**Cyber-aggression towards women:
Measurement and psychological predictors in gaming communities**

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Abstract

Approximately 52% of young women report receiving threatening messages, sharing of their private photos by others without their consent, or sexual harassment online – examples of cyber-aggression towards women. A scale to measure endorsement of cyber-aggression towards women was developed to be inclusive of the many contemporary ways that women are targeted online. We examined sociopolitical ideologies (right-wing authoritarianism, social dominance orientation) and perceived threats (based on the Dual Process Motivational Model of Ideology and Prejudice, as well as Integrated Threat Theory) as predictors of endorsement of cyber-aggression towards women in three studies (Pilot Study, $n=46$; Study 1, $n=276$; Study 2, $n=6381$). Study 1 and 2 participants were recruited from online video gaming communities; Study 2 comprised responses collected during or after a livestream of YouTubers doing the survey went viral. The YouTubers criticized feminism and alleged that female gamers had privilege in the gaming community. In all three studies, exploratory factor analyses suggested endorsement of cyber-aggression towards women is a unidimensional psychological construct and the scale demonstrated great internal reliability. In path analyses, social dominance orientation emerged as the most consistent predictor of endorsement of cyber-aggression towards women, mediated, in part, by perceived threats.

Keywords: cyberbullying, political ideology, sexism, harassment, intergroup attitudes, video games

1.1 Introduction

One of the many benefits of the Internet are the digital environments where people can connect. These spaces, however, can also be exploited to carry out harmful acts of cyber-aggression, often towards women. Indeed, a survey by the World Wide Web Foundation found that 52% of young women and girls report some form of online abuse, with most believing the problem is getting worse (World Wide Web Foundation, 2020; see also European Union Agency for Fundamental Rights, 2014). However, psychological research on perpetrators of or those who condone cyber-aggressions towards women (CATW) is limited. To address this gap in the literature, the current research examines CATW in three studies of mostly male (Pilot Study, 100%; Study 1, 87.3%; Study 2, 90.7%) gamers. We develop and evaluate a measure of CATW and investigate sociopolitical ideologies and perceived threats, both established predictors of intergroup prejudice, including sexism in particular (e.g. Connor, Glick, & Fiske, 2017; Sibley, Wilson, & Duckitt, 2007), as underlying CATW. Specifically, we examine whether right-wing authoritarianism (RWA) and social dominance orientation (SDO) predict higher CATW via perceived threats, drawing on established models in the intergroup relations literature: Dual Process Model of Prejudice and Ideology (Duckitt, 2001; Duckitt & Sibley, 2017) and Integrated Threat Theory (Riek et al., 2006; Stephan & Stephan, 2000). We examine this in the context of a rise in targeted cyber-aggressions towards prominent female members of the gaming community.

1.1 Cyberbullying, Cyber-Aggression, and Cyber-Violence

Cyber-aggression can take many forms, with the most familiar and well-researched being cyberbullying. Cyberbullying generally refers to intentional and repeated aggressive behaviour that is communicated electronically towards an individual who cannot adequately defend themselves (Kowalski et al., 2014; Smith et al., 2008; Willard, 2007). The specificity and

taxonomy of cyberbullying behaviours varies across psychological literature (Berne et al., 2013). Willard (2007), for example, identified seven types of cyberbullying, such as harassment, cyberstalking, and sexting. On social media platforms, collective endorsement or widespread sharing can make a single aggressive act by a perpetrator repeatedly harmful and the victim virtually powerless (Thomas et al., 2014). As there are online behaviours that can harm women and girls without necessarily being repeated, as defined by cyberbullying (Berne et al., 2013), the conceptualization of cyber-aggression, more broadly referring to any intentionally aggressive behaviour that occurs electronically with no repetition of behaviour or power imbalance necessary (Grigg, 2010), is most inclusive of the various, relevant harmful behaviours directed towards women online.

1.1.1. Gendered Cyber-Aggression and Cyber-Violence

Some studies report no gender differences in cyberbullying (Anderson, 2018; Kowalski et al., 2014), whereas others suggest women are targeted more frequently (Sourander et al., 2010) and men cyberbully more and to a greater degree (Guo, 2016; Li, 2007; Olweus & Limber, 2010; Sest & March, 2017). Notwithstanding that women can engage in cyber-aggression, gendered online aggressions towards women online persist and intensely so. A “Cyber Violence Against Women and Girls” report by the United Nations (UN) presented a call-to-action towards extreme forms of cyber-aggression towards women, amidst a rise in highly publicized cases (United Nations Broadband Commission & United Nations, 2015). Many of the cases involved common forms of cyber-aggressions, such as harassment or doxing, but also primarily gendered forms of aggression, such as the distribution of non-consensual pornography, sexist trolling, or threats of rape. The UN defined cyber-violence against women and girls as “any act of gender-based violence that results in, or is likely to result in, physical, sexual or psychological harm or

suffering to women [and girls], including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life.”

Using a 2013 report on technology-related violence against women by The Learning Network, the UN expanded this definition to encompass six broad domains of cyber-violence against women and girls: *hacking* (unauthorized access to systems or resources in an attempt to acquire, manipulate, or maliciously use personal information), *surveillance and tracking* (stalking and tracking actions without consent), *impersonation* (adopting an identity online to acquire private information, damage social relationships, terrorize, or create fraudulent identity documents), *harassment and spamming* (repeated attempts to contact without consent, agitate, threaten, or scare), *recruitment* (luring into compromising situations), and *malicious distribution* (unwanted distribution of private information with the intent to harm) (Baker et al., 2013; United Nations Broadband Commission & United Nations, 2015). In the present research, we used The Learning Network’s domains of technology-related violence as the bases for our own, broad conceptualization of aggressive online behaviours that can harm women; noting that this conceptualization must be more inclusive in the number of media (Berne et al., 2013) and types of behaviours that represent the construct relative to existing measures of aggressive online behaviour (Kurek et al., 2019; Thomas et al., 2014).

1.1.2. Cyber-Aggression Towards Women in Online Gaming Communities

Nearly half of gamers are women (Entertainment Software Association, 2020; Interactive Software Federation of Europe, 2020), yet online gaming communities are perceived as one of the most inequitable online environments for women (Duggan, 2014). This inequity is theorized to be historically rooted in the construction of the gamer identity around the male identity (Lien, 2013). In doing so, online video gaming communities have assumed and normalized the

oppressive structures and phenomena of traditional patriarchal societies (Gray et al., 2017).

These include the sexually objectified, powerless, and disproportionately small representations of women within games and gaming communities (Burgess et al., 2007; Downs & Smith, 2010; Ivory, 2006), female gamers' routine use of coping strategies for their resultingly marginalized identities, such as conforming to gender stereotypes or concealing their gender identities (Behm-Morawitz & Schipper, 2015), as well as the perpetration and legitimization of online and offline aggression towards female gamers (Fox & Tang, 2017; Gray et al., 2017; Tang et al., 2020).

Recently, the rise in women challenging this status quo has coincided with the rise of movements such as Gamergate and several high-profile incidents of CATW in the online gaming community. Targets of these movements have been subjected to behaviours ranging from chronic harassment to doxing, and death and rape threats (Easpaig & Bróna, 2018; Gray et al., 2017). The historical friction around gender roles and the use of CATW to enforce them in those high-profile incidents make the online gaming community an ideal lens to investigate support of, and participation in, CATW.

1.2. Sociopolitical Ideology and Threat as Predicting Cyber-Aggression Towards Women

Intergroup attitudes, including attitudes towards women, stem, in part, from sociopolitical ideologies and perceptions of women as posing a threat (Connor et al., 2017; Sibley et al., 2007). According to the Dual-Process Motivational Model of Ideology and Prejudice (Duckitt, 2001), two of the most robust ideological predictors of intergroup attitudes are right-wing authoritarianism (RWA; Altemeyer, 1981) and social dominance orientation (SDO; Ho et al., 2015; Pratto, Sidanius, Stallworth, & Malle, 1994). Those higher in RWA display rigid adherence to social norms, submission to perceived legitimate authorities, and aggression towards individuals or groups that authorities disapprove of (Altemeyer, 1981). Those higher in

SDO prefer social hierarchies where higher status groups are at the top of a hierarchy of power, and are able to dominate over the lower status groups underneath them (Ho et al., 2015; Pratto et al., 1994). In general, RWA captures preferences for social tradition over progressiveness and SDO captures preferences for intergroup inequality over equality (Duckitt, 2001; Jost et al., 2003). Longitudinal research has shown that RWA and SDO, independently, predict year-to-year increases in prejudice (Osborne et al., 2020).

