ARTICLE

Check for updates

Sexualized culture on livestreaming platforms: a content analysis of *Twitch.tv*

Kristel Anciones-Anguita[1✉] & Mirian Checa-Romero [1]

The *Twitch.tv* livestreaming platform, with 3 million daily viewers internationally, has become a space for online digital culture and entertainment. Given the current concern regarding the exposure of sexualized content on social networks and its consequences for adolescence, the objective of this study is to analyze, from a gender perspective, whether women become more sexualized than men during their livestreams. Using a content-analysis design, an ad-hoc scale was developed to analyze the frequency and intensity of sexualization based on context variables and streamers' behavior such as clothing, posture, or evocation of a sexual act, among others. After analysis of the livestreams ($n = 1920$), our scale made it possible to distinguish three levels of intensity: non-sexualized, sexualized, or hypersexualized. Statistically significant evidences was found in the level of sexualization between men and women in different categories of livestreaming. The results show that women are self-sexualized more and in greater intensity than men; there are also differences in the behavior and context of their livestreams. The sexualized representation of women in the media shapes gender attitudes, dehumanizes women, and legitimizes violence against them, and so it is essential to understand the role of media platforms in self-sexualization and the consequences to show women as sexual objects, principally for young people.

[1] Universidad de Alcalá, Madrid, Spain. ✉email: kristel.anciones@uah.es

Introduction

In recent decades, a multitude of studies have examined the influence of media on culture and thought (eg: Thompson, 2000; Gerbner et al., 2002; Ward, 2016). Nowadays, there is a particular concern regarding the consequences that social media content, especially sexualized content, can have on young people. Sexualized content refers to the portrayal of individuals, especially women, as sexual objects (Ward, 2016). In an effort to appear sexually attractive and conform to current beauty standards (Chua and Chang, 2016), there is an increasing trend among women and girls towards self-sexualization on social media platforms (Kapidzic and Herring, 2015). Given that sexualization involves attributing sexual nature to individuals, self-sexualization occurs when individuals willingly sexualize themselves in order to appear sexually appealing (Choi and DeLong, 2019). In this regard, it has been found that women experience greater social pressure regarding their appearance and increased concern for self-representation that must conform to current beauty standards (Chua and Chang, 2016). Furthermore, socialization on social media aims to present a flawless online appearance, resulting in heightened vulnerability in identity development (Davis, 2018) and an escalation of negative consequences. Some studies highlight the impact on mental health and performance, including increased anxiety, depression, and psychological distress among adolescents (Burnay et al., 2022; Keles et al., 2020), body dissatisfaction, and eating disorders (Mustapic et al., 2017). Others focus on how exposure to sexualized content shapes attitudes about gender and sexists' beliefs (Blackburn and Scharrer, 2019) increases the value girls place on appearing attractive (Daniels et al., 2020) and exacerbates violence against women (Cobo-Bedía, 2020; Halicki et al., 2023). The sexualized representation of women in the media is associated with the adoption of gender roles and engagement in sexual harassment behaviors (Gramazio et al., 2021) as well as with attributing responsibility to victims of rape (Bernard et al., 2019). Furthermore, it can impact the understanding of sexuality for young users (Cowan, 2012).

In order to sell products, the image of women is sexualized in TV advertisements (Goffman, 1979; Lindner, 2004), magazine covers (Hatton and Trautner, 2011), music videos, (Merlyn, 2020), video games (Stermer and Burkley, 2012), or social networks (Daniels et al, 2020). Several factors serve as precursors to self-sexualization. Notably, body surveillance and self-esteem (Ruckel and Hill, 2017), exposure to sexualized content in media (Trekels and Eggermont, 2018). However, the most frequent predictor tends to be the search for attention and popularity on social media (Ramsey and Horan, 2018). Liss et al. (2011) developed a scale to measure the enjoyment of self-sexualization and found that some women may experience a sense of control or positive feelings when garnering men's attention through their sexuality. Nevertheless, other studies reveal that self-sexualization is not associated with offline sexual agency (Ramsey and Horan, 2018), and women who enjoy sexualization are more likely to feel objectified by their partners and experience lower relationship satisfaction (Ramsey et al., 2017).

Although it is common knowledge that women are used as lures to promote a product and that the fundamental goal of the objectification shown in the media is to increase consumption (Barzoki et al., 2017), it is well established that women who present themselves as sexualized are perceived as less competent, deserving of attention, and less intelligent (Ward, 2016; Daniels et al., 2020). Llovet and Establés (2023) found evidence of higher rates of self-sexualization among female influencers. However, social success was not linked to this aspect, while for men, social success was associated with their professional aspect. Other studies provide evidence of self-sexualization on social media

platforms, both among professionals and general users, with the aim of obtaining positive social appraisal (Yan et al., 2022) or monetary rewards (Drenten et al., 2020). Similarly, the portrayal of women in the media follows a similar pattern. For instance, researchers found that violence and sexual content in song lyrics were commonplace (Couto et al., 2022), as were representations in teen series (Masterson and Messina, 2023). They even demonstrated gender representations in video games (Lynch et al., 2016) and children's movie posters (Aley and Hahn, 2020). Detailed information on the study sample and findings can be found in Table 1.

In order to address these questions and given the widespread use of digital media by young people, it is essential to analyze the socializing and normalizing effect of commodifying women's bodies (Cobo-Bedía, 2020). Therefore, it is essential to examine how self-sexualization of women in the media and the role of technology in the dissemination of sexualized content because, in addition to causing distress among the female population, it perpetuates values that reinforce exclusion and undermine women's equality (Verdú, 2018). In this regard, this study aims to explore the way in which streamers produce and distribute content on social networks and, specifically, on the livestreaming platform Twitch.tv.

***Twitch.tv* as a setting for sexualized culture.** Today, streaming represents a significant part of digital entertainment and online culture (Cullen and Ruberg, 2019; Woodcock and Johnson, 2019). The *Twitch.tv* platform has millions of daily viewers who can choose between nearly 98,000 livestreaming channels in five categories: "Games", "In Real Life" (hereinafter, "IRL"), "Music", "Esports," and "Creative", which in turn are divided into subcategories, for example: "*ASMR*" (*Autonomous Sensory Meridian Response*), "*Pools, Hot Tubs & Beaches*", or "*Food & Drink*". On this platform, the number of viewers has undergone a dizzying increase—going from 121 K daily viewers in 2012 to almost 3M in 2022. This growth, which stemmed from the unique livestreaming of streamers playing video games, has led *Twitch.tv* to set the pace and gain an advantage over other livestreaming platforms such as *Mixer* or *YouTube* (Cullen and Ruberg, 2019).

The success of livestreaming platforms may be attributed to their capacity to enable viewers to interact with the individual livestreaming through various means, such as utilizing the chat feature or making monetary donations or channel subscriptions ranging from €4.99 to €24.99. Depending on the subscription level, subscribers receive benefits such as ad-free content viewing, acquiring badges, or gaining access to a more efficient chat exclusively for them. These forms of mediation between the viewer and the streamer offer the audience the opportunity to personalize their experience and connect with the streamer's expressions, voice, and immediate environment (Woodcock and Johnson, 2019). This "close" contact with a streamer chatting in a relaxed atmosphere provokes emotional connection and awakens feelings of comfort that could be compared to the feeling of spending time with a friend (Woodcock and Johnson, 2019).

In order to regulate these interactions, *Twitch.tv* has a set of rules to protect users, deter offensive behavior, and maintain a good commercial and social relationship within the platform (https://www.twitch.tv). However, with regard to the distribution of sexual, obscene, or pornographic content, subjective, vague, and contradictory guidelines are observed, especially in terms of clothing and displays of the body. Such distribution reinforces discriminatory attitudes towards women and the LGTBQI+ community, often minorities in these spaces (Ruberg, 2021) given that, despite the fact that, according to the company, 35% of

Table 1 Key Content Analysis Studies on Gender Issues in the Media.

