. Live streaming is unique from any other systems regarding self-presentation due to its affordance of high-fidelity and

multidimensional physical presence -- as a social interaction space, livestreaming allows for a variety of inputs (e.g., real time video, audio, and text) that influence both the content creator (i.e., streamers) and the audience (i.e., viewers). These may introduce new practices and phenomena of self-presentation that distinguish from asynchronous and/or low-fidelity text/image-based social media platforms. However, while live streaming has been investigated from different views in the fields of HCI and CSCW, very little study explores the aspect of self-presentation in live streaming. Our focus on live streaming, therefore, not only points to the increasing importance to understand how identity seamlessly shapes the creation and reception of content but also sheds light on how people can present and experience their gender identity and sexual identity in new and different ways. Especially, we chose female and LGBTQ streamers as our sample because these users are often considered marginalized and vulnerable populations in online social spaces who further highlight gender and sexuality as keys to their digital representations. This directly affects how they behave and interact through live streaming. Specifically, we investigate three research questions:

RQ1: How do streamers perceive, understand, and interpret their presentations of gender and sexuality in the context of live streaming?

RQ2: What are streamers' unique strategies to present gender and sexuality through live streaming?

RQ3: What are the main challenges for streamers' presentations of gender and sexuality?

Our contributions to HCI and CSCW are two-fold. First, our contribution lies in the case study itself. There is a growing body of HCI and CSCW literature on social engagement and viewer-streamer interaction in live streaming (e.g., Hamilton et al., 2014; Wohn et al., 2018). Yet the gender identity and sexual identity aspect of the streaming practices is an understudied topic. Our case study, therefore, provides empirical evidence of how live streaming platforms afford new phenomena and approaches of experiencing and practicing gender identity and sexual identity. Second, we contribute towards a growing broader research agenda in HCI and CSCW on more nuanced presentations of identity in emerging novel online social spaces. We do so in four ways: 1) exploring the less audience/performance-oriented but more self-driven aspect of digital representations -- as an *affirmation* of one's own perception of oneself so as to (re)establish connections to the world, the others, and the self; and as an *empowerment* to express and advocate gender and LGBTQ equity; 2) highlighting a highly dynamic, interactive, and multilayered self-presentation mechanism afforded by a complex system featuring *content, viewers, streamers, and subculture*; 3) pointing to the need for potential new lenses to analyze technology-supported identity construction beyond *selective self-presentation/performance and visibility*; and 4) calling for more critical research on connections between nuanced digital presentation afforded by new and novel systems and unexpected

social consequences such as tensions between supporting multimodal self-disclosing as agency and protecting necessary privacy.

2 Background

Two strands of research are shaping this study: the presentation of gender and sexuality in online social spaces; and live streaming as a new social interaction space.

2.1 The Presentation of Gender and Sexuality in Online Social Spaces

Identity, as a central concept to people's online and offline experiences, often seems to be applied with varying meanings, ranging from as a social being belonging to a group (e.g., being female or LGBTQ) and as an established image of self through putting on specific clothes or make-up to sometimes about psychological identity through having better understandings about one's self. In this paper, we especially focus on the gendered and sexualized aspects of identity: how one defines and understands his/her self with regard to gender and sexuality, and how such understandings affect the way through which one presents his/her self in live streaming.

From a theoretical perspective, gender and sexuality are not two distinct and separate categories. Rather, they are intimately related themes that are central to identity. The development of gender identity and sexual identity is essential to construct stable and consistent identities (Kroger 1995). Discourses of gender and sexuality are also inextricably interwoven. Their interrelationships directly affect important concepts such as transsexuality and transgender (Richardson 2007). In the past two decades, a large body of HCI/CSCW research has investigated the complexity of presenting gender and sexuality in online social spaces and how technologies afford and mediate such complexity. Many of them focus on well-established mainstream online social spaces such as Facebook (Bailey et al., 2013; DeVito et al., 2018; Haimson 2018; Haimson et al., 2016; Litt 2012; Litt and Hargittai, 2016; Marwick 2005), Twitter (Walton and Rice, 2013), and popular online games and virtual worlds including *World of Warcraft*, *Second Life*, *EverQuest*, and *Audition* (Ducheneaut 2010; Freeman et al., 2016; Freeman et al., 2015; Huh and Williams, 2010; Yee et al., 2011).

In particular, two mutually complementary lenses have been used to analyze the intertwining identity-technology relationships. One is *selective self-presentation/performance* based on Goffman's metaphor of *theatrical performance* (Goffman 1978). According to Goffman, self-identity is constructed in a collective and interactive process within different social settings. In this sense, gender representation and sexual representation online are largely

performed and audience-oriented: it is important for performers (i.e., users who endeavor to present themselves online) to identify audiences (i.e., other online users who perceive and interpret performers' digital representations) so as to adjust their performance (i.e., how performers present and practice their gender and sexuality online).

Many existing online social spaces are designed to support such a performance/audience-driven approach to present identity. First, many systems support the creation of multiple separated profiles or 'circles' to carefully 'craft' the aspect of the self to be presented (Kairam et al., 2012; Marwick 2005). Second, people can choose to construct different facets of identity across different systems (Farnham and Churchill, 2011). Third, some systems such as online gaming and virtual worlds afford the experimentation of completely new identities (e.g., cross-gender play) (Huh and Williams, 2010). Therefore, this lens highlights how gender and sexuality are portrayed and experienced as a combination of conscious personal choices and specific technological affordances of online social spaces. It sheds light on a number of identity practices and issues with regard to gender and/or sexuality in these spaces, including the authenticity and multiplicity of digital identities (Dimicco and Millen, 2007; Farnham and Churchill; Haimson et al., 2016; Panek et al., 2013), identity construction based on "the imagined audience" (Litt 2012; Litt and Hargittai, 2016), and cross-gender/queerness gameplay (Freeman et al., 2016; Freeman et al., 2015; Huh and Williams, 2010; Ruberg and Shaw, 2017).

The other lens, *visibility*, especially attends to marginalized users' (e.g., LGBTQ) practices and challenges of presenting gender identity and sexual identity in online social spaces. Overall, it refers to such users' control over the disclosures of sexual orientation or gender identity to the outgroup (Blackwell et al., 2016; Carrasco and Kerne, 2018). In particular, it highlights the broader sociopolitical significance of disclosing sexual orientation or gender identity -- it is not only important to the individual process of accepting and sharing one's identity, but also in political advancement and public advocacy toward greater acceptance of non-normative identity (e.g., LGBTQ) (Blackwell et al., 2016). For example, this lens has been used to investigate LGBT parents' online disclosures (Blackwell et al., 2016), supporting LGBT users' selective visibility on social media (Carrasco and Kerne, 2018), and transgender and gender non-conforming SNS users' struggles when disclosing major identity changes online (Haimson et al., 2015; 2016).

More recently, there is an emerging trend in HCI and CSCW to better understand more nuanced presentations of identity in emerging online social spaces, especially in those that have not been widely studied. Such studies have highlighted a number of new phenomena and practices concerning gender and sexuality, including: 1) *temporality* as shown in the so-called "throwaway accounts" on Reddit (Leavitt 2015); 2) *tagging and formatting* as in Tumblr

LGBTQ bloggers' creative writing (Oakley 2016); 3) *visualization* as in image-centric platforms (e.g., Instagram) (Andalibi et al., 2017; Leaver and Highfield, 2018; Newman 2015); and 4) *geography* as in location-based mobile dating apps for LGBTQ users (Birnholtz et al., 2014; Hardy and Lindtner, 2017).

However, two limitations emerge in prior research. First, a large body of prior research has focused on presentation of gender and sexuality in well-established mainstream online social spaces (e.g., Facebook and multiplayer games) using the *selective self-presentation/performance* and/or the *visibility* lenses. Yet, to what degree these findings and theoretical lenses can be applied to new research context is unclear. Second, live streaming is unique from any other systems regarding self-presentation due to the real time and high-fidelity nature of interactions and the complicated interactive mechanisms between streamers and diverse viewers. Yet, very little study explores the interplay of technology, design, and affordance in relation self-presentation in live streaming. Our goal of this paper is to contribute towards addressing these two limitations by investigating how users present, experience, and affirm their gender identity and sexual identity through live streaming, a new social interaction space that affords and supports high-fidelity and multidimensional physical presence by real time audio, video, and textual interaction.

2.2 Live Streaming as a New Social Interaction Space

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). Since 2009, live streaming has increasingly become a broader social media trend due to the advanced network technologies and the growing public interests in user-generated digital content (Hilvert-Bruce et al., 2018; Li et al., 2018). Twitch.tv is currently one of the largest live streaming platforms. In the early days, Twitch was primarily for video game players to share their gameplay in real time. Now it hosts a wide range of live content from gameplay, painting, eating, to cooking.

