When the game turns toxic: Exploring gendered effects on well-being and self-esteem

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A B S T R A C T

Background: Toxic behavior remains a significant problem in online games, but there is scarce knowledge about the psychological effects of being subjected to such behavior, especially across genders. The present study addresses this gap by examining how toxic behavior affects players' well-being and self-esteem.
Methods: The present study combined elements of an Intensive Longitudinal Study (ILS) and an Ecological Momentary Assessment (EMA) with daily assessments of 88 gamers over a 15-day period, investigating self-esteem, well-being and verbal toxic behavior experience. Data were analysed using a logistic random effects model.
Results: Women received significantly more derogatory comments related to gender, sexuality, religion, or ethnicity, and sexual comments/sounds directed at them compared to men. Women also experienced a significantly stronger effect of toxic behavior on their well-being and self-esteem relative to men.
Conclusions: The present study demonstrates that experiencing toxicity can indeed have significant effects on those who are targeted, especially women. Results should be considered by the gaming industry and gaming community, respectively, to create and maintain safe and welcoming gaming environments.

1. Introduction

The reasons for playing video games are many (Bányai et al., 2019), but the social aspect appears to be a key factor (Gonçalves et al., 2023). Some of the most popular online games are multiplayer games that require teamwork and communication—often with friends and strangers from diverse backgrounds and various age groups, which can lead to many positive interactions with a wide range of people and expanded networks (Entertainment Software Association, 2024; Hygen et al., 2024). However, toxic behavior remains a significant problem in online games (e.g., ADL, 2020; Bryter, 2020; Sky, 2023), particularly in some of the most popular games such as multiplayer online battle arena games (MOBAs) (Zsila et al., 2022). Although research on gaming toxicity has expanded since the late 2010s, evidence on psychological effects remains limited and theoretically fragmented; recent work calls for studies

on individual differences and mediating/moderating factors and emphasizes the need for prevention and intervention programs (Zsila & Demetrovics, 2025). The present study addresses this gap by examining the impact of toxic behavior on players' well-being and self-esteem in naturalistic settings. To reduce recall bias and clarify short-term temporal ordering, we measure these outcomes in real time using ecological momentary assessment (Stone & Shiffman, 1994).

There is no consensus in the literature regarding the definition of toxic behavior or what it entails (Kou, 2020, pp. 81–92; Kowert, 2020). However, toxic behavior in gaming is often described as including negative communication directed towards other players, such as harassment, threats, trash talk, and flaming. It also includes in-game disruptions, such as spamming, cheating, and contrary play. Additionally, toxic behaviors such as swatting (i.e., sending police/emergency services to a location based on a false claim of emergency), stalking, and

doxxing (i.e., releasing private information online), extend beyond the game environment (Adinolf & Turkay, 2018; Beres et al., 2021, pp. 1–15; Kowert, 2020; Türkay et al., 2020, pp. 1–13). Thus, toxicity involves highly negative forms of communication and actions that may occur within the game, but it can also extend beyond the game, affecting real-life interactions and situations.

Most players of online multiplayer games have been victims or witnesses of toxic behavior (e.g., ADL, 2020; Zsila et al., 2022). Both men and women are subjected to such behavior. In one study it was indicated that men are more likely to experience toxic behavior (Zsila et al., 2022), while another suggested that nearly as many women as men have experienced it (Bryter, 2020). Nevertheless, women have received particular attention in the literature (Bryter, 2022, 2023; Kuss et al., 2022; Reach3, 2023; Sky, 2023) because they seem to be disproportionately targeted with sexual (Bryter, 2023) and gender-based harassment (Reach3, 2023).

Although toxic behavior is a well-known problem, and several theories have been applied to understand why it occurs (e.g., Ajzen, 1991; Bandura, 1986; Suler, 2004), there is a paucity of research on its effects. For those who spend a significant amount of time gaming regularly, much of their social interaction occurs while gaming. This raises an important question about whether the experiences they encounter have implications outside of gaming. Frequent exposure to different types of toxic behavior during gaming, for example, may influence players' well-being and self-esteem. Supporting such reasoning, a meta-analysis (Harris & Orth, 2020) demonstrated that relationships and self-esteem reciprocally predict each other over time. Similarly, Evangelou et al. (2024) identified a range of emotional responses to negative online feedback.

It is worth considering whether the interactions in gaming—though often short-lived and brief—may nonetheless affect self-esteem and well-being. Even transient connections in gaming environments might have an impact given their potential to provide either social support or, conversely, negative reinforcement.

It has been reported that experiencing toxic behavior while gaming was associated with feelings of isolation, reduced sociability, suicidal thoughts (ADL, 2020), and depression (Zsila et al., 2022). However, these studies have certain limitations. The ADL study relied on retrospective self-reports of the consequences of toxic behavior, while in the study by Zsila et al. (2022), participants reported instances of toxic behavior they had experienced over the past year, and the correlation between depressive symptoms and the frequency of toxic behavior was analysed. Thus, very few studies have examined momentary, in-situ effects, and to our knowledge, no previous research has simultaneously assessed toxicity exposure alongside same-day or next-day changes in well-being or self-esteem in naturalistic gaming situations.