Topic	Sample selection	Study objetives	Method	Findings	Refs.
Self-objectification of Influencers in Spain	246 posts from 14 Spanish influencers.	Conducting research on the prevalence of self-objectification among the top influencers in Spain and the societal values associated with self-objectification	Content analysis	Evidence suggests higher rates of self-sexualization among women. However, social success appears to be higher in men who do not resort to self-sexualization but instead emphasize their professional facets.	Llovet and Establés (2023)
Guiones románticos y sexuales en series para adolescentes	19 adolescent series on Netflix	Understanding how romantic and sexual scripts influence experiences of relationships and sexual health in adolescents	Content analysis	Sexual and romantic language predominates in series aimed at adolescents. Additionally, they found more scripts focused on the end of relationships rather than on the construction of healthy relationships	Masterson and Messina (2023)
Sexualization in Fraternity Instagram Posts	600 Instagram posts	Analyzing signs of sexualization in Instagram posts from Greek fraternities	Content analysis	Women tend to engage in more sexualization than men on Instagram. There is a higher occurrence of positive feedback on more sexualized posts	Yan et al. (2022)
Violence, Sexual Content and Degrading Terms in Music Lyrics.	781 song lyrics from the Hot 100 Billboard list of 2017.	Analyzing song lyrics considering categories of sexual content, sexual violence, and derogatory terms against women	Content analysis	The coexistence of violence and sexual content, violence and derogatory terms towards women was significant, while the coexistence of sexual content and derogatory terms towards women was common but insignificant	Couto et al. (2022)
Representación de género en carteles de películas animadas	152 popular children's films from the United States	Investigating gender representation in animated characters on posters targeted at the children's audience	Content analysis	The main characters tend to be men who are portrayed as more powerful. In contrast, female representations depict characters as smaller, less significant, and subordinate	Aley and Hahn (2020)
Sexualized labour in digital culture	172 female influencers on Instagram	Exploring the concept of sexualization in digital culture	Content analysis	Monetization and post engagement are correlated with sexualized representations	Drenten et al. (2020)
Female characters in video games across 31 years	571 video games featuring female characters	Analyzing gender differences in the content of video games	Content analysis	Female characters in games often assume secondary roles and are more sexualized compared to their male counterparts	Lynch et al. (2016)

Source: the author(s).

streamers are women, the reality is that their audience levels are much lower. So much so that, within the Top 100 Spanish-speaking streamers, female content creators represent only 8% and account for 5.34% of the total audience (Selenepernas, 2022). Therefore, despite the creation and regulation of these policies, gender-differentiated interactions are observed that consolidate a profoundly masculinized environment. This generates a hostile male-dominated environment in which hate speech towards the female gender is disseminated, including harassment, negative assessment of their competence, and sexual comments about their bodies (Ruberg, 2021; Todd and Melancon, 2019). In addition, they are often not considered as "true gamers" because they play less or play games considered inferior (Paaßen et al., 2017) or because they focus more on their appearance than on the game (Grayson, 2017). For their part, men are rated as better and more competitive players (Salter, 2018), which increases the invisibility of women in this community.

In an attempt to compete with male streamers and given that positive feedback from followers increases when content is sexualized (Bell et al., 2018), women often resort to self-sexualization (Uszkoreit, 2018). This practice of self-representation is created on the basis of a series of performances that respond to the ethical and aesthetic codes of the culture in which they are projected. The gestures, behavior, and environment constitute a fictitious creation modeled by the dominant patterns of society (Goffman, 1959), and, in this case, of the platform's users. Live streaming offers various ways to sexualize content, such as using erotic cosplay, simulating sexual acts, playing video games in revealing clothing, or performing specific exercises and movements requested by viewers in exchange for monetary donations. Previous research has found that content creators sexualize their content through the replication of stylized and staged pornographic poses and gestures, referred to as *porn chic* by McNair (2002). This particular aesthetic differs from explicit pornography as it does not depict explicit sexual acts but shares the goal of monetizing a product (Drenten et al., 2020) and portraying women as available or 'fuckable' (Dines, 2010). New digital scenarios allow the general public to create their own content in amateur pornography (Choi and DeLong, 2019) or on social media platforms like Instagram (Llovet and Establés, 2023; Yan et al., 2022). Additionally, individuals can buy, sell, or access explicit sexual material through platforms such as OnlyFans, IsMyGirl, Fansly, or those commonly known as Cam-Girls. These women, who arouse their clients through sexual innuendos to gain economic benefits, gifts, sponsorship, or fame, are specifically recruited by companies that manage the platforms in exchange for a share of the profits (Cunningham et al., 2018; Wang, 2021). Similarly, Twitch.tv streamers receive between 50% and 80% of subscription fees, often receive gifts from their followers, and can enhance their audience through an intimate connection with their viewers. Although different authors argue that this reaction empowers women (Barnett et al., 2018), as they obtain economic and psychological benefits from it (Grande-López, 2019), various research suggests that sexualized streamers are perceived as less deserving of attention and labeled as "Titty-streamers" or "Bubby gamers" (Ruberg et al., 2019). In this regard, the uniqueness of the current study lies in providing an in-depth analysis of live and audience-mediated self-sexualization, typically male-dominated, on live streaming platforms. That is, this study goes beyond planned and edited content releases, offering insights into the spontaneous creation of content aimed at gaining popularity and economic benefits, while receiving immediate feedback and rewards from viewers. From this perspective, the current study addresses the following research questions: Do women experience more sexualization than men on Twitch.tv? Are the differences in sexualization between men and women statistically significant? Therefore, the objective of this research is twofold: on the one hand, to analyze whether women are self-sexualized more than men on *Twitch.tv* from a gender perspective (H_1) and, on the other hand, to determine whether there are statistically significant differences according to the streamer's sex, in terms of the behavior and context of their livestreams (H_2). The results obtained will make it possible to gather information on the patterns of sexualization in the categories analyzed and offer relevant data on the current panorama, in addition to obtaining an awareness of the socializing power of the media.

Method

This research is based on the methodological strategy of content analysis which consists of objectively and systematically analyzing the textual, visual, and behavioral characteristics of media content (Neuendorf, 2017). As demonstrated in the introduction the section, previous research shows that this methodology is the most appropriate for media análisis.

As in previous studies, through this strategy, an ad-hoc instrument adapted to livestreaming platforms has been developed based on an analytical framework that responds to the combination of different observable attributes (posture, clothing, image focus, etc.) with which to measure the frequency and intensity in which streamers sexualize themselves, as well as their context and behavior within the categories analyzed.

To contrast the results, the chi-square test was used to analyze whether there are statistically significant differences in the frequency and intensity of sexualization, depending on the gender of the streamers.

Sample selection. Using a cross-sectional recording procedure (September and October 2022), data was collected and archived from a total of 1920 video clips categorized by gender based on their own personal profile description distributed in the two most popular categories of Twitch.tv: videogames and IRL. Based on these criteria, the top 10 videos were selected from the daily world ranking within the selected categories during 32 consecutive days. Within the Videogames category, the three most popular clips of each day were selected ($n = 960$) and within the IRL category, clips from the subcategories JustChatting ($n = 320$), ASMR ($n = 320$) and Pools, Hot Tubs & Beaches ($n = 320$). The selection criteria for this sample align with current recommendations to include the male gender in studies on sexualization (Pecini et al., 2023). The sample encompasses streamers and categories regardless of the emphasis placed on physical appearance, as the primary inclusion criterion was the monthly average of viewers and followers (Average Viewer Ratio) and the popularity of video games. This ensured the inclusion of channels with the strongest and most consistent average viewership, using *Twitch.tv*-specific statistical software, such as *Twitchtracker.com* or *SullyGnome.com*.