The Dual-Process Model describes how RWA and SDO explain individual differences in prejudice along three hypotheses; two are relevant to the present research and are discussed here (Duckitt, 2001). The differential effect hypothesis suggests that RWA and SDO can predict distinct forms of prejudice towards the same groups. Notable to the current research, they predict different forms of sexism. RWA is a better predictor of benevolent sexism, or attitudes that patronize and relegate women into traditional gender roles, and SDO is a better predictor of hostile sexism, or attitudes that view women as incompetent and antagonistic (Glick & Fiske, 1996, 1997; Roets et al., 2012; Sibley et al., 2007). SDO is an especially powerful predictor of negative attitudes towards women (Bates & Heaven, 2001; Lippa & Arad, 1999; Pratto et al., 2000; Russell & Trigg, 2004), especially subgroups of women such as housewives and feminists (Duckitt, 2006; Duckitt & Sibley, 2007). Of particular relevance, greater SDO predicts greater sexist beliefs about women gamers and self-reported sexual harassment in online video games (Fox & Tang, 2014; Tang et al., 2020; Tang & Fox, 2016). Notably, the studies that did examine the relations between SDO and sexual harassment only looked at perpetration that occurs in social environments within games. Examining CATW, in comparison, allows for measurement of sexual harassment, as well as other aggressive online behaviours, towards female gamers in social environments outside of the games themselves. Given that RWA and SDO predict

different forms of sexism and that the motivations behind the behaviours encompassing CATW could reasonably differ in their benevolence (e.g., non-consensual cybersurveillance) and hostility (e.g., harassment) towards targets, investigating whether sociopolitical ideologies significantly relate to and predict endorsement of CATW was evaluated (Hypothesis 1 of the present research).

1.2.1. Perceived Threat of Female Gamers

The differential mediation hypothesis of the Dual Process Model is also of relevance to the present research. According to the differential mediation hypothesis, the effects of RWA and SDO on prejudice, including sexism, are mediated by sensitivities to different threats, which stem from the distinct motivational origins of RWA and SDO (Duckitt, 2001; Duckitt & Sibley, 2017). Those higher in RWA view the world as dangerous and are more attuned to social threats. Those higher in SDO view the world as a “competitive jungle” and are more attuned to threats to group dominance. Greater perceptions of these respective threats, then, mediate expressions of prejudice in those higher in RWA and SDO. As such, given that greater SDO is associated with prejudice towards female gamers, it is possible that female gamers are perceived as a competitive threat towards the traditionally male-dominated (see Lien, 2013) gaming community.

Consequently, those higher in SDO or those who perceive female gamers as threatening the established gender hierarchy in gaming communities should display greater endorsement of and engagement in CATW. Although less likely, as the acts that constitute CATW are primarily hostile in nature, it is also possible that those higher in RWA could perceive female gamers as socially threatening and respond with CATW; though primarily in benevolent sexist ways. For example, a person may stalk a woman online believing their actions are in the best interests of her safety and protection, while insensitive to how doing so undermines her security and privacy.

Complementing the Dual Process Model's social threat and group dominance threat, Integrated Threat Theory (Stephan & Stephan, 2000) describes several group-based threats that underlie negative intergroup attitudes as a result of perceived value conflicts (similar to social threat) or competition with outgroups (similar to group dominance threats) (for a review, see Riek, Mania, & Gaertner, 2006). Those relevant to CATW are *realistic threat* (fear of the ingroup failing to secure competitive resources, and outgroups succeeding; Sherif & Sherif, 1969), *symbolic threat* (fear of an outgroup's cultural values and beliefs conflicting with the ingroup's; Sears, 1988), and *intergroup anxiety* (fear of awkwardness/discomfort that emerges when in the presence of outgroup members; Stephan & Stephan, 1985). Finally, *group esteem threat* (fear of an outgroup sully the ingroup's image; Branscombe & Ellemers, 1998; Branscombe & Wann, 1994), is an additional predictor of negative intergroup attitudes which concerns socially-valued characteristics of the ingroup (Riek et al., 2006).

In the context of female gamers, these threats may reflect fears of losing the competitive resource that is power over the gamer identity, fears of female gamers' values and beliefs conflicting with those of the male gamer status quo, fears of accommodating female gamers within traditionally masculine gaming communities, and fears of female gamers threatening the masculine image of male gamers, respectively. The competition over resources that comprises realistic threats may reflect the same competitive jungle worldview that those higher in SDO hold, triggering similar threats to group dominance. Conversely, aversion to competing beliefs and interactions with outgroup members resembles the threats to social values that drive prejudice from those higher in RWA. Further, the threat posed to a group's image is similar to the social threat that those higher in RWA are sensitive to, as they are both perceived as putting established social norms at risk. Presently, to investigate whether endorsement of CATW is

driven by these perceptions, whether and which of these threats correlated with or predicted endorsement of CATW was evaluated (Hypothesis 2 in the present research).

Accordingly, previous literature has shown these threats to mediate the relations of RWA and SDO with prejudice towards people with disabilities, international students, people labelled as “homosexuals,” and Muslims (Bustillos & Silván-ferrero, 2013; Charles-Toussaint & Crowson, 2010; Rios, 2013; Uenal, 2016). However, whether any Integrated Threat Theory, group esteem, or social or group dominance threats mediate the relations between sociopolitical ideologies (i.e., RWA, SDO) and female gamers is unclear and a gap in the literature that the present research directly evaluates (Hypothesis 3 in the present research).

1.3. The Present Research

One goal of the present research was to develop and evaluate a scale to measure endorsement of CATW. Endorsement of ambivalent sexism and self-reported engagement in CATW were used to validate the scale. Using this scale and drawing on two conceptions of intergroup threat (Dual Process Model, Integrated Threat Theory), we hypothesized that higher (vs. lower) scores on each of the sociopolitical ideologies (i.e., RWA, SDO; Hypothesis 1) and higher scores on each of the perceived threats (i.e., social, group dominance, realistic, symbolic, intergroup anxiety, group esteem; Hypothesis 2) would relate to greater endorsement of CATW. Furthermore, drawing on prior Dual Process Model literature using social, group dominance, and Integrated Threat Theory threats as mediators between sociopolitical ideologies and negative outgroup attitudes, we hypothesized that the relation between sociopolitical ideologies (RWA, SDO) and CATW would be mediated by threats (Hypothesis 3). Three mediation models were used to test Hypothesis 3, each assessing the roles of different perceived threats as potential mediators: a Dual Process Model inspired model (Figure 1) evaluated social threat and group

dominance threat; an Integrated Threat Theory inspired model (Figure 1) evaluated realistic threat, symbolic threat, intergroup anxiety, and group esteem threat; and a latent threat model (Figure 2) evaluated a latent threat variable with all measured threats as indicators. The latent threat model was tested to account for potential communalities and spillover effects of intergroup threats on prejudice (Bergh & Akrami, 2017), and similarities between conceptualizations of threat between the Dual Process Model and Integrated Threat Theory.

To evaluate hypotheses, two samples were collected, comprising three studies. The Pilot Study was collected in the Fall semester of 2016 and consisted of male undergraduate gamers. Due to the very small sample size ($n=46$), this sample was only used to conditionally explore the factor structure of endorsement of CATW and correlations. A second sample of members of online video gaming communities was then collected in February 2017 to definitively assess the factor structure of CATW and power the analyses for Hypothesis 3. Unexpectedly, approximately 26 hours after online recruitment began, the survey link went ‘viral’ after a popular YouTube account livestreamed and archived a video of themselves doing the survey (while chatting with a friend who had already completed the survey) to thousands of subscribers. At the start of the archived video, there was a warning for viewers to complete the survey themselves before watching. However, the video is no longer accessible as the associated YouTube account has since been terminated. The discussion in the video contained claims that female gamers are a protected and privileged class, as well as criticisms of the subjective nature of interpretations of survey items, feminism, social justice warriors, Antifa, and gender identity politics.

A significant increase in the response rate for the survey was detected shortly after the time of archival. The start time of the stream was deduced and used as a conservative boundary

between participants whose responses were likely not influenced by the stream (started the study before the start of the stream; Study 1, $n=276$) and those that could have been influenced (started the study after the start of the stream; Study 2, $n=6381$). Due to sample size restrictions for producing reliable estimates (Jackson, 2003), Hypothesis 3 was only evaluated in Studies 1 and 2, and the latent threat model was only evaluated in Study 2.