Beyond retrospective or one-off cross-sectional designs, temporally fine-grained observational approaches (e.g., EMA) offer complementary leverage on short-term dynamics, reducing recall bias and clarifying temporal ordering. Moreover, retrospective studies, such as those examining toxic experiences over a year and correlating them with symptoms of depression (Zsila et al., 2022), make it difficult to determine whether a true association exists or if the observed associations are driven by other factors. It is also possible that individuals with more depressive symptoms are more likely to report experiencing toxic behavior, as their negative thought patterns may influence both their perceptions and recall of such interactions.

Kowert and Cook (2022) emphasize the need for more knowledge about the frequency of various types of toxic behavior in gaming. Since previous research has shown that women and men are subjected to different forms of toxic behavior (Bryter, 2020), we argue that it is equally important to examine gender differences in both the frequency and types of toxic behaviors experienced. Understanding what players are exposed to is essential for investigating the effects of such behavior. Because game toxicity is game-specific and situational (not chronic or cross-platform, such as cyberbullying) (Zsila & Demetrovics, 2025), the present study focuses on in-game verbal hostility and its immediate psychological impact.

Given that our study aims to investigate the impact of toxic behavior on self-esteem and well-being, we have chosen to focus on various types of verbal toxicity. This includes behaviors such as sexual harassment, scolding, ridicule and threats (Beres et al., 2021, pp. 1–15; Kowert, 2020). It is reasonable to assume that verbal toxic behavior, experienced through spoken interactions is perceived more personally and thus has a greater impact on self-esteem and well-being compared to other forms of toxicity, such as cheating, spamming or other types of disruptive behaviors. Moreover, women's greater experiences with, or heightened concerns about, sexual harassment and assault may make them more likely to experience stronger negative effects when actually exposed to sexualized toxicity during gaming, in line with research indicating that in comparison to men, women are more likely to be excluded from games because they are women, be sent inappropriate messages, and be sexually harassed (Bryter, 2020).

Self-Determination Theory (SDT) emphasizes that well-being depends on satisfying three psychological needs: relatedness, competence, and autonomy (Deci & Ryan, 2000), while the Need to belong theory (Baumeister & Leary, 1995) highlights a fundamental desire to form and maintain positive social connections. These theories complement each other in gaming contexts: multiplayer games often provide opportunities to meet these needs by fostering social bonds, offering challenges and competition that build competence, and granting autonomy through choices in play style and customization. However, when players encounter harassment or other toxic behaviors, these needs, and the sense of belonging, are undermined. Such experiences can erode relatedness and belonging, diminish perceived competence, and reduce autonomy, making it reasonable to expect negative effects on well-being and self-esteem.

Moral disengagement, cognitive rationalizations that license hostility (Bandura, 1986), and toxic online disinhibition, where anonymity and perceived distance lower restraint (Suler, 2004) can contextualise why toxicity occurs in games. SDT and Need to belong theory (Baumeister & Leary, 1995; Deci & Ryan, 2000) guides the impact hypotheses we test; moral disengagement and online disinhibition situate occurrence and are not tested directly.

It is important to examine the effects of toxic behavior as it occurs in real time to better understand immediate effects, as well as those that may persist beyond the initial exposure. Against this backdrop, our study aims to address the following research questions:

RQ1: Which types of verbal toxic behavior are most frequently experienced by male and female gamers?
RQ2: Does experiencing toxic behavior during gaming influence the immediate and short-term well-being and self-esteem of male and female gamers, and do these effects differ by gender?

Considering these research questions, we formulate the following hypotheses:

H1a (gendered exposure). Female gamers will report higher frequencies of gendered/sexualized verbal toxicity than male gamers (e.g., Bryter, 2020).

H2a (performance-focused exposure). Male gamers will report higher frequencies of performance/skill-directed verbal toxicity than female gamers (Zsila et al., 2022).

H3a (same-day well-being). Exposure to verbal toxicity will predict lower same-day (post-session) well-being relative to baseline.

H4a (same-day self-esteem). Exposure to verbal toxicity will predict lower same-day self-esteem relative to baseline.

H5a (lagged effects). Verbal toxicity on the following day will predict lower next-morning well-being and self-esteem (controlling for evening

levels on the previous day).

H6a (gender moderation). Negative same-day and next-day effects on well-being and self-esteem are stronger for female than for male gamers.

2. Materials and methods

2.1. Study design

This study employed a hybrid research approach, combining elements of an intensive longitudinal study (ILS) and an Ecological Momentary Assessment (EMA) approach, which involves real-time reporting in participants' natural environment (Stone & Shiffman, 1994).