It is important to note that those videos in which the streamer did not show their image were excluded, as it did not allow the analysis of all study variables, as well as those in which non-real images such as Hentai, cartoons, or human 3D representations were shown.

Procedure. In order to carry out an observational procedure, a recording protocol must be constructed with which to establish the variables of analysis and the fundamental traits to be observed (Neuendorf, 2017). Moreover, sexualization is multifaceted: in other words, it is influenced by different aspects such as the amount of clothing, body exposure, or posture, although not all of these affect to the same degree when perceiving people through media (Bernard and Wollast, 2019; Hatton and Trautner, 2011).

Table 2 Coding and categorization of observable items.

	Sexual coding scheme				
GENERAL	No, of viewers	–	–	–	–	–
	Category	Games	Just Chatting	ASMR	Pools, HotTubs & Beaches	
	Streamer's Gender	Female	Male	–	–	–
CONTEXT	Clothing	Not very revealing (0)	Moderate necklines, exposed shoulders (1)	Tight-fitting clothes, showing abdomen (2)	Lingerie, swimwear (3)	Minimun clothing (4)
	Posture	Seated (0)	Variety of poses (1)	Legs open, Lying down, on all fours (2)	–	–
	Exposed body parts	None (0)	Chest (1)	Buttocks (1)	Genitals (1)	–
	Image focus	Shoulders to head (0)	Entire body (1)	–	–	–
BEHAVIOR	Mouth	Neutral (0)	Seductive (1)	Sexualized (2)		
	Acto sexual	None (0)	Kissing, hugging, sucking, simulating fellatio (1)	–	–	
	Role-Play	None (0)	Erotic or infantilized cosplay (1)	–	–	

Source: the author(s).

As such, in order to capture these differences, the variables to be observed, the duration of the observation sessions, and the sample were established based on key elements extracted from the review of the scientific literature together with the review of two external expert profiles in the field of education and communication.

Materials. After defining the observation protocol and sample, an instrument was developed to measure the frequency and intensity of sexualization of women and men on *Twitch.tv*. To this end, the variables were defined and grouped into three dimensions (Table 2), in which the following were collected: (i) general data on the livestream: number of spectators, category and sex; (ii) the context: clothing, body parts shown, focus of the image, and setting; and (iii) behavior, in which mouth movements, simulation of a sexual act, the inclusion of role-play, and body posture are analyzed.

To measure the intensity of sexualization, an additive scale of 0 to 14 points was developed to categorize the degree to which each livestream is sexualized. The conceptualization of the variables made it possible to capture the differences and distinguish three levels of intensity: non-sexualized (0–4), sexualized (5–8), or hypersexualized (9–14). Previous studies have examined the degree of sexualization in the media based on the relationship established between different variables, such as revealing clothing and suggestive posture (e.g., Holland and Haslam, 2016), facial expression and makeup (e.g., Bernard et al., 2019), or through the combination of various sexualizing features such as the use of the mouth or exposure of body parts (e.g., Hatton and Trautner, 2011; Yan et al., 2022). These studies have demonstrated that the relationship between these variables increases or decreases the intensity of sexualization. However, there is no research on livestreaming platforms. As such, variables tailored to such needs were included in this instrument. The following is a justification for the choice of measurements and variables chosen, as well as their coding.

Context
Clothing (0–4): Despite the fact that the type of clothing and degree of nudity does not necessarily increase the sexualization of

the individual (Fasoli et al., 2018), there are studies that point to significant gender differences in relation to attire in the media (Hatton and Trautner, 2011; Smith and Sanderson, 2015). Thus, the degree of nudity or type of clothing is presented as an important marker of sexualization (e.g., Díaz-Atozano et al., 2021). In this study, a scale has been developed ranging from not very revealing clothing (0), exposed arms or shoulders (1), tight-fitting clothing (2), lingerie and/or swimsuits (3), and to a minimum of clothing that covering only the nipples and pubic area (4).

Exposed body parts (0–3): The normalization of sexualization in the media has been used as a lure when selling any type of product (Rodal, 2009), to the point of hypersexualizing specific parts of the body such as the breast, buttocks, and genitals (Díez-Gutiérrez, 2021). Those livestreams in which none of these parts occupied a central focus or were not visible were categorized with a zero (0), while if any of them were emphasized or shown, they were categorized with one (1) point for each of the parts displayed.

Image focus (0–1): The constitution of the individual—the streamer—in front of a camera, presenting them to a group—the viewers—permeabilizes and regulates what can be said, what can be communicated and what can be shown (Calvo and San Fabián, 2018). In this sense, the focus of the image represents a multimodal text where the body's visibility plays an important role in conveying a sexualized message (Díaz-Atozano et al., 2021; Goffman, 1979). Therefore, in relation to the scale of sexualization, a distinction is made between those livestreams that focus only on head and shoulders (0) and those in which there is a substantially greater exposure showing all or a large part of the body (1).

Posture (0–2): The inclusion of posture to address cognitive objectification offers an important foothold for understanding sexualization as a set of variables to be studied holistically. Exposure of revealing clothing may not show cognitive objectification (Schmidt and Kistemaker, 2015), but a discrepancy arises when adding suggestive postures (Bernard et al., 2018). In this

regard, posture takes on a potential value to sexualize and adds potential value to body language. Several ranges are considered in this study, ranging from sitting (no sexualization, 0); suggestive tilting of torso and/or hips (subtle sexualization, 1); to sitting with legs spread, lying down or on all fours (explicit sexualization, 2).

Behavior
Mouth (0–2): The mouth is a fundamental component of sexualization. Over the years, it has been employed to hypersexualize women in the media (Fasoli et al., 2018; Merlyn, 2020). Specifically, the intensity of how this body part is used is related to the ability to transmit pleasure and emotions (Gray et al., 2011). The instrument developed establishes different scores depending on the intensity and use of the mouth, ranging from neutral (0), talking or smiling; seductive (1), lip biting or blowing kisses; to sexualized (2), simulating fellatio or a sexual act.

Sexual act (0–1): References to the sexual act in the media are applied in the form of innuendo, double entendres, and nudity (Reichert and Lambiase, 2012), or as pre-pornographic representations that sexualize and objectify the body (Martín-Sanz, 2020). From this perspective, a point (1) is given to those livestreams that show behaviors that simulate fellatio, masturbation, or movements that insinuate sexual acts.

Role-play (0–1): The analysis took into account visual motifs such as fan service: erotic representations of the manga or anime world through the use of cat ears, cosplay, lolicon aesthetics, fishnet stockings, and other fetishes. All of these related to the Hentai and soft-porn world, components that orbit within a male heteronormative sexualization and hypersexualization (Hernández-Esquivel, 2021). Therefore, a point (1) is awarded to those livestreams that simulate roles of submission, slavery, or domination through these terms.

This coding provides a deeper insight because, although we find *streamers* with the same amount of clothing in different channels, for example, the analysis of context and behavior gives us a different view of the degree of sexualization. In this context, a streamer wearing a swimsuit sunbathing on the beach would receive 7 points and fall within the sexualized or moderately intense category. Meanwhile, another streamer, also in a swimsuit but adopting a more seductive pose (tilting the hips suggestively) and simulating a sexual act such as licking an ice cream cone or a microphone, would score 12 points and be categorized as sexualized. Therefore, measuring both context and the behavior allows us to show the intensity of sexualization.

Data analysis. In order to minimize bias in the observation, the instrument was subject to a pilot in which four external observers specialized in the field collected data from all selected categories, at the same time over the course of five days. In this way, the first 10 direct samples from each channel were analyzed on the basis of the same criteria, using Cohen's Kappa inter-rater reliability index (Cohen, 1960). A concordance degree of 0.854 was obtained for all variables, considered very good according to the scale proposed by the author, thus allowing us to continue with content analysis.

