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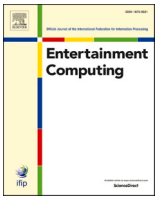

"Pro Gamers" & Cyberbullying: Workplace bullying & sexual harassment in professional video gaming

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ABSTRACT

As Esports grows rapidly, it is imperative to understand cyberbullying in the professional video game playing context, including those who are most vulnerable to cyberbullying. It is predicted that professional women players would experience more cyberbullying and consequently have adverse effects on their mental health. Participants ($N = 145$) were collected from around the world (n = 14 countries) and completed a 10-minute online survey. Path analysis demonstrated that being a woman is a significant predictor of a particular type of cyberbullying (sexual harassment) which in turn also predicts mental health outcomes. Further, the degree to which a player treats gaming as a job (i.e., level of gaming professionalism) is a significant predictor of overall cyberbullying, and that cyberbullying subsequently predicts mental health outcomes. This study suggests the virtual workplace for professional players is unsafe, and further research is required to better understand how to protect these vulnerable workers from harm.

1. Introduction

Professional online gaming is a rapidly growing industry, with live stream gaming events attracting 662.7 million viewers and "Esports" (electronic sports) revenues as high as $947.1 million in 2021 [1]. However, behind the screens, cyberbullying is a prevalent issue in online videogames, including professional gaming [2,3,4,5,6]. This may lead to some vulnerable minority groups in professional gaming to be targeted for cyberbullying, which is particularly the case for women [3,4,6]. This project explores a combination of workplace bullying, cyberbullying, and sexism in a population that has often been neglected in the gaming literature. In Australia, women (46 %) and non-binary (1 %) together represent nearly half of people playing videogames [7]. Therefore, the aim of this project is to better understand cyberbullying in minorities who game professionally.

1.1. What is a 'Professional Gamer'?

The term 'Professional Gamer' is complex to define. Even the term 'gamer' itself can carry negative connotations and stereotypes [8,9], leading to minority groups especially avoiding the term (note: both player or videogame player is used throughout this paper). Regardless of the term itself, a videogame player who operates in a 'professional' context is commonly involved in some form of competition such as tournament participation, the most visible of which is esports [10]. Videogaming tournaments are typically organised by the gaming community [11], and much like conventional sports there are rules, regulations, systems, judges, prizes, and are typically mainstream broadcasted [10].

More broadly one may be defined as a professional player if they can make a financial living from gaming [11]. Faust and colleagues [11], express that 'elite' professional players do this activity as a full-time job, and when one can rely on an income from gaming, it is no longer a hobby but an occupation. Professional players can also earn team salaries if they are in a gaming team, sponsorship money, money from viewers subscription, donations and streaming fees, and money from media rights and merchandising [10].

Unlike a conventional job, there is an aspect of professional gaming that appears to be inescapable; the title of professional player now comes with a celebrity status [6]. Professional players are, in addition, tasked with activities surrounding the preservation and creation of a reputation/persona, including; appealing to viewers and consumers of gaming (e.g., subscribers and viewers); managing and changing teams if it affects their reputation; and upholding a marketable persona for sponsorship deals [6].

The esports industry also shares similarities with the traditional sport

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industry, including toxic masculinity largely due to being a male-dominated industry [3,4,6]. This hyper-masculinisation has created many obstacles for women in gaming, and even more so for professional women players [6,12]. The industry-wide hyper-masculinisation places women in a compromising position regarding economic stability, their gender identity, and having to create a public persona that caters for the male dominated audience (for further detail, see [6]). This encourages misogynistic attitudes, behaviours and aggressive acts towards women in gaming, including cyberbullying [2,4,12].

There is limited research in the area, however, from the accounts of professional women players [3,6], and the systematic review of bio-psychosocial risk of esports [5], it is predicted that the professional players will be exposed to more experiences of cyberbullying.

Therefore, it is hypothesised that:

Hypothesis 1 : level of professional gaming will be a significant positive predictor of cyberbullying (H1a) and sexual harassment (H1b), such that as the more professional a player is based on professional gaming behaviours (e.g., streaming, earning an income, compete in tournaments), the more likely they are to experience cyberbullying and sexual harassment.

1.2. What is Cyberbullying?

Across the literature, cyberbullying is defined as intentional, aggressive, and repeated acts towards someone who cannot defend themselves, carried out through the use of technology [13,14,15,16]. Likewise, Vranjes et al. [16], defined workplace cyberbullying similarly with one distinction; cyberbullying does not have to be a repeated behaviour by a single perpetrator (a view shared by Ballard & Welch) [2]. Although a single perpetrator may not repeat the act, the singular digital act could reach a wider audience, and instead encourage others to repeat the act. For example, if an intimate photo was posted online with the intention of humiliating someone, that photo has the potential to be viewed multiple times and for others to re-share the image, causing ongoing harm; it is accumulative. Unlike traditional bullying, cyberbullying is often anonymous, further creating a more complex power imbalance and making it more difficult for victims to defend themselves [2,15,16].