2. Method

2.1 Participants and Procedure

Participants completed the survey in exchange for partial course credit (Pilot Study) or a chance to win one of five \$25 gift cards to their digital gaming store of choice (Studies 1 and 2). For Studies 1 and 2, survey links were posted to five popular gaming communities with prior consent from community leaders (i.e. administrators, moderators). The posts encouraged participants to share the survey link with other gamers after completing it themselves. After consenting, participants completed questions about gaming, including how much they identify as a “gamer,” how much time they spend playing video games every week, and what their favourite game is. Participants then wrote any comments or thoughts they have about the role of women in the video gaming community for use in a different study. Next, participants completed dummy questions as a screen for automated bots that may be completing the survey. Participants then completed measures of sociopolitical ideology, perceived threat, sexist attitudes, endorsement of CATW, and engagement in CATW in a randomized order. Afterwards, participants indicated whether they had heard about news stories involving female members of the video gaming community experiencing repeated harassment on social media, followed by any thoughts or feelings they may have about those news stories. Last, participants completed demographic items and read a debriefing form explaining the specific purpose of the study. Analyses relating to

gamer identification, gaming habits and preferences, and responses to open-ended questions are not discussed in the current paper. Supplementary materials, including measures, data, and additional analyses are available at

https://osf.io/jyfdy/?view_only=99439677a0c34cd08b77fc806f197e85 (Anonymized link for peer review)

2.1.1. Pilot study

Participants were 46 male undergraduate students at a Canadian university that identified as gamers ($M_{\text{age}} = 20.87$, $SD = .61$). The sample was ethnically diverse: White/Caucasian 26.7%, Filipino 13.3%, South Asian 13.3%, Southeast Asian 13.3%, Chinese 8.9%, Other ethnic groups (groups written-in by participants) 15.4%, 8.9% Multiethnic.

2.1.2. Study 1 (pre-viral)

A total of 815 responses were recorded before the link went viral. Participants were removed from the original “pre-viral” sample for: not consenting to participate (153), incorrectly answering “dummy” questions designed to screen for automated responding (163), withdrawing part-way through the study (181), opting out of having their responses included (5), taking less than 10 minutes or longer than 3 hours to complete (as determined by pilot testing and examination of quartiles for completion time; 20), having duplicate responses from the same computer (3), demonstrating acquiescent responding on more than one scale (4), and missing a significant number of responses for items (10). The final sample comprised 276 participants ($M_{\text{age}} = 27.64$, $SD = 6.73$; Gender – Male: 87.3%, Female: 8.4%, Gender Minorities: 4.4%; Nationality – United States 47.5%, Canada 10.7%, United Kingdom 10.0%, Germany 5.4%, Brazil 1.5%, France 1.1%, Mexico 1.1%, Japan 0.8%, South Korea 0.4%, Spain 0.4%, Other nations (written-in by participants) 21.1%; Ethnicity – White/Caucasian 61.4%, Latin American

7.7%, South Asian 3.3%, Black 2.6%, Chinese 2.6%, Filipino 1.5%, Southeast Asian 1.5%, Arab/West Asian 0.7%, Japanese 0.4%, Korean 0.4%, Other ethnic groups (written-in by participants) 7.0%, 11.0% Multiethnic).

2.1.3. Study 2 (post-viral)

A total of 13,581 responses were recorded after the survey went viral. Participants were removed from the original “post viral” sample for: not consenting to participate (2929), incorrectly answering “dummy” questions (1361), withdrawing part-way through the study (2232), opting out of having their responses included (74), taking less than 10 minutes or longer than 3 hours to complete (155), having duplicate responses from the same computer (35), demonstrating acquiescent responding on more than one scale (181), and missing a significant number of responses for items (233). This left a sample of 6381 participants ($M_{\text{age}} = 24.12$, $SD = 6.49$; Gender – Male: 90.7%, Female: 5.3%, Gender Minorities: 4.0%; Country – United States 52.7%, United Kingdom 11.8%, Canada 8.0%, Germany 3.3%, Brazil 0.8%, France 0.6%, Russia 0.6%, Japan 0.5%, Mexico 0.4%, Spain 0.4%, South Korea 0.1%, China 0.05%, Other nations (written-in by participants) 20.8%; Ethnicity – White/Caucasian 73.2%, Latin American 3.5%, Black 2.2%, Chinese 0.7%, Arab/West Asian 0.6%, South Asian 0.6%, Filipino 0.4%, Southeast Asian 0.4%, Japanese 0.2%, Korean 0.1%, Other ethnic groups (written-in by participants) 7.4%, 10.8% Multiethnic).

2.2. Measures

Reliability coefficients in the form of Cronbach’s alphas and Spearman-Brown coefficients (for two-item scales; see Eisinga, Grotenhuis, & Pelzer, 2017) for all measures are available in Tables 1 and 2. Because of time constraints, participants in Studies 1 and 2 completed shorter versions of most scales. For all measures, responses to items were averaged to

compute final scores, with higher scores indicating a greater presence of that given construct.

For each of the perceived threat measures, with the exception of intergroup anxiety, removal of one item (two in the case of group esteem threat) was shown to considerably improve poor initial reliabilities. Thus, final scores for these measures have been computed after removing their respective, poorest-performing items. The items removed are indicated in the supplementary materials.

2.2.1. Sociopolitical ideology

2.2.1.1. Right-wing authoritarianism

Participants completed the 22-item (Pilot Study) or 12-item (Studies 1 and 2) version of the RWA scale (Altemeyer, 2006), responding to each item on a scale from 1 (Very Strongly Disagree) to 9 (Very Strongly Agree).

2.2.1.2. Social dominance orientation

Participants completed the 16-item (Pilot Study) or 8-item (Studies 1 and 2) versions of the SDO₇ scale (Ho et al., 2015; Pratto et al., 1994). Participants indicated the degree to which they endorsed each statement on a scale from 1 (Strongly Oppose) to 7 (Strongly Favour).

2.2.2. Threat

2.2.2.1. Social threat

Participants completed four items modified from a social threat measure (Choma et al., 2016), adapted to assess the threat posed by females in video game communities. Participants indicated the degree to which they endorsed each statement (e.g. “Female gamers undermine traditional gamer values”) on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

2.2.2.2. Group dominance threat

Participants completed four items modified from a group dominance threat measure (Charlesford & Choma, 2013; Choma et al., 2016), adapted to assess the threat posed by females in video game communities. Participants indicated the degree to which they endorsed each statement (e.g. “I hate when female gamers are portrayed as inferior to male gamers.”) on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

2.2.2.3 Realistic threat

Participants completed three items modified from the realistic threat scale (Stephan & Stephan, 2000; Stephan, Ybarra, & Bachman, 1999), adapted to assess the threat posed by females in video game communities. Participants indicated the degree to which they endorsed each statement (e.g., “The rise in the number of female gamers has compromised the quality and type of games that game developers make”) on a scale from 1 (Strongly Disagree) to 10 (Strongly Agree).

2.2.2.4 Symbolic threat

Participants completed five items (e.g. “What female gamers value in their video games is problematic for long-time fans of video games”) modified from the symbolic threat scale (Stephan & Stephan, 2000; Stephan et al., 1999), adapted to assess the threat posed by females in video game communities on a scale from 1 (Strongly Disagree) to 10 (Strongly Agree).

2.2.2.5 Intergroup anxiety

Participants completed the intergroup anxiety scale (Stephan & Stephan, 1985). Participants indicated how much they would experience 12 (Pilot Study) or 6 (Studies 1 and 2) emotions when in contact with female gamers (e.g., awkward, threatened, safe, at ease) on a scale from 1 (Not At All) to 10 (Extremely).

2.2.2.6 Group esteem threat

Participants completed a modified version of the revised Collective Self-Esteem Scale (CSES-R; Luhtanen & Crocker, 1992), adapted to assess the threat posed by females in video game communities. Participants indicated the degree to which they endorsed four statements on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

2.2.3. Ambivalent sexism

Participants completed the 22-item (Pilot Study; Glick & Fiske, 1996) or 12-item (Studies 1 and 2; Rollero, Glick, & Tartaglia, 2014) Ambivalent Sexism Inventory (ASI), using a response scale from 0 (Disagree Strongly) to 5 (Agree Strongly). Eleven statements corresponded to endorsements of hostile sexism and eleven statements corresponded to endorsements of benevolent sexism. Corresponding scores for each of those two subscales were averaged from relevant items. Higher scores on each of the subscales indicate greater hostile and benevolent sexism, respectively.