The data extracted from this analysis was recorded and processed with SPSS 29.0. The factorial structure was studied through Exploratory Factor Analysis (EFA) supported by the Kaiser-Meyer-Olkin (KMO) index and Bartlett's sphericity test. To decide on item retention, anti-image correlations were examined. Furthermore, total explained variance was analyzed to determine the number of components. Finding the rotated solution, an analysis of internal consistency is conducted through

Table 3 Rotated component matrix.

	Context	Behavior
Clothing	**0.878**	0.351
Posture	**0.798**	0.441
Focus of the image	**0.804**	0.433
Mouth	0.417	**0.784**
Sexual act	0.400	**0.779**
Role	0.086	**0.823**
Chest	**0.783**	0.435
Buttocks	**0.889**	-0.127
Genitals	**0.862**	0.105
Explained variance	60.55%	17.26%

Statistically significant values are shown in bold.

the Cronbach's Alpha reliability coefficient for each dimension that comprises the scale. Finally, the scale is presented with its respective dimensions, variables, and conceptualizations. Categorical variables were presented through cross tables and frequency distributions. In order to test whether there are significant differences in the degree of sexualization depending on the gender of the streamer, as well as in the aspects of context and behavior according to the *Twitch.tv* category, chi-square tests of sample homogeneity were performed.

Results
Dimensional analysis of the instrument. Exploratory Factor Analysis (AFE) and Common Factor Analysis (CFA) were carried out on the entire sample ($N = 1920$). To assess the adequacy of sampling, the Kaiser-Meyer-Olkin Index and Bartlett's test of sphericity were calculated. The resulting values in both tests (KMO = 0.89; χ^2 Sphericity = 17232.42, $p < 0.001$) were adequate, leading to the subsequent exploration of the factorial structure of the instrument, as they meet the respective criteria for factor reduction in dimensions (Van Wingerde and Van Ginkel, 2021). Regarding the extraction of principal components, the Varimax technique with Kaiser normalization is employed (Table 3). The results revealed two factors, and both are greater than 0.7 (Vo and Lee, 2020), representing adequately the latent constructs of interest or different dimensions of the same construct and verifying the common method bias those accounts for common variance among variables by eliminating measurement error variance. The Context dimension is composed of the variables: clothing, posture, focus of the image, chest, buttocks, and genitals. As for the Behavior dimension, it is composed of the variables: mouth, sexual act, and role. The previously mentioned structure succeeds in explaining the variability present in the data, totaling 77.98% of the explained variance by the two factors.

Regarding reliability, the Cronbach's Alpha coefficient was used for each dimension (Table 4), yielding the following values: Context (0.89) and Behavior (0.78). All items obtained factorial weights exceeding 0.827, so the elimination of any item was not considered. It can be observed, therefore, that the values are satisfactory and recommended for acceptance (Linkov, 2021). Finally, all the analyses conducted allow for the availability of a valid and reliable scale.

Descriptive analysis. In the first descriptive analysis, and with the objective of contrasting H₁, we analyze the frequency and intensity with which streamers sexualize according to gender. In terms of frequency, there is a higher percentage of men (61.2%) than women (38.8%) livestreaming (Fig. 1 and Table 5). However, these differences are exacerbated depending on the category in which the livestream is located. Thus, categories such as Just

Chatting or Games have a higher frequency of male streamers (86.75% and 92.10% respectively), while in the categories of ASMR and Pools, Hot Tubs & Beaches, there is a higher representation of female streamers (98.75% and 97.19%, respectively), demonstrating a clear division by sex.

Regarding the intensity of sexualization, 87.4% of streamers grouped within the non-sexualized level are male, while 97.2% and 99.7% of the remaining two levels of cognitive subjectification, sexualization and hypersexualization, respectively, are composed of females.

The individual results for the intensity of sexualization for each of the livestreams indicate that there are descriptive differences within the female sex ($n = 745$). While the Games and Just Chatting categories place the intensity of sexualization at a low or non-sexualized level, the ASMR and Pools, Hot Tubs & Beaches categories have the highest amount of hypersexualized and sexualized livestreams. Women, who make up the vast majority of these categories, are more sexualized in general, reaching high levels of sexualization or hypersexualization in approximately half of the livestreams.

Meanwhile, no men are hypersexualized in the categories of Games, Just Chatting, and ASMR, and only one man is hypersexualized in the category of Pools, Hot Tubs, & Beaches. The same is true for medium intensity, in which only 10 men out of the entire sample ($n = 1174$) are sexualized. In addition to

Table 4 Factorial weights of items and communalities.

	Factorial weight	Communality
Clothing	0.98	0.89
Posture	0.93	0.83
Focus of the image	0.94	0.83
Mouth	0.86	0.79
Sexual act	0.88	0.77
Role	0.86	0.68
Chest	0.91	0.81
Buttocks	0.85	0.81
Genitals	0.92	0.75
Promedio	0.89	0.78
Cronbach's Alpha	0.89	0.78

Table 5 Level of sexualization as a function of streamer.

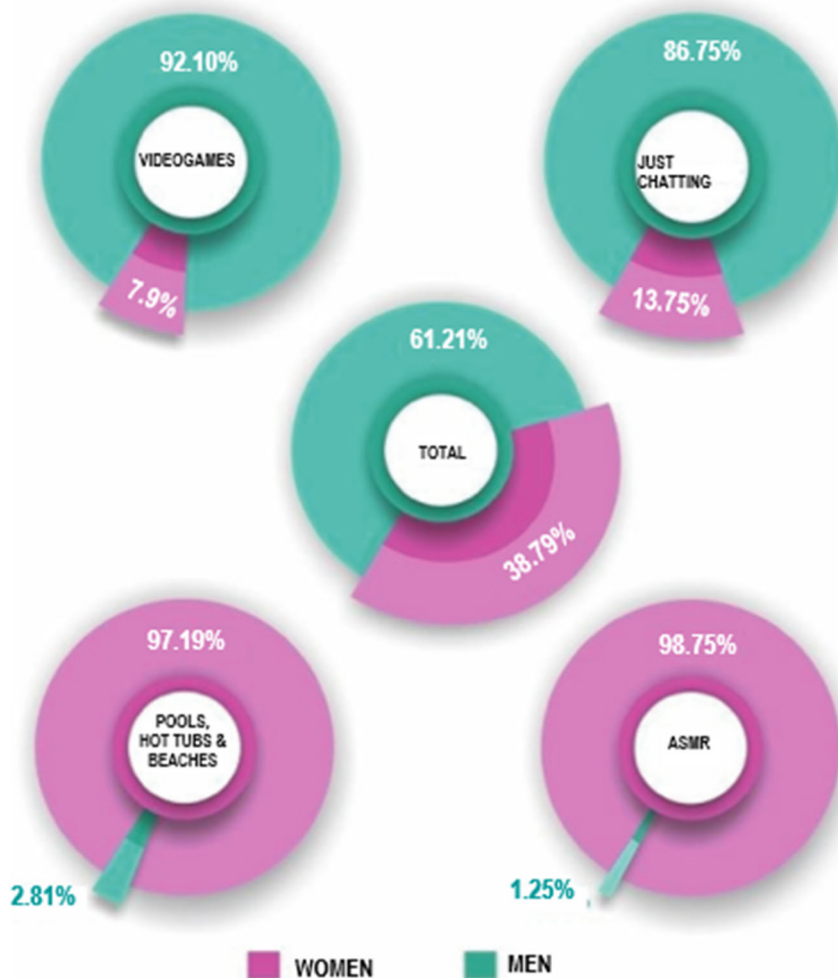| Level of sexualization	Men (%)	Women (%)	Total
Hypersexualized	2 (0.17)	389 (52.21)	391
Sexualized	5 (0.43)	190 (25.5)	195
Not sexualized	1167 (99.4)	166 (22.28)	1333
Total	1174	745	1919

Source: the author(s).