Over a 15-day period, participants completed three separate questionnaires. The first questionnaire collected background information, including gender, age, and employment status. For 14 consecutive days, participants received a morning questionnaire assessing their well-being and self-esteem. Each evening, they completed a questionnaire that assessed their well-being and self-esteem and gathered information about their gaming session that evening, such as whom they played with and experiences of verbal toxic behavior. The study follows an ILS framework by involving frequent measurements over a shorter time period, allowing for the examination of outcomes that can change rapidly (Bolger & Laurenceau, 2013). However, the assessments also incorporate elements of EMA by gathering data close to the time of experience in participants' natural environments. This method helps minimize memory distortions while increasing the contextual relevance of the findings (Stone & Shiffman, 1994). In our study, where we aimed to investigate the impact of toxic behavior on well-being and self-esteem, we measured toxic behavior and these two outcomes simultaneously. Additionally, we assessed self-esteem and well-being the following day, enabling us to analyse both the immediate effects of toxic behavior and whether these effects persist into the next morning.

To participate in the study, the participants were required to download an application on their phone, m-Path (Mestdagh et al., 2023). At fixed times each morning and evening, participants received reminders from the application to complete the daily questionnaires. Thus, all questionnaires were answered in m-Path. M-Path is an application well-suited for conducting intensive longitudinal studies and has been used in previous research (e.g., Bij De Vaate et al., 2023).

2.2. Recruitment and participants

We recruited participants through various digital platforms commonly used by gamers, such as Discord groups and gaming websites. Additionally, we informed about the study at schools, youth clubs, via podcasts, and e-sports clubs. To be eligible for the study, participants had to meet the following criteria: be over 16 years old, play at least one of the following games: Call of Duty, Counterstrike, Fortnite, Valorant, or Overwatch, and use a microphone while playing. The study was conducted in Norway.

We created a dedicated website where we described the study and outlined participants' rights. Participants were not compensated for their participation in the study. However, as an incentive, they had the opportunity to win six gift certificates of 500 Norwegian Kroner each (approximately 45 American dollars) and two gaming keyboards.

A total of 104 participants completed the background questionnaire, but 16 of these did not respond to any further questionnaires. These were excluded, resulting in a final sample of 88 participants. Three of these participants reported being non-binary and were not included in gender-specific analyses due to their small number.

2.3. Measures

2.3.1. Toxic behavior

Based on previous literature (e.g., Beres et al., 2021, pp. 1–15; Kowert, 2020) and given the research group's in-depth knowledge of the gaming and esports community, we developed five questions aimed at capturing different types of verbal toxic behavior. The questions were as follows:

1. How often did you receive criticism on how you played?
2. How often did you receive criticism for things other than how you played (you were scolded, ridiculed)?
3. How often did you receive negative comments related to gender, sexuality, religion, or ethnicity?
4. How often did you receive sexual comments or sounds directed at you (rape threats, sexual comments, moaning/sexual sounds)?
5. How often did you receive threats (violence threats, someone threatening to ruin your reputation, someone threatening to spread personal information about you (doxxing))?

The questions were rated on a five-point Likert scale (1 = never, 5 = very often).

We created a sum score of toxic behavior exposure, conceptualized as a formative exposure index capturing the breadth/intensity of distinct toxicity types. For such formative indicators, internal consistency metrics (e.g., Cronbach's α) are neither required nor conceptually appropriate as evidence of reliability. For transparency, we report that a PCA suggested a dominant first component and α = .86. We interpret this only as covariance between exposure types (toxic behaviors tend to co-occur), not as evidence of a single reflective latent construct.

2.3.2. Well-being

Well-being was measured using a modified version of the Scale of Positive and Negative Experience (SPANE; Diener et al., 2010). SPANE comprises of 12 questions measuring positive (six questions) and negative (six questions) feelings. The original scale is used to measure well-being over a 4-week period on a five-point Likert scale (1 = rarely or never, 5 = very often or always). However, given the design of our study, we needed to make some adjustments. We used the same emotions measured in SPANE, but the questions were modified to reflect how the respondents felt *now* (rather than in the last four weeks). In our study, the questions began with: "Now you will get some questions about how you are feeling right now," followed by examples such as: "Do you feel positive?" and "Do you feel sad?" In line with this change, we also adjusted the response options to a 7-point scale (1 = strongly disagree, 7 = strongly agree). These modifications were necessary as we asked participants these questions every morning and evening throughout the duration of the study. In line with Diener et al. (2010), we created a total score by subtracting the negative score from the positive score (SPANE-B). The original scale could range from −24 to 24, but as our scale was a 7-point scale, it ranges from −36 to 36. Higher scores indicate experiencing more positive emotions, which reflect greater well-being. The research group has previously used SPANE with a Norwegian sample (BLINDED FOR REVIEW), and as described in the previous article, SPANE has been validated in several studies (e.g., Espejo et al., 2020; Rahm et al., 2017). The reliability of the scale was good in the present study, with Cronbach's alpha being .94 (morning) and .94 (evening).