2.2.4. Cyber-Aggression Towards Women

2.2.4.1. Endorsement of Cyber-Aggression Towards Women

An initial pool of 36 items were developed by the authors. Items were designed to be face valid to capture the specificity of cyber-aggressions towards women and reflect the endorsement of attitudes related to specific behaviours that fell under each of the six domains. Five items reflected hacking, five items reflected impersonation, six items reflected surveillance and tracking, ten items reflected harassment and spamming, five items reflected recruitment, and five items reflected malicious distribution behaviours. Positively and negatively keyed items were included to avoid random responding. Participants responded to each of these items on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree). These items were refined through exploratory

factor analyses (EFA) and confirmatory factor analyses (CFA); results are presented in the Results section.

2.2.4.2. Engagement in Cyber-Aggression Towards Women

Participants responded to six items measuring how often they engage in common examples of behaviours that reflect each of the six domains of CATW: hacking, impersonation, surveillance/tracking, harassment/spamming, recruitment, and malicious distribution.

Participants rated how frequently they engaged in each example behaviour on a scale of 1 (Never) to 7 (Very Frequently).

3. Results

Bootstrapping using 1000 samples, with 95% confidence intervals in the Pilot Study and Study 1, and 99% confidence intervals in Study 2, was conducted for all analyses with exception of the EFAs to accommodate univariate and multivariate outliers and consistent non-normality across the data. Importantly, given its large sample size, Study 2 was over-powered. In lieu of this, a +/- .10 magnitude threshold (i.e. a "small" effect size; Cohen, 1988), was used as an additional qualifier to distinguish meaningful, significant estimates.

3.1. Endorsement of Cyber-Aggression Towards Women Scale Development

3.1.1. Exploratory Factor Analyses

3.1.1.1. Pilot Study

For the Pilot Study, Principal Axis Factoring (PAF) was conducted on the 36 items assessing endorsement of CATW to evaluate the scale's structure, applying an oblique rotation (promax, with kappa set to 4). PAF is optimal for non-normal distributions (Sakaluk & Short, 2017). The Kaiser-Meyer-Olkin (KMO) test was 'mediocre' (KMO = .58) and above the .50 threshold for sampling adequacy (Hutcheson & Sofroniou, 1999). Bartlett's test of sphericity, χ^2

(630) = 1839.26, $p < .001$, indicated that the item-correlations were large enough to justify factor analysis.

An initial PAF revealed nine factors with Eigenvalues exceeding Kaiser's criterion of 1 (12.14, 3.70, 3.37, 2.27, 1.63, 1.58, 1.50, 1.22, and 1.14 respectively), explaining a total of 79.29% of the variance. Examination of the scree plot suggested extraction of either a single factor or four factor solution, with the sharpest point of inflexion on the second factor. Parallel analyses (Horn, 1965) were conducted suggesting the extraction of a maximum of three factors, as only the first three Eigenvalues generated from random data (3.35, 2.96, 2.62, 2.34...) were lower than the Eigenvalues from the reduced correlation matrix generated from the observed data (12.09, 3.56, 3.28, 2.16...). Given these results, and that the first factor accounted for considerably more variance than subsequent factors, and that scree plots are better for determining factor retention in PAF relative to using Kaiser's criterion (Kahn, 2006), a single factor solution was identified.

A final PAF for this sample was conducted, forcing extraction onto this single factor (Kahn, 2006), which accounted for 33.72% of the variance. Weakly loading ($<.32$) items and those with low communalities ($<.40$) were removed (Costello & Osborne, 2005), resulting in a 13-item CATW endorsement scale for the Pilot Study that demonstrated excellent reliability ($\omega = .96$; see Table 3 for factor loadings). Notably, the final scale lacked any items from the surveillance and tracking subdomain. Support of CATW did not correlate significantly with hostile sexism, $r = .18$, $p = .22$, or benevolent sexism, $r = .16$, $p = .30$, but did correlate significantly with self-reported engagement in CATW, $r = .74$, $p < .001$. It is worth noting that despite the small sample size in the Pilot Study, the relatively high mean factor loadings (prior to

using a cut-off), low number of extracted factors, and a high number of variables of the sample facilitated conditions that could produce reliable EFA results (de Winter et al., 2009).

3.1.1.2. Study 1

As with the Pilot Study, for Study 1 ($n = 276$), PAF was conducted on the 36 items, applying an oblique rotation (i.e., promax, with kappa set to 4). The KMO test verified the sampling adequacy for the analysis, $KMO = .91$, which indicates ‘superb’ acceptability for sampling (Hutcheson & Sofroniou, 1999). Bartlett’s test of sphericity, $\chi^2(630) = 4654.77, p < .001$, further verified the factorability of the items relating to endorsement of CATW. The initial PAF revealed seven factors exceeding Kaiser’s Eigenvalue criterion of 1 (12.04, 2.54, 1.76, 1.70, 1.42, 1.18, and 1.02 respectively), explaining a total of 60.20% of the variance. Similar to the Pilot Study, the first extracted factor (Factor 1) with an Eigenvalue of 10.70 accounted for 38.21% of the variance, considerably more than any subsequent factor. Examination of points of inflexion in the scree plot suggested a two-factor solution. Parallel analyses suggested the extraction of a maximum of six factors, as only the first six eigenvalues generated from random data (1.04, .91, .82, .74, .69, .63, .67...) fell below those from the reduced correlation matrix generated from the observed data (11.61, 2.10, 1.28, 1.28, 1.17, .89, .68, .54...).

Given the possibility of either a single or bifactor solution, two subsequent PAFs were conducted, forcing the extraction of one or two factors respectively. In the single factor model, all items loaded stronger than .32. In the bifactor model, the first extracted factor featured items from all subdomains of cyber violence against women and girls. Comparatively, the second factor lacked items from the impersonation subdomain, and no meaningful interpretation of the items that clustered on it could be identified. Thus, a single-factor solution was deemed most appropriate. After removing 24 items with low communalities ($<.40$) the 12 remaining items

were averaged to produce a single endorsement of CATW ($\omega = .92$). This scale correlated strongly with hostile sexism, $r = .63, p < .001$, and weakly with benevolent sexism, $r = .14, p = .02$. Furthermore, it correlated strongly with self-reported engagement in CATW, $r = .51, p < .001$. This pattern of relations with hostile and sexism provide evidence for the convergent validity of the endorsement of CATW scale.

3.1.2. Confirmatory Factor Analyses (Study 2)

To confirm the single factor structure obtained in Study 1, a CFA using Maximum Likelihood estimation was conducted with Amos 22 software on responses from Study 2 ($n = 6381$). 0.15% of the values were missing and replaced using multiple imputation (Schlomer et al., 2010). The tested model featured the 12 items extracted in the EFA in Study 1 modelled as exogenous predictors of a single latent CATW variable. The initial model, despite significant Chi-square values, $\chi^2(35) = 3370.29, p > .001$, had subpar model fit, as indicated by acceptable comparative fit index (CFI) = .85, Root Mean Square Error of Approximation (RMSEA) = .10, and Tucker-Lewis fit index (TLI) = .82, statistics. After consulting modification indices, seven covariances between items from the same subdomains of CATW were iteratively added post-hoc, resulting in good model fit, $\chi^2(47) = 825.28, p > .001$, CFI = .97, RMSEA = .05, TLI = .95. The resulting scale had great reliability ($\omega = .85$), did not correlate significantly with benevolent sexism, $r = -.01, p = .37$, but did correlate with hostile sexism, $r = .37, p < .001$, and endorsement of CATW, $r = .37, p < .001$; again providing evidence for convergent validity. Properties of the final scale are available in Table 3.

3.2. Correlations with Endorsement of Cyber-Aggression Towards Women

Descriptive statistics and correlations between study variables are available for the Pilot Study in Table 1, and for Studies 1 and 2 in Table 2. Hypotheses 1 and 2 evaluated whether

endorsement of CATW was significantly, positively related to each of the sociopolitical ideologies (Hypothesis 1) and each of the perceived threats (Hypothesis 2) that were measured, respectively. Hypothesis 1 was fully supported, as, across all three studies, RWA and SDO correlated positively with endorsement of CATW. However, Hypothesis 2 was only partially supported, as all threats were significantly positively correlated with endorsement of CATW across all three studies, with the exception of group esteem, social, or group dominance threats in the Pilot Study. In reporting these results, we caution interpretation of endorsement of CATW's relations with realistic threat in the Pilot Study, realistic threat in Study 2, and group dominance threat in Study 2, as well all subsequent results for these measures, due to poor reliabilities ($\omega=.26$; $rs=.46, .24$ respectively). The implications of this are discussed further in the Discussion section.