Fig. 1 Gender representation of streamers by category. Source: the author(s).

Table 6 Results of independent variables according to coding scale.

KEY	Score	0		1		2		3		4	
	Gender	Male	Female	M	F	M	F	M	F	M	F
	N = 1918	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
CONTEXT	Clothing	1144 (97.4)	132 (17.7)	20 (1.7)	81 (10.9)	3 (0.3)	134 (18)	3 (0.3)	250 (33.6)	4 (0.3)	147 (19.8)
	Chest	1165 (99.2)	243 (32.7)	9 (0.8)	501 (67.3)	–	–	–	–	–	–
	Posture	1158 (98.6)	170 (22.8)	14 (1.2)	313 (42.1)	2 (0.2)	261 (35.1)	–	–	–	–
	Buttocks	1172 (99.8)	483 (64.9)	2 (0.2)	26 (35.1)	–	–	–	–	–	–
	Genitals	1171 (99.7)	408 (54.8)	3 (0.3)	336 (45.2)	–	–	–	–	–	–
	Image focus	1158 (98.6)	177 (23.8)	16 (1.4)	567 (76.2)	–	–	–	–	–	–
BEHAVIOR	Mouth	1170 (99.7)	243 (32.7)	4 (0.3)	243 (32.7)	0 (0)	258 (34.7)	–	–	–	–
	Sex act	1173 (99.9)	360 (48.4)	1 (0.1)	384 (51.6)	–	–	–	–	–	–
	Role	1171 (99.7)	571 (76.7)	3 (0.3)	173 (23.3)	–	–	–	–	–	–

Source: the author(s).

Table 7 Chi-square test: differences in the level of sexualization between men and women.

Level of sexualization	P value
Hypersexualized	0.001
Sexualized	0.000
Not sexualized	0.002
Total	0.000

Source: the author(s).

showing different results for each category in relation to the different levels of sexualization, it is observed that women ($n = 745$) are not only found mostly in the less popular and, therefore, less visited categories, but also that these categories show the highest percentages of sexualization and hypersexualization.

Regarding the context and behavior variables (Table 6), the results reveal that men, for the most part, place the focus of the image on their face and do not show behaviors characteristic of sexualization such as suggestive postures, seductive mouths, or simulation of a sexual act, but are instead focused on playing, chatting, or streaming. However, the majority of women (71.4%) wear attire ranging from moderate necklines to bikinis or minimal clothing and use the focus of the image to show their full body (76.2%). In addition, more than half of these streamers evoke a sexual act (51.6%), while two thirds of them insinuate such acts or seduce with their mouth (32.7% + 34.7%).

Inferential analysis. In a second inferential analysis, and with the aim of contrasting H2, a χ^2 test was performed (Table 7), showing that there are statistically significant differences between men and women both at the global level ($p = 0.000$) and in each of the levels of sexualization ($p = 0.001$; $p = 0.000$; $p = 0.002$, respectively).

Finally, with regard to the behavioral and contextual variables by gender and *Twitch.tv* categories (Table 8), it is also observed that the differences between men and women are statistically significant in most of these. As for the context variables, those differences for which a higher level of significance between men and women has been found in all the analyzed categories of *Twitch.tv* are the following: (i) in the use of clothing, with women using a minimum of clothing (underwear or swimsuits) compared to men who use clothing which is not very revealing; (ii) in the focus of the image, with women showing their entire body compared to men who show only from the shoulders to the head; (iii) in the parts of the body exposed, with women more

frequently showing their breasts, buttocks, or genitals, with exceptions in the case of chests/breasts, buttocks, and genitals in the categories of Pools, Hot Tubs & Beaches, ASMR, or Games respectively.

With respect to the behavioral variables, there are also statistically significant differences between men and women in all categories of *Twitch.tv*. Women show a higher level of significance the following: (i) use of the mouth, where they make a more sexualized use; (ii) sexual acts (kissing, hugging, sucking, simulating fellatio) performed significantly more by women than by men in all categories (with the exception of the Games category, where no such acts were observed in either sex); (iii) role-play, with women using more erotic or infantilized cosplay than men; iv) posture, with women presented more often with open legs, lying down, or on all fours, compared to men who show themselves sitting down.

The results obtained, both descriptive and inferential, support the hypotheses (H$_1$ and H$_2$) in almost all the behavioral and contextual streamer variables according to gender in all categories of *Twitch.tv*.

Discussion

The growth of *Twitch.tv* is undeniable, especially if we consider the integration of new categories and subcategories to attract a totally different audience compared its beginnings as a video-game platform, where more than 80% were men (Zolides, 2020). Although the growth and evolution of the platform could offer a more egalitarian reality among streamers, categories such as Games and Just Chatting still present themselves as a marginal niche for women. Because of this, female streamers may resort to self-sexualization as a strategy to engage more followers. It is worth noting the clear division by gender according to lives-treaming category. Thus, 84% of women are found in those categories where the female body can be subjected to sexist and discriminatory rules and standards (Ruberg and Lark, 2020; Routsalainen, 2022), such as ASMR and Pools, Hot Tubs & Beaches.

Regarding the intensity of sexualization, this study is consistent with previous research arguing that the female gender is sexualized at a higher level than male sex in the media (Hatton and Trautner, 2011; Ward, 2016). In this sense, the results obtained reveal statistically significant differences in the intensity of sexualization between men and women, as well as in the behavior and context of streamers in the different categories of *Twitch.tv*. While men focus their streaming on their speech or competence as video gamers and do not show their bodies or suggest seduction to engage viewers or subscribers, women resort to self-objectification, which reinforces the relationship between sex

Table 8 Relationship between the variables of analysis according to Twitch category and gender of streamer.

Analysis variables		Category	P value
Context variables	Clothing	ASMR	0.013[a]
		Just Chatting	0.000[a]
		Pools, Hot Tubs & Beaches	0.001[a]
		Games	0.000[a]
		Total (aggregate)	0.000[a]
	Image focus	ASMR	0.050[b]
		Just Chatting	0.000[a]
		Pools, Hot Tubs & Beaches	0.002[a]
		Games	0.000[a]
		Total (aggregate)	0.000[a]
	Posture	ASMR	0.000[a]
		Just Chatting	0.000[a]
		Pools, Hot Tubs & Beaches	0.006[a]
		Games	0.000[a]
		Total (aggregate)	0.000[a]
	Exposed body parts	Chest	
		ASMR	0.090[c]
		Just Chatting	0.000[a]
		Pools, Hot Tubs & Beaches	0.239
		Games	0.000[a]
		Total (aggregate)	0.000[a]
		Buttocks	
		ASMR	0.593
		Just Chatting	0.000[a]
		Pools, Hot Tubs & Beaches	0.000[a]
		Games	0.769
		Total (aggregate)	0.000[a]
		Genitals	
		ASMR	0.234
		Just Chatting	0.000[a]
		Pools, Hot Tubs & Beaches	0.000[a]
		Games	0.027[b]
		Total (aggregate)	0.000[a]
Behavior variables	Mouth	ASMR	0.000[a]
		Just Chatting	0.000[a]
		Pools, Hot Tubs & Beaches	0.008[a]
		Games	0.000[a]
		Total (aggregate)	0.000[a]
	Sex act	ASMR	0.000[a]
		Just Chatting	0.000[a]
		Pools, Hot Tubs & Beaches	0.025[b]
		Games	0.769
		Total (aggregate)	0.000[a]
	Role-play	ASMR	0.069[c]
		Just Chatting	0.000[a]
		Pools, Hot Tubs & Beaches	0.337
		Games	0.008[a]
		Total (aggregate)	0.000[a]

Level of significance: [a]99%, [b]95%, [c]90%.