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., Consalvo, 2017; Hamilton et al., 2014; Li et al., 2018; Sjoblom and Hamari, 2017; Taylor 2018; Wulf et al., 2020). It has also opened new research frontiers with regard to viewer-streamer interaction (e.g., Cai and Wohn, 2019a; Wohn et al., 2018), content moderation (e.g., Seering et al., 2017, Cai and Wohn, 2019b), and privacy issues in cyberspace (e.g., Li et al., 2018). Prior 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 et al., 2016). Younger streamers and viewers (e.g., teens) even consider livestreaming 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; Sjoblom and Hamari, 2017). Specifically, parasocial relationships, suspense of the video game outcome, and using the chat function predominantly contribute to viewers' enjoyment (Wulf et al., 2020).

In particular, though live streaming platforms are sometimes criticized for sexism and online harassment, currently numerous efforts have been done to encourage the rise of female and LGBTQ streamers (Alexander 2018). As of July 2018, seventeen out of the fifty most popular creative Twitch streamers are female (Smith 2018), and *QueersPlayGames* (<http://queersplaygames.com/>) is emerging as a well-known community for LGBTQ streamers. However, despite live streaming has been investigated as a form of cultural production (Gray 2017, Pellicone and Ahn, 2017), a part of digital economy (Johnson 2019; Wohn and Freeman, 2020; Wohn et al., 2018), an engagement with cultural heritage (Lu et al., 2019), and affective labor and performance (Woodcock and Johnson, 2019), very little study explores how this emerging social space both affords people's (especially female and LGBTQ streamers') perceptions, experiences, and interpretations of their gender identity and sexual identity and introduces new challenges in this process. This open space, therefore, leads to the three RQs that we proposed at the beginning of this paper.

3 Methodology

This study is part of a larger research on social dynamics on live streaming platforms. Of all the live streaming platforms, Twitch.tv is considered one of the biggest and most popular. It enjoys more than 15 million unique daily visitors, each spending an average of 95 minutes watching live gaming and other content (<https://twitchstats.com/>). Between January and May of 2019, there were 4.2 million monthly streamers, and a cumulative 313 billion minutes watched by viewers (<https://twitchtracker.com/>). Therefore, for this study we especially focused on Twitch streamers who were self-identified as women and/or LGBTQ.

We used various methods and platforms in order to recruit diverse participants. First, we attended TwitchCon in person, a convention for Twitch streamers, to directly recruit participants. Five participants were recruited in this way. Second, we reached out to ethnic minority and LGBTQ online groups. For example, we posted recruitment messages on Discord (a computer-mediated communication application especially for gamers) channel for Anykey, a non-profit organization

that advocates for diversity in gaming, as well as other group channels for Black streamers and female streamers. Third, we used keywords search (including words such as "Twitch, female, woman, streamer, gay, black, Asian, harassment, lesbian, trans") on Twitter to find people who identified as being a female and/or LGBTQ live streamer in their Twitter profile and/or had Tweeted about being harassed during streaming. We then directly contacted them either via Twitter messages or their emails, if their contact information were listed on their Twitter profiles. We contacted 100 streamers through this method.

We conducted in-depth, semi-structured interviews with all streamers who responded to our recruitment messages and were willing to be interviewed. As a result, 25 interviews were conducted. Participants were interviewed either by telephone or audio chat on Discord. Interviews lasted between 60 and 90 minutes, and participants were given a \$50 gift card. Interviews started with questions about basic information about participants' stream, such as how often they streamed, how long they had been streaming, and the content they streamed. The main interview questions were related to their interactions with the audience, self-presentation, perceptions and uses of the livestreaming systems and features, and moderation practices.

Among the 25 participants, 18 are cis women, two are trans women, and five are cis men. Seven participants self-identified their sexual orientation as being bisexual, lesbian, queer, or gay. Of the 24 participants who shared their ethnicity, 12 are White, two are African American, five are Asian, three are Latino, and two are mixed race. Table 1 summarizes the demographic information of the participants as well as their streaming content and number of followers/channel views.

Pseudonym	Gender	Age	Race	Sexual Orientation	Streaming Content	No. of followers/channel views
Amy	Cis female	30	Latino	Bisexual	Variety	188k/5M
Becky	Trans Woman	26	White	Straight	Gaming	254/4.9k
Cecelia	Cis female	24	Mixed	Straight	Variety	627/56.7k
Deb	Cis female	41	White	Straight	Creative	2k/77.8k
Emma	Cis female	20	White	Straight	Gaming	3.9k/37.5M
Fiona	Cis female	19	White	Lesbian	Creative, Gaming	23k/1.5M
Georgia	Cis female	44	African American	Queer	Creative, Gaming, Talk Show	5k/212.6k
Heidi	Cis female	24	White	Straight	Variety	3k/58k
Iris	Cis female	32	White	Straight	Gaming	508/21k
Jane	Cis female	31	Asian	Straight	Creative, Gaming	512/11k

Karen	Cis female	N/A	Asian	Straight	Art	553/4k
Lisa	Cis female	19	Asian	Straight	Art, Gaming	6.3k/9k
Maria	Cis female	25	White	Straight	Creative, Gaming	20.8k/387k
Nancy	Trans Woman	N/A	White	Straight	Gaming	66/2.6k
Olivia	Cis female	26	Latino	Straight	Gaming	2.5k/16k
Patty	Cis female	52	White	Straight	Gaming	979/22.7k
Quinn	Cis female	24	African American	Straight	Gaming	24k/723k
Rachel	Cis female	31	Latino	Straight	Gaming	536/16.9k
Stella	Cis female	22	Asian	Straight	Gaming	260/11.9k
Tina	Cis female	33	Asian	Straight	Gaming	N/A
Andrew	Cis male	N/A	N/A	Gay	Gaming	266/2.6k
Bobby	Cis male	25	White	Bisexual	Gaming	533/17k
Cooper	Cis male	29	White	Gay	Gaming	19k/384k
Daniel	Cis male	28	Latino	Bisexual	Gaming	227/2.3k
Everett	Cis male	34	White	Gay	Gaming	45.8k/1.8M

Table 1: Demographic information of interviewees

Inspired by phenomenology (Eatough and Smith, 2008), we then used an empirical, in-depth qualitative analysis of the collected data to explore streamers' self-presentation on live streaming, especially with regard to their gender and/or sexuality. We sought first-person, subjective, narrative accounts of streamers' experiences of self-presentation in the interviews, and we coded them thematically. Our coding and analytical procedures were: 1) we closely read through the collected data to acquire a sense of the whole picture as regards how streamers approached their gender and sexuality through live streaming and collectively identified thematic topics and common features in the data (e.g., perceptions, practices, strategies, and challenges) for further analysis; 2) we carefully examined and reviewed the thematic topics and developed sub-themes; 3) we collaborated in an iterative coding process to discuss, combine, and refine themes and features to generate a rich description synthesizing streamers' interpretations and practices of gender identity and sexual identity on live streaming as well as the challenges that they encountered.

4 Findings

In this section, we present our findings regarding how streamers presented, practiced, and managed their gender and sexual identities through live streaming platforms. We divide our findings into three parts: a self-driven approach to present gender and sexuality; streamers' key strategies to support such an

approach by appropriating the live streaming platform; and challenges emerging in this process.

4.1 A Self-driven Approach to Present Gender and Sexuality through Live Streaming

An interesting finding emerging in our data is that many participants regarded how they presented gender and sexuality through live streaming as self-driven regardless of how viewers perceived them. Many described that live streaming platforms afforded ‘safe spaces’ for them to reveal non-binary or non-traditional gender identity and sexual identity, even amidst the harassment that they would sometimes be subject to. For example, Andrew (cis male, age unknown, race unknown, gay) noted,

One of my viewers has come out as bisexual in the past couple weeks, so I'm super proud of him for that. It was a neat little thing. He definitely thanked me and thanked the channel for providing him with a good queer space.

Specifically, we identified three main themes that support streamers' self-driven approach to present gender and sexuality through live streaming: negotiating gender and sexuality in the context of content creation; live streaming as an official ‘ritual’ to acknowledge gender and sexuality in public; and advocating gender and sexuality as an online activism.

4.1.1 Negotiating Gender and Sexuality in the Context of Content Creation

Live streaming is a content-centric social space. Content created by streamers is the key to trigger streamer-viewer online interactions and forge the formation of interest-based online communities (e.g., gaming, crafting, and DIY making). In this sense, how to manage the interactive relations between "who I am" especially concerning gender and sexuality and ‘what I create’ (i.e., the need for creating and crafting content for viewers) is central to female and LGBTQ streamers' digital presentations. Yet many participants noted that in their streaming practices, presenting who they were in their own beliefs was more important than creating and crafting their digital representations and the streamed content to please viewers. For example, some female streamers claimed that a straightforward "mirroring" between who they were and what they created-- how they presented themselves was not a performance and the content they created directly represented their identity. Heidi (cis female, 24, white, straight) described,

I don't like to pretend I guess like it's exhausting for me if I have to put on too much of a show so I try to keep it as genuine as possible... I don't curate a ton,

I swear a lot on my stream and that's just how it is and I swear a lot in real life too.

For female streamers such as Heidi, live streaming was less of an audience-oriented, customized 'performance' and more of a novel and meaningful way to reinforce and further advocate their understandings of themselves. This self-driven approach was essential to both attract viewers and satisfy their own social and emotional needs.