3.3. Evaluating the Mediating Role of Threat

Perceived threat was hypothesized to mediate the relationship between sociopolitical ideologies (RWA, SDO) and endorsement of CATW (Hypothesis 3). Three mediation models were tested with Amos 22 software, using maximum likelihood estimation. The Dual Process Model and Integrated Threat Theory-inspired models were fully saturated ($df=0$); therefore, no fit indices are reported. In all three models, sociopolitical ideologies were modeled as predicting the threat variables and CATW, and the threat variables were modelled as predicting CATW. Results of the Dual Process Model and Integrated Threat Theory-inspired models are displayed in Table 4, and results of the latent threat model are displayed in Figure 2. All three models were evaluated while controlling for gender as well, resulting in slight differences in estimates but no meaningful differences when it comes to statistical significance or interpretation. Results of these

models can be found in the supplementary materials and correlations with dummy-coded gender variables can be found in Table 2.

3.3.1. Dual Process Model-inspired model (with social and group dominance threats)

In Studies 1 and 2, RWA and SDO had significant positive direct effects on social threat, whereas only SDO had a significant positive direct effect on group dominance threat. SDO had a significant positive direct effect on endorsement of CATW in both studies; the direct effect of RWA was not significant. In both studies, social and group dominance threat had significant positive direct effects on endorsement of CATW. SDO had a significant positive indirect effect in Studies 1 and 2. Conversely, RWA only had a significant positive indirect effect on endorsement of CATW in Study 1. The DPM-inspired model accounted for 48% (Study 1) and 23% (Study 2) of the variance in endorsement of CATW. In sum, these results indicate partial support for Hypothesis 3.

3.3.2. Integrated Threat Theory-inspired model (with realistic, symbolic, intergroup anxiety, and group esteem threats).

In both studies, RWA and SDO had significant positive direct effects on all four threat variables, with the exception of the direct effect of SDO on intergroup anxiety, which fell below the .10 threshold. SDO had a significant direct effect on CATW; the effect for RWA was not significant. In Study 1, none of the threat variables had significant direct effects on endorsement of CATW. However, in Study 2, realistic threat and group esteem threat had significant direct effects on endorsement of CATW. RWA and SDO had significant positive indirect effects on endorsement of CATW in Study 1, but not in Study 2. The ITT-inspired model accounted for 39% (Study 1) and 19% (Study 2) of the variance in endorsement of CATW. These results provide partial support of Hypothesis 3.

3.3.3. Latent threat model

To evaluate whether latent threat mediated the relation between sociopolitical ideology and CATW (Hypothesis 3), covarying latent RWA and latent SDO were modelled as predictors of latent threat, which in turn predicted latent CATW. Latent RWA and latent SDO were also modelled as predicting latent CATW directly. Latent RWA and SDO variables were created using parcelling (Little et al., 2002), with three parcels with four items each loading onto latent RWA, and four parcels with two items each loading onto latent SDO (Ho et al., 2012). Latent threat was created by modelling all of the threat variables as indicators; the loadings were strong except for intergroup anxiety (loaded moderately) and group dominance threat (loaded weakly). Latent CATW was modelled with the 12 items as indicators, retaining the covariances from the CFA. Model fit was good, CFI = .90, TLI = .89, RMSEA = .06, $\chi^2(262) = 5339.57, p > .001$.

Latent RWA and latent SDO covaried significantly and strongly. Latent SDO significantly predicted greater endorsement of CATW and greater latent threat. In contrast, latent RWA only significantly predicted greater latent threat, not CATW. Latent RWA and SDO accounted for 33% of the variance in latent threat. Latent threat significantly predicted greater CATW. Together, latent RWA, SDO, and threat accounted for 28% of the variance in CATW. Latent SDO had a significant positive indirect effect on CATW. However, the indirect effect of latent RWA on CATW was not significant. Thus, Hypothesis 3 was only partially supported via meaningful indirect effects of SDO, but not RWA.

4. Discussion

Despite an abundance of psychological research on online gendered harassment (Barak, 2005; Barlett & Coyne, 2014; Chisholm, 2006; Henry & Powell, 2015) and evidence that cybervictimization occurs disproportionately for women (Guo, 2016; Tokunaga, 2010),

understanding of the wide variety of forms that gendered cyber-aggressions can take is limited. Furthermore, literature on gendered cyber-aggressions towards female gamers specifically has examined their occurrence within games (Fox & Tang, 2014; Tang et al., 2020), whereas aggression towards female gamers via other online means has seen little empirical attention. Across three samples, the present research sought to rectify this by developing a scale to measure endorsement of a broad range of CATW behaviours, and then use this scale to evaluate whether sociopolitical ideology, mediated by perceived threat, predicted CATW. Two of these samples, Study 1 and Study 2, provide a rare glimpse into the online video gaming community where CATW has been a contentious issue. Study 2 particularly provides unique insight into this, due to the signal boost it received from a popular YouTuber that resulted in the recruitment of a large number of participants. While the exact influence of this video and the use of snowball sampling more generally are indeterminate, the criticisms of female gamers, feminism, and related topics that the YouTuber championed in the video are relevant to CATW and contextualize the results of Study 2.

4.1. The Endorsement of Cyber-Aggression Towards Women Scale

The scale demonstrated great internal reliability ($\alpha s = .92, .85$) and represented a unidimensional construct, despite items deriving from four of the six different domains of behaviour defined by The Learning Network (Baker et al., 2013). This finding is consistent with other research suggesting that cyberbullying, a more specific form of cyber-aggression, is a unidimensional construct (Menesini et al., 2011). While not as directly comparable, it is worth noting that the Video Game Sexism Scale, used to measure sexist beliefs about women within online gaming environments rather than endorsements of behaviour outside of them as CATW does, also represents a unidimensional construct (Fox & Tang, 2014). The extent to which these

constructs overlap and potentially indicate environment-agnostic antipathies towards female gamers, are worth future investigation. The scale from the Pilot Study contained items from all domains with the exception of surveillance and tracking, but we refrain from making meaningful interpretations of this scale due to its small sample size. The final scale did not contain any items from the hacking or malicious distribution domains. The absence of hacking items may be due to participants believing that they do not possess or would not acquire the technical skills (e.g. bypassing security, illicitly accessing a webcam livestream) required to engage in hacking behaviours. Hacking-related behaviours are not completely absent from the final scale, however. For instance, the “If I have figured out the password to a woman’s account or profile, I can do what I want with it” item from the impersonation subdomain presupposes that a person has illicitly obtained a woman’s password, be it via hacking or similar means such as social engineering.

The omission of malicious distribution items from the final scale is more curious, as many of the items reflected underlying disregards for personal privacy and explicit intents to harm that items from the final scale featured (e.g. a recruitment item stating that “It is okay to trick a woman into a compromising situation using the Internet”). Anecdotally, malicious distribution of intimate photos seems to be an exemplary and widely known form of CATW that this scale was intended to capture through casting a wide net for relevant behaviours, especially given that it has been used in targeting high-profile female members of the gaming community. Compared to items from other domains, it is possible that the malicious distribution items were perceived to be more face-valid (e.g. “Threatening to release private information about a woman onto the Internet in order to get my way is an acceptable thing to do”), and subject to greater social desirability bias in responding. Although hacking and malicious distribution behaviours

did not meaningfully load onto unextracted factors, future research might explore additional items related to those domains to determine whether they represent constructs distinct from CATW.

Generally, the items from the endorsement of CATW scale commonly feature easy and conventionally popular methods of CATW. This is evidenced by the disproportionately high number of items from the harassment domain relative to its proportion of candidate items and multiple items relating to the use of fraudulent profiles. Using fraudulent profiles to engage in CATW allows perpetrators to avoid accountability and licenses them to engage in disinhibited behaviour, such as harassment, via the perceived anonymity that it affords them. This may partially explain why some of the most face-valid items still loaded onto the scale, such as “There is no problem with telling a woman to kill herself on the Internet;” concerns surrounding social desirability fade when an anonymous profile is used to minimize the impact that perpetrator’s aggressions can have on their actual social relationships.

The aggressive nature of endorsement of CATW is reflected in consistently positive correlations with hostile sexism ($r_s = .63, .37$) and weak correlations with benevolent sexism ($r_s = .14, -.01$). Some items, however, could be subject to alternative interpretations and might not have been considered aggressive. Items such as “Continually monitoring the activities of a woman online is totally fine” and “It is okay to use the Internet to tell a woman what I think about her, regardless of if she wants to know or not” may be perceived as benevolent and paternalistic based on the specific woman or women that participants are considering when responding. Thus, the context and relationship to the target may affect the degree to which the behaviour is perceived as harmful and classifiable as an act of CATW. For example, the two items mentioned previously could apply to a reasonably concerned parent in relation to their

young daughter, which could be subjectively interpreted by the parent as being reasonable, but could nonetheless provide insight into what individuals believe they have license to do to women online – sometimes aggressively so.