work and livestreaming for female streamers only (Ruberg and Lark, 2020). Furthermore, the commodification of one's own body to elicit emotional and sexual engagement for commercial purposes may not be as advantageous as it may seem. This is because control over ownership on the internet is fluid, and frequently, the content is utilized by third parties for their own benefit (Drenten et al., 2020) or yields minimal economic gain (Wang, 2021). Although reference may be made to the concept of

sexual freedom, we must not forget that self-objectification often responds to a patriarchal ideology created according to the male gaze (Cobo-Bedía, 2020). Revealing clothing or suggestive posture conditions the moral and competence valuation of women (Bernard et al., 2020; Wollast et al., 2018) and translates into a dehumanizing view that turns the person into a sexual object (Fasoli et al., 2018). Therefore, the level of sexualization of women on *Twitch.tv* may be normalizing what is culturally acceptable, both on and off this digital platform. In December 2023, following the controversy surrounding the '*Topless Meta*', a new trend among streamers involving the simulated nudity from the waist up, Twitch.tv decided to implement an update to its regulations regarding sexual content. The platform stated that content deliberately emphasizing breasts, buttocks, or the pelvic region, even when clothed, as well as erotic dances involving undressing or gestures of undressing, will not be penalized as long as it is properly labeled.[1] Along these lines, there are different positions regarding the reasons why women choose to objectify themselves: while some authors defend sexual freedom and argue that self-sexualization gives them power, enjoyment and self-esteem (Barnett et al., 2018), others point out that sexual freedom and sexualization is dehumanizing (Wollast et al., 2018) and affects both neuronal and behavioral levels (Bernard et al., 2020). It is crucial to understand how these regulations normalize the sexualization of women and their content and how it can impact adolescents, especially considering the increasing occurrence of the sexual recruitment of young women through social media (Humphreys et al., 2019). This is also relevant when self-sexualization is a voluntary decision, given the rise in sexual exploitation and human trafficking associated with live streams (Delva Benavides and Gonzalez Lopez, 2022).

Although the study sample includes sexualized and hypersexualized men ($n = 7$ out of the total sample) in categories such as ASMR or Pools, Hot Tubs, and Beaches, it is important to note that in some of these livestreams the men's scenarios and behaviors parodied and ridiculed women's activity in these categories. This is a clear reflection of the results offered by previous research (Cullen and Ruberg, 2019; Zolides, 2020), in which they warn that these types of platforms build and perpetuate an online hate discourse towards women, which can be extrapolated to different offline contexts of everyday life.

The results obtained in the study call for new approaches to the use and formation of social networking platforms, especially if we take into account that they occupy a significant portion of the daily lives of young users, with 73% between 16 and 34 years of age in the case of *Twitch.tv*.[2] Given that the female body invades most cultural productions, even more so when consumers are young (Verdú, 2018), it is essential to develop educational plans that take into account that media manipulation of the female image constitutes a social problem capable of producing a negative psychological impact on women's identity, self-image, and well-being (Bernard et al., 2020). The symbolic violence reproduced in the media has harmful consequences for the public in general and for women in particular, since the objectification reproduced in the media forms part of the ideological basis of inequality (Verdú, 2018). Although there are more models of women, their sexualized or hypersexualized representation in the media is a matter of concern in terms of the different cultural options presented to childhood and adolescence, as the representation of the female model as a sexual object has an influence at both the neural and behavioral level (Bernard et al., 2020). Furthermore, it plays a key role in the management of distress in intimate partner violence and attribution of blame (Johnson et al., 2022), including sexual assault (Halicki et al., 2023).

On the other hand, we emphasize the need to use the instrument developed to analyze more categories and/or streamers,

even if they have fewer viewers, by means of a longitudinal registry with larger samples, aiming to analyze the content of users with less representation.

Finally, it is observed that the male community attempts to ridicule and parody the livestreams of those categories in which female representation is higher, with the discomfort caused to many men by the intrusion of women on the platform is indicated in various social networks (Ruberg et al., 2019), mainly with strategies that they themselves refer to as "semi-porn to attract teenage audiences" (@JotaEme009 on Twitter.com) or as content that "is not appropriate for the platform" (JordiWild on Youtube.com). In this sense, future research will delve deeper into the community's view of these livestreams, through the streamers' discourse and viewers' comments. In this way, we will investigate, through mixed methods, the reasons why women decide to objectify themselves in order to obtain a closer view of the protagonists' reality and what the individual psychological impact of sexualization is, if any.

Conclusions

This research delves into the extent of exposure and sexualization of streamers in different categories on the Twitch.tv platform. According to the objectives, we conclude that women are more intensely sexualized than men in a statistically significant manner, and furthermore, female streamers experience significantly higher levels of sexualization compared to their male counterparts. This is observed by taking into account contextual and behavioral variables in live broadcasts, leading to implications for gender dynamics, especially concerning self-sexualization.

To conduct this study, the methodology of content analysis was employed using a tool developed ad hoc. A large number of live broadcasts were analyzed, considering various elements such as poses, types of clothing, gestures, and roles accompanying live-streamed videos. These open and free publications replace, for sectors consuming pornography, other pages with explicit sexual content, underscoring the increased risk of these broadcasts where women often appear hypersexualized.

It is crucial to highlight that many users of these platforms are minors or emerging adults, making it necessary for parents, guardians, and educators to be aware of this new form of implicit sexualization in order to educate and inform about the potential uses and risks associated with live broadcasts. Only in this way can awareness be raised about the importance of these perverse forms of sexualization, which disrupt the equality between men and women.

Additionally, it is important to consider that the reproduction of sexualization in the media contributes to an increase in violence against women and reinforces sexist attitudes and opinions that, in the medium and long term, can lead to cases of sexual harassment, undervaluation of their achievements, and workplace discrimination.

Data availability

According to the interests of the authors, the data used cannot be published in open access repositories.

Notes

1 https://www.twitch.tv.
2 https://www.streamscheme.com/twitch-statistics.

References

Aley M, Hahn L (2020) The powerful male hero: a content analysis of gender representation in posters for children's animated movies. Sex Roles 83(7-8):499–509. https://doi.org/10.1007/s11199-020-01127-z

Barnett M, Maciel I, Gerner M (2018) Enjoyment of sexualization and feminism: relationships with sexual self-schema and psychosexual health. Sexuality Cult 22(3):669–684. https://doi.org/10.1007/s12119-018-9515-5

Barzoki MH, Mohtasham L, Shahidi M, Tavakol M (2017) Self-objectification and self-sexualization behavior within consumer culture. Appl Res Qual Life 12(2):425–438. https://doi.org/10.1007/s11482-016-9468-5

Bell BT, Cassarly JA, Dunbar L (2018) Selfie-objectification: self-objectification and positive feedback ("likes") are associated with frequency of posting sexually objectifying self-images on social media. Body image 26:83–89. https://doi.org/10.1016/j.bodyim.2018.06.005

Bernard P et al. (2019) The face of sexualization: faces wearing makeup are processed less configurally than faces without makeup. Int Rev Soc Psychol 32(1):16. https://doi.org/10.5334/irsp.211

Bernard P, Cogoni C, Carnaghi A (2020) The sexualization–objectification link: Sexualization affects the way people see and feel toward others. Curr Dir Psychol Sci 29(2):134–139. https://doi.org/10.1177/0963721419898187

Bernard P, Content J, Deltenre P, Colin C (2018) When the body becomes no more than the sum of its parts: The neural correlates of scrambled vs. intact sexualized bodies. NeuroReport 29:48–53. https://doi.org/10.1097/WNR.0000000000000926

Bernard, P, Wollast, R (2019) Why is sexualization dehumanizing? The effects of posture suggestiveness and revealing clothing on dehumanization. Sage Open 9(1). https://doi.org/10.1177/2158244019828230

Blackburn G, Scharrer E (2019) Video game playing and beliefs about masculinity among male and female emerging adults. Sex Roles 80(5-6):310–324. https://doi.org/10.1007/s11199-018-0934-4