2.3.3. Self-esteem

Inspired by Bij De Vaate and colleagues (2023), we measured self-esteem with the following question: 'How satisfied do you feel with yourself now?' Participants answered on a slider scale with a minimum value of 0 (not satisfied at all) to 100 (very satisfied).

2.3.4. Gaming context

Every evening, participants were asked who they had gamed with. The options were: "Only friends" (those you knew from before, either online or offline), "Friends and on randomly composed teams," and "Only on randomly composed teams."

This variable was initially considered in the main analysis. However, it did not show statistical significance and did not contribute to the model. Thus, we excluded it from the final analysis. Consequently, this variable is only presented in the descriptive results.

2.4. Data analysis

The study lasted for 15 days and consisted of two surveys per day. Thus, each participant could potentially have 29 data points. The potential for the entire sample was 2552 data points: (1 background form + 28 morning/evening forms) * 88 participants.

There was a large variation in the number of questionnaires participants completed during the survey period (between 3 and 100 percent). In total, 1286 of the potential 2552 data points were filled out. This means that the proportion missing data was 49.6 %.

Since our study had a substantial amount of missing data, we needed to determine whether the missingness was completely at random (MCAR) or not. In other words, were there specific characteristics that distinguish participants with a high level of missing data? To determine this, we first recoded the five toxic behavior questions so that the variables became dichotomous (instead of using a five-point scale). The variables were coded 0 (never) and 1 (rarely-often). Thus, 0 = no (not experienced toxic behavior) and 1 = yes (experienced toxic behavior to varying degrees, from rarely to very often). The proportion of "yes" for each variable was estimated in two ways: First, descriptively as the observed proportion, and subsequently using a logistic regression model with participant as a random effect ("logistic random effects regression model"). Accounting for the random effect of participants means considering that the proportions vary between individuals. By examining the proportions of missing data for individual participants, we observed that participants with minimal missing data generally reported higher levels of toxic behavior. In other words, participants who answered most questionnaires tended to report higher proportions of toxic behavior. Therefore, data were not missing completely at random (MCAR) in our dataset but possibly missing at random (MAR) given the observed data. This implies that estimates based on descriptive data may be subject to systematic bias, in this case, overestimation of toxic behavior. A logistic random effects model, as well as a linear mixed effects model, provides approximately unbiased estimates also under the less restrictive MAR assumption (O'Kelly & Ratitch, 2014). Hence, we used a logistic random effects model to examine the frequency of toxic behavior.

To investigate whether toxic behavior affects well-being and self-esteem, we used a linear mixed effects model with the sum score for well-being or self-esteem as the dependent variable, the sum score for toxic behavior as a covariate, and participant as a random effect.

STATA version 18 Special Edition (Statacorp, 2023) was used for all analyses.

2.5. Ethical approval

This study was reviewed and approved by The Norwegian Agency for Shared Services in Education and Research (SIKT), with the approval number 368106, dated March 26, 2024. Participation was voluntary, and participants were informed that by downloading the m-Path application, they were providing their consent to participate. The participants received detailed information about the study via the project website prior to their participation. Additionally, they received clear instructions on how to withdraw their consent at any time or request the deletion of their data. Participation was completely anonymous, and it was not possible to identify individual participants as they created fictitious usernames during registration.

In accordance with Norwegian research ethics regulations, individuals aged 16 years and above are considered legally competent to provide informed consent for participation in research, provided the study does not involve clinical interventions or physical procedures. As this was a non-invasive, anonymous, and survey-based study, participants aged 16 and older were able to consent independently, in line with national ethical guidelines (The Norwegian National Research Ethics Committees, 2022). Therefore, no parental or guardian consent was required for participants under the age of 18.

3. Results

An overview of the sample characteristics, including demographics such as gender, living situation, and employment status, as well as the frequency of completed questionnaires across these demographic groups, together with descriptive statistics for the key study variables are presented in Table 1.

More men than women participated in the study, and they also completed more questionnaires (had more datapoints) than women. Among the various age groups, employment statuses and living situations we examined, participants under the age of 20 years, those living with their parents/guardians, and students were the ones who completed the most questionnaires during the 15 days of the study. Women played with their friends more frequently than men. In this study, nearly 56 percent of the time women gamed exclusively with their friends, compared to 35 percent for men. On average, men reported higher well-being scores (both morning and evening) than women, whereas women, on average, reported higher self-esteem scores (both morning and evening) than men. However, these differences were small.

The estimates derived from a logistic random effects model (see Fig. 1) showed that, except for receiving criticism about gameplay (71.2 % vs. 61.5 %; no significant gender differences), women were more likely to experience the other forms of toxic behavior measured in this study and significantly more derogatory comments related to gender, sexuality, religion, or ethnicity (estimated 23.3 % for women and 2.7 % for men), as well as sexual comments or sounds directed at them (estimated 13.3 % for women and 3.6 % for men), compared to men. Otherwise, there were no other significant differences in the frequency of the different types of toxic behaviors experienced by men and women.