4.2. Correlations with Cyber-Aggression Towards Women

The consistently significant, positive correlations of RWA and SDO with endorsement of CATW support Hypothesis 1 and suggest that sociopolitical ideology plays an important role in the cybervictimization of women. In online gaming communities, where some male gamers may perceive themselves as the resident authorities, the influence of female gamers could be perceived as threatening to and dissident from the social norms and conventions male gamers define. Thus, for those higher in RWA, CATW might represent an appropriate response to those (i.e. female gamers) who violate social norms and conventions. Comparatively, SDO was consistently as strong or stronger in its relation to endorsement of CATW relative to RWA. For those higher in SDO, CATW might provide effective means of preserving social hierarchies and keeping subordinate groups (i.e. female gamers) in their place. The stronger relations with SDO (vs. RWA) may be due to the authority of male gamers being less clearly defined and more presumptive relative to the clearer distinction between the dominant (i.e. male gamers) and subordinate (i.e. female gamers) groups in the gaming community. These results add CATW to the list of other negative attitudes that are related to higher RWA and SDO, such as those towards international students (Duckitt & Sibley, 2009, 2017; Sidanius et al., 2017).

There is only partial support for Hypothesis 2. All threats had significant positive correlations with endorsement of CATW, with the exception of group esteem, social, and group dominance threats in the Pilot Study. These nonsignificant relations are likely attributable to the small sample size of the Pilot Study, as those same weak relations with CATW did not emerge in

Studies 1 and 2. Notably, group dominance threat had the strongest correlation with endorsement of CATW in Studies 1 and 2. While not the case in the Pilot Study, intergroup anxiety had the weakest, albeit significant, correlations with endorsement of CATW, which may relate to gender identity being less salient and more suppressible in online interactions relative to face-to-face ones (Behm-Morawitz & Schipper, 2015).

Importantly, the significant relations of realistic threat in the Pilot Study as well as realistic threat and group dominance threat in Study 2 with endorsement of CATW should be interpreted with caution given the poor reliabilities of those measures ($\omega=.26$; $r_s=.46$, $.24$ respectively). In the Pilot Study, realistic threat was measured using three items and the internal consistency of the scale was far below acceptable ranges. In Study 2 (as well as Study 1), however, realistic threat, group dominance threat, and each of the other perceived threats aside from intergroup anxiety were measured using two items. The endorsement of CATW scale at the centre of this research had a considerable number of candidate items; consequently, we had to reduce the number of items from other established measures – namely the perceived threats – so not to compromise scale development while ensuring that the total length of the survey was short. Keeping survey length short is necessary to maximize response rates and minimize nonresponse bias when sampling from online communities (Rogelberg & Stanton, 2007). This is especially the case for many of the communities we were recruiting from, where long surveys could have failed to garner interest early on, and the postings of the survey would have quickly disappeared from the frontpage of those communities. Knowing this, the most face-valid items of the full perceived threat measures were selected for inclusion in the online sample.

As most of the final perceived threat scales only included two items, Spearman-Brown correlation coefficients were most suitable for assessing internal consistency (Eisinga et al.,

2013). There is limited consensus in the literature on how to interpret Spearman-Brown reliabilities. Too weak of a correlation can indicate that the items are measuring different things. Too strong of a correlation, however, can signal that the items are too similar in content rather than merely tapping the same construct. To identify potentially problematic measures, or measures with lower reliabilities that could impact results, we used Cortina's (1993) recommendation that items should intercorrelate at $r \geq .50$. Using this as a guide, we identified realistic threat in the Pilot Study, as well as realistic threat and group dominance threat in Study 2 as having subpar reliability. Thus, for these measures we caution interpretation as to whether their relations with CATW support Hypothesis 2. We discuss the implications of these reliabilities further in the following section.

4.3. Predicting Cyber-Aggression Towards Women

Results from each of the Dual Process Model-inspired, Integrated Threat Theory-inspired, and latent threat models provide partial support for perceived threat mediating the relations between sociopolitical ideology and endorsement of CATW, as predicted in Hypothesis 3. Consistent with what is proposed in the Dual Process Model (Duckitt, 2001), the results of the Dual Process Model-inspired model showed that RWA and SDO had significant direct effects on social and group dominance threat respectively. The exception to this was the consistent direct effect that SDO had on social threat, which may be indicative of a generalized or latent threat posed by female gamers to those higher in SDO. Notably, unlike SDO, which consistently had a significant direct and indirect effect on endorsement of CATW, RWA only had a weak, indirect effect on endorsement of CATW in Study 1. Preliminarily, these results suggest that gendered cyber-aggressions may be rooted more in support for hierarchical social structures than they are

in adherence to social norms and deference to authorities, most strongly (but not exclusively) mediated by and additionally directly predicted by threats to those beliefs in social hierarchies.

SDO was observed to be a stronger predictor of endorsement of CATW in the Integrated Threat Theory-inspired model as well, predicting endorsement of CATW directly in both Study 1 and 2, and indirectly in Study 1. Comparatively, RWA only indirectly predicted endorsement of CATW in Study 1. Reinforcing the relative importance of SDO to endorsement of CATW is the finding that the direct effects of SDO on perceived threats and the indirect effect of SDO on endorsement of CATW were marginally stronger on average relative to their RWA counterparts. Amongst the indirect effects observed in Study 1, partial mediation of RWA and SDO was present via all threat types, further suggesting the possibility of a latent threat of female gamers that might be driving the relationship between sociopolitical ideology and endorsement of CATW. Unlike the Dual Process Model-inspired model, where social and group dominance threat consistently had direct effects on endorsement of CATW, direct effects in the Integrated Threat Theory-inspired model were only observed for realistic and group esteem threat in Study 2. This result should be interpreted with caution, however, as many of the magnitudes of the direct effects of perceived threats do not differ significantly across studies, especially with respect to realistic threat where they are identical; our use of the .10 threshold is primarily what qualifies realistic and group esteem threats' significant direct effects as being meaningful.

Results from the latent threat model add further credence to the notion that a latent threat construct might be mediating the relationship between sociopolitical ideology and endorsement of CATW. All of the measured perceived threat variables loaded strongly onto a latent threat variable, with the exception of intergroup anxiety, which loaded only moderately (potentially due to the aforementioned issues with detecting female gamer group identity), and group dominance

threat, which demonstrated poor item intercorrelation ($r=.24$). Furthermore, the latent threat model echoed findings from the Dual Process Model-inspired and Integrated Threat Theory-inspired models that SDO is the most robust predictor of endorsement of CATW. SDO directly and indirectly, via latent threat, predicted endorsement of CATW, whereas RWA did not. The latent threat variable was additionally a stronger direct predictor of endorsement of CATW than any individual perceived threat, something that has also been found for prejudice towards immigrants (Stephan et al., 1998).

Despite poorer reliabilities, realistic threat and group dominance threat were included in the Integrated Threat Theory-inspired and latent threat models. Notwithstanding the fact that scales featuring less items will inevitably report poorer internal consistencies (Cortina, 1993), there were several reasons we decided to retain these measures. First, similar to other research that must balance fewer items per construct with access to large samples (e.g. World Value Survey), the items selected were highly face-valid. The threat constructs are central to the theoretical frameworks we investigated, as each threat is complementary to other perceived threats within the theoretical frameworks. We believed that excluding them would preclude a comprehensive test of those models. Finally, the inclusion of realistic threat and group dominance threat ensured consistency throughout the models across samples. Therefore, we chose to retain these measures. Nevertheless, the Integrated-Threat Theory-inspired and latent threat models for Study 2 were re-evaluated without specifying realistic threat and group dominance threat, which produced slight differences in estimates but no meaningful differences when it comes to statistical significance or interpretation. Results of these models can be found in the supplementary materials.

Ultimately, we find that whether we examined samples unaffected (Study 1) or likely affected (Study 2) by the livestream, or specify threats from the Dual Process Model, Integrated Threat Theory, or combine them to evaluate the presence of latent threat, SDO emerges as the most consistent predictor of endorsement of CATW. SDO is typically moderately, positively correlated with hostile sexism and weakly positively correlated with benevolent sexism, with the inverse pattern for RWA (Feather & Mckee, 2012; Russell & Trigg, 2004; Sibley et al., 2007); findings that have been found in the gaming community as well (Fox et al., 2014). Given that CATW is most closely conceptually related to and most strongly correlated with hostile sexism, the findings of the present research are compatible with this previous literature.