However, some LGBTQ streamers seemed to highlight a more dynamic relationship between their identity presentation and content creation. On the one hand, how they reinforced and further advocated their understandings of themselves in novel and meaningful ways through live streaming made the content they created more appealing. On the other hand, the popularity of the created content attracted more viewers to get to know the streamer as a human being in turn. In this process, explicitly disclosing their non-binary or non-traditional gender and sexuality was fundamental. Everett's (cis male, 34, white, gay) account explained this view:

Everybody visiting your channel for the first time is a stranger. You can start by saying I am going to play a popular game. If you do it that way, you are going to get a lot more people who do not care about you as a person. I would say people are in my channel mostly for me and secondarily for the game that I am playing.

For Everett, the content he created alone did not define who he was and would not attract and retain viewers in an organic way-- viewers would 'just focus on the game' but 'do not care about you as a person.' In this sense, the created content is somewhat ethereal: it can be easily copied and become out of date, or quickly lose popularity. In contrast, a streamer's digital presentation (e.g., who they are) including their gender identity and sexual identity, acts as the backbone to make the created content unique, which secures the audience pool: viewers are firstly attached to the streamer 'as a person' and then follow the content they create. This is considered a healthier and more sustainable approach for both establishing streamer-viewer interaction and affirming streamers' digital identity. In Everett's case, being a *gaming* streamer was not part of his online identity but being a *queer* gaming streamer was. Therefore, openly disclosing his queer identity became a significant and meaningful principle for his streaming practices. Such a disclosure not only distinguished him from other game streamers and attracted viewers who genuinely cared about him as a human being, but also oriented how he defined himself online and behaved accordingly.

4.1.2 Live Streaming as an Official ‘Ritual’ to Acknowledge Gender and Sexuality in Public

Compared to cis female streamers, LGBTQ streamers especially highlighted how presenting their gender and sexuality through live streaming was an official ‘ritual’ to announce and acknowledge their non-binary or non-traditional identity to others. Some technological affordances enable them to engage in such rituals, such as the ability to ‘tag’ their content with key words such as ‘LGBTQ,’ ‘Pride,’ or ‘gaymers’ to proactively associate their profile with these attributes. By publicly proclaiming these identity markers, streamers can not only express themselves but also attract viewers who are allies or supportive of these aspects of their identity.

For example, Becky (trans woman, 26, white, straight), a trans woman, told a story about how she revealed her new identity on a live stream:

I didn't want to come out with my old account. I was going to start over and I wanted to be open about my identity from the start. Once I saw Twitch talking about Twitch Unity¹. I thought now was a good time to start. I have a lot of trans friends and I kind of wanted a place where they could be themselves and not have to worry about anything.

According to this quote, live stream has become an official way for some LGBTQ streamers to reveal their gender identity and sexual identity to the public (i.e., chose to show their face and voice to all viewers). Though such a disclosure may sometimes cause controversies and harassment, these streamers often regard it as a fresh ‘start over’ to re-establish and re-negotiate their connections with themselves, others, and the society. This start over is symbolic because it represents the moment when more intimate self-reflections and self-awareness occur and a willingness to be open about gender and sexuality emerges. It is also ritualized because it becomes a ceremonial action to fully embrace their non-binary or non-traditional identity and openly exhibit it to the world.

In sum, through such a ‘ritual,’ LGBTQ streamers acknowledge that they can be perceived and portrayed more like human beings rather than digital figures by the viewers. Yet it may also make these streamers more vulnerable since they have to implicitly open some of the deepest and most meaningful dimensions of their personal lives to online strangers.

4.1.3 Advocating Gender and Sexuality as an Emerging Activism

For some of our participants, how they perceived and presented their gender identity and sexual identity online was beyond the individual level of

¹ Twitch Unity was an inclusivity initiative created by Twitch that allowed streamers and viewers to associate their streams and usernames with the event.

understanding, affirming, and negotiating their selves. Rather, it became an emerging activism to advocate gender equality and LGBTQ rights through live streaming. In this way, their presentation of gender and sexuality started to be sociopolitically significant.

However, advocating and promoting gender equality and LGBTQ rights was not a pre-existing goal for these streamers -- they did not start engaging in streaming to seek these values on purpose. Rather, this pursuit gradually emerged as part of their everyday streaming practices and became important to how they presented their gender identity and sexual identity through live streaming. Even some streamers themselves were surprised by this gradual and unexpected change, as Amy (cis female, 30, Latino, bisexual) noted,

We are not the so-called Social Justice Warrior but I'm surprised to find out if I see a chat is going to the wrong direction, I will speak up.

How did this happen? Many female streamers expressed their concerns that though more women were actively engaging in live streaming, they were still underrepresented, marginalized, and vulnerable. Some highlighted the traditional masculine gaming culture as a potential reason since Twitch started as a game streaming platform, for example, 'if we're good at games people never believe that we're actually good at the game because well, you're a female. Same thing for streaming' (Emma, cis female, 20, white, straight) and 'female gamers are like unicorns and the idea that Black women don't play video games or use technology is a myth that really needs to die' (Georgia, cis female, 44, African American, queer). Some others warned about the misogyny in online social spaces in general, such as 'being a female online just makes you an easy target. That's what you get being a Twitch stream girl with boobs' (Stella, cis female, 22, Asian, straight).

Due to these concerns, many female streamers decided to actively promote and reveal their gender identity in their live streaming practices rather than hiding or weakening it. Their choice was based on two considerations: increasing the visibility of existing female streamers and building role models to encourage prospective female streamers. Fiona (cis female, 19, white, lesbian) summarized,

I've learned that I actually have a quite of bit of female streamers more than I used to. Just being a strong female voice in the community attracts other women to my channel. We get to learn a lot about each other as we have serious conversations and real talks and discussions about women in streaming.

Through their everyday streaming practices, these streamers gradually realized that how they perceived, acknowledged, and presented their gender (i.e., women)

on live streaming was not just meaningful for themselves but associated with deeper social values and political aspirations -- how female streamers demanded a voice, fought to have a voice, and actively participated in shaping and appropriating the live streaming culture.

Some female streamers even took a more activist approach: pushing their actions to promote gender equality beyond the level of individual channels. In doing so, they vigorously engaged in large-scale community activities and campaigns in hopes of making a collective effort to foster a more open, tolerant, and friendly social atmosphere for female, LGBTQ, and other marginalized streamers. The following two quotes exemplify these efforts:

I have done a lot of campaigns for female empowerment and anti-bullying. The promotion of my policy, the zero tolerance policy, is something that a lot of people implement on their channels now. It's like if you wanna have a better community, try the zero tolerance policy. That doesn't mean just blocking or banning people, it also means acknowledging that what they did was unacceptable so that way we can promote a more positive community going on and going forward. (Olivia, cis female, 26, Latino, straight)

Recently I made a little clip that we put on Twitter. It said using the term titty streamer, which so many people use to describe women streaming, is really sexist. Even if there is a women who is exploiting her body on Twitch as [a] means to attract viewers, even if that is what she is doing openly and admittedly, she is still a human being with a personality that doesn't make her any less of a human and people should not just degrade her to a pair of boobs. I will have talks about those types of things and we'll share clips of me talking about that kind of stuff. Usually they will go viral. (Amy, cis female, 30, Latino, bisexual)

Collectively, these two quotes highlight female streamers' proactive self-reflections on presenting gender in order to build a counter-culture against sexism and misogyny in the live streaming community. They also proposed several concrete recommendations to heighten the activist aspect of their gender identity. The first was to widely promote and implement a 'zero tolerance policy.' This policy would empower female streamers to fight with cyber bullying by educating people to respect others and by building a supportive community for all. The second was to increase the general public's awareness of gender equality on live streaming. One strategy was to optimize other social media platforms outside live streaming (e.g., Twitter) to share and spread critiques on sexist attitudes and languages towards female streamers.

Regarding LGBTQ rights, streamers also gradually developed strong voices to acknowledge and support the LGBTQ community through live streaming. They

considered this pursuit both necessary and urgent as LGBTQ streamers were often trapped in the debates at the intersection of both gender and sexuality. Nancy (trans woman, age unknown, white, straight) described,

When I told people I am trans, they tried to play it like ‘oh okay, that's cool’ but then I could tell they never met a trans person before. There was a transition. Females in the industry are not taken seriously either. I get lumped into both categories so it's difficult to find my place in this community.

Due to such a double challenge (e.g., ‘get lumped into both categories’), LGBTQ streamers felt even more marginalized and developed an even higher demand to seek understandings, support, and acknowledgement from the public compared to some straight cis female streamers. In doing so, openly demonstrating how they understood and experienced gender and sexuality was critical to their digital presentation, for example,

I want more people to have hair they are proud of, have nails they are proud of, I want people to be proud of how they look and excited to be with others in a weird way. I want people to be happy and I think when they see me they see someone who is happy and proud of how they feel and look. And hopefully I can spread that and have positive influences on others. There are definitely proactive ways you can make direct action happen and I choose to be more a presence in a space rather than a force in a space. I don't really go out of my way to tell people how to live their lives but I do live a life that I think people also identify with. (Bobby, cis male, 25, white, bisexual)

Bobby's account well explained why presenting his LGBTQ identity on live streaming was much more than just promoting himself or his channel. It was about setting up role models to positively influence others (e.g., viewers) who had similar struggles regarding self-identification and sense of belongingness. It also acted as a proactive but non-violent approach to support the LGBTQ community - by ‘showing’ their own lives rather than ‘telling’ people how to live their lives.