Most of the current cyberbullying and cyberbullying in gaming literature focus on children and adolescents. Langos [14] identified eight distinct manifestations of cyberbullying, which include; harassment; cyberstalking, denigration; 'happy slapping' (distribution of a video of physically assaulting a victim); exclusion; outing and trickery; impersonation and masquerading; and indirect threats. Similarly, Coyne et al. [13], cited four specific forms of cyberbullying (written-verbal acts, visual acts, exclusion, and impersonation) that parallel those mentioned by Langos [14]. These sources provide valuable information about the forms of cyberbullying; however, they were conceived in the context of cyberbullying in adolescents and in some cases assume the bully and victim physically interact prior to the cyberbullying behaviour (e.g., at school). In addition, general gaming and professional gaming research has primarily focused on the experiences of men with the exception of two studies [3,4].

Prior to gender-based research, Ballard and Welch [2] recorded a list of cyberbullying acts that occurred in Massively Multiplayer Online Games (MMOGs), which includes such behaviours as name-calling, use of profanities, and exclusion. Some of the gaming-specific acts parallel those Langos [14] used to describe cyberbullying in general. Most importantly, there appears to be a specific theme of sexual content in gaming cyberbullying, with Ballard and Welch [2] identifying three of the nine behaviours listed to be of a sexual nature (e.g., sexual harassment), which may be particularly relevant to women players. In a qualitative study exploring the experiences of professional women players, sexual harassment was a common form of cyberbullying experienced, including sexual threats (e.g., threats of sexual assault and rape) [3]. In a separate qualitative study analysing a discussion forum with female players, sexual harassment was commonly reported, with regular cyberbullying during gaming being the main reason some female players resorted to gaming alone [4]. In a systematic review exploring the wellbeing of esports players, female players were more likely to experience cyberbullying in the form of sexual harassment and objectification [5]. Further, Ballard and Welch [2], found that female players reported experiencing significantly higher rates of sexual harassment and sexual pursuits than male players during MMOGs.

Therefore, based on the literature, it is hypothesised that:

Hypothesis 2: identifying as a woman player (cis or trans) will significantly positively predict the experiences of cyberbullying (H2a) and sexual harassment (H2b).

1.3. Workplace Cyberbullying: An organisational perspective

Videogaming is an established profession, so it is possible to use an organisational psychology perspective to explore the relationships between cyberbullying and adverse outcomes. There are several consequences associated with workplace cyberbullying, including effects on mental health [12,13,16]. Mental health is a commonly used term to refer to well-being and mental/psychological health concepts. However, other terms covered in the literature include well-being and mental health-specific concepts (e.g., anxiety, stress/strain, suicidality); such terms will be used to reflect the findings in the literature.

Consequences of workplace cyberbullying include anxiety, poor well-being and mental strain, and job dissatisfaction [12,13,16]. These can be explained through the disempowerment theory; cyberbullying violates the worker's dignity and consequently affects their perceptions of the work environment [13]. Conversely, Loh and Snyman [12] used conservation of resources to describe cyberbullying consequences for female employees. They expressed that female employees tend to have less power and therefore, fewer resources in the workplace when faced with a stressor such as cyberbullying or sexual harassment. The anonymity and accessibility of cyberbullying further makes it difficult to escape, creating mental strain and depleting energy to work (i.e., loss of resources). This may be most relevant to women in gaming as qualitative studies have shown that women players do not have the same levels of social support or resources as men players [3,4]. Following this theory, cyberbullying may not only affect professional women players' mental health, but also their job. Regarding the consequences of cyberbullying in adult populations outside the workplace is slim. However, a systematic review found that those who had experienced cyberbullying were 2.10 to 2.57 (OR) times more likely to experience suicidal thoughts, behaviours or attempts [17]. In addition to this, female players have reported experiencing more anxiety, stress and depleted enjoyment of gaming because of the negative interactions they had experienced during gaming, including cyberbullying [4]. In organisational psychology literature, workplace cyberbullying consequences include anxiety, poor well-being and mental strain, and job dissatisfaction [12,13,16], with workplace cyberbullying being a significant positive predictor of stress [12], and significant negative predictor of mental well-being [16].

With the assumption of professional video gaming as a job, cyberbullying models in the organisational literature [12,13,16] suggest that the more cyberbullying and sexual harassment professional players experience, the more it will negatively impact their mental health.

Therefore, it is predicted that:

Hypothesis 3: cyberbullying (H3a) and sexual harassment (H3b) will be a significant negative predictors of mental health outcomes (MHI-5 scores), such that frequency of cyberbullying experiences increases, mental health decreases.

The proposed model incorporating H1-H3 is presented in Fig. 1.

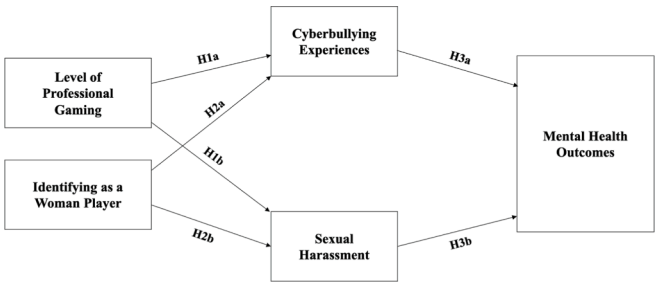

Fig. 1. Model illustrating the relationship between level of professional gaming, identifying as a woman player, cyberbullying, and mental health outcomes.