Burnay J, Kepes S, Bushman BJ (2022) Effects of violent and nonviolent sexualized media on aggression-related thoughts, feelings, attitudes, and behaviors: A meta-analytic review. Aggress Behav 48(1):111–136. https://doi.org/10.1002/ab.21998

Calvo S, San Fabián JL (2018) Selfies, jóvenes y sexualidad en instragram: representaciones del yo en formato imagen. Pixel Bit 52:167–181. https://doi.org/10.12795/pixelbit.2018.i52.12

Choi D, DeLong M (2019) Defining female self sexualization for the twenty-first century. Sex Cult 23(4):1350–1371. https://doi.org/10.1007/s12119-019-09617-3

Chua THH, Chang L (2016) Follow me and like my beautiful selfies: Singapore teenage girls' engagement in self-presentation and peer comparison on social media. Comput Hum Behav 55:190–197. https://doi.org/10.1016/j.chb.2015.09.011

Cobo-Bedía, R (2020) Pornografía. El placer del poder. Ediciones B

Cohen D (1960) A coefficient of agreement for nominal scales. Educ Psychol Meas 20:37–46. https://doi.org/10.1177/001316446002000104

Couto L, Hust SJ, Rodgers KB et al. (2022) A content analysis of music lyrics exploring the co-occurrence of violence, sexual content, and degrading terms toward women. Sex Cult 26:1965–1980. https://doi.org/10.1007/s12119-022-09978-2

Cowan, G (2012) Content analysis of visual materials. In: Handbook for conducting research on human sexuality. Psychology Press, p. 352-375

Cullen A, Ruberg B (2019) Necklines and "naughty bits": constructing and regulating bodies in live streaming community guidelines. FDG '19: Proc 14th Int Conf Found Digital Games 36:1–8. https://doi.org/10.1145/3337722.3337754

Cunningham S, Sanders T, Scoular J, Campbell R, Pitcher J, Hill K, Hamer R (2018) Behind the screen: commercial sex, digital spaces and working online. Technol Soc 53:47–54. https://doi.org/10.1016/j.techsoc.2017.11.004

Daniels EA, Zurbriggen EL, Ward LM (2020) Becoming an object: a review of self-objectification in girls. Body Image 33:278–299. https://doi.org/10.1016/j.bodyim.2020.02.016

Davis, SE (2018) Objectification, sexualization, and misrepresentation: social media and the college experience. Social Media+Society, 4(3) https://doi.org/10.1177/2056305118786727

Delva Benavides JE, Gonzalez Lopez IS (2022) Venta sexual digital: las redes sociales y su regulación internacional. Juríd CUC 18(1):241–278. https://doi.org/10.17981/juridcuc.18.1.2022.11

Díaz-Atozano P, Padilla-Castillo G, Requeijo-Rey P (2021) Sexualización de niñas en redes sociales: la necesidad de inteligencia semántica en Instagram. Investig Fem 12(1):31–45. https://doi.org/10.5209/infe.69559

Díez-Gutiérrez E (2021) Valores y socialización educativa a través de la música reggaetonera. Resonancias 25(48):109–133. https://doi.org/10.7764/res.2021.48.6

Dines, G (2010) Pornland: How porn has hijacked our sexuality. Beacon Press

Drenten J, Gurrieri L, Tyler M (2020) Sexualized labour in digital culture: Instagram influencers, porn chic and the monetization of attention. Gend Work Org 27(1):41–66. https://doi.org/10.1111/gwao.12354

Fasoli F, Durante F, Mari S, Zogmaister C, Volpato C (2018) Shades of sexualization: When sexualization becomes sexual objectification. Sex Roles 78(5):338–351. https://doi.org/10.1007/s11199-017-0808-1

Gerbner, G, Gross, L, Morgan, M, Signorielli, N, Shanahan, J (2002) Growing up with television: Cultivation processes. Media Effects: Advances In Theory And Research 2(1), 43-67

Goffman E (1979) Gender advertisements. Harvard University Press, Cambridge, MA

Goffman, E (1959) The Presentation of Self in Everyday Life. Penguin Books

Gramazio S, Cadinu M, Pagliaro S, Pacilli MG (2021) Sexualization of sexual harassment victims reduces bystanders' help: the mediating role of attribution of immorality and blame. J Interpers Violence 36(13-14):6073–6097. https://doi.org/10.1177/0886260518816326

Grande-López V (2019) La hipersexualización femenina en los medios de comunicación como escaparate de belleza y éxito. Commun Pap 8(16):21–42. http://hdl.handle.net/10498/21599

Gray K, Knobe J, Sheskin M, Bloom P, Barrett LF (2011) More than a body: mind perception and the nature of objectification. J Pers Soc Psychol 101(6):1207–1220. https://doi.org/10.1037/a0025883

Grayson, N (2017) Streamer's Hateful Rant Revives Debate About Women On Twitch

Halicki KT, Hauser R, Wänke M (2023) When she is standing left, she might be blamed. responsibility attribution for sexualized violence moderated by rape myth acceptance and benevolent sexism. Violence Women 29(2):300–320. https://doi.org/10.1177/10778012221108420

Hatton E, Trautner MN (2011) Equal opportunity objectification? The sexualization of men and women on the cover of Rolling Stone. Sex Cult 15(3):256–278. https://doi.org/10.1007/s12119-011-9093-2

Hernández-Esquivel CE (2021) Tezuka Osamu: el pionero en la sexualización de niñas y adolescentes representadas en el manga japonés. La Colmena 110:67–72. https://doi.org/10.1145/3337722.3337754

Holland E, Haslam N (2016) Cute little things: the objectification of prepubescent girls. Psychol Women Q 40(1):108–119. https://doi.org/10.1177/0361684315602887

Humphreys, K, Le Clair, B, & Hicks, J (2019) Intersections between pornography and human trafficking: training ideas and implications. J Couns Pract 10(1). https://doi.org/10.22229/ibp1012019

Johnson, JD, Edwards, W, Pagliaro, S, & Lecci, L (2022) Sexualized music videos desensitize fijian women to intimate partner violence suffering: the mediating role of culpability attributions. J Interpers Violence, 37(15-16), https://doi.org/10.1177/08862605211015260

Kapidzic S, Herring SC (2015) Race, gender, and self-presentation in teen profile photographs. N Media Soc 17(6):958–976. https://doi.org/10.1177/1461444813520301

Keles B, McCrae N, Grealish A (2020) A systematic review: the influence of social media on depression, anxiety and psychological distress in adolescents. Int J Adolesc Youth 25(1):79–93. https://doi.org/10.1080/02673843.2019.1590851

Lindner K (2004) Images of women in general interest and fashion magazine advertisements from 1955 to 2002. Sex Roles 51:409–421

Linkov V (2021) Research based on scientific realism should not make preliminary assumptions about mathematical structure representing human behavior: Cronbach and Gleser's measure as an example. Theory Psychol 31(3):465–470. https://doi.org/10.1177/09593543211016082

Liss M, Erchull MJ, Ramsey LR (2011) Empowering or oppressing? Development and exploration of the Enjoyment of Sexualization Scale. Personal Soc Psychol Bull 37(1):55–68. https://doi.org/10.1177/0146167210386119

Llovet C, Establés MJ (2023) ¿Desvestidos para triunfar? Análisis de contenido de la auto objetificación de influencers en España. Rev Comun 22(2):271–297. https://doi.org/10.26441/RC22.2-2023-3193

Lynch T, Tompkins JE, Van Driel II, Fritz N (2016) Sexy, strong, and secondary: a content analysis of female characters in video games across 31 years. J Commun 66(4):564–584. https://doi.org/10.1111/jcom.12237