Others also considered openly revealing and presenting their LGBTQ identity part of a broader social movement to unite LGBTQ streamers for community support and educational purposes. Becky (trans woman, 26, white, straight) explained,

It started by me joining LGBT streaming communities when I identified as male still. Through meeting some I figured out that I was trans and my depression was dysphoria. Then I just made friends and we had shared interests. I live a bit out in the country so it's not easy for me to meet other trans people in person. So hanging out in LGBT streaming communities is how

I meet more people like me. I learn about their experience and I have people I can ask about transitioning stuff. I get information from the source and people who experience it first hand rather than websites written by people who may or may not know what they're talking about. I just get a satisfaction of knowing there are more people like me.

According to this quote, LGBTQ streamers' advocacy concerning their gender and sexuality was not only aspirational (e.g., advocating LGBTQ rights) but also experiential: such advocacy cared about how individuals could find emotional satisfaction and social support by connecting to a community that was built upon shared identities. Features such as collective streaming, which enables multiple streamers to stream to one channel at the same time, helped build these shared identities. Similar to picture-in-picture, this feature is mostly used when people are having 'talk show' types of content or playing the same game. Bobby talked about how he joined a network of gay streamers who often streamed with each other as that was a method to build community and share their viewers.

At the same time, sometimes streamers wondered if they were qualified to be in the unexpected role of educator that they found themselves in. For them, being a woman and/or LGBTQ did not necessarily make one fully aware of all gender/sexuality issues: 'I don't feel like it's my role [to be an educator], but I do feel that I will end up doing it,' said Cooper (cis male, 29, white, gay).

In summary, for female and LGBTQ streamers involved in this study, presenting and promoting their gender identity and sexual identity as activism and empowerment was an unexpected but emergent outcome of their streaming practices. This pursuit gradually grew into a social awareness and responsibility -- gender and sexuality were not merely part of their streamer profile but a key to their digital presentations through which they advocated equality, justice, and social support for underrepresented groups (i.e., female and LGBTQ streamers).

4.2 Strategies to Present Gender and Sexuality through Live Streaming

To support their self-driven approach to present gender and sexuality, streamers developed two core strategies to appropriate the affordances of the live streaming technologies: manipulating webcams and microphones to highlight face and voice; and intentionally managing clothing and appearance to assert agency.

4.2.1 Manipulating Webcams and Microphones to Enhance Digital Presence

The implementation of webcam and microphone is considered central to conduct live streaming practices. These devices not only afford a high-fidelity presence of streamers but also significantly enrich the streamed content (e.g., showing the game being played, the streamer's face, and the streamer's voice

narrative all simultaneously). In addition, whether and how streamers use webcams and microphones indicates a type of power -- the potential to amplify the impact of their gender identity and sexual identity at their own will. For example, Georgia (cis female, 44, African American, queer) and Becky (trans woman, 26, white, straight) explained the powerful role of webcams in their streaming practices:

I want people to see that I'm African American female. I know that that opens me up to additional harassment, but I think about it as I want. If somebody is Black and they're viewing, they're looking for people to view, I want them to see that they're not alone. I pride that over the additional harassment that I might get. (Georgia)

I haven't been on hormones super long so I still look masculine. I occasionally had to explain what being trans is and it's led to some confrontations. But I understand that whether or not I want to, I am a form of representation. For a lot of people I'm the first trans person they meet. So educating is a common occurrence. (Becky)

Presenting one's face had various levels of fidelity depending on the streamer's technical equipment and their knowledge of the broadcasting software. At the very basic level, streamers used webcams built into their laptops. Yet those with more elaborate settings had separate cameras that could achieve a more flattering angle of their face, as well as proper lighting (e.g., ring lights). Green screens enabled "cropping" of their face so that only their face appears on the stream rather than the entire background. Broadcasting both their face and their content required streaming software, the most popular ones being Open Broadcasting System (OBS), Streamlabs, and XSplit.

It was rare that streamers had this set up from the very beginning, but 'upgraded' their equipment over time. Sometimes, their viewers helped with these upgrades. It was common for streamers to list links to desired equipment, software, or computer accessories on their Twitch page in case people wanted to purchase and gift them to the streamer. They also held special fundraising campaigns—for example, Georgia ran a special stream to upgrade her PC.

In addition to their appearance, streamers were hyper aware of the effects that audio has on their self-presentation. Nancy (trans woman, age unknown, white, straight) described her experience of using audio in streaming:

I did not directly tell some people that I'm trans. I was like "oh I'm female" but then somebody went "oh the voice" and then they went, "I didn't know." And then they just start saying a few pronouns and stuff. They would say "she" as some streamers do, but then they would go "he" cause they assume because of

my voice. It's frustrating but I think it's still important for me to show my voice.

The above three quotes show that many female and LGBTQ streamers were well aware of the potential risks of using webcams and microphone, including possible harassment, confrontations, and confusions about their identity. Yet, participants did not regard such devices as threats to their digital presentations. Rather, they considered actively incorporating webcams and microphones a more vivid, organic, and comprehensive way to enhance the presence of the underrepresented groups, which may facilitate community building and social change. For example, viewers would see their faces, hear their voices, and potentially know more about them and treat them as human beings rather than IDs or profile pictures behind the computer screen. In addition, such an enriched presence could positively influence other female or LGBTQ viewers and streamers, which motivated them to face, express, and experience their identity and made them feel 'not alone.'

It is important to note that when we are talking about streamers' usage of microphones and webcams, it is not about the specific equipment but rather about their choice to have it or not. By choosing to omit or include audio and/or video, they are asserting control over what they want to present. For example, Rachel (cis female, 31, straight), one of the few streamers who chose not to have a camera, said that the absence of the camera was due to the fact that she had limited technical support as well as the desire to avoid harassment regarding her appearance.

4.2.2 Managing Clothing and Appearance for Agency

Another strategy that many female and LGBTQ streamers used was to intentionally manage how they dressed and looked on live streaming. Some considered it a proactive tactic to assert their agency and independence as well as resilience against the sexism and anti-LGBTQ movement in live streaming. Patty (cis female, 52, white, straight) explained,

It really doesn't matter what you look like, how old you are, and how you're dressed. You could be dressed like a ninja with everything totally covered and somebody would still find something to be rude about. Really, it doesn't matter. You should not modify your clothing and look based on what people are saying because it doesn't matter. You should just be you.

Some female streamers revealed that they would not purposely dress up or put on extra make up just to look more attractive to the viewers. For example,

I'm not a person that's used to putting on a lot of makeup I guess. I know the difference between no makeup and camera-ready makeup, so I'll do a little bit to make sure that my skin looks somewhat clean and clear. I think our ultimate goal is to always come across as clear as possible, so that every detail makes sense in that we look real versus fake. (Heidi, cis female, 24, white, straight)

In doing so, these female streamers chose to wear and look like themselves regardless of viewers' perceptions and demands. A few participants noted,

I just kind of learned to wear whatever I'm feeling comfortable in for that day. I am not gonna stream here in lingerie um, but if it's hot in my room I will wear a tank top and if some people want to come in and make lewd comments to me they're gonna get banned. So that's been the evolution of me deciding what I want to wear, I wear whatever I'm comfortable in. (Amy, cis female, 30, Latino, bisexual)

The most conscious decision is overall I try to not appear like a slob or anything too degenerate. Mostly because I don't think I'm that kind of person to begin with and I don't do anything too much. I might sort of fix my hair if it looks like really bad but that's about it. I don't wear makeup, dress up fancy or anything like that. Just like what I do in my daily life. (Lisa, cis female, 19, Asian, straight)

Both participants acknowledged that there was a general trend to stereotype and objectify female streamers. Some women, either voluntarily or unwillingly, even complied with this trend by dressing revealingly. Without judging those who subjected to such a trend, these participants strongly advocated the idea of 'being yourself' in their streaming practices. For them, making free decisions on what to wear and how they looked represented how they controlled their own bodies and built images of strong female figures in live streaming. Some of them even used clothing as a weapon to demonstrate their belief on gender equality and resist viewers' inappropriate behaviors, as Heidi (cis female, 24, white, straight) described,

I've worn like a very thin spaghetti strap dress on stream and I got comments and that was kind of annoying, but it didn't stop me from wearing a dress the next week. You know what? Fuck this person I'm going to wear it more.