2. Method

2.1. Participants

A total of 145 participants remained after data cleaning and screening procedure. Participants were aged between 18 and 49 (median = 25), with a total of 46.9% women (cis and trans; see Table 1). A total 14 countries participated with most participants from Australia (44.8%), the United States (20%), and India (13.8 %), with the remaining countries not exceeding 3.4% each (Canada, England, Finland, Germany, the Netherlands, the Philippines, Poland, Spain, Sri Lanka, Sweden, and Switzerland). In addition, a total of six sexuality descriptions were recorded with the majority being straight (47.6%) or bisexual (26.9%); other sexuality descriptions included lesbian/gay (15.2%), unsure (4.8%), prefer not to say (4.8%), and something else (e.g., asexual, demisexual; 2.8%).

2.2. Design

A cross-sectional, self-report, correlational, design was employed. A within-subjects design using path analysis was used to test the model in Fig. 1.

2.3. Materials

2.3.1. Construction of the cyberbullying measure

A similar method used by Li and Putsaka [18] study was adopted to develop an inclusive, context-appropriate instrument to measure cyberbullying in videogaming. The first step was to review the literature and identify key themes and manifestations of general cyberbullying and gaming cyberbullying. The second step was to collate established measures of cyberbullying in the literature, and perform a cross-analysis of the themes of cyberbullying present in the scales. Four scales were cross-examined; the Bullying and Cyberbullying Scale-Adolescents (BCS-A; sub-scale cyber) [19], the Cyberbullying Scale (CBS) [15], the Online Victimisation Scale (OCS; sub-scales General and Sexual online victimisation) [20], and the Cyberbullying Experiences scale (CES; victimisation sub-scale) [21]. The themes identified in the four scales are illustrated in Table 2. From this cross-examination, it was identified that no single scale of cyberbullying captured all of the common themes of cyberbullying identified in step one; at most, BCS-A and CBS captured six out of the eight themes. It became evident that a sub-scale from one measure capturing the missing theme(s) would have to be used in conjunction with another full measure of cyberbullying.

Step three was to compare the reliability coefficients of the scales to determine which scales were most consistent at measuring cyberbullying. The CBS had a higher internal reliability coefficient ($\alpha = .94$; Stewart et al., 2014), than the BCS-A ($\alpha = .83$) [19]; therefore, it was decided that the CBS will be used as a base scale to measure cyberbullying. Questions from another survey were added to measure the theme of sexual harassment. The CES sub-scales that covered sexual harassment had a higher reliability coefficient (public humiliation $\alpha = .89$; unwanted contact $\alpha = .84$) [21], than the OCS (online sexual victimisation $\alpha = .76$) [20]; therefore, it was decided that three questions from the CES would be adapted alongside the CBS in the survey. Based on the remaining gap identified in step one, two original questions were added to cover sexualised content (use of sexual names and being asked to send explicit pictures). To maintain face validity, all additional questions were phrased similar to the CBS.

Step four was to re-word the CBS questions as they were written for a child population (e.g., *How often do you get online or text messages from another kid threatening to beat you up or hurt you physically?*). Therefore, phrases that alluded to "kids" were changed for the context of an adult gaming population. Two academic researchers reviewed the adapted scales (one with a background in gaming and gaming research), and four game players also informally reviewed the adapted scales. Changes were made to maintain face validity.

The last step was to determine the recall timeframe for cyberbullying experiences. The CBS measured experiences from "the past few months," however, the CES (sexual harassment questions) measured experiences from "the last 12 months". This is a discrepancy abundantly present among bullying and cyberbullying scales [22,23]. In Vivolo-Kantor et al. [23] systematic review and Sun et al. [22] meta-analysis, there does not appear to be recall time preference in bullying and cyberbullying literature. However, both expressed that it is important, for example differing months in the school year [23]. This can also be argued for gaming; for example, new game releases will attract a plethora of viewers compared to other times of the year. In addition, Sun et al. [22] explained that using a short recall time will produce lower reported bullying and cyberbullying experiences. Therefore, it was decided for the purpose of this study, all cyberbullying items would consistently use a recall time frame of 12 months. The final scale demonstrated excellent reliability with a Cronbach's Alpha of $\alpha = .93$ (the cyberbullying in gaming scale is freely available upon request).

2.3.2. Mental health outcomes

Mental health outcomes were measured by the Mental Health Inventory-5 (MHI-5). The MHI-5 is a 5-item general mental health scale encompassing four psychological concepts: anxiety, positive affect,

Table 1
Table showing demographic information of participants including gender, age, and number of professional video game players identified in the sample

	Women *N* (%)	Men *N* (%)	Gender Diverse *N* (%)	Prefer not to say *N* (%)	Something else† *N* (%)	Total *N* (%)
	Cis 58 (40) Trans 10 (6.9)	Cis 65 (44.8) Trans 0 (0)	9 (6.2)	2 (1.4)	1 (.7)	145 (100)
Professional Player*	24 (16.6)	35 (24.1)	3 (2.1)	2 (1.4)	0 (0)	64 (44.1)
Age	Median = 27.5	Median = 24	Median = 21	Median = 28.5	Median = 30	Median = 25
	Min. = 18	Min. = 18	Min. = 19	Min. = 22	Min. = 30	Min. = 18
	Max. = 49	Max. = 42	Max. = 46	Max. = 35	Max. = 30	Max. = 49
Total	68 (46.9)	65 (44.8)	9 (6.2)	2 (1.4)	1 (.7)	145 (100)

* This is based on the Level of Professionalism scale. Participants who scored ≥ 1 were deemed to fit the minimum (one professional activity) for "professional player".
†This participant specified their gender description as "agender".