Hypothesis 1b. (gendered exposure): Supported. Women reported significantly higher rates of gendered/sexualized toxicity (23.3 % vs. 2.7 %, $p < .01$) and sexual comments/sounds directed at them (13.3 % vs. 3.6 %, $p < .01$).

Hypothesis 2b. (performance-focused exposure): Not supported. For the performance-focused category measured, criticism about gameplay, the gender difference (71.2 % vs. 61.5 %) was not statistically significant.

The results from a linear mixed-effects model revealed gender differences in how toxic behavior affected well-being and self-esteem (see Table 2.). More specifically, there was a significant negative effect of toxic behavior on both men's and women's well-being. However, the effect was significantly stronger for women immediately after exposure (same evening), and unlike men, the negative impact persisted into the following day for women.

Toxic behavior also negatively impacted women's self-esteem

Table 1
Descriptive statistics of participants and key study Variables.

	Participants % (*N*=88)	% of data points (*n*=1286)
Gender		
Male	64,8	72,4
Female	33,0	26,4
Non-binary	2,3	1,2
Age		
< 20 years	43,2	59,2
20-25 years	22,7	18,9
> 25 years	34,1	21,9
Living Situation		
Lives with parents/guardians	45,5	60,3
Lives alone	15,9	9,9
Lives with partner	11,4	9,0
Lives with partner and children	14,8	9,1
Shared housing (student housing)	10,2	10,5
Employment/Activity Status		
Full-time	29,6	17,8
Part-time	11,4	11,9
Without work	9,1	5,0
Student	50,0	65,3

| Study variables						
Gaming context (who did you game with) (*n*=1286)		**Men**		**Women**		
Only friends		35,0		55,8		
Friends and on randomly composed teams		49,8		37,0		
Only on randomly composed teams		15,3		7,3		
		Male			**Female**	
Well-being	Min to max	M	SD	Min to max	M	SD
Evening	-26 to 36	19,8	11,4	-33 to 36	17,8	15,3
Morning	-24 to 36	16,0	11,7	-27 to 36	15,4	15,3
Self -esteem						
Evening	0 to 100	71,0	20,0	0 to 100	71,3	24,1
Morning	0 to 100	62,8	21,0	9 to 98	66,0	24,4
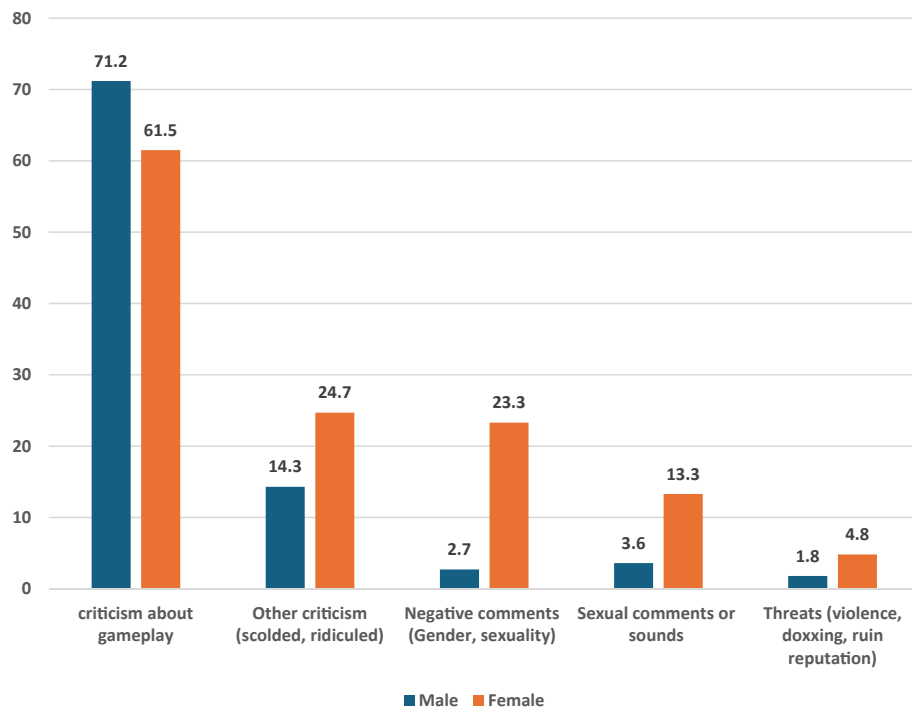
Fig. 1. Estimated proportions from a logistic model of toxic behavior in gaming by gender (Percentage). Significant gender differences were only observed for gendered/sexualized comments and sexual comments/sounds (both $p < .01$).

Table 2
Effect of toxic behavior on well-being or self-esteem. Linear mixed effects model with toxic behavior and gender and their interaction as covariates, and individual as a random effect.