In contrast, LGBTQ streamers preferred to 'dress up' more than what they usually did under some circumstances. Bobby (cis male, 25, white, bisexual), who streamed on both his own channel as well as on a collective channel for gay streamers, revealed such an example:

Usually if I'm having a stream on the [collective] channel, I want to put my best face forward so not only will I make sure I be showered, I'll be clean, I'll have some fun eccentric colorful clothes on. I'll also do my nails, I'll do my hair, um, sometimes I will even get it freshly dyed again so that it's a more vibrant color. It's unbelievable that all the people who are like part of that. I'm like 'whoa you guys are so cool,' and they look at me like 'you too' and 'you are awesome.'

In this example, Bobby carefully dressed up and did more preparation to 'look good' on purpose. Yet, dressing up was not an exaggeration or performance of his identity. Instead, it became a crucial mechanism to highlight the uniqueness of his sexual identity and present the best part of it to his community. For him, clothing and appearance not only reinforced his self-confidence but also made his peers, viewers, and community better recognize and appreciate his efforts.

4.3 Challenges for Streamers' Presentations of Gender and Sexuality

Thus far we have presented female and LGBTQ streamers' self-driven approach to present gender and sexuality as well as their key strategies to support such an approach. We now turn to the challenges that they encounter in this process.

4.3.1 The Mismatch between Viewers' Expectations and Streamers' Aspirations

One of the largest challenges that many female and LGBTQ streamers faced was the mismatch between viewers' expectations and their own aspirations to present their gender and sexuality. In particular, participants were worried about the tensions between a submissive, objectified, and hetero-normative gender role and their own will to advocate a more open, equal, and tolerable view of gender and sexuality through live streaming. Emma (cis female, 20, white, straight) described her concern:

I myself and many other female streamers I know, don't like to dress all revealing. When people get used to the very sexualizing of streamers and find other streamers who don't dress all revealing for some reason, they will get really offended that, that female streamers don't dress more revealing.

For her, the perceived stereotype of sexualized female streamers not only affected how female streamers behaved but also shaped the live streaming culture as a whole. In her opinion, on the one hand, these inappropriate expectations downgraded female and LGBTQ streamers to a marginalized and vulnerable

position, making promoting gender equality and LGBTQ rights challenging. On the other hand, it led to a false impression and toxic attitude about gender roles (e.g., women being submissive and men being dominant as an acknowledged social norm), which hindered the formation of a healthy, positive, and supportive live streaming community.

LGBTQ streamers also shared similar stories about how viewers had false or odd expectations for them, mainly due to the lack of knowledge about the LGBTQ community. For example, Andrew (cis male, age unknown, race unknown, gay) highlighted one such example: the assumption that gay streamers were more open to flirting:

People seem to feel that sexual come-ons and sexual dialogue is less taboo in the gay community than it is in other communities, like with heterosexual or anything like that. People are more just kind of flirtatious with gay streamers and they expect you to flirt back. Sometimes this is OK but sometimes not.

Such a mismatch does not always lead to harassment, hate speech, or toxic comments. However, it is difficult for streamers to tackle this issue as the mismatch often leads to confusion and awkward interactions between streamers and viewers. For example, Deb (cis female, 41, white, straight) noted,

What they see is that ok I am a woman and I am streaming and there is no one watching her so maybe she'll do stuff for me. So, I have been propositioned, I have been asked to give private shows, umm, yeah, they think because you are a woman and you are on Twitch so you are there to please them basically sometimes.

And Daniel (cis male, 28, Latino, bisexual) added,

There was a boy. I think he was younger, he wasn't really educated on how to handle certain situations. He was asking me if my stream was an okay place for straight people and I was like "yes that's perfectly fine," and I thought that's where it ended and he kept bringing up how his dad hated gay people and how he's perfect okay with gay people and he kind of kept making it a topic. I was not sure what he expected me to respond.

In these cases, Deb (a straight cis female streamer) and Daniel (a LGBTQ streamer) were bothered by viewers' expectations for how they should behave as women or LGBTQ through live streaming. There was a demand for female streamers to follow male viewers' rules, entertain them, and always acknowledge male viewers' compliments; otherwise they were considered rude. There was also an expectation for LGBTQ streamers to accept flirting or reveal their

vulnerability. In our data, our participants embraced a different perception for their gender roles and sexual identity and thus rejected such expectations.

4.3.2 Tensions between Live Streaming Identity and Offline World Limitations

Our participants also cited tensions between their presentations of gender and sexuality in live streaming and constraints in their offline lives as another primary challenge. While they were proud of what they represented, they were concerned that these activities might undermine their offline lives due to the loose anonymity of live streaming platforms/practices (e.g., showing face/voice and intensive interaction with viewers). Bobby's (cis male, 25, white, bisexual) and Iris' (cis female, 32, white, straight) accounts demonstrate such a challenge:

My day job is working at a conservative middle school as the tech person. I'm a public facing live streaming person that during the day also works with 13 and 14-year-olds in mass and so there is a line. If I do something really obviously weird or too radical, I could totally lose my job. That makes me more careful. I am very proud of what I do and how I represent myself and proud of whom I represent. So I don't have any fears. I have no worries about it. But I was at one point worried about being too overtly queer on live streaming because I was afraid of being fired if my students or coworkers saw me online. (Bobby)

I was at work and one of my co-workers came up to me and asked '...do you stream by any chance?' And I was like "I do," but it's something I don't tend to advertise in my everyday life and they were like "I didn't know and one of your fans came in started talking about your stream." It was very embarrassing. (Iris)

For Bobby, his digital representation on live streaming to promote his LGBTQ identity might very likely cause backfire to his offline career. Similarly, Iris shared the hesitance to let her offline social circle be aware of her digital presence on live streaming. For her, there was a fine line between her 'everyday life' and what she did on live streaming. Based on their stories, there seems to be a dilemma: as a 'public facing' live streamer, their online presence and streaming practices effectively facilitated their perceptions, understandings, and experiences of gender and sexuality, which they were very proud of. However, being 'public facing' may also be counterproductive to their offline life, as their workplaces may not always support their approach of understanding and presenting gender identity and sexual identity.

In this sense, the high fidelity digital representation through live streaming explicitly or implicitly empowers many female and LGBTQ streamers online but

may also make them more vulnerable in their offline lives. As a result, many streamers tended to set up a boundary between their live streaming practices and private life, in hopes of not letting their digital representation negatively affect their offline social relationships.

5 Discussion

To answer our RQs, our findings have shown: 1) female and LGBTQ streamers in this study tended to adopt a less audience-oriented but more self-driven approach to present their gender and sexuality, highlighting the negotiation of gender and sexuality in the context of content creation, live streaming as an official ‘ritual’ to acknowledge gender and sexuality in public, and advocating gender and sexuality as an online activism (RQ1); 2) they used unique strategies to support this self-driven approach for self-presentation, involving manipulating webcams and microphones and managing clothing and appearance (RQ2); and 3) they often faced various challenges in their identity practices, including the mismatch between viewers’ expectations and streamers’ aspiration as well as tensions between live streaming Identity and offline limitations (RQ3). Using our findings as a basis, we now discuss the implications of this work for 1) better understanding the interplay of live streaming technology, design, and functionality for nuanced presentations of identity; and 2) pointing to the increasing complexity of identity and identity-related practices through live streaming as a double-edged sword.

5.1 The Interplay of Live Streaming Technology, Design, and Functionality for Gender and Sexual Representation

In this paper, we build upon the existing work on the presentation of gender identity and sexual identity in online social spaces and endeavor to investigate how studying a unique and novel form of social interaction space (e.g., live streaming) may bring in new insights on more nuanced technology-supported presentations of identity. Some aspects of our findings are still consistent with results in prior CSCW studies on well-established online social spaces (e.g., social networking sites), such as the importance of disclosing gender and sexuality to increase marginalized users' visibility and socio-political significance (Blackwell et al., 2016; Carrasco and Kerne, 2018; Haimson 2015; Haimson et al., 2016).

However, one important highlight from our study is that our participants approached their gender and sexual representation as a self-driven reflection, negotiation, and empowerment. This differs from the performed and audience-oriented (e.g., catering to viewers) aspect of gender and sexuality discussed in many previous studies (e.g., Bailey et al., 2013; Litt 2012; Litt and Hargittai,

2016; Huh and Williams, 2010; Ducheneaut 2010). In our study, this particular population of streamers brought in a strong sense of their own identity and tried not to be influenced by their viewers. They perceived and practiced their identity was less collectively constructed or customized to their audience but more self-driven. In this process, they 1) (re)affirmed their own understandings of themselves and (re)established their relationships to others and the world; and 2) expressed and advocated their activist aspirations where female and LGBTQ streamers, who were often marginalized and vulnerable, actively pursued a more inclusive, tolerable, supportive, and friendly live streaming culture.

Yet this does not mean that our participants were unaware of, or did not care about, their audience. In fact, in contrast to traditional media such as Facebook and even newer media such as Instagram, Reddit, and Tumbler, they were more aware of their audience (who were watching them on live streaming) due to the financial incentives (e.g., viewers directly pay them for the content) and the enhanced presence of audience (e.g., real time and interactive chats). Nevertheless, many streamers, such as our participants, intentionally chose not to let the audience shape their digital representations and streaming practices. This special awareness affected their digital presentations in two ways: a) taking a more proactive attitude when disclosing their gender and sexual identity (e.g., as a 'ritual,' or a ceremonial action) to officially announce who they are to the world in a high-fidelity way (showing face and voice) compared to Haimson's studies (Haimson 2015; Haimson et al., 2016); and b) further advocating their own understanding of gender and sexuality as a sociopolitical significant resistance to viewers' expectations, leading to the emerging online activism.