Table 2
Summary of the themes of cyberbullying identified in the scales, what literature the themes are congruent with, and whether it has been identified in the gaming context literature (consistent with Li & Putsaka's 2017 approach to developing context-appropriate instruments)

Theme Identified in the Scales	Example	Congruent with Cyberbullying Literature	Relevance to Gaming Context	Scales with Theme			
				BCS-A	CBS	OCS	CES
Verbal denigration	E.g., name calling, hurtful comments, antiquated gender stereotype comments (i.e., "make me a sandwich")	YES: Coyne et al., 2017; Doane et al., 2013; Langos, 2015; Loh & Snyman, 2020; Stewart et al., 2014; Thomas et al., 2019	YES: Ballard & Welch, 2017; Darvin et al., 2021	✓	✓	✓	✓
Exclusion	E.g., kicked out of online areas, being ignored, not permitted access to items or assets	YES: Coyne et al., 2017; Langos, 2015; Thomas et al., 2019	YES: Ballard & Welch, 2017; Darvin et al., 2021; Li & Putsaka, 2017; McLean & Griffiths, 2018	✓	✓		
Sexual Harassment	E.g., sent explicit images, unwanted sexual comments and names, use of avatar to make sexual actions	YES: Langos, 2015; Loh & Snyman, 2020; Tynes et al., 2010	YES: Ballard & Welch, 2017; Darvin et al., 2021; Mclean & Griffiths, 2018; Schulze et al., 2021			✓	✓
Rumours & Lies	E.g., gossip, false dissemination	YES: Langos, 2015; Stweart et al., 2014; Thomas et al., 2019	YES: Ballard & Welch, 2017; Darvin et al., 2021	✓	✓		
Photo/video Manipulation and/ or Dissemination	E.g., sharing embarrassing photos, editing photo in a harmful way	YES: Coyne et al., 2017; Doane et al., 2013; Langos, 2015; Loh & Snyman, 2020	NO: Has not been reported in the literature	✓			✓
Threats	E.g., threatening physical harm, threats to safety of self and family	YES: Langos, 2015; Loh & Snyman, 2020; Stewart et al., 2014; Thomas et al., 2019	YES: Ballard & Welch, 2017; Darvin et al., 2021	✓	✓	✓	
Trickery & Manipulation	E.g., manipulation tactics to gain private information & publicly distributed, secrets are published without permission	YES: Doane et al., 2013; Langos, 2015	NO: Has not been reported in the literature	✓	✓		✓
Impersonation	E.g., pretending to be the victim and making rude comments, harming the victims' reputation via impersonation, hacking	YES: Coyne et al., 2017; Langos, 2015	NO: Has not been reported in the literature		✓		✓

BCS-A = Bullying & Cyberbullying Scale-Adolescents (Thomas et al., 2019); CBS = Cyberbullying Scale (Stewart et al., 2014); OVS = Online Victimisation Scale (Tynes et al., 2010); CES = Cyberbullying Experiences Scale (Doane et al., 2013).

depression, and emotional control [24]. Participants answer the questions on a 6-point frequency scale, ranging from *Never* (1), to *Always* (6) [16]. Scores range from 0 to 100, where lower scores represent poor mental health and higher scores represent optimal mental health [25]. An example question follows: "How much of the time, during the last month, have you been a very nervous person?" [24].

2.3.3. Level of professional gaming

A 7-point frequency measure was created to measure the degree to which a player engages in professional gaming behaviours, i.e., how heavily involved they are in job-like behaviours in the context of videogaming. This was created on the characteristics that differentiate a professional player from a non-professional player, which arose in the literature (e.g., see Zolides [6], Bányai et al., [10], and Faust [11]). Six key criteria were established; 1) Most of your income comes from gaming; 2) You have a following or subscribers; 3) you have contracts, sponsorships, or endorsements; 4) you participate in competitions; 5) you are referred to as an active public gaming figure; and 6) you primarily game for a living, not for a hobby or enjoyment. Participants ticked any number of the six behaviours, which were tallied to indicate their level of professional gaming. The score range is 0 to 6, where 0 indicates no level of gaming in a professional context (none of the criteria checked), and 1 to 6 indicating some level of professional gaming ($\alpha = .68$).

The final survey was administered through Qualtrics, an online survey platform. The survey took roughly five to 10-min to complete.

2.4. Procedure

The University of South Australia's Human Research Ethics Committee gave ethical approval for this project. Participant recruitment process lasted 42 days, from June to August of 2022.

Several strategies were used simultaneously during the recruitment process:

One: The survey was promoted on Facebook with paid advertisement. A total of $80.10AUD was invested into this form of advertisement. The advertisement ran for 37 days.