Our finding that SDO consistently predicts endorsement of CATW also complements prior research showing that SDO predicts sexist beliefs about women gamers and admissions of in-game sexual harassment towards them (Fox & Tang, 2014; Tang et al., 2020; Tang & Fox, 2016). Seemingly, whether in the games themselves or in the gaming communities that are built around them, those who prefer hierarchical intergroup relations perceive female gamers as a threat to that established hierarchy – which presumably crowns the male gamer identity at its top – and motivates prejudice towards them. These negative attitudes towards female gamers may be similar to those towards feminists, who are perceived as disruptors to the gender social hierarchy (Duckitt & Sibley, 2007), or those towards women in Western patriarchal societies more broadly (Bates & Heaven, 2001; Lippa & Arad, 1999; Pratto et al., 2000; Russell & Trigg, 2004).

While SDO was primarily mediated by group dominance threat in the Dual Process Model-inspired model, group dominance threat was the weakest of the latent threat indicators. This suggests that the relationship between beliefs in hierarchical social structures and endorsement of CATW may not be driven solely by direct threats to those social hierarchies, as

defined by the items for group dominance threat, but a constellation of group-based threats that may challenge those hierarchies indirectly. Realistic, symbolic, and social threats, which loaded the strongest onto the latent threat factor, may challenge the male-dominated group hierarchy in gaming communities through undermining male gamers' perceived control over the social resources that keep them in power (e.g. influence on game development) and ability to direct the norms of discourse about gaming. Without consistent relations to other outcomes or significantly contrasting patterns of mediation via perceived threats, it remains to be seen if RWA has differential effects on female gamers or those effects differentially mediated when compared to SDO, per the hypotheses of the Dual Process Model (Duckitt, 2001). There may be more specific contexts where attitudes towards female gamers may be more sensitive to their strict compliance to social norms, perceived authorities, and threats they may pose to disrupting them (e.g. within the corporate structure of game development studios). However, additional research simultaneously examining RWA and SDO as predictors of more hostile and benevolent sexist attitudes and outcomes in gaming contexts is required to evaluate this possibility.

4.4. Limitations and Future Directions

Several additional limitations, beyond those already noted, are worth mentioning. First, due to the viral spread of the survey online beyond the communities it was initially posted to, we cannot know for certain whether the population sampled was entirely online gamers and to what degree participants were influenced by the livestream and archived video that made the survey link go 'viral.' However, means for self-reported identification as a gamer were similar in Study 1 ($M=3.29$, $SD=1.66$) and Study 2 ($M=2.98$, $SD=1.49$), suggesting that gamers were primarily sampled. Second, all the measures used were self-report, many of which are highly face-valid, and thus susceptible to socially desirable responding. This is especially the case with the CATW

measures, which describe socially reprehensible, and in some cases illegal activities that participants may not want to admit to endorsing or engaging in. Relatively low means and highly positively skewed distributions for these measures that could be, in part, due to socially desirable responding suggest that future research should measure CATW using more covert methods that are limited to observations of clearly identifiable online gamers. These can include observational research and automated text analyses of gaming forums and social media.

Third, the validation of the endorsement of CATW scale in the present paper is contingent upon the population it was validated in, and the current technologies available that CATW leverages. While the Pilot Study was relatively more ethnically diverse, Studies 1 and 2 primarily sampled White men from North America. Subsequent research should evaluate this scale in different populations, update it if existing items load differently onto the scale, and evaluate the addition of new items that reflect new ways of engaging in CATW afforded by advances in technology. Last, the present paper examines CATW cross-sectionally, in an international online sample, and in the context of heteronormative gender dynamics between men and women. As the perpetrators of and those threatened by CATW are not necessarily men, which comprise the majority of the present samples, and as CATW may differ depending on the local cultural or normative gender norms of participants and towards gender minorities that present as women, future research should explore these behaviours across different gender dynamics.

5. Conclusion

The online video gaming community inherits a long history of disproportionate treatment and representation of female gamers (Burgess et al., 2007; Downs & Smith, 2010; Duggan, 2014; Ivory, 2006; Lien, 2013). Despite observed decreases in hostile sexism over time (Huang

et al., 2019), CATW by individuals and organized groups have reached critical mass in that same period, with some arguing that CATW in the gaming community in the mid-2010s (e.g. the GamerGate movement) created a blueprint for engaging in cultural warfare with groups with opposing views online (United Nations Broadband Commission & United Nations, 2015; Warzel, 2019). CATW in the gaming community during this period is believed to be so influential, in part, due to the multitude of Internet-enabled ways that the aggressors targeted female gamers. It is important to note that despite the present research being conducted within the gaming community, means for endorsement of CATW were generally low ($M_s = 1.31, 1.85, 2.51$; minimum value of 1). Thus, it would be inaccurate to characterize the gaming community as a whole as being supportive of CATW.

To account for this breadth in the number of ways that women and girls are commonly being victimized online, the present research expanded measurement of CATW to more behaviours through development of the endorsement of CATW scale. The scale aims to more accurately canvas a moving target – support of an ever-expanding list of CATW behaviours – but nonetheless currently provides a more inclusive way of measuring CATW that minimizes measurement error. Although the present research used female gamers as a target group for the context of online gaming communities, many of the CATW behaviours are not inherently gendered, and could lend themselves to adapted versions of the scale that are validated for other cyber-victimized groups. For researchers, the endorsement of CATW scale offers a more inclusive and comprehensive self-report method of measuring cyber-aggression that has been demonstrated to be reliable even in large samples.

Although the selection of studies in the present research are far from conclusive on their own, there is strong, preliminary support for the role of sociopolitical ideology and perceived

threat of female gamers in endorsement of CATW. Most notably, preferences for hierarchical power structures between social groups, which is commonly associated with hostile sexism, and a multifaceted, general threat posed by female gamers appear to be driving support of CATW. Both the myths that try to legitimize male gamers' superior social status relative to female gamers and the threats female gamers may appear to pose, such as weakening the control male gamers have over the gamer identity, consumer demand, and dominant belief systems in the online gaming community, present themselves as sensible targets for reducing endorsement of CATW. Endorsement of CATW could be attenuated by targeting these underlying beliefs that social groups are in constant competition with one another and the perceived competition some might feel with female gamers that drive the attitudes and behaviour of individuals with higher SDO (Pratto et al., 1994). Presenting female gamers as equal and nonthreatening may intuitively seem like a plausible way of reducing endorsement of CATW. This could involve increasing the inclusion of women and normalizing their presence across the many subdomains of gaming: development, games media, eSports, and representation within the games themselves. What remains to be understood and is not clear from the results, however, is the most effective way of making female gamers less threatening to those who endorse CATW against them. The latent threat those higher in SDO feel towards them may be an alternate form of hostile sexism, a threat that is unaccounted for in the measures we used, or a threat that we measured using a limited number of items that's role could become clearer if a follow-up study more comprehensively measured it. The present research lays the foundation for these future empirical inquiries.

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Table 1*Means, standard deviations, internal consistencies, and correlations for Pilot Study variables*

Variable	M (SD)	Reliability	1	2	3	4	5	6	7	8	9
1. RWA	2.91 (0.99)	.82/.83	-								
2. SDO	2.69 (0.94)	.88/.87	.16	-							
3. REAL	3.55 (1.81)	.26/.26	.51**	.37*	-						
4. SYMB	3.76 (1.89)	.82/.83	.43**	.38**	.64**	-					
5. ANX	2.86 (0.96)	.76/.78	.19	.42**	.46**	.38**	-				
6. EST	2.09 (1.11)	.70/.71	.35*	.09	.43*	.33*	.09	-			
7. SOC	1.50 (0.92)	.87/.87	.13	.28	.18	.18	.26	.53**	-		
8. DOM	2.42 (1.12)	.50/.63	.50**	<.01	.24	.08	-.05	.35*	.28	-	
9. CATW	1.35 (0.81)	.95/.96	.32*	.45**	.31*	.37*	.36*	.23	.16	.27	-
10. ENG	1.33 (0.82)	.93/.94	.25	.45**	.26	.38**	.19	-.01	.18	.07	.74**

Note. $N = 46$. * $p < .05$, ** $p < .01$. RWA = right-wing authoritarianism; SDO = social dominance orientation; REAL = realistic threat; SYMB = symbolic threat; ANX = intergroup anxiety; EST = group esteem threat; SOC = social threat; DOM = group dominance threat; CATW = endorsement of cyber-aggression towards women; ENG = engagement in cyber-aggression towards women. Reliabilities are Cronbach's alpha values followed by McDonald's omega values.