How do they happen? The *unique technological affordances* of live streaming platforms play important role. In our study, participants often noted that live streaming challenged the traditional landscape of anonymous online social spaces due to its affordance of real time visual, audio, and textual communication between streamers and viewers. Compared to social networking sites, it is challenging and undesired to pursue multiplicity in self-presentation on live streaming by using multiple accounts of multi-level privacy setting (Dimicco and Millen, 2007; Farnham and Churchill, 2011). Live streaming platforms such as Twitch also do not provide access limitation settings as it is a public platform for openly sharing all streaming content. In this sense, it is crucial for streamers to maintain consistent and strong identities/accounts so they can attract a stable audience base. Such affordance tends to influence the interaction dynamics of live streaming in two ways. On the one hand, most viewers (audience) still keep being anonymous (e.g., only represented by a user ID). However, they can strengthen their online social presence and heighten streamers' awareness of them through live chat/comments and direct interaction with the streamer (e.g., gift giving), which may possibly affect the streamer's online behaviors by imposing their own understandings of how gender and sexuality should be represented. As some of

our participants observed, some female streamers did change their behavior (e.g., dressing more revealing) to please their audience. Yet more importantly, on the other hand, streamers are less anonymous compared to many other online social spaces (e.g., Reddit) due to the public broadcast of live audio and video. This inevitably exposes part of their personal lives to strangers, which may lead to undesirable social consequences.

Nevertheless, many of our participants considered their digital representations through live streaming an empowerment rather than a threat: only they, not their viewers, were able to use webcam and microphone on live streaming. In this way, they could intentionally manipulate visual and audio cues as vehicles for expressing, affirming, and advocating their personal aspirations on gender and sexuality in a more comprehensive and vivid manner -- through their voice, appearance, clothing, actions on camera, and content of streaming. For them, everything they said, did, even how they looked on the camera could be a demonstration of agency -- the ability to control what (and how much) visual and audio information they presented and the resistance to viewers' inappropriate expectations on gender and sexuality.

In addition, the *unique power structure* in live streaming may also contribute to streamers' self-driven approach to present gender and sexuality. As we mentioned earlier in this paper, content creation is the key to sustain the live streaming communities -- streamers create content; viewers watch content, may pay for it, and follow their favorite streamers; and streamers are encouraged to create more content. While viewers may seem to be the most powerful party (as consumers), our participants appeared to care more about their identity as their brand and keeping agency. Our findings show that streamers' identity and personality as a human being is essential to, sometimes more important than, the content they create, and can be the very reason why viewers come to their channel. In this sense, live streaming's extreme focus on content creation inexplicitly encourages streamers to pursue their understandings and interpretations of gender and sexuality at their own will. This in turn helps them build their unique personal brand and become more visible and identifiable. While this trend may not be true of all streamers, it was apparent among our participants.

Therefore, our findings highlight a highly dynamic, interactive, and multilayered self-presentation mechanism in a complex social interaction space: how to present gender and sexuality both shapes and is shaped by at least four layers: 1) the created *content*; 2) various expectations from *viewers* who consume and possibly pay for the created content; 3) *streamers'* strong perceptions and understandings of their own identity; and 4) the culture and values of the specific *communities* that the streamers belong to. To establish and practice their understandings of identity, streamers often need to carefully navigate through and work around these layers and act upon how different layers interact with one

another. This nuanced mechanism points to the need for potential new lenses for the CSCW community to analyze technology-supported identity construction beyond the traditional *selective self-presentation/performance* and *visibility*. As we have shown, live streaming platforms seem to promote a self-driven approach to present gender and sexuality as a negotiation and navigation among *content, viewers, streamers, and subculture*, while self-presentation theories often focus on performer and audience only. Likewise, in our study, seeking visibility was rarely a pre-existing goal for most female and LGBTQ streamers. Though their engagement with streaming and identity construction did sometimes increase the visibility and awareness eventually, it was challenging to understand their actions, motivations, and behavioral changes (e.g., from non-activist to somehow activist) through the lens of visibility alone.

In this sense, a potential new lens beyond *selective presentation/performance* may focus on how gender identity and sexual identity is portrayed and experienced as a combination of 1) conscious and self-driven personal choices, 2) performer-audience interaction (audience-driven crafting and the resilience to such crafting), 3) how the content, either related or unrelated to identity, is created, and 4) specific subculture -- all in the context of technological affordances and power structure of the online social spaces. A potential new lens beyond *visibility* may not only explore marginalized users' control over their body, the disclosure of their identity, and the broader sociopolitical significance (e.g., presenting and disclosing identity as an online activism) but also emphasize the dynamic process to foster such visibility as well as how such users react to their unexpected role of educator in this process.

5.2 A Double-Edged Sword? Gender and Sexual Presentations as Resilience

For female and LGBTQ streamers, online harassment is common and can deter them from streaming. However, our participants somehow demonstrated a strong resilience towards misunderstandings and/or inappropriate expectations for their digital representations. While gender and sexuality online may often be considered socially constructed or (re)produced (Ducheneaut 2010; Yee et al., 2011; Hardy and Lindtner, 2017), these participants exhibited a certain degree of resistance to the collective process of identity building and used their online representation as a means to insist and reinforce their own aspirations about gender and sexuality.

In this study, it is somewhat unclear where exactly this resilience comes from or what factors lead to its emergence. Several participants discussed about how they have "thick skin" but they did not elaborate on how they developed this immunity, whether it was related to how they built their identity in other contexts and/or offline, or if this was something that their live streaming practices actively

contributed to. However, a potential reason can be the subculture where such live streaming platforms are embedded. Live streaming platforms such as Twitch are still very prominent within the video game culture. In our study, at least 20 out of the 25 participants streamed gaming content as well. For these participants, embracing a gamer identity and a female/LGBTQ identity at the same time could be quite challenging (Paaßen et al., 2017; Shaw 2012). Operating identity in such overly masculine structures, which are often hostile towards underrepresented groups such as women and LGBTQ, can serve as an adequate vehicle for the emergence of resilience as a counter-culture.

What was clear was how aware these streamers were of the challenges and social consequences regarding their digital representations that live streaming affords. For them, digital presentations with regard to gender and/or sexuality through live streaming appeared to be a double-edged sword. On the one hand, they were equipped with an interactive, public, and high-fidelity system -- they could choose to take full advantage of the agency, support, and technology to present and affirm themselves. On the other hand, they also exposed themselves to a broader public and revealed a great amount of audio and visual cues about themselves and sometimes even about more emotional and intimate aspects of their lives. This not only makes them possibly vulnerable online but also may pose potential risks offline.

In addition, as streamers found themselves being unintended educators and advocates, they sometimes found themselves questioning whether they knew enough about the topics to be educating others, which further complicated how they perceived and presented their own identity. For them, this self-driven approach to present gender and sexuality through live streaming was necessary to set up role models who further advocated gender equality and LGBTQ rights in nuanced and more powerful ways. However, it also further highlighted new challenges of breaking up stereotypes in the male-dominated online/streaming/gaming culture (Ahmadi et al., 2020; Prescott and Bogg, 2013), including tensions between being public figures online and having private lives offline, between engaging in emerging activism and maintaining healthy social circles, and between multimodal self-disclosing as agency and protecting necessary privacy. These challenges, therefore, raise new questions for CSCW researchers concerned about the increasing complexity of digital representation and its intertwining with offline social identities today.

5.3 Limitations and Future Work

It should be noted that this study has a few limitations. In recruiting, we specifically targeted female and LGBTQ streamers who displayed their gender identity and sexual identity as part of their streamer profile and who were willing to be interviewed, which may be why identity played such a strong role in their

streaming practices. This self-selected sample may not represent the ideology and experiences of female and LGBTQ streamers as a whole. Second, there may also be a bias toward streamers who were active social media users outside of the streaming platforms due to our recruitment method. In future research, a variety of other data sources (e.g., logs, large-scale surveys, online chats in the live streams, focus group discussions) could be used as a way to reach a broader participant population and further validate findings from the interviews. In addition, as our participants vary in terms of the numbers of followers, popularity, and age (e.g., from 19 to 52), future work could focus on further investigating how these factors affect streamers' self-presentation practices and strategies with regard to gender and sexuality. For example, it may be more challenging for an older female streamer to present herself in a gaming-related area.

Lastly, as with any other types of technology usage, it is challenging to untangle the direct effect of the technical system itself from other environmental and personal factors. Our snapshot of these streamers' perceptions and behaviors at one point in time may not be sufficient to understand how this timeframe lies in the context of their entire life. Yet, our empirical investigation points to the need for deeper longitudinal studies in the future to understand the causal relations between streamers' personal factors (e.g., motivations and personalities), social contexts, and their identity-related practices. More research is also needed to further explore how marginalized streamers such as women and LGBTQ combat and mitigate harassment and hostile environment in their identity construction practices.