Two: A "Pro Gamers Research Team" account was made on Facebook, Twitter, and Instagram to advertise the study, so that people could share the post and survey on their own feeds and with others. On Twitter and Instagram, hashtags were used to reach a wider audience including #gamers, #gamergirls, and #LGBTQIA. In addition, permission was sought from Facebook pages and groups to post or have the research team's Facebook post shared in the group. Six of 10 approached Facebook pages and groups approved of the advertisements.

Three: A "Pro Gamers Research Team" Reddit account was made and public subreddits were approached for permission to advertise; 12 of the 29 approached subreddits approved the request.

Four: Esports companies, teams, and gaming companies were emailed to invite them to support the study by sharing the survey with team members or on their social media pages. A total of 74 companies and teams were contacted. Only four companies and teams responded with three agreeing to share the survey. In addition, individual Twitch streamers were emailed to invite them to participate in the survey and to spread the word. It is unknown if these recipients participated in the survey; none of the contacted streamers responded to the email.

Clicking the survey link would take patrons to an information page about the study (intent, inclusion/exclusion criteria, participation requirements). Participants could then consent, participate, and share the survey to create a snowballing affect, or decline participation. After

completing the survey, participants were taken to a debriefing page, including a crisis support hotline respective to their location of residency (answered in demographics section).

3. Results

Data were imported into SPSS Statistics 28. Variables were relabelled, and responses were coded to their respective scales (cyberbullying experiences scale; MHI-5; level of professional gaming). Data were cleaned and screened, incomplete responses were deleted, and variables transformed into Z-scores when not normally distributed.

Initial exploratory analyses were conducted to better understand the nature of cyberbullying in this sample. When cyberbullying was dichotomised (no = no cyberbullying experiences in the last 12 months; yes = one or more incidents), almost all of the sample (95.9%) experienced cyberbullying in the last 12 months, suggesting that these toxic behaviours have a very high prevalence rate in videogaming. Further, when looking specifically at players who game strictly in a professional context (n = 59; i.e. report at least one or more of the 'professional gamer' activities, such as having endorsements, subscribers, etc.), half experienced cyberbullying predominantly from their co-workers (49.2% from team mates, coaches, other professional players/streamers), and the other half experienced cyberbullying predominantly from their consumers (50.9% from viewers, fans, subscribers). Mean scores and standard deviations for level of professional gaming, cyberbullying experiences, and MHI-5 are recorded in Table 3. In addition, Table 4 displays frequency and percentage of characteristics of Professional Gaming selected by the professional players; as displayed, esports participation was the most chosen characteristics, followed by having a fan base on social media platforms and being a gaming figure on platforms such as Twitch and YouTube.

3.1. Hypothesis testing

Path analysis was conducted in SPSS AMOS 28 to test H1, H2, and H3 (see Fig. 2). Direct effects are also included (but not hypothesised) from the leading indicators (identifying as a woman player; level of professional gaming) to predict the outcome (mental health) for completeness, and in the process of mediation. A correlation was included between the error term for cyberbullying and sexual harassment on theoretical grounds, given that their thematic similarity may lead to a consistency in unmeasured factors that impact upon both [26,27], such as stigma around reporting or comorbidities.

Level of professional gaming was a significant weak-to-moderate positive predictor of both cyberbullying (p < .01; H1a) and sexual harassment (p < .01; H1b); therefore, H1 was supported. The level of professional gaming was not a significant direct predictor of mental health outcomes, suggesting that cyberbullying and sexual harassment play a full mediation role between professional gaming and mental health. Conversely, being a woman (cis or trans), was a significant moderate positive predictor of sexual harassment (p < .001; H2b) but

Table 3
Table displays the mean scores and standard deviation for the three main scales

Scale		*N*	*M* (*SD*)
Level of Professional Gaming			
	Pro Players*	64	1.88 (1.25)
	All Players	145	.83 (1.25)
Cyberbullying Experiences			
	Women (Cis & Trans)	68	23.38 (17.87)
	Men (Cis & Trans)	65	20.32 (18.85)
	Gender Diverse†	10	16.90 (6.45)
	Prefer Not to Say	2	29.50 (6.36)
	Pro Players	64	25.33 (20.43)
	All Players	145	21.65 (17.72)
Mental Health Inventory 5			
	Women (Cis & Trans)	68	14.06 (4.99)
	Men (Cis & Trans)	65	15.75 (6.13)
	Gender Diverse†	10	11.30 (4.62)
	Prefer Not to Say	2	10 (2.83)
	Pro Players	64	14.64 (5.6)
	All Players	145	14.57 (5.61)

* This is the *M* and *SD* for participants who scored ≥ 1on the Level of Professional Gaming Scale.
†Gender Diverse includes participants who are Non-binary/Genderqueer and Something Else.