Dependent variable	Men			Women			p-value for the interaction term
	Regression coefficient			Regression coefficient			
	estimate	95 % confidence interval CI	p-value	estimate	95 % confidence interval CI	p-value	
Well-being (evening)	−.45	−.76 to −.15	.004	−1.17	−1.52 to .81	<.001	.003
Well-being (the morning after)	−.28	−.64 to .08	.13	−.65	−1.10 to −.20	.004	.21
Self-esteem (evening)	−.32	−.86 to .22	.25	−1.91	−2.53 to - 1.28	<.001	<.001
Self-esteem (the morning after)	−.34	−.91 to .23	.24	−1.07	−1.78 to −.36	.003	.12

* unstandardized regression coefficient.

Note. We tested typical play context (friends only, mixed, random teams) as a covariate; it was not significant and did not change the associations between toxic exposure (and its gender interaction) and wellbeing, so play context is not included in the reported models.

immediately upon exposure, with this effect persisting into the following day. In contrast, men's self-esteem was not affected by toxic behavior. A significant gender difference was observed in the immediate effect on self-esteem.

Hypothesis 3b. (same-day well-being): Supported.[1] Toxicity predicted lower same-day well-being for both men (b = −.45, 95 % CI [−.76, −.15], p = .004) and women (b = −1.17, 95 % CI [−1.52, −.81], p < .001).

Hypothesis 4b. (same-day self-esteem): Partially Supported. Toxicity predicted lower same-day self-esteem for women (b = −1.91, 95 % CI [−2.53, −1.28], p < .001), but not for men (b = −.32, p = .25).

Hypothesis 5b. (lagged effects to next morning): Partially supported. Toxicity predicted lower next-morning well-being (b = −.65, 95 % CI [−1.10, −.20], p = .004) and self-esteem (b = −1.07, 95 % CI [−1.78, −.36], p = .003) for women, but not for men (both p's > .10).

Hypothesis 6b. (gender moderation): Partially supported. Toxicity effects were significantly stronger for women on same-day outcomes (Well-being evening interaction p = .003; Self-esteem evening interaction p < .001), but interaction terms for next-morning outcomes were not significant (p's = .21 and .12).

4. Discussion

To the best of our knowledge, this is the first study to examine both the frequency of various forms of toxic behavior experienced by women and men while gaming and the potential impact of toxic behavior on well-being and self-esteem. The only comparable study was conducted by Fox and colleagues (2018) who used a diary method to examine different types of toxic behavior and mood. However, their small sample size limited the use of quantitative data. Moreover, previous research has primarily focused on the prevalence of toxic behavior among gamers at some point in time (ADL, 2020; Zsila et al., 2022), and some studies have asked participants about the perceived effects of such behavior (Norwegian Media Authority, 2022; ADL, 2020). In contrast, our study measured toxic behavior concurrently with participants' ratings of their well-being and self-esteem, allowing us to observe these aspects in real-time using ecological momentary assessment. Additionally, well-being and self-esteem were also measured the following morning to assess whether the effects persisted beyond the immediate impact. This approach differs from other studies that rely on participants'

recollections of past experiences and their retrospective assessments of the impact of toxic behavior, increasing ecological validity of the results (Stone & Shiffman, 1994).

In the present study, as hypothesised, gendered exposure patterns emerged: women reported more gendered and sexualized toxicity (H1 supported). No gender differences were found for performance-focused criticism (H2 not supported). Toxic behavior predicted immediate well-being drops for both genders (H3 supported), and same- and next-day self-esteem declines for women only (H4–H5 partially supported). Gender moderated same-day effects only (H6 partially supported). These findings are consistent with our theoretical framework based on Self-Determination Theory (SDT) and the Need to Belong hypothesis, which posit that exposure to harassment, criticism, or other toxic behaviors may undermine the need for belongingness and relatedness, competence, and autonomy, thereby negatively impacting well-being and self-esteem. However, the observed gender differences are not fully captured by these theories. While SDT and the Need to Belong provide a framework for overall effects, they do not explicitly address why men and women might respond differently. We discuss potential explanations for these gender-specific patterns below.

4.1. Gender-specific patterns in verbal toxicity

Our findings revealed that both men and women experience both different levels and different types of toxicity. Women experienced a higher frequency of almost all types, and significantly more sexual and gendered toxicity. This finding is in line with previous research. The Bryter Female gamer study (2020) showed that nearly as many women as men had experienced toxicity from other players, however women had significantly more often been excluded from games due to their gender, being sent inappropriate content, and sexually harassed compared to men. This result is particularly concerning as women in our study gamed only with friends over 55 percent of the times they played, however they still experienced toxicity more frequently than men. Women report higher social motivation for gaming (Hygen et al., 2024) and, in our study, were more likely than men to play with friends. This may also be a coping mechanism to avoid toxic behavior. Consistent with this, a large portion of women avoid multiplayer games, hide their gender/play avatars of the opposite sex or avoid in-game chat (Bryter, 2020, 2022, 2023; Lopez-Fernandez et al., 2019).