Martín-Sanz A (2020) Antes del sexo. La construcción de la fantasía pornográfica en el género gonzo. FEMERIS 5(3):114–134. https://doi.org/10.20318/femeris.2020.5766

Masterson AM, Messina NM (2023) Love and sexual scripts: a content analysis of 19 Netflix teen series. J Child Media 17(2):161–179. https://doi.org/10.1080/17482798.2023.2165517

McNair, B (2002) Striptease Culture: Sex, Media And The Democratisation Of Desire. Routledge

Merlyn MF (2020) Dime lo que escuchas y te diré quién eres. Representaciones de la mujer en las 100 canciones de reggaetón más populares en 2018. Feminismos 35:291–320. https://doi.org/10.14198/fem.2020.35.11

Mustapic J, Marcinko D, Vargek P (2017) Body shame and disordered eating in adolescents. Curr Psychol 36:447–452. https://doi.org/10.1007/s12144-016-9433-3

Neuendorf, KA (2017) The Content Analysis Guidebook. Sage

Paaßen B et al. (2017) What is a True Gamer? The Male Gamer Stereotype and the Marginalization of Women in Video Game Culture. Sex Roles 76:421–435. https://doi.org/10.1007/s11199-016-0678-y

Pecini C, Guizzo F, Bonache H, Borges-Castells N, Morera MD, Vaes J (2023) Sexual objectification: advancements and avenues for future research. Curr Opin Behav Sci 50:101261. https://doi.org/10.1016/j.cobeha.2023.101261

Ramsey L. R, Marotta J. A, Hoyt T (2017) Sexualized, objectified, but not satisfied: Enjoying sexualization relates to lower relationship satisfaction through perceived partner-objectification. J Soc Pers Relat 34(2):258–278

Ramsey LR, Horan AL (2018) Picture this: women's self-sexualization in photos on social media. Pers Individ Differ 133:85–90. https://doi.org/10.1016/j.paid.2017.06.022

Reichert, T, & Lambiase, J (2012) Sex in Advertising Perspectives on the Erotic Appeal. Routledge

Rodal AB (2009) Representaciones de lo femenino en la publicidad. Muñecas y mujeres: entre la materia artificial y la carne. Cic Cuad de Infón y Comunicación 14:269–284. https://revistas.ucm.es/index.php/CIYC/article/view/CIYC0909110264A

Routsalainen, M (2022) "Cute Goddes is Actually and Aunty": The evasive middle-aged woman streamer and normative perfomances of feminity in video game streaming. Telev Media 1(11). https://doi.org/10.1177/15274764221080962

Ruberg B (2021) "Obscene, pornographic, or otherwise objectionable": Biased definitions of sexual content in video game live streaming. N Media Soc 23(6):1681–1699. https://doi.org/10.1177/1461444820920759

Ruberg B, Cullen A, Brewster K (2019) Nothing but a "titty streamer": legitimacy, labor, and the debate over women's breasts in video game livestreaming. Crit Stud Media Commun 36(5):466–481. https://doi.org/10.1080/15295036.2019.1658886

Ruberg B, Lark, D (2020) Livestreaming from the bedroom: Performing intimacy through domestic space on Twitch. Convergence 1-17. https://doi.org/10.1177/1354856520978324

Ruckel L, Hill M (2017) Look@ me 2.0: self-sexualization in Facebook photographs, body surveillance and body image. Sex Cult 21:15–35. https://doi.org/10.1007/s12119-016-9376-8

Salter M (2018) From geek masculinity to Gamergate: the technological rationality of online abuse. Crime Media Cult 14(2):247–264. https://doi.org/10.1177/1741659017690893

Schmidt AF, Kistemaker LM (2015) The sexualized-bodyinversion hypothesis revisited: Valid indicator of sexual objectification or methodological artifact? Cognition 134:77–84. https://doi.org/10.1016/j.cognition.2014.09.003

Selenepernas (2022) Análisis de la presencia de las mujeres streamers de lengua española en Twitch. Everriculum. https://www.mastermarketingdigital.com/everriculum

Smith L, Sanderson J (2015) I'm going to instagram It! An analysis of athlete self-presentation on Instagram. J Broadcast Electron Media 59(2):342–358. https://doi.org/10.1080/08838151.2015.1029125

Stermer S, Burkley M (2012) Xbox or SeXbox? An examination of sexualized content in video games. Soc Pers Psychol Compass 6(7):525–535. https://doi.org/10.1111/j.1751-9004.2012.00442.x

Thompson M. J (2000) Gender in magazine advertising: Skin sells best. Cloth. Text. Res. J 18(3):178–181

Todd R, Melancon J (2019) Gender differences in perceptions of trolling in live-stream video broadcasting. Cyberpsychol Behav Soc Netw 22(7):472–476. https://doi.org/10.1089/cyber.2018.0560

Trekels J, Eggermont S (2018) "I can/should look like a media figure": the association between direct and indirect media exposure and teens' sexualizing appearance behaviors. J Sex Res 55(3):320–333. https://doi.org/10.1080/00224499.2017.1387754

Uszkoreit, L (2018) With great power comes great responsibility: video game live streaming and its potential risks and benefits for female gamers. In: Gray, K, Vorhees, G & Vossen, E (eds) Feminism in Play, 163-181. https://doi.org/10.1007/978-3-319-90539-6_10

Verdú, D (2018) El sufrimiento de la mujer objeto. Consecuencias de la cosificación sexual de las mujeres en los medios de comunicación. Feminismo/s 31. https://doi.org/10.14198/fem.2018.31.08

Vo T, Lee J (2020) Phenotypic correlation analysis of Phalaenopsis reciprocal F1 hybrids using SPSS and principal component analysis (PCA). Acta Hortic 1262:213–218. https://doi.org/10.17660/ActaHortic.2019.1262.28

Wang Y (2021) Playing live-streaming 'love games': mediated intimacy and desperational labour in digital China. J Gend Stud 30(5):621–632. https://doi.org/10.1080/09589236.2021.1929100

Ward LM (2016) Media and sexualization: state of empirical research, 1995–2015. J Sex Res 53:560–577. https://doi.org/10.1080/00224499.2016.1142496

Van Wingerde B, Van Ginkel J (2021) SPSS syntax for combining results of principal component analysis of multiply imputed data sets using generalized Procrustes analysis. Appl Psychol Meas 45(3):231–232. https://doi.org/10.1177/0146621621990757

Wollast, R, Puvia, E, Bernard, P, Tevichapong, P, Klein, O (2018) How sexual objectification generates dehumanization in Western and Eastern cultures. Swiss J Psychol. https://doi.org/10.1024/1421-0185/a000209

Woodcock J, Johnson MR (2019) The affective labor and performance of live streaming on Twitch. tv. Telev N. Media 20(8):813–823. https://doi.org/10.1177/1527476419851077

Yan, K, Terán, L, Gahler, H, Salmon, J, Dajches, L, Stevens Aubrey, J (2022) The costs of sexualization: examining viewers' perceptions of sexualized profile

owners in online dating. Psychol Pop Media. https://doi.org/10.1037/ppm0000391

Zolides, A (2020) Gender moderation and moderating gender: Sexual content policies in Twitch's community guidelines. New Media Soc 1-17. https://doi.org/10.1177/1461444820942483

Author contributions
Although both authors have participated, designed, and agreed on the work, their participation could be highlighted in the following sections: KA: Original idea. Data acquisition. Text writing and revisions. Approval of the final version. MC: Analysis and interpretation of data. Text writing and revisions. Approval of the final version.

Competing interests
The authors declare no competing interests.

Ethical approval
The current study did not involve the use of humans/animals and did not require approval of the locals ethics board.

Informed consent
The study uses a media content analysis methodology. The sample is made up of public live streams created by adults.

Additional information
Correspondence and requests for materials should be addressed to Kristel Anciones-Anguita.

Reprints and permission information is available at http://www.nature.com/reprints

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.