Table 4
Frequency of items selected on the Level of Professional Gaming Scale by Professional players; when tallied, this provides a relative gauge of how many professional behaviours each participant engages in

Level of Professional Gaming Characteristics	"Yes" Frequency *n* (%)				
	Women	Men	Gender Diverse	Prefer not to say	Total
Most of your income comes from gaming (e.g., competitions, streaming, merchandise, team salaries, etc.).	4 (16.7)	5 (14.3)	0	1 (50)	10 (15.6)
You have actively participated in game competitions and tournaments (e.g., esports).	14 (58.3)	24 (68.6)	0	2 (100)	43 (67.2)
You have an active following/fan base presence online via subscribers, viewers, or followers on media platforms.	10 (41.7)	14 (40)	1 (33.3)	1 (50)	26 (40.6)
You have sponsorships, contacts and endorsements with companies/organisations surrounding gaming and/or your gaming accomplishments.	1 (4.2)	8 (22.9)	1 (33.3)	0	10 (15.6)
You are an active public gaming figure online via Twitch, YouTube, Instagram, and/or Twitter.	10 (41.7)	10 (28.6)	0	1 (50)	21 (32.8)
You game for a living, not just for the purpose of enjoyment or as a hobby.	4 (16.7)	5 (14.3)	0	1 (50)	10 (15.6)

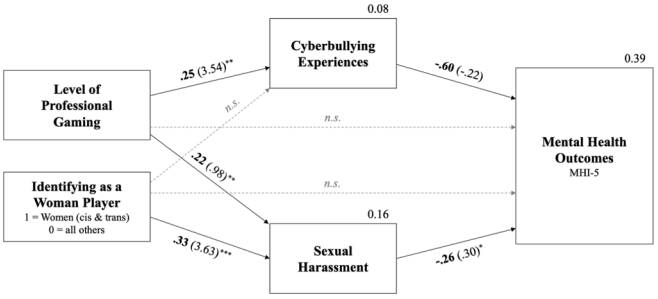

Fig. 2. Figure displays the model of level of professional gaming, identifying as a woman player, cyberbullying, sexual harassment and mental health outcomes. Note: estimates are displayed as followed; standardised estimates (unstandardised estimate); solid arrows indicate significant pathways, with * = p < .05; ** = p < .01; *** = p < .001; n.s. = non-significant (grey line); and proportion of variance explained for cyberbullying, sexual harassment, and mental health outcomes can be seen above each construct.

not cyberbullying (*n.s.*; H2a); therefore, H2 was partially supported. Similar to gaming professionalism, being a woman in gaming was not a significant direct predictor of mental health outcomes, suggesting that sexual harassment plays a full mediation role between the two. Last, both cyberbullying ($p < .001$; H3a) and sexual harassment ($p < .05$; H3b) were significant (strong and moderate effects, respectively) negative predictors of mental health outcomes; H3 was supported. Proportion of variance explained (R^2) by cyberbullying was small, sexual harassment was small-to-moderate, and mental health outcomes were large [28]. See Fig. 2 for standardised and unstandardised values, significant regression pathways, and proportion of variance explained by each construct.

Model fit indices are displayed in Table 5, and across a variety of metrics our proposed model (M1) displays excellent fit, with GFI > 0.95 [29], NFI > 0.90 [30] and CFI > 0.95 [31], but does not reach acceptable fit on RMSEA (a score of < .08 required) [32]. Regardless, the proposed model does display a significant improvement in model fit over M0 (the null/independence model), $\Delta\chi^2\,(9) = 314.49^{***}$, and all of the model-fit-indices score better than if there were no relationships between variables (M0), suggesting that the proposed model may be a good explanation of the relationships between being a woman player, professional gaming, cyberbullying, sexual harassment, and mental health.

4. Discussion

There was sufficient support (H1 and H3, plus partial support for H2) to suggest that the model presented in Fig. 1 may be a valid explanation of the cyberbullying experiences for professional players. In essence, the more professional a game player becomes, the more they are exposed to hostile behaviours, and subsequently experience poor mental health outcomes (especially so for women). In addition, the model demonstrates that women working in gaming (regardless of professional status) are more likely to experience cyberbullying, which in turn has an adverse relationship with their mental health. This is in accordance with the disempowerment theory; as demonstrated in Fig. 2, approximately 40 % of variance in mental health outcomes were explained by hostile behaviours – cyberbullying and sexual harassment – supporting the position that these hostile behaviours come with a sense of personal violation and consequently have a disempowering effect via mental health.

It was not a surprise to find that being a woman in gaming was a significant predictor of sexual harassment, and consequential adverse mental health impacts as previous research indicated similar results [2,3,4,5]. However, being a woman in gaming was not a predictor of cyberbullying, contradicting previous research [2,5]. This is important because initially one might presume that since women are more likely to be the victim of hostile behaviours such as bullying, they would simply experience cyberbullying as a result of their gender; however, path analysis demonstrated that over and above any gendered effects, working as a professional in gaming is the clear predictor of being exposed to cyberbullying. Alternatively, the finding could be attributed to how specific subtypes of cyberbullying might be associated with different genders (e.g., men players experienced more verbal denigration than other genders), or gender-based likelihood to socialise and therefore be exposed to cyberbullying. For example, Yao et al. [33] explored in- and out-groups in relation to the willingness of men players to play with women. In another study, Yao et al. [34] explored stereotypes in women gamers to develop the Female Gamer Stereotype scale, specifically highlighting factors such as femininity, sociability, and video game preferences. In combination, it may be these facets specific to women in gaming that make them vulnerable to sexual harassment, whereas cyberbullying exposure is a result of the degree of professionality. Considering disempowerment theory, sexual harassment may be being used as a more intense form of violation towards women in gaming. The gaming scene currently has an already established unbalanced power dynamic as demonstrated by video gaming companies; game development and sales are very much targeted towards the cis-heterosexual man. When women then enter this gaming space (which is not new), the formation of in- and out-groups may be pronounced (and further so in the case of women in professional gaming). It may then be that sexual harassment is adopted as a more hostile form of violation and disempowerment, and in turn, women in gaming experience the adverse effects on their mental health.