4.2. Disparities in toxic behavior effects: stronger and more enduring for women

Although our results showed that toxic behavior negatively affected both men's and women's well-being, the effects were stronger and persisted for a longer duration for women. Women's self-esteem was also negatively impacted by toxicity exposure in gaming, whereas men's was not. Why are women more affected by this type of behavior than men? The reasons are likely complex and multifaceted. However, we

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[1] To address potential bias from missing data (MNAR), we ran a simple tipping-point check on standardized outcomes. A 1-SD increase in exposure predicted −.12 SD in same-day well-being for men (p = .004), with an additional −.19 SD for women (p = .003), i.e., ≈ −.31 SD for women. While ML is not unbiased under MNAR, these magnitudes indicate that reversing significance would require substantial bias.

propose some possible explanations that may interact with each other.

Women in our study experienced more severe forms of toxic behavior, such as sexual and gender-based toxicity. Kowert (2022) contends that some forms of toxic behavior are more harmful than others. It is possible that the comments women receive are perceived as more personal and therefore have a greater impact on their well-being and self-esteem. Additionally, experiencing sexual comments and threats of rape must be understood in the context that many women have experiences with sexual assault offline. According to a report by the Norwegian Centre for Violence and Traumatic Stress Studies (Dale et al., 2023), 14 percent of Norwegian women reported having been raped, while 18 percent reported experiencing other forms of sexual assault at least once in their lifetime. The figures for men were significantly lower, with 2 percent reporting having been raped and 5 percent experiencing other forms of sexual assault. For women with prior experiences of violence or sexual assault, toxic (sexual) comments can serve as a form of re-traumatization, which may contribute to the development and maintenance of mental disorders, such as Post-Traumatic Stress Disorder (PTSD; American Psychiatric Association, 2022). Many women may also have a heightened fear of victimization, a concern that men may not experience to the same degree. This heightened fear is supported by research showing that women's reported levels of fear of crime are higher than those of men, despite men facing a higher risk of victimization for almost all nonsexual violent crimes, such as robbery and aggravated assault. The only crimes where women's victimization rates exceed those of men are rape and sexual assault (Reid & Konrad, 2004). This discrepancy highlights that women's fear of violence is not solely a response to personal experience but rather a reflection of broader societal realities and perceived vulnerability. These fundamental differences between men and women, both in terms of lived experiences and the greater extent to which women carry a fear of being subjected to harm compared to men, could provide insight into why men and women are affected differently by toxic behavior. For women, such behavior may resonate more deeply as it reinforces an underlying fear of physical harm or assault—a fear based on societal realities (especially when it comes to sexual assault: Dale et al., 2023; Reid & Konrad, 2004) and personal safety concerns.

Our findings may also be explained by gender differences in stress response. A review study highlights both psychological and biological differences in how men and women respond to stress. The authors further point out that women are more susceptible to developing depression and anxiety, whereas men are at greater risk for aggression and substance abuse. These differences in vulnerability to mental health challenges have been partially attributed to the effects of sex hormones (Verma et al., 2011). Depression and anxiety are classified as internalizing disorders where distress is directed inward. This may explain why, in our study, women appear to be more negatively affected by toxic behavior. They may internalize the negative experiences to a greater extent, leading to stronger impacts on well-being and self-esteem. In contrast, men might be more inclined to respond with aggression or other externalizing behaviors rather than internalizing the distress. This distinction could help clarify why toxic interactions have a more profound psychological impact on women compared to men. These differences may help explain why women, on average, showed stronger impacts on well-being and self-esteem in our study. Men also experience internal distress; however, reviews/meta-analyses suggest they are *more likely* to *additionally* display anger or other externalizing responses in competitive contexts (Chaplin & Aldao, 2013; Nolen-Hoeksema, 2012; Tamres et al., 2002). These findings align with emerging research suggesting that those who experience toxic behavior may, in some cases, become perpetrators themselves, creating a potential vicious cycle of harm within gaming environments (Liu et al., 2024). Consequently, had we included measures of aggression (i.e., exhibit toxic behavior towards others) following exposure to toxic behavior, the observed effects might have been even stronger for men.

Complementary evidence on masculine norms and help-seeking indicates lower acknowledgement of vulnerability and reduced support-seeking among men (Addis & Mahalik, 2003).

Another point concerns performance-focused toxicity. Even when not statistically more frequent for men in our sample, performance criticism is likely to be more relevant in competitive, male-centered contexts (Kowert et al., 2014; Entertainment Software Association, 2024), consistent with SDT's competence threat account (Deci & Ryan, 2000). In popular competitive game genres, such as those represented in the current study - performance norms and skill evaluation are especially salient (Zsila et al., 2022), which may help explain why men's well-being was negatively affected by toxicity on the same day, although these effects did not persist into the following morning, as observed in our results. Notably, our EMA models did not detect significant same-day or next-day decrements in men's self-esteem; future work should incorporate more granular measures of performance-specific toxicity (e.g., intensity/severity, whether criticism was public vs. private, and rank/stakes) to test this pathway directly.