6 Conclusions

The increasingly popular live stream platforms not only create new forms of social interaction experiences and human relationships but also shape how people perceive and define themselves online. In this paper, we have highlighted streamers' self-presentations with regard to gender and/or sexuality as emerging in a highly dynamic, interactive, and multilayered self-presentation mechanism of *content*, *viewers*, *streamers*, and *subculture*; demonstrated by controlling their own bodies; featuring an awareness of diverse audiences and the resistance to their expectations; and supported by the affordances and power structure of the specific online social space.

To answer the research questions we raised at the beginning of this paper, live streaming, as a new and novel social interaction space, mediates a more self-driven approach of self-presentation by highlighting the importance of affirmation and empowerment in this process. It also supports new phenomena/practices to manage gender and sexual identity by allowing users to manipulate visual and audio cues, clothing, and appearance for agency. We hope that these insights can contribute to potential new analytical lenses to investigate technology-supported

identity construction and further understand the interplay between technology, design, and functionality in people’s digital representations.

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8 References

- Ahmadi, Michael; Rebecca Eilert; Anne Weibert; Volker Wulf; and Nicola Marsden (2020). "We want to push the industry via communication": Designing Communication Measures to Foster Gender Diversity in a Video Game Company. *Proceedings of the ACM on Human-Computer Interaction*. vol. 4, no. GROUP, January 2020, paper 26. <https://doi.org/10.1145/3375196>
- Alexander, Julia (2018). New grant will support up-and-coming female streamers on Twitch. (2018). Retrieved March 2, 2019 from <https://www.polygon.com/2018/2/23/17044286/twitch-female-streamer-grant-charity>
- Andalibi, Nazanin; Pinar Ozturk; and Andrea Forte (2017). Sensitive self-disclosures, responses, and social support on Instagram: the case of# depression. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing, Portland, Oregon, USA, 25 February – 1 March 2017*. New York: ACM Press, pp. 1485–1500.
- Bailey, Jane; Valerie Steeves; Jacquelyn Burkell; and Priscilla Regan (2013). Negotiating with gender stereotypes on social networking sites: From “bicycle face” to Facebook. *Journal of Communication Inquiry*, vol. 37, no. 2, January 2013, pp. 91–112.
- Bardzell, Shaowen (2010). Feminist HCI: Taking stock and outlining an agenda for design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Atlanta, Georgia, USA, 10 – 15 April 2010*. New York: ACM Press, pp. 1301–1310.
- Bardzell, Shaowen; and Jeffrey Bardzell (2011). Towards a feminist HCI methodology: Social science, feminism, and HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Vancouver, BC, Canada, 7 – 12 May 2011*. New York: ACM Press, pp. 675–684.
- Birnholtz, Jeremy; Colin Fitzpatrick; Mark Handel; and Jed R Brubaker (2014). Identity, identification and identifiability: The language of self-presentation on a location-based mobile dating app. In *Proceedings of the 16th International Conference on Human-Computer Interaction with Mobile Devices & Services, Palazzo dei Congressi, Florence, Italy, 6 – 9 September 2016*. New York: ACM Press, pp. 3–12.
- Blackwell, Lindsay; Jean Hardy; Tawfiq Ammari; Tiffany Veinot; Cliff Lampe; and Sarita Schoenebeck (2016). LGBT parents and social media: Advocacy, privacy, and disclosure during shifting social movements. In *Proceedings of The 2016 CHI Conference on Human Factors in Computing Systems, San Jose, CA, USA, 7 – 12 May 2016*. New York: ACM Press, pp. 610–622.

- Cai, Jie; and Donghee Yvette Wohn (2019a). Live streaming commerce: Uses and gratifications approach to understanding consumers' motivations. In *Proceedings of the 52nd Hawaii International Conference on System Sciences, Grand Wailea, Maui, Hawaii, USA, 8 – 11 January*. ScholarSpace 2019, pp. 1-10.
- Cai, Jie; and Donghee Yvette Wohn (2019b). Categorizing Live Streaming Moderation Tools: An Analysis of Twitch. *International Journal of Interactive Communication Systems and Technologies (IJICST)*, vol. 9, no. 20, pp. 36-50.
- Cai, Jie; Donghee Yvette Wohn; Ankit Mittal; and Dhanush Sureshbabu (2018). Utilitarian and hedonic motivations for live streaming shopping. In *Proceedings of the 2018 ACM International Conference on Interactive Experiences for TV and Online Video, Seoul, Korea, 26 – 28 June 2018*. New York: ACM Press, pp. 81–88.
- Carrasco, Matthew; and Andruud Kerne (2018). Queer Visibility: Supporting LGBT+ Selective Visibility on Social Media. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems, Montréal, Canada, 21 – 26 April 2018*. New York: ACM Press, paper 250. <https://doi.org/10.1145/3173574.3173824>
- Consalvo, Mia (2017). Player one, playing with others virtually: What's next in game and player studies. *Critical Studies in Media Communication*, vol. 34, no. 1, pp. 84-87.
- DeVito, Michael A; Jeremy Birnholtz; and Jeffery T Hancock (2017). Platforms, people, and perception: Using affordances to understand self-presentation on social media. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing, Portland, Oregon, USA, 25 February – 1 March 2017*. New York: ACM Press, pp. 740–754.
- DeVito, Michael A; Ashley Marie Walker; and Jeremy Birnholtz (2018). 'Too Gay for Facebook': Presenting LGBTQ+ Identity Throughout the Personal Social Media Ecosystem. *Proceedings of the ACM on Human-Computer Interaction*, vol. 2, no. CSCW, November 2018, article 44. <https://doi.org/10.1145/3274313>
- DiMicco, Joan Morris; and David R Millen (2007). Identity management: Multiple presentations of self in Facebook. In *Proceedings of the 2007 International ACM Conference on Supporting Group Work, Sanibel Island, Florida, USA, 4 – 7 November 2007*. New York: ACM Press, pp. 383–386.
- Ducheneaut, Nicolas (2010). Massively multiplayer online games as living laboratories: Opportunities and pitfalls. In W. S. Bainbridge (ed.): *Online worlds: Convergence of the real and the virtual*. London: Springer, pp. 135–145.
- Eatough, Virginia; and Jonathan A. Smith (2008). Interpretative phenomenological analysis. In C. Willig; and W. S. Rogers (eds.): *The Sage Handbook of Qualitative Research in Psychology*, London: Sage, pp. 194-211.
- Farnham, Shelly D; and Elizabeth F Churchill (2011). Faceted identity, faceted lives: Social and technical issues with being yourself online. In *Proceedings of the ACM 2011 Conference on Computer Supported Cooperative Work, Hangzhou, China, 19 – 23 September 2011*. New York: ACM Press, pp. 359–368.
- Freeman, Guo; Jeffrey Bardzell; and Shaowen Bardzell (2016). Revisiting computer-mediated intimacy: In-game marriage and dyadic gameplay in Audition. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, San Jose, CA, USA, 7 – 12 May 2016*. New York: ACM Press, pp. 4325–4336.
- Freeman, Guo; Jeffrey Bardzell; Shaowen Bardzell; and Susan C Herring (2015). Simulating marriage: Gender roles and emerging intimacy in an online game. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing, Vancouver, Canada, 14 – 18 March 2015*. New York: ACM Press, pp. 1191–1200.
- Goffman, Erving (1978). *The presentation of self in everyday life*. London: Harmondsworth.