It is important to note here that it is specifically the sexual harassment and cyberbullying that has these negative effects on players, and it is not the video gaming itself. This may further imply that there are underlying factors such as gaming culture and community that is feeding into such antisocial behaviours. It is also important to recognise that although the aim was to explain and explore the predictor of sexual harassment and cyberbullying, causal conclusions cannot be drawn from this study due to the absence of longitudinal data. Further, factors around why women players and professional players are exposed to more hostile behaviours should be further explored (e.g., in- and out-groups [34]; increased visibility) in the case of predicting cyberbullying and sexual harassment experiences.

The high prevalence of cyberbullying experiences highlight the toxic nature of the gaming community, and the challenges experienced by professional players trying to make a living. Previous research has reported cyberbullying occurring in a non-professional gaming context [2,4], and in the context of esports – a sub-genre of professional gaming [3,5]. However, the model presented in this study demonstrates that the more professional a player is, the more cyberbullying experiences will occur, resulting in adverse mental health outcomes. It is important to note that being a professional player and playing video games in of itself does not predict adverse mental health outcomes, which support Vuorre and colleagues [35] recent assertion that video games do not have an impact on mental health. Therefore, rather than an issue of job tasks themselves, instead the biggest risk for professional players is their work *environment*; the culture surrounding professional players promotes workplace cyberbullying and exposes them to this continual hazard (without any workplace health and safety supports).

Interestingly, professional players reported cyberbullying perpetrators to equally be both co-workers (other professional players, team mates, coaches) and consumers (viewers, fans). This highlights cyberbullying in professional gaming to be more complex than originally thought. In the organisational psychology literature, workplace bullying (in which perpetrators are co-workers or supervisors), is prevented and intervened via employee training and company policies [36,37]. However, these interventions are not transferable to the professional gaming context, which operates outside the conventional workplace (or even 'sole-trader'). For players who are not signed to a team, their income comes from sponsorships, streaming, and competitive tournament winnings (e.g., like esports); it is not possible for management to enforce an anti-bullying policy or training interventions when management itself does not exist. And this may be the very case for many professional players has demonstrated in Table 5 displaying the selection of professionalism characteristics; after esports participation, the items relating to social media presence and use of platforms such as Twitch and YouTube were the next most selected. This may be an indication that esports

Table 5
Table displays chi-square, df, and fit indices for Fig. 2.

	χ^2	df	$\Delta\chi^2$(df)	GFI	NFI	CFI	RMSEA
M0	317.65	10		.657	.000	.000	.462
M1	3.16	3	314.49(9) ***	.991	.990	.993	.123

M0, Model 0/Independence Model; M1, Model 1/Default Model; χ^2, chi-square; $\Delta\chi^2(1)$, difference of chi-square; GFI, Goodness of Fit Index; NFI, Normed Fit Index; CFI, Comparative Fit Index; RMSEA, Root Mean Square of Error Approximation.
*** $p < .005$.

is not the only avenue for professional gaming, but is simply one of a few; the alternatives being live streamers or YouTubers in video gaming. The concern for the wellbeing and prevention of cyberbullying in the workplace for this line of work is a reflection of the current job design; one that lacks organisation and standard practice. If a majority of professional players are independent workers whom are independent from an organisation or company, and therefore, do not have safety officers or human resources, rendering a majority of current organisational interventions impractical and likely ineffective. This is both a limitation and criticism of the current workplace cyberbullying literature, which explores only the 'conventional' workplace.

Whilst trending studies that develop our understanding of workplace cyberbullying continue to emerge, practical interventions themselves have not been thoroughly explored or implemented. Even outside of professional gaming this gap needs to be addressed. Since the COVID pandemic, remote working and working online has become commonplace, with the Australian Bureau of Statistics chief, Dr. David Gruen, stating that remote working will persist after the pandemic [38]. An increase of online work creates more opportunities for workplace cyberbullying to arise, suggesting a need for prevention and intervention. It is therefore recommended that organisational psychologists and researchers explore and perhaps reconceptualise "workplace cyberbullying" as a phenomenon that is evolving outside of conventional jobs as demonstrated by this study; for example, cyberbullying from colleagues may venture past work hours and work systems, rather extending into personal life through social media use. Perhaps "workplace cyberbullying" should evolve to focus on the workers involved as opposed to just the environment in which it is experienced. Only after reconceptualization can interventions be developed to prevent, protect or decrease the affects and experiences of cyberbullying whilst working. Whilst improving the workplace for professional videogame players may not be of particular interest to everyone, improving an online workplace should be.