Studies indicate that women report slightly higher levels of guilt, shame, and embarrassment compared to men (Else-Quest et al., 2012). Perhaps the toxic comments women receive during games amplify these pre-existing feelings of guilt and shame. These dynamics could provide insight into why the women in our study were more negatively affected than men, particularly in terms of well-being and self-esteem.

Another aspect that may help explain our findings concerns gaming culture. Gaming has traditionally been perceived as a male-dominated arena (Kowert et al., 2014), although a significant proportion of gamers are women (Entertainment Software Association, 2024). However, fewer women than men prefer multiplayer games, as those games included in our study (Clement, 2021). It is possible that women who play such games feel less welcome and receive less social support compared to their male counterparts. As a result, when exposed to toxic behavior, they may not receive support from other players, leaving them to face the negativity alone. This could increase the negative impact of toxic behavior.

Moreover, for many players it may be challenging to delineate the boundary between 'acceptable behavior' in a competitive setting (as many games are), and when the behavior crosses "the line" and becomes toxic. This distinction may be particularly challenging to navigate, as many players perceive toxic behavior as a form of humor (Norwegian Media Authority, 2022) or as an intrinsic aspect of gaming culture (Beres et al., 2021, pp. 1–15).

While our findings highlight gender differences in the impact of toxic behavior, we cannot draw definitive conclusions about the reasons behind these differences. In this discussion, we have explored potential explanations, but it is important to acknowledge that the underlying causes are complex and likely involve multiple interacting factors. To fully understand these dynamics, further research is needed. Future studies should aim to investigate the interplay of individual, social, and cultural factors to provide a more comprehensive understanding of the mechanisms driving these gender differences.

Online multiplayer games involve large, mainstream audiences (Entertainment Software Association, 2024). Recurrent exposure to in-game verbal toxicity, particularly gendered/sexualized forms, may produce cumulative costs; our short-term effects underscore the need for scalable, in-game safeguards and for evaluating their impact with temporally fine-grained methods.

4.3. Limitations

Despite its advantages of using an intensive longitudinal design, a more ecologically valid methodology relative to other studies on toxic behaviors in game, the present study had some limitations.

Our study focused specifically on verbal toxic behavior, such as derogatory comments and harassment, while excluding other forms of toxicity, such as spamming, disruptive gameplay, or cheating. Including these behaviors might have provided a more comprehensive

understanding of toxicity in gaming. Additionally, our sample was self-selected, which may limit the generalizability of the findings, as individuals with strong opinions or prior experiences with toxicity might have been more inclined to participate.

Although the intensive longitudinal design allowed for real-time assessment, participant dropout and missing data may have influenced our results. While we applied robust statistical techniques to handle missing data, biases cannot be entirely ruled out. Moreover, our study measured short-term effects, leaving open questions about the long-term psychological consequences of repeated exposure to toxic behavior. Further, our design is observational and lacks a control group. Although EMA improves temporal resolution and reduces recall bias, causal claims remain limited and unmeasured confounding cannot be ruled out. Also, we did not measure basic psychological needs or perpetrator cognitions; thus, our use of SDT (impact) and moral disengagement/online disinhibition (occurrence) is interpretive rather than confirmatory.

We did not record the source of toxic behavior at the incident level (friends vs. strangers), which prevents context-specific effect estimation; future studies should capture incident-level sources.

Future research should explore a broader range and source of toxic behaviors, consider diverse gaming contexts, and investigate how coping strategies or gaming communities influence the psychological impact of toxicity over time. Moreover, future research should examine whether exposure to verbal harassment contributes to a cyclical pattern of toxicity, where individuals who experience harassment subsequently engage in perpetration themselves. Understanding these dynamics, including potential gender differences in pathways and outcomes, would provide important insights into how gaming culture sustains and amplifies toxic behaviors.

5. Conclusion

Our findings highlight the significant impact of toxic behavior on players' well-being and self-esteem, with women experiencing particularly strong negative effects. Given that gaming serves as an important social space for many players, addressing toxicity is crucial to fostering inclusive and supportive gaming environments.

While some players may dismiss toxic behavior as humor and part of gaming culture, our results suggest that it has real psychological consequences, particularly for those who are frequently targeted. Game developers, community moderators, and policymakers should consider implementing stricter anti-toxicity measures and fostering awareness of respectful gaming etiquette.

Future research should examine long-term effects, the role of coping mechanisms, and how game design choices can help mitigate the prevalence and impact of toxic behavior. Promoting positive social interactions in gaming could enhance player experiences and contribute to a healthier digital environment.

CRediT authorship contribution statement

Beate Wold Hygen: Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Stian Lydersen:** Writing – review & editing, Methodology, Formal analysis. **Daria J. Kuss:** Writing – review & editing. **Tobias Scholz:** Writing – review & editing, Methodology. **Christian Wendelborg:** Writing – original draft, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Data availability statement

The data are not publicly available due to privacy or ethical restrictions.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used ChatGPT (OpenAI) and Copilot for linguistic assistance (improving sentence structure, grammar, and language), not for generating content or ideas. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

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