Table 2*Means, standard deviations, internal consistencies, and correlations for Study 1 and Study 2 variables*

Variable	Study 1 M (SD)	Study 1 Reliability	1	2	3	4	5	6	7	8	9	10	11	12	13	Study 2 M (SD)	Study 2 Reliability
1. M	-	-	-	-	-	.00**	.02**	.02**	.03**	.01**	.04**	.03**	.04**	.07**	.08**	-	-
2. F	-	-	-	-	-	.03**	.03**	.01**	.01**	.02**	.01**	.00**	.01**	.01**	.04**	-	-
3. GM	-	-	-	-	-	.03**	.06**	.04**	.03**	.02**	.07**	.04**	.05**	.01**	.08**	-	-
4. RWA	2.27 (1.14)	.90/.90	-.04	.07	-.03	-	.42**	.35**	.33**	.21**	.32**	.38**	.13**	.26**	.18**	2.75 (1.06)	.85/.85
5. SDO	2.75 (1.40)	.87/.87	.01	.00	-.03	.52**	-	.31**	.28**	.16**	.24**	.30**	.29**	.34**	.18**	3.76 (1.02)	.67/.67
6. REAL	2.60 (2.00)	.53/.70	-.06	.07	.03	.48**	.52**	-	.71**	.28**	.34**	.53**	.18**	.30**	.20**	3.60 (2.13)	.46/.63
7. SYMB	2.40 (2.11)	.69/.82	-.08	.07	.04	.43**	.46**	.71**	-	.31**	.35**	.58**	.12**	.28**	.18**	3.29 (2.39)	.67/.80
8. ANX	2.91 (1.14)	.77/.78	.14*	.11	-.08	.25**	.27**	.26**	.28**	-	.31**	.33**	.06**	.19**	.13**	3.21 (1.05)	.73/.73
9. EST	1.74 (1.12)	.50/.66	.00	.04	.06	.38**	.37**	.47**	.46**	.39**	-	.54**	.06**	.27**	.23**	1.64 (.97)	.50/.56
10. SOC	1.13 (1.00)	.71/.76	.01	.02	.02	.41**	.35**	.55**	.58**	.36**	.58**	-	.09**	.32**	.21**	1.85 (1.25)	.71/.83
11. DOM	3.09 (1.97)	.76/.86	-.00	.01	-.01	.42**	.71**	.48**	.45**	.13*	.25**	.25**	-	.34**	.07**	4.96 (1.18)	.24/.40
12. CATW	1.85 (1.05)	.90/.92	-.08	.02	.15*	.37**	.60**	.45**	.41**	.19**	.33**	.33**	.66**	-	.37**	2.51 (.94)	.83/.85
13. ENG	1.18 (0.47)	.82/.85	-.06	.07	.01	.28**	.31**	.38**	.38**	.13*	.34**	.35**	.29**	.51**	-	1.21 (.45)	.74/.77

Note. Study 1 $N = 276$, Study 2 $N = 6381$. Study 2 variables are on the upper right section of the table. * $p < .05$, ** $p < .01$. M = male gender; F = female gender; GM = gender minority; RWA = right-wing authoritarianism; SDO = social dominance orientation; REAL = realistic threat; SYMB = symbolic threat; ANX = intergroup anxiety; EST = group esteem threat; SOC = social threat; DOM = group dominance threat; CATW = endorsement of cyber-aggression towards women; ENG = engagement in cyber-aggression towards women. Reliabilities are Cronbach's alpha values followed by McDonald's omega values. Spearman-Brown correlation coefficients are used instead of Cronbach's alpha for all threats' reliabilities, except for intergroup anxiety.

Table 3*Item characteristics of the Endorsement of Cyber-Aggression Towards Women scale*

Item	Factor Loading		Standardized Regression Weight	Squared Multiple Correlation
	Pilot Study	Study 1	Study 1	Study 1
1. Obtaining a woman's personal information online without her permission is never okay	.663			
6. If I have figured out the password to a woman's account or profile, I can do what I want with it.	.845	.635	.51	.26
7. To get information about a woman, it's okay to pose as her online.	.741	.648	.52	.27
8. It is okay to impersonate someone online to learn more about a woman	.771			
15. Continually monitoring the activities of a woman online is totally fine.		.640	.49	.24
19. There is potential harm in repeatedly messaging, calling or texting a woman. (reverse-coded)		.632	.38	.15
20. It is fine to use the Internet to contact a woman even though she does not want to be contacted.		.693	.53	.28
21. It is okay to use the Internet to tell a woman what I think about her, regardless of if she wants to know or not.		.648	.38	.14
23. There is no problem with telling a woman to kill herself on the Internet.	.711	.642	.46	.21
24. It's okay to create new, anonymous online profiles or accounts for the sole purpose of using them to spam a woman with messages.	.874	.750	.70	.49
25. There is nothing wrong with threatening real life violence to a woman on the Internet	.821			
26. There's nothing wrong with making unprovoked sexual remarks towards or sexual requests of a woman on the Internet.	.846	.736	.63	.40
27. It is okay to trick a woman into a compromising situation using the Internet.	.853	.795	.70	.48
28. There is nothing wrong with using fake advertisements or profiles to trick a woman online.	.901	.750	.69	.48
30. It is okay to mislead a woman online.	.813	.692	.64	.40
32. It is okay to share intimate photos or videos of a woman online without her consent	.869			
35. Threatening to release private information about a woman onto the internet in order to get my way is an acceptable thing to do	.743			

Table 4

Standardized direct and indirect effects of Dual Process Model- and Integrated Threat Theory-inspired models in Study 1 and Study 2

	DPM					ITT								
Study	Predictor	Effect	SOC	DOM	CATW	Predictor	Effect	REAL	SYMB	ANX	EST	CATW		
1	RWA	Direct	.31**	.07	.00	RWA	Direct	.29**	.26**	.16*	.26**	.01		
		Indirect			.07*		Indirect					.07*		
	SDO	Direct	.19**	.67**	.22**	SDO	Direct	.37**	.33**	.18**	.24**	.48**		
		Indirect			.34**		Indirect					.08*		
	SOC	Direct			.14**	REAL	Direct					.11		
	DOM	Direct			.46**	SYMB	Direct					.07		
						ANX	Direct					-.02		
						EST	Direct					.08		
	R^2			.19	.51	.48				.34	.26	.09	.18	.39
	2	RWA	Direct	.31**	.01	.07**	RWA	Direct	.26**	.25**	.17**	.27**	.05**	
Indirect					.07**	Indirect							.09**	
SDO		Direct	.17**	.29**	.18**	SDO	Direct	.20**	.17**	.09**	.12**	.24**		
		Indirect			.11**		Indirect						.05**	
SOC		Direct			.22**	REAL	Direct					.11**		
DOM		Direct		.26**	SYMB	Direct						.06**		
					ANX	Direct					.05**			
					EST	Direct					.12**			
R^2			.17	.09	.23				.15	.13	.05	.11	.19	

Note. Study 1 $N = 276$, Study 2 $N = 6381$. * $p < .05$, ** $p < .01$. DPM = Dual Process Model-inspired model; ITT = Integrated Threat Theory-inspired model; RWA = right-wing authoritarianism; SDO = social dominance orientation; SOC = social threat; DOM = group dominance threat; BS = benevolent sexism; HS = hostile sexism; CATW = endorsement of cyber-aggression towards women.

Figure 1. The Dual-Process Model-inspired model (left) and Integrated Threat Theory-inspired model (right). RWA = right-wing authoritarianism; SDO = social dominance orientation; SOC = social threat; DOM = group dominance threat; REAL = realistic threat; SYMB = symbolic threat; ANX = intergroup anxiety; EST = group esteem threat; CATW = endorsement of cyber-aggression towards women.

Indirect effects: RWA → CATW : $\beta = .08^{**}$; SDO → CATW : $\beta = .10^{**}$

Figure 2. Structural equation model of sociopolitical ideology predicting endorsement of cyber-aggression towards women, mediated by perceived threat. *Note.* $N = 6381$, $df = 262$. All pathways were significant at $p < .01$, except the pathway from RWA to CATW, which was not significant, $p = .832$. P = parcels of latent variables; RWA = right-wing authoritarianism; SDO = social dominance orientation; REAL = realistic threat; SYMB = symbolic threat; ANX = intergroup anxiety; EST = group esteem threat; SOC = social threat; DOM = group dominance threat; CATW = endorsement of cyber-aggression towards women.