- Gray, Kishonna L (2017). They're just too urban: Black gamers streaming on Twitch. *Digital Sociologies*, vol. 1, pp. 355–368.
- Haimson, Oliver (2018). Social media as social transition machinery. *Proceedings of the ACM on Human-Computer Interaction*, vol. 2, no. CSCW, November 2018, article 63. <https://doi.org/10.1145/3274332>
- Haimson, Oliver L; Jed R Brubaker; Lynn Dombrowski; and Gillian R Hayes (2015). Disclosure, stress, and support during gender transition on Facebook. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing, Vancouver, Canada, 14 – 18 March 2015*. New York: ACM Press, pp. 1176–1190.
- Haimson, Oliver L; Jed R Brubaker; Lynn Dombrowski; and Gillian R Hayes (2016). Digital footprints and changing networks during online identity transitions. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, San Jose, CA, USA, 7 – 12 May 2016*. New York: ACM Press, pp. 2895–2907.
- Haimson, Oliver L; and Anna Lauren Hoffmann (2016). Constructing and enforcing" authentic" identity online: Facebook, real names, and non-normative identities. *First Monday*, vol. 21, no. 6, June 2016, <https://journals.uic.edu/ojs/index.php/fm/article/view/6791>
- Hamilton, William A; Oliver Garretson; and Andruid Kerne (2014). Streaming on twitch: Fostering participatory communities of play within live mixed media. In *Proceedings of the 32nd Annual ACM Conference on Human Factors in Computing Systems, Toronto, Canada, 26 April – 1 May 2014*. New York: ACM Press, pp. 1315–1324.
- Hardy, Jean; and Silvia Lindtner (2017). Constructing a desiring user: Discourse, rurality, and design in location-based social networks. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing, Portland, Oregon, USA, 25 February – 1 March 2017*. New York: ACM Press, pp. 13–25.
- Hilvert-Bruce, Zorah; James T Neill; Max Sjöblom; and Juho Hamari (2018). Social motivations of live-streaming viewer engagement on Twitch. *Computers in Human Behavior*, vol. 84, July 2018, pp. 58–67.
- Huh, Searle; and Dmitri Williams (2010). Dude looks like a lady: Gender swapping in an online game. In W. S. Bainbridge (ed.): *Online worlds: Convergence of the real and the virtual*. London: Springer, pp. 161–174.
- Johnson, Mark R (2019). Inclusion and exclusion in the digital economy: Disability and mental health as a live streamer on Twitch. *Information, Communication & Society*, vol. 22, no. 4, pp. 506–520.
- Kairam, Sanjay; Mike Brzozowski; David Huffaker; and Ed Chi (2012). Talking in circles: selective sharing in google+. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. Austin, TX, USA, 5 – 10 May 2012*. New York: ACM Press, pp. 1065–1074.
- Kroger, Jane (1995). The differentiation of "firm" and "developmental" foreclosure identity statuses: A longitudinal study. *Journal of Adolescent Research*, vol. 10, no. 3, July 1995, pp. 317–337.
- Gopinaath Kannabiran; Jeffrey Bardzell; and Shaowen Bardzell (2011). How HCI talks about sexuality: Discursive strategies, blind spots, and opportunities for future research. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. Vancouver, BC, Canada, 7 – 12 May 2011*. New York: ACM Press, pp. 695–704.
- Leaver, Tama; and Tim Highfield (2018). Visualising the ends of identity: pre-birth and post-death on Instagram. *Information, Communication & Society*, vol. 21, no. 1, pp. 30–45.
- Leavitt, Alex (2015). This is a throwaway account: Temporary technical identities and perceptions of anonymity in a massive online community. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing. Vancouver, BC, Canada, 14 – 18 May 2015*. New York: ACM Press, pp. 317–327.
- Li, Yao; Yubo Kou; Je Seok Lee; and Alfred Kobsa (2018). Tell Me Before You Stream Me: Managing Information Disclosure in Video Game Live Streaming. *Proceedings of the ACM on Human-Computer Interaction*, vol. 2, no. CSCW, article 107, <https://doi.org/10.1145/3274376>
- Light, Ann (2011). HCI as heterodoxy: Technologies of identity and the queering of interaction with computers. *Interacting with Computers*, vol. 23, no. 5, September 2011, pp. 430–438.

- Litt, Eden (2012). Knock, knock. Who's there? The imagined audience. *Journal of Broadcasting & Electronic Media*, vol. 56, no. 3, September 2012, pp. 330–345.
- Litt, Eden; and Eszter Hargittai (2016). The imagined audience on social network sites. *Social Media+ Society*, vol. 2, no. 1, February 2016, <https://doi.org/10.1177/2056305116633482>
- Lottridge, Danielle; Frank Bentley; Matt Wheeler; Jason Lee; Janet Cheung; Katherine Ong; and Cristy Rowley (2017). Third-wave livestreaming: Teens' long form selfie. In *Proceedings of the 19th International Conference on Human-Computer Interaction with Mobile Devices and Services. Vienna, Austria, 4-7 September 2017*. New York: ACM Press, pp. 1-20.
- Lu, Zhicong; Michelle Annett; Mingming Fan; and Daniel Wigdor (2019). I feel it is my responsibility to stream: Streaming and engaging with intangible cultural heritage through livestreaming. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems. Glasgow, UK, 4-9 May 2019*. New York: ACM Press, article 229.
- Marwick, Alice E (2005). I'm more than just a Friendster profile: Identity, authenticity, and power in social networking services. *Association for Internet Researchers 6.0*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1884356
- Newman, Melissa J (2015). Image and identity: Media literacy for young adult Instagram users. *Visual Inquiry*, vol. 4, no. 3, December 2015, pp. 221–227.
- Oakley, Abigail (2016). Disturbing hegemonic discourse: Nonbinary gender and sexual orientation labeling on Tumblr. *Social Media+ Society*, vol. 2, no. 3, August 2016, <https://doi.org/10.1177/2056305116664217>
- Paaßen, Benjamin; Thekla Morgenroth; and Michelle Stratemeyer (2017). What is a true gamer? The male gamer stereotype and the marginalization of women in video game culture. *Sex Roles*, vol. 76, no. 7, April 2017, pp. 421-435.
- Panek, Elliot T; Yioryos Nardis; and Sara Konrath (2013). Mirror or Megaphone?: How relationships between narcissism and social networking site use differ on Facebook and Twitter. *Computers in Human Behavior*, vol. 29, no. 5, September 2013, pp. 2004–2012.
- Pellicone, Anthony J; and June Ahn (2017). The Game of performing play: Understanding streaming as cultural production. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems. Denver, CO, USA, 6-11 May 2017*. New York: ACM Press, pp. 4863–4874.
- Prescott, Julie; and Jan Bogg (2013). The gendered identity of women in the games industry. *Eludamos: Journal for Computer Game Culture*, vol. 7, no. 1, pp. 55-67.
- Richardson, Diane (2007). Patterned fluidities: (Re) imagining the relationship between gender and sexuality. *Sociology*, vol. 41, no. 3, June 2007, pp. 457-474.
- Rode, Jennifer A (2011). A theoretical agenda for feminist HCI. *Interacting with Computers*, vol. 23, no. 5, September 2011, pp. 393–400.
- Ruberg, Bonnie; and Adrienne Shaw (2017). *Queer game studies*. Minnesota: University of Minnesota Press.
- Schlesinger, Ari, W; Keith Edwards; and Rebecca E Grinter (2017). Intersectional HCI: Engaging identity through gender, race, and class. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems. Denver, CO, USA, 6-11 May 2017*. New York: ACM Press, pp. 5412–5427.
- Seering, Joseph; Robert Kraut; and Laura Dabbish (2017). Shaping pro and anti-social behavior on twitch through moderation and example-setting. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing. Portland, Oregon, USA, 25 February - 1 March 2017*. New York: ACM Press, pp. 111–125.
- Sjöblom, Max; and Juho Hamari (2017). Why do people watch others play video games? An empirical study on the motivations of Twitch users. *Computers in Human Behavior*, vol. 75, October 2017, pp. 985–996.
- Shaw, Adrienne (2012). Do you identify as a gamer? Gender, race, sexuality, and gamer identity. *New Media & Society*, vol. 14, no. 1, February 2012, pp. 28-44.
- Smith, Craig (2018). 55 amazing Twitch stats and facts. Retrieved March 2, 2019 from <https://expandedramblings.com/index.php/twitch-stats/>
- Tang, John C; Gina Venolia; and Kori M Inkpen (2016). Meerkat and periscope: I stream, you stream, apps stream for live streams. In *Proceedings of the 2016 CHI Conference on Human*

- Factors in Computing Systems. San Jose, CA, USA, 7 – 12 May 2016.* New York: ACM Press, pp. 4770–4780.
- Taylor, TL (2018). *Watch me play: Twitch and the rise of game live streaming.* Princeton: Princeton University Press.
- Twitch.tv (2017). About Twitch. Retrieved March 2, 2019 from <https://www.twitch.tv/p/about/>
- Walton, S Courtney; and Ronald E Rice (2013). Mediated disclosure on Twitter: The roles of gender and identity in boundary impermeability, valence, disclosure, and stage. *Computers in Human Behavior*, vol. 29, no. 4, July 2013, pp. 1465–1474.
- Wohn, Donghee Yvette; and Guo Freeman (2020). Live Streaming, Playing, and Money Spending Behaviors in eSports. *Games and Culture*, vol. 15, no. 1, January 2020, pp. 73-88.
- Wohn, Donghee Yvette; Guo Freeman; and Caitlin McLaughlin (2018). Explaining viewers' emotional, instrumental, and financial support provision for live streamers. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems. Montréal, Canada, 21 - 26 April 2018.* New York: ACM Press, article 474, <https://doi.org/10.1145/3173574.3174048>
- Woodcock, Jamie; and Mark R Johnson (2019). The affective labor and performance of live streaming on Twitch. tv. *Television & New Media*, vol. 20, no. 8, December 2019, pp. 813-823.
- Wulf, Tim; Frank M Schneider; and Stefan Beckert (2020). Watching Players: An Exploration of Media Enjoyment on Twitch. *Games and Culture*, vol. 15, no. 3, May 2020, pp. 328-346.
- Yee, Nick; Nicolas Ducheneaut; Mike Yao; and Les Nelson (2011). Do men heal more when in drag?: Conflicting identity cues between user and avatar. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. Vancouver, BC, Canada, 7 – 12 May 2011.* New York: ACM Press, pp. 773–776.