

## Empirical Article

**Predicting hostility towards women: incel-related factors in a general sample of men**JIEWEN ZHANG,<sup>1,2,3</sup>  AMALIE B. MOLLANDSØY,<sup>1</sup> CECILIE NORNES,<sup>1</sup> EILIN K. EREVIK<sup>1,4</sup>  and STÅLE PALLESEN<sup>1,4</sup><sup>1</sup>*Department of Psychosocial Science, University of Bergen, Bergen, Norway*<sup>2</sup>*Department of Developmental Psychology and Socialisation, University of Padua, Padua, Italy*<sup>3</sup>*Department of Sociology, Central South University, Changsha, China*<sup>4</sup>*Norwegian Competence Center for Gambling and Gaming Research, University of Bergen, Bergen, Norway*

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Hostility towards women is a type of prejudice that can have adverse effects on women and society, but research on predictors of men's hostility towards women is limited. The present study primarily introduced predictors associated with misogynist involuntary celibates (incels), and then investigated whether loneliness, rejection, attractiveness, number of romantic and sexual partners, right-wing authoritarianism, and gaming predicted hostility towards women among a more general sample of men. A total of 473 men (aged 18–35, single, heterosexual, UK residents) recruited via Prolific answered the hostile sexism subscale, the misogyny scale, the self-perceived sexual attractiveness scale, the right-wing authoritarianism scale, the game addiction scale for adolescents, the adult rejection-sensitivity scale, the UCLA loneliness scale, and self-developed questions regarding number of sexual and romantic partners, and time spent gaming. We found a strong positive relationship between right-wing authoritarianism and hostility towards women, as well as a strong convex curvilinear relationship between attractiveness and hostility towards women. The number of sexual partners showed a moderate concave relationship with hostility towards women. We did not find sufficient support for a relationship between gaming and hostility towards women, and there was no support that loneliness, rejection, or romantic partners predicted hostility towards women among a general sample of men. Our study supports right-wing authoritarianism and self-perceived attractiveness as potential strong predictors in understanding men's hostility towards women in the wider community.

Pre-registration: <https://osf.io/ms3a4>.

**Key words:** Hostility towards women, rejection, attractiveness, loneliness, gaming, right-wing authoritarianism.

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## INTRODUCTION

A central topic in the field of prejudice that has garnered recent attention is sexism, characterized as bias directed at sex or gender, wherein women are perceived as different and inferior to men (Allport, 1954; Council of Europe, 2020; Fiske, 2017). A distinction is drawn between hostile and benevolent sexism (Glick & Fiske, 1996). The former is working hand in hand with misogyny to uphold patriarchal social structures (Manne, 2017), and refers to men's hostility and antipathy towards women, whereas benevolent sexism portrays a more positive view of women, although still a paternalistic view (Glick & Fiske, 2001). While both attitudes are paternalistic, hostility towards women is considered more objectionable than benevolent sexism (Becker & Wright, 2011).

Indeed, men's hostility towards women can be conveyed in speech, writing, behavior, and gestures (Council of Europe, 2020), with some expressions being subtle, while others are more overt (Bearman & Amrhein, 2013), such as aggression (Forbes, Adams-Curtis & White, 2004), verbal, physical and sexual violence (Abrams, Viki, Masser & Bohner, 2003; Agadullina, Lovakov, Balezina & Gulevich, 2022; Begany & Milburn, 2002; Jewkes, Sikweyiya, Morrell & Dunkle, 2011; Locke & Mahalik, 2005; Parrott & Zeichner, 2003), and rape (Dale, Aakvaag, Strøm, Augusti & Skauge, 2023). Negative effects of expressions of men's

hostility towards women include women's stereotypical self-views, as well as impairment of women's career and legal protection (Barreto & Doyle, 2023). Therefore, understanding men's hostility towards women is important, especially in terms of how it operates as a series of negative outcomes.

Notably, a new phenomenon that in recent times has been linked to hostility towards women is misogynistic attitudes among some of the individuals identifying themselves as involuntary celibates (incels) (Carian, DiBranco & Ebin, 2022; Czerwinsky, 2024; Kelly, DiBranco & DeCook, 2021). Misogynist incels see themselves as victims of feminism and egalitarianism (Zimmerman *et al.*, 2018). They often discuss their struggle to find sexual and romantic partners in online forums representing online subculture (Mogensen & Rand, 2020; Reform, 2022). In the majority of cases, misogynist incels are heterosexual, cisgendered men who are unable to secure sexual or romantic relationships with heterosexual, cisgendered women (Czerwinsky, 2024). Regarding misogynist incels, a big-scale data-driven study already provided an in-depth analysis of the evolution of male-dominated online communities over 14 years, with a particular focus on user migration and toxicity (hate speech evolved) within these communities consisting of a wide variety of web platforms and men groups, not limited to those identifying as incels. The study observed a significant migration from traditional to newer incel

communities which exhibit higher levels of toxicity and extreme anti-women ideologies (Ribeiro, Blackburn, Bradlyn *et al.*, 2020). Scholars have also explored the underlying mechanisms behind transformation being misogynist incels. There is concern such shift is giving way to violent social events or even terrorist attacks in the real world (Blake & Brooks, 2023; Czerwinsky, 2024; Kelly *et al.*, 2021; Sugiura, 2021). It seems that misogynist incelism is rooted in male supremacism that date back to earlier patriarchal ideologies. Hostility towards women is not confined to online spaces but has generally been exacerbated by digital technologies, leading to continuous development of hostility fueled by the anonymity and de-inhibiting effect of the internet (Ging & Siapera, 2019; Kelly *et al.*, 2021; Sugiura, 2021).