Another challenge that has emerged from this study relates to the academic community and the research into 'gamers'; the current discourse around videogames has created a distrust for academics in the gaming community. For example, in this study a recruitment post made in a subreddit received negative comments and accusations, such as "Another research [study] which will probably conclude with gaming = bad… You guys are asking just one-sided questions". Whilst this comment did not accurately reflect the intentions of this study, it does raise a poignant issue. For over a decade, primary research regarding gaming has had the premise of "gaming = bad", regardless of whether these conclusions are supported or fair. For example, peer reviewed articles suggest that violent videogames have a causal relationship with violent behaviour [39,40,41]. However, this topic and these articles are the result of publication bias [42], putting into question whether this is truly the case. This trend in the literature ostracises a passionate community rather than understanding them. Academics must evaluate their motivations prior to research with the videogaming community.

4.1. Limitations

The primary limitation of this study is the sample size, which may be directly attributed to the gaming community's mistrust of academics, as described earlier. The limited residency of participants, in particular is a limitation; the majority of participants resided in Australia, and primarily were countries with English or Latin-based languages. This limits the generalisability of the results to the wider gaming community, given that a large portion of the videogame consumer base reside in the Asia-Pacific region [43]. This may indicate the need for cyberbullying scales that are also valid and reliable in other languages, including non-Latin-based languages (e.g., Japanese).

The other major limitation of this study is the measure used for cyberbullying experiences. Whilst the method for development and adaption was thorough, and the reliability coefficients were still high, content validity of the scale may be in question. In an optional comment section of the survey, some participants expressed the survey to not quite capture the essence of cyberbullying behaviours in the gaming context. The adapted and modified versions of the existing cyberbullying scales (in order to fit the gaming context) may account for some of the lower effect sizes reported. For example, the lack of significant relationship between gender and cyberbullying despite other significant relationships found between gender (being a woman) and sexual harassment (a different, but previously validated measure). If this is the case, these results may actually be underestimating the effects present in the population, and therefore, the generally low mean scores for cyberbullying and the smaller proportion of variance explained by cyberbullying and sexual harassment may not fully capture the prevalence of said adverse behaviours in gaming and professional gaming.

This limitation highlights the need to further explore the psychometrics of the newly developed cyberbullying in gaming scale, such as testing for convergent and divergent validity in a different sample.

4.2. Strengths

Despite the limited sample size, this study has demonstrated that obtaining a diverse sample in both gender is possible for gaming research (contrary to the expected predominantly cis-heteronormative male dominated stereotype of the typical 'gamer'). The theoretical model of this study focused on the disempowerment of women (cis and trans) in gaming. However, after data collection, diversity in gender was highly represented across a range of levels of professional gaming in this sample. This is a major strength as the previous gaming literature has not been able to achieve this level of diversity (or have not attempted such). This study demonstrates that it is possible to reach a diverse population (especially when many minorities avoid self-identifying as a 'gamer') when considerable effort is put towards recruitment and inclusive language is used (i.e., recruiting "video game player" and "cis and trans persons"). This should set an example for future research in gaming populations.

Another major strength of this study is the knowledge these results bring to this specific field. Professional videogame playing is now an established occupation and posit six measurable characteristics that can act as a reliable gauge of the level of professional gaming. Further, it has also been identified to be an occupation without safety protocols or protection from an adverse work environment; an environment with high levels of cyberbullying which in turn has adverse effects on mental health.

4.3. Future directions

This study has illustrated several needs and gaps in the literature that future research could attempt to address. Primarily, further research is needed to better understand how the adapted cyberbullying scale actually holds up in the gaming/professional gaming context, including both qualitative (e.g., evaluating construct validity) and quantitative (e.g., psychometric testing). Furthermore, future research should attempt to explore cyberbullying in other vulnerable gaming communities such as the LGBTQIA + communities. As mentioned, the gaming population may be more diverse than expected in terms of gender, and potentially sexuality. LGBTQIA + peoples are vulnerable to adverse mental health outcomes [44], yet little research has been done concerning cyberbullying experiences of these diverse populations. It is recommended future research explore the intersectionality in cyberbullying, in particular understanding the relationships between gender, sexuality, and race in professional gaming. Another recommendation is for researchers to explore the motivations behind these cyberbullying behaviours in gaming, and further understand the situational factors that enable such high prevalence in the gaming community. Lastly, it is recommended that research investigates potential intervention and prevention strategies for the gaming community to combat cyberbullying, and further

what strategies can be developed for professional players to create a safer online work environment. This may include the adaptation of training modules from organisational online cyberbullying to be used with professional players to enhance their ability to recognise cyberbullying and how to address it. Alternatively, research could focus on software that protects professional players from being exposed to types of cyberbullying (e.g., directed harassment via emails or private messages).

5. Conclusion

Professional videogaming is a growing sector, and just like any other occupation, workers and employees have a right to feel safe in the workplace. However, this is not the case for professional players, and much less so for women. Perhaps it is because there is no governing body to enforce policy and protection, or perhaps the job inherently has health and safety risks that leave a worker exposed to victimisation. Regardless, new avenues must be explored to better support these emerging workers and create a safer work environment and to protect the mental health of professional video game players.

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Louise H. Trudgett-Klose: Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Sarven S. McLinton:** Writing – review & editing, Supervision, Methodology, Conceptualization.

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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