Notwithstanding, factors predicting men's hostility towards women include not only male supremacism and technological use, but can also be categorized into psychological dimensions (loneliness, sensitive to rejection), interpersonal dimensions (romantic and sexual partners, attractiveness), culture dimensions (digital gaming culture), and social dimensions (political participation) (Carian *et al.*, 2022; Grunau, Biesel, Gul & Kupfer, 2022; Hansmeyer, 2021; McPherson, 2018; Morssinkhof, 2021; Oliver, Navarro-Perez, Tomás & Rodrigo, 2023; Tileagă, 2019; Vergel, La parra-Casado & Vives-Cases, 2024).

Despite research identifying these predictors of hostility towards women, there is limited empirical evidence as previous research almost exclusively has examined hostility towards women from one or two dimensions. Previous studies have traced a variety of factors contributing to the development of misogyny, mainly emphasizing psychological and interpersonal etiology (Grunau *et al.*, 2022; Hansmeyer, 2021; McPherson, 2018; Morssinkhof, 2021; Oliver *et al.*, 2023). A few studies have focused on the additive effects of various dimensions. For example, Renström (2024) found that single men who also had high social dominance orientation expressed more hostility towards women compared to those who belonged to only one of the two categories. Fleming, Patterson, Chavarin, Semple, Magis-Rodriguez & Pitpitan (2018) found that men with lower education levels, depression, and heroin use exhibit higher hostility towards women compared to those who belonged to only one of these categories. Additionally, studies have found that men's hostile attitudes towards women are more pronounced compared to women's (Oliver *et al.*, 2023). This may stem from patriarchal or male supremacist ideologies and can also be explained by peer norm theory and masculine gender role stress theory (Carian *et al.*, 2022; Leone, Parrott & Swartout, 2017; Tileagă, 2019). Therefore, the current study aims to examine whether the predictors of hostility towards women found among incels could be significantly associated with hostility towards women in a non-incel related general population of men.

Empirical studies have shown that traits predictive of misogynist incels, such as feelings of exclusion, were also significant for the general population of heterosexual men (Fontanesi, Cosi, Crosta, Verrocchio, Jannini & Ciocca, 2022; Saptura & Boyle, 2020). However, there is controversy about the effects of loneliness and sensitivity to rejection on hostility towards women for men in general (Grunau *et al.*, 2022; Morssinkhof, 2021; Saptura & Boyle, 2020). Therefore, to elucidate the roles of loneliness and sensitivity to rejection in

fostering hostility towards women, we formulated two hypotheses: men in the general population who report loneliness to hold more hostile attitudes towards women (Hypothesis 1) and men sensitive to rejection to have higher levels of hostility towards women (Hypothesis 2).

In term of the interpersonal dimension, misogynist incels report high levels of poor relationships with women, describing themselves as unattractive losers lacking romantic and sexual partners (Mogensen & Rand, 2020; Reform, 2022). However, in a broad sample of young men, a study found that men who reported having sexual experience had significantly more hostile attitudes towards women than men who reported having no sexual experience (Ramiro-Sánchez, Ramiro, Bermúdez & Buela-Casal, 2018). Furthermore, Bosson, Rousis & Felig (2022) found significant positive correlations between attractiveness, relationship success, and hostility towards women, implying that there is heightened hostility among men who seem to consider themselves attractive and successful in relationships with women. Likewise, recent attention that has been paid to the self-proclaimed misogynist Andrew Tate has raised questions regarding hostility towards women in men. Viewed and followed by millions of young men who want to be in a relationship, Tate teaches them how to attract and treat women with his recipe including values that dehumanize women (Das, 2022). It is conceivable that looking up to Andrew Tate as a role model implies a significant increase in hostility towards women. Based on the aforementioned studies, we expected men in the general population with only a few romantic partners to hold more hostile attitudes towards women than those with none or many romantic partners (Hypothesis 3). We also expected men with both high and low attractiveness scores to be more hostile towards women than men with moderate scores (Hypothesis 4), and the men with both many and few sexual partners would have more hostile attitudes towards women than men in the general population with a moderate number of sexual partners (Hypothesis 5).

In terms of the social dimension, scholars have pointed to the political extremists of right-wing authoritarianism as a prevailing patriarchal ideology which impact online incel communities and as such men's hostile attitudes towards women (Carian *et al.*, 2022; Williams, 2020). Right-wing authoritarianism was significantly associated with the growth of misogynistic incels with black pill view, referring to a collection of statements about romance and dating indicating that there is no personal solution to social problems for men (Kelly *et al.*, 2021). The patriarchal traditionalism of male supremacism has been identified as the root cause of misogynist incelism (Kelly *et al.*, 2022). Right-wing authoritarianism reflects social and ideological attitudes about social control, submission to and respect for authorities, as well as conformity to traditional and religious norms (Austin & Jackson, 2019; Duckitt & Sibley, 2010, 2016). This implies that hostility towards women is not only present at an individual level, but also legitimized politically through right-wing authoritarians at the social level. Empirically, Begany & Milburn (2002) found that right-wing authoritarianism significantly and positively predicted sexual harassment, mediated by hostile attitudes towards women among American men in the general population. Systematically, in the context of hostility towards women, the concepts of misogynistic incels, right-wing authoritarianism, male

supremacist, terrorism, and the black pill ideology were found to be closely associated (O'Hanlon, Altice, Lee *et al.*, 2024). Therefore, it is plausible to assume an association between right-wing authoritarianism and hostility towards women. Accordingly, we expected men in the general population with high scores on right-wing authoritarianism to be more hostile towards women than men with lower scores (Hypothesis 6).

From the culture dimension within the incel zeitgeist, hostile sexism erupted in the online gaming communities, with the event of Gamergate as a hallmark example, referring to a large, networked harassment campaign by gamers and misogynists against several prominent women in the gaming industry (Ip, 2014; Lindsay, 2021; Stuart, 2014; Vergel *et al.*, 2024). This sense of resentment reflects the issues of hostile sexism and misogyny that exist within the digital gaming culture, which are primarily manifested in the following aspects: pinkification (marking clothes and toys regarded "suitable" for girls with the use of pink color), marginalization, sexualization, exclusion, and harassment (Fisher & Jenson, 2016). Hostile sexism and misogyny in online gaming communities may stem masculine territoriality, technology use including anonymity and a lack of guardianship, and content of gaming design including presenting female avatars in more revealing and provocative clothing than males (Downs & Smith, 2010; Jansz & Martis, 2007; Lopez-Fernandes, Williams, Griffiths & Kuss, 2019; Lynch, Tompkins, van Driel & Fritz, 2016; Vergel *et al.*, 2024). These factors work together and may increase hostile attitudes towards women. On this basis, previous studies have found that online game involvement and gaming hours were predictors of sexual harassment and misogyny (Bègue, Sarda, Gentile, Bry & Roché, 2017; Tang & Fox, 2016; Tang, Reer & Quandt, 2020). Nevertheless, it would be desirable to examine whether online game involvement and gaming hours are associated with hostile attitudes towards women in a larger sample. Based on the experience-acquisition properties of social cognitive theory, we expected that men in the general population who spend more time playing video games or have a gaming addiction would have increased hostility towards women than their counterparts (Hypothesis 7).

So far, gender focused scholars across disciplines and methods have made strides to understand how and why hostility towards women is carried out. Recent reviews have focused on misogyny and found that around 90% of the included meta-data were qualitative or theoretical, with a few being based on surveys (Czerwinsky, 2024; O'Hanlon *et al.*, 2024). Research has well documented that right-wing authoritarianism is associated with hostility towards women. However, to our knowledge, no studies have investigated this relationship while controlling for loneliness, rejection, attractiveness, and romantic and sexual relationships/experience. Similarly, hostility towards women is ingrained in some political ideologies and is enacted in new ways. This issue has progressively transitioned from being a matter of personal experiences to one that is deeply rooted in political ideology and has further expanded into the cultural sphere, as evidenced by the emergence of such as misogynist incel communities and Gamergate (Carian *et al.*, 2022; Vergel *et al.*, 2024). As hostility towards women evolves in new ways, the current study continues to examine whether its emergence is still related to political views.

Against this backdrop, we conducted a quantitative study to examine whether loneliness, number of female romantic and sexual partners, rejection, attractiveness, gaming, and right-wing authoritarianism could predict men's hostility towards women in a general sample of men. The goal of our study was to gain more insight into men's hostility towards women, specifically whether predictors that are often studied regarding incels' hostile attitudes towards women are associated with hostility towards women in a general sample of men, and identify the key factors under a controlled condition. As such, the current study can contribute knowledge about which factors should be researched further when determining the causes of hostility towards women in general samples of men (Figure 1).

## METHOD

### Respondents

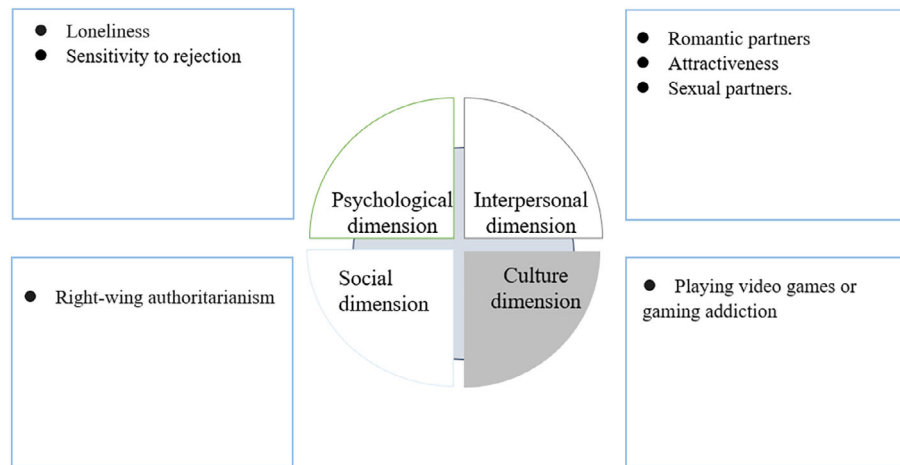
The original sample consisted of 516 men aged 18 to 35 years, with a mean age of 26.3 ( $SD = 5.0$ ). We limited the sample to single heterosexual men, living in the UK. No men were asked whether they self-identified as an incel due to the aim for a general sample in the current study. Number of participants was chosen based on the power calculation performed with G\*Power 3.1.9.2 (Faul, Erdfelder, Lang & Buchner, 2007). When the alpha level was set at 0.05 (two-tailed) and power at 0.80, it showed that a sample size of 395 respondents was required to detect a significant individual predictor with a small effect ( $f^2 = 0.02$ ) in a multiple regression analysis. Based on the recommendation to have more respondents than required for sufficient power (Pallant, 2020), we chose to recruit 500 participants.

Respondents were recruited via Prolific (<https://www.prolific.co>), a UK based company that recruits participants for paid surveys. Participants were pre-selected based on demographic variables (single, heterosexual, UK residents, men, aged 18–35). They were compensated with a sum equal to £8 for answering the questionnaire. Responses and research participants remained anonymous to the project team. Prolific accepted more than the requested sample to compensate for missing or partially completed responses, providing a final sample of 516 respondents.

After final data collection, 15 cases were excluded for only partially completing the questionnaire, leaving 501 respondents who had completed the entire questionnaire. Data collections, especially online surveys, are susceptible to careless responses, such as inattentive and random response styles (Meade & Craig, 2012). Four questions to identify careless responding proposed by Brühlmann, Petralito, Aeschbach and Opwis (2020) were adjusted to fit seamlessly with the layout and formulation of the questionnaire: "I read every question and try to answer correctly," "I read instructions carefully," "To show that you are reading these instructions, choose the number 5," and "I see myself as someone who did not read this statement." Twenty-eight of the remaining respondents did not answer these statements correctly and were consequently removed for careless responses. Therefore, the final sample analyzed consisted of 473 single, heterosexual men, aged 18 to 35, who were UK residents, with a mean age of 26.2 ( $SD = 5.0$ ).

### Measures

**Hostile sexism subscale.** The hostile sexism subscale from the ambivalent sexism inventory (ASI) was used to measure hostility towards women as it correlates well with other measures of hostility towards women but contains more subtle expressional items than more traditional measures, including items that baldly assert women's inferiority (Glick, Fiske, Mladinic *et al.*, 2000). The scale consists of 11 questions answered on a six-point Likert scale, ranging from 0 (*strongly disagree*) to 5 (*agree strongly*). An example is "Most women interpret innocent remarks or acts as being sexist." A composite score is calculated by adding the score for



Seven research hypotheses across the four dimensions on hostility towards women among a more general sample of men

Fig. 1. Seven research hypotheses across the four dimensions on hostility towards women among a more general sample of men.

each item and dividing by the number of items. In our sample, the scale had high internal consistency (Cronbach's  $\alpha = 0.95$ ).

**Misogyny scale.** Hostility towards women was also measured using the misogyny scale developed by Rottweiler and Gill (2021), as it aligned with the theoretical conceptualization of the hostile sexism subscale but with rather banal ways to indicate beliefs that women should be subjugated. This scale was designed not to include subtle gender bias in favor of men but rather uses commonplace examples of sexism. The scale consists of 10 questions, where participants are asked to respond to statements on a seven-point Likert scale, from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale reflects three factors: manipulative and exploitative nature of women (e.g., "Women seek to gain power by getting control over men"), distrust towards women (e.g., "It is generally safer not to trust women too much"), and devaluation of women (e.g., "I feel uncomfortable when a woman dominates the conversation"). In accordance with previous studies, and due to the high intercorrelation between the scores of the three subscales (Rottweiler & Gill, 2021), we collapsed their scores into one global misogyny score by taking the mean of the ten items. High internal consistency was found in the current sample ( $\alpha = 0.94$ ).

**Self-perceived sexual attractiveness scale.** To measure perceived sexual attractiveness, we used the self-perceived sexual attractiveness (SPSA) scale developed by Amos and McCabe (2015). The scale consists of six statements about a person's self-perceived sexual attractiveness, to which the participant responds on a seven-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). An example of a statement is "I believe I can attract sexual partners." The total composite score comprises the sum of the scores of the six items. In the present sample, we found a high internal consistency ( $\alpha = 0.96$ ).

**Adult rejection sensitivity questionnaire.** Rejection sensitivity was measured using the adult rejection sensitivity questionnaire (A-RSQ; Berenson, Gyurak, Ayduk *et al.*, 2009). The A-RSQ consists of nine questions about situations that participants answer on a six-point Likert scale in terms of how concerned they are about being rejected in given specific situations (rejection concern) ranging from 1 (*very unconcerned*) to 6 (*very concerned*), and how likely they think the rejection is (rejection expectancy) from 1 (*very unlikely*) to 6 (*very likely*). An example of a situation is "You call a friend when there is something on your mind that you feel you really need to talk about." Scores for each situation are calculated by multiplying scores on rejection concern by the reversed score on rejection expectancy. Our sample found an acceptable internal consistency ( $\alpha = 0.77$ ). Number of female romantic and sexual partners

To investigate whether there is a relationship between the number of sexual and romantic female partners, and the degree of hostility towards women, we asked the participants: "How many female romantic partners have you had," and "How many female sexual partners have you had" with options from 0 to more than 50. When scoring, the option "more than 50" was given the value 51. These items were constructed for the present study.

**Short-form UCLA loneliness scale, ULS-8.** To measure loneliness, we used the ULS-8 (Hays & DiMatteo, 1987), a short form of the UCLA loneliness scale developed by Russell, Peplau and Ferguson (1978). The scale consists of eight statements that assess the extent to which the person feels socially isolated and lonely. Participants respond on a four-level frequency scale from 1 (*often*) to 4 (*never*). An example of a statement is "There is no one I can turn to." The composite loneliness score is the sum of the eight items. In our sample, the internal consistency,  $\alpha = 0.86$ .

**Hours and days spent gaming.** When measuring gaming, we were specifically interested in online video games because they are the types of games where women often report sexual discrimination and harassment (Cote, 2017). We therefore asked the participants: "Do you play video games online?" with the response options being "yes" and "no." Participants who answered affirmatively were then asked: "Roughly how many hours do you spend playing online video games each day?" on a scale from 1 to 24, and "How many days do you play online video games in a week?" on a scale from 1 to 7. Participants who replied "no" to gaming were coded 0 on the latter questions.

**Game addiction scale for adolescents.** We used the seven-item version of the game addiction scale (Lemmens, Valkenburg & Peter, 2009) to assess men's addictive tendencies related to their gaming. Although it was developed for adolescents, it has also been validated with adult gamers (Baysak, Kaya, Dalgar & Candansayar, 2016; Ulkhaq, Rozaq, Ramadhani, Heldianti, Fajri & Akshinta, 2018). Only the participants who had confirmed playing video games were asked to complete this scale. The questions pertained to the last six months, and the response options ranged from 1 (never) to 5 (very often). An example of a question is, "How often during the last six months have you played games to forget about real life?" The composite score on gaming addiction comprises the sum of the scores on the seven items. Participants who replied "no" to gaming were coded as 1 instead of missing for each question, providing the lowest possible score on the GASA. The internal consistency ( $\alpha$ ) in the present sample was 0.84.

**Right-wing authoritarianism scale.** To investigate the relationship between hostility towards women and right-wing authoritarianism, we

used the 10-item version of the right-wing authoritarianism scale (RWA scale; Altemeyer, 2022). The scale consists of 10 statements that participants respond to on a nine-point Likert scale from  $-4$  (*very strongly disagree*) to  $4$  (*very strongly agree*). An example of a question is, "Our country desperately needs a mighty leader who will do what has to be done to destroy the radical new ways and sinfulness that are ruining us." A total score is calculated by adding the scores of the items. The alpha value for this scale was 0.90 in the present study.

### Procedure

The questionnaire was set up in SurveyXact, a web-based solution for administering online surveys. The link to the questionnaire was uploaded to Prolific's webpage, and research participants were invited to answer. Data collection took place during December 2022. Potential participants were informed about the study via a page on Prolific containing an overview of studies in which they could participate. In addition, Prolific sends e-mails with information about new surveys to a random sample of potential participants within the target demographic group. Potential participants were informed about the purpose of the study and possible advantages and disadvantages of participating before providing consent. Only participants who confirmed that they had read the form and provided consent were given access to the online questionnaire. After completion of the data collection, but before inspecting and analyzing the data, the hypotheses were pre-registered at the Open Science Framework (<https://osf.io/ms3a4>), except the use of age as a control variable in the current study, which was not pre-registered because it is rarely mentioned as a significant variable on the direct impact of men's hostility towards women. The project was exempted from approval by the Regional Committee for Medical and Health Related Research, as all data were collected anonymously.

### Analysis

Statistical analyses of the data material were conducted using SPSS, version 28. The Pearson correlation coefficient assessed the bivariate relationships between the study variables. Preliminary analyses were performed to ensure no violation of linearity and normality. Regression analyses were used to assess the ability of the 11 independent variables: attractiveness (measured by the SPSA scale), loneliness (measured by ULS-8), rejection (measured by A-RSQ), numbers of romantic partners and sexual partners, hours and days spent gaming, gaming addiction (measured by GASA) and right-wing authoritarianism (measured by the RWA Scale) to predict levels of hostility towards women (measured by the hostile sexism subscale and misogyny scale), while also controlling for age only if age in the bivariate correlations have significant associations with other independent variables. Squared versions of attractiveness and number of sexual partners were added in the regression analyses, enabling the investigation of curvilinear relationships shown as convex (positive) or concave (negative) relationships between the quadratic terms and hostility towards women. Simple linear regression analyses were first run for each independent variable separately for the two dependent variables, providing crude models. Two multiple linear regression analyses were then performed, controlling for each of the other independent variables, thereby creating adjusted models. Preliminary analyses were conducted to ensure that the assumptions of normality, linearity, multicollinearity, and homoskedasticity were not violated.

## RESULTS

### Descriptives

Mean values and standard deviations for the independent and dependent variables are presented in Table 1. The descriptive analysis showed that romantic partners, sexual partners, and gaming hours were highly skewed, indicated by skewness greater

than one (Pallant, 2020). This result was also confirmed by inspecting the shape of the distribution shown in histograms. In such cases, it is recommended to present non-parametric statistics, such as the median and the spread of scores (Pallant, 2020): Romantic partners ( $Md = 2$ ; Interquartile range [IQR]: 1, 4); sexual partners ( $Md = 2$ ; IQR: 0, 6); and gaming hours ( $Md = 2$ ; IQR: 1, 3). Importantly, it should be noted that as long as the residuals in the regressions are approximately normally distributed, the distribution of the dependent or independent variables does not impact the regression results (Habeck & Brickman, 2018).

### Correlations

Preliminary analyses showed a violation of normality for sexual and romantic partners, and gaming hours. Their bivariate associations were analyzed using Spearman's rho in line with Pallant's (2020) recommendation. As shown in Table 2, correlations ranged from  $-0.425$  to  $0.891$ .

### Multiple regression analyses

Preliminary analyses showed no major deviations from normality. There was no multicollinearity between the independent variables, except the expected high correlations between the non-squared and squared versions of attractiveness and sexual partners, as all other variance inflation factors were below 2. A few outliers were identified, but the amount was within what is expected in large samples (Pallant, 2020). Hence, none of these cases were removed. The results of the regression analyses (crude and adjusted) for hostile sexism and misogyny are presented in

Table 1. Descriptive statistics for study variables ( $N = 473$ )

Variable	<i>M</i>	<i>SD</i>	Min./Max.
Age <sup>a</sup>	26.21	4.96	18/35
Hostile sexism <sup>b</sup>	2.03	1.25	0/5
Misogyny <sup>c</sup>	2.95	1.36	1/7
Right-wing authoritarianism <sup>d</sup>	34.07	15.83	10/87
Romantic partners <sup>e</sup>	3.37	5.51	0/51 <sup>f</sup>
Sexual partners <sup>e</sup>	5.58	9.12	0/51 <sup>f</sup>
Loneliness <sup>g</sup>	20.77	5.56	8/32
Rejection <sup>h</sup>	10.32	3.98	1/28
Attractiveness <sup>i</sup>	22.35	9.02	6/42
Gaming hours <sup>j</sup>	2.18	2.06	0/15
Gaming days <sup>k</sup>	3.68	2.27	0/7
Gaming addiction <sup>l</sup>	12.84	4.78	7/29

<sup>a</sup>18–35,

<sup>b</sup>hostile sexism subscale,

<sup>c</sup>misogyny scale,

<sup>d</sup>right-wing authoritarianism scale,

<sup>e</sup>number of previous partners, 0 to >50,

<sup>f</sup>51 = over 50,

<sup>g</sup>UCLA loneliness scale ULS-8,

<sup>h</sup>Adult rejection sensitivity questionnaire,

<sup>i</sup>Self-perceived sexual attractiveness scale,

<sup>j</sup>Per day,

<sup>k</sup>Per week,

<sup>l</sup>Game addiction scale for adolescents.

Table 2. Bivariate correlations between the study variables ( $N = 473$ )

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age <sup>a</sup>	–											
2. Hostile sexism <sup>b</sup>	–0.050	–										
3. Misogyny <sup>c</sup>	–0.055	0.891**	–									
4. Right-wing authoritarianism <sup>d</sup>	–0.081	0.599**	0.558**	–								
5. Romantic partners <sup>e</sup>	0.394**	0.063	0.113*	–0.020	–							
6. Sexual partners <sup>e</sup>	0.379**	0.048	0.093*	–0.101*	0.805**	–						
7. Loneliness <sup>f</sup>	0.090	0.004	0.039	–0.091*	–0.085	–0.085	–					
8. Rejection <sup>g</sup>	0.108**	0.035	0.110*	–0.028	–0.048	–0.083	0.512**	–				
9. Attractiveness <sup>h</sup>	–0.011	0.072	0.076	0.052	0.313**	0.342**	–0.425**	–0.335**	–			
10. Gaming hours <sup>i</sup>	–0.144**	0.115*	0.119**	0.060	–0.007	–0.018	0.090	0.059	–0.144**	–		
11. Gaming days <sup>j</sup>	–0.098*	0.077	0.191	–0.011	–0.036	–0.062	0.087	–0.006	–0.135**	0.673**	–	
12. Gaming addiction <sup>k</sup>	–0.108*	0.176**	0.227**	0.111*	<–0.001	–0.048	0.235**	0.178**	–0.113*	0.684**	0.566**	–

<sup>a</sup>18–35,<sup>b</sup>Hostile sexism subscale,<sup>c</sup>Misogyny scale,<sup>d</sup>Right-wing authoritarian scale,<sup>e</sup>Number of previous partners, Spearman's  $\rho$ ,<sup>f</sup>UCLA Loneliness Scale ULS-8,<sup>g</sup>Adult Rejection Sensitivity Questionnaire,<sup>h</sup>Self-Perceived Sexual Attractiveness scale,<sup>i</sup>Per day, Spearman's  $\rho$ ,<sup>j</sup>Per week.<sup>k</sup>Game Addiction Scale for Adolescents.\* $p < 0.05$ ,\*\* $p < 0.01$ .

Tables 3 and 4, respectively. The standardized betas were interpreted per Acock's (2014) suggestion of  $\beta < 0.20$  as weak, 0.20 to 0.50 as moderate, and  $\beta > 0.50$  as a solid effect. In the following sections, we highlight the significant findings.

As shown in Tables 3 and 4, right-wing authoritarianism significantly predicted hostile sexism ( $\beta = 0.599$ ,  $p < 0.001$ ) and misogyny ( $\beta = 0.558$ ,  $p < 0.001$ ). These findings remained significant when controlling for the other independent variables in the adjusted model (hostile sexism ( $\beta = 0.606$ ,  $p < 0.001$ ) and misogyny ( $\beta = 0.556$ ,  $p < 0.001$ )). The strong positive relationship showed that men who scored higher on right-wing authoritarianism had more hostile attitudes towards women than men with lower right-wing authoritarianism.

In the crude models of attractiveness, only the squared version significantly, but weakly, predicted hostile sexism ( $\beta = 0.098$ ,  $p = 0.032$ ) and misogyny ( $\beta = 0.102$ ,  $p = 0.027$ ). In the adjusted models, non-squared and squared versions significantly predicted hostile sexism (non-squared:  $\beta = -0.500$ ,  $p = 0.002$ ; squared:  $\beta = 0.580$ ,  $p < 0.001$ ) and misogyny (non-squared:  $\beta = -0.467$ ,  $p = 0.005$ ; squared:  $\beta = 0.553$ ,  $p < 0.001$ ). The strong positive relationships for the squared version showed a convex curvilinear relationship, meaning that those who viewed themselves as least and most attractive were more hostile towards women than men with more average scores on attractiveness. The moderate to strong negative linear relationships for the non-squared version of the variable showed a tendency for hostility towards women to decrease with higher attractiveness. For sexual partners, the non-squared and squared versions significantly and moderately predicted hostile sexism (non-squared:  $\beta = 0.279$ ,  $p = 0.008$ ; squared:  $\beta = -0.253$ ,  $p = 0.010$ ) and misogyny (non-squared:

$\beta = 0.313$ ,  $p = 0.003$ ; squared:  $\beta = -0.255$ ,  $p = 0.010$ ) in the adjusted model only. The negative relationship for the squared version showed a concave curvilinear relationship, meaning that men with the lowest and highest numbers of sexual partners were less hostile towards women than men with more average numbers of sexual partners. The positive linear relationships for non-squared attractiveness showed a tendency for hostility towards women to increase with an increased number of sexual partners. Rejection significantly and positively, but weakly, predicted misogyny in the crude model ( $\beta = 0.110$ ,  $p = 0.017$ ) and adjusted model ( $\beta = 0.108$ ,  $p = 0.013$ ).

Gaming hours significantly, albeit weakly, predicted hostile sexism ( $\beta = 0.124$ ,  $p = 0.007$ ) and misogyny ( $\beta = 0.143$ ,  $p = 0.002$ ) in the crude model. The positive relationships indicated an increase in hostility towards women with an increase in gaming hours. However, this relationship was not significant in the adjusted model. Gaming addiction significantly, but weakly, predicted hostile sexism ( $\beta = 0.124$ ,  $p = 0.007$ ) and misogyny ( $\beta = 0.143$ ,  $p = 0.002$ ) in the crude model, but only misogyny in the adjusted model ( $\beta = 0.134$ ,  $p = 0.008$ ). The positive relationships indicated that hostility towards women increased with more problematic gaming.

For the adjusted model as a whole, the independent variables significantly predicted hostile sexism  $F(12, 460) = 26.62$ ,  $p < 0.001$ , and misogyny,  $F(12, 460) = 24.83$ ,  $p < 0.001$ . The total variance explained by the adjusted model was 41.0% for hostile sexism and 39.3% for misogyny. Right-wing authoritarianism made the largest unique contribution, explaining 34.7% of hostile sexism and, 29.3% of misogyny. Attractiveness (non-squared and squared), sexual partners (non-squared and

Table 3. Regression coefficients of the independent variables on the hostile Sexism Subscale (N = 473)

Variable	Model 1			Model 2			Partial corr.
	B (SE)	β	P	B (SE)	β	P	
Age <sup>a</sup>	-0.013 (0.012)	-0.050	0.278	-0.004 (0.010)	-0.014	0.725	-0.016
Right-wing authoritarianism <sup>b</sup>	0.047 (0.003)	0.599	<0.001***	0.048 (0.003)	0.606	<0.001***	0.609
Attractiveness <sup>c</sup>	0.010 (0.006)	0.072	0.118	-0.069 (0.022)	-0.500	0.002**	-0.143
Attractiveness (squared)	0.000 (0.000)	0.098	0.032*	0.002 (0.001)	0.580	<0.001***	0.168
Sexual partners <sup>d</sup>	-0.002 (0.006)	-0.012	0.789	0.038 (0.014)	0.279	0.008**	0.123
Sexual partners (squared)	-0.000 (0.000)	-0.032	0.493	-0.001 (0.000)	-0.253	0.010**	-0.120
Romantic partners <sup>d</sup>	-0.003 (0.010)	-0.014	0.764	-0.008 (0.011)	-0.034	0.493	-0.032
Loneliness <sup>e</sup>	0.001 (0.010)	0.004	0.933	0.011 (0.010)	0.047	0.296	0.049
Rejection <sup>f</sup>	0.011 (0.015)	0.035	0.449	0.011 (0.014)	0.036	0.400	0.039
Gaming hours <sup>g</sup>	0.075 (0.028)	0.124	0.007**	0.027 (0.029)	0.044	0.362	0.043
Gaming days <sup>h</sup>	0.042 (0.025)	0.077	0.095	0.020 (0.026)	0.036	0.451	0.035
Gaming addiction <sup>i</sup>	0.046 (0.012)	0.176	<0.001***	0.015 (0.014)	0.056	0.256	0.053

Notes: In model 1, we used simple linear regressions for the independent variables separately on the hostile sexism subscale to create a crude model. In model 2, we used multiple regression analysis including all variables to create a fully adjusted model. Partial corr. = Partial correlation coefficient.

<sup>a</sup>18–35,

<sup>b</sup>right-wing authoritarianism scale,

<sup>c</sup>Self-perceived sexual attractiveness scale,

<sup>d</sup>Number of previous partners, 0 to >50,

<sup>e</sup>UCLA loneliness scale ULS-8,

<sup>f</sup>Adult rejection sensitivity questionnaire,

<sup>g</sup>per day,

<sup>h</sup>per week,

<sup>i</sup>game addiction scale for adolescents.

\**p* < 0.05,

\*\**p* < 0.01,

\*\*\**p* < 0.001.

Table 4. Regression coefficients of the independent variables on the Misogyny Scale (N = 473)

Variable	Model 1			Model 2			Partial corr.
	B (SE)	β	P	B (SE)	β	P	
Age <sup>a</sup>	-0.015 (0.013)	-0.055	0.236	-0.014 (0.011)	-0.049	0.221	-0.057
Right-wing authoritarianism <sup>b</sup>	0.048 (0.003)	0.558	<0.001***	0.048 (0.003)	0.556	<0.001***	0.571
Attractiveness <sup>c</sup>	0.011 (0.007)	0.076	0.099	-0.070 (0.025)	-0.467	0.005**	-0.132
Attractiveness (squared)	0.000 (0.000)	0.102	0.027*	0.002 (0.001)	0.553	<0.001***	0.158
Sexual partners <sup>d</sup>	0.007 (0.007)	0.049	0.289	0.047 (0.016)	0.313	0.003**	0.136
Sexual partners (squared)	0.000 (0.000)	0.026	0.577	-0.001 (0.000)	-0.255	0.010**	-0.119
Romantic partners <sup>d</sup>	0.014 (0.011)	0.056	0.224	0.005 (0.013)	0.022	0.671	0.020
Loneliness <sup>e</sup>	0.010 (0.011)	0.039	0.399	0.010 (0.011)	0.039	0.394	0.040
Rejection <sup>f</sup>	0.038 (0.016)	0.110	0.017*	0.037 (0.015)	0.108	0.013*	0.115
Gaming hours <sup>g</sup>	0.094 (0.030)	0.143	0.002**	0.032 (0.032)	0.048	0.325	0.046
Gaming days <sup>h</sup>	0.036 (0.028)	0.060	0.191	-0.016 (0.029)	-0.027	0.581	-0.026
Gaming addiction <sup>i</sup>	0.064 (0.013)	0.227	<0.001***	0.038 (0.014)	0.134	0.008**	0.124

Notes: In model 1, we used simple linear regressions for the independent variables separately on the misogyny scale to create a crude model. In model 2, we used multiple regression analysis including all variables to create a fully adjusted model. Partial corr. = Partial correlation coefficient.

<sup>a</sup>18–35,

<sup>b</sup>right-wing authoritarianism scale,

<sup>c</sup>self-perceived sexual attractiveness scale,

<sup>d</sup>number of previous partners, 0 to >50,

<sup>e</sup>UCLA loneliness scale ULS-8,

<sup>f</sup>adult rejection sensitivity questionnaire,

<sup>g</sup>per day,

<sup>h</sup>per week,

<sup>i</sup>game addiction scale for adolescents.

\**p* < 0.05,

\*\**p* < 0.01,

\*\*\**p* < 0.001.

squared), gaming addiction, and rejection also made significant but small contributions to one or both dependent variables.

## DISCUSSION

This study explored the relationship between incel-related predictors, including loneliness, rejection, attractiveness, number of sexual and romantic partners, gaming, and right-wing authoritarianism and hostility towards women among men in a more general population in the UK. Based on previous research, we postulated seven hypotheses outlining our expected findings. The results showed that right-wing authoritarianism was the strongest predictor, with a significant positive relationship with hostility towards women supporting Hypothesis 6. As expected, the squared version of attractiveness significantly and positively predicted hostility towards women, supporting a convex curvilinear relationship postulated in Hypothesis 4. A significant curvilinear relationship was also found between sexual partners and hostility towards women, but with another shape (concave) than we expected, thus not supporting Hypothesis 5, as men with some sexual partners were more hostile towards women than those with few or many partners. Surprisingly, loneliness, rejection, and romantic partners did not significantly predict hostility towards women. Hence, hypotheses 1, 2, and 3 were not supported. Additionally, the results provided varied support for the relationship between gaming and hostility towards women: only gaming addiction significantly predicted hostility towards women in the adjusted model, with a weak relationship with misogyny and the non-hostile sexism subscale. Thus, our findings do not lend convincing support for Hypothesis 7.

The lack of support for our hypotheses (1, 2, 3, 5) about loneliness, rejection, and romantic and sexual partners is surprising considering studies linking incels with such characteristics and hostility towards women (see, e.g., Broyd *et al.*, 2022; Mogensen & Rand, 2020; O'Malley, Holt & Holt, 2022; Zimmerman, Ryan & Durie-Smith, 2018). Our findings do not necessarily refute previous research showing that these factors are significant among incels, but instead lead us to question the assumed significant associations between loneliness, rejection, lack of romantic and sexual partners, and hostility towards women in a more general male population. The findings are similar to previous research, which found that feelings of social isolation and low self-perceived mate value do not play a role in forming hostility towards women in the general population (Morssinkhof, 2021). A possible explanation is that their contribution, if any, may be complex and involve various mediators, such as coping mechanisms, which denote how a person cognitively and emotionally handles stressors (Compas, Jaser, Bettis *et al.*, 2017; Folkman & Moskowitz, 2004). As such, our findings are important as they contribute to mitigating and dispelling stereotypes linked to individual experiences of loneliness, rejection, the absence of romantic and sexual relationships, and hostility towards women.

Our findings regarding attractiveness were as expected regarding the relationship with hostile attitudes towards women, as high and low attractiveness were associated with most hostility towards women among men in the general population (Hypothesis 3). The results between low attractiveness and hostility towards women

were consistent with previous studies (Broyd, Boniface, Parsons, Murphy & Hafferty, 2022; Hoffman, Ware & Shapiro, 2020; Zimmerman *et al.*, 2018). Low attractiveness and hostility towards women might be viewed in light of coping mechanisms. If men struggle with feeling unattractive and use externalization in the form of blaming women, this may lead them to project their anger onto women. In accordance with previous studies, Cowan and Mills (2004) found that men with more hostility towards women had less internal control and saw women as scapegoats to whom one could project one's insecurities. Therefore, coping strategies in terms of a self-serving attribution style might be the underlying mechanism between low attractiveness and hostility towards women. Second, men who perceive themselves as highly attractive may be driven by different mechanisms regarding their hostility towards women, for example, in terms of narcissistic beliefs. High levels of hostility towards women have been found in narcissistic men (Keiller, 2010). It is conceivable that men in our study who considered themselves attractive might be more prone to a narcissistic self-evaluation and consequently take offense if women do not share their high opinion of themselves. This, in turn, may cause them to devalue women and endorse traditional gendered norms to rebalance the perceived slight to their self-esteem. Although attractiveness is positively correlated with sexual partners, there was no support for a relationship between having a high number of sexual partners and being hostile towards women in the regression analysis. Therefore, we suggest that men's subjective feelings about their attractiveness, possibly shaped by narcissistic traits rather than the number of sexual partners they have had, are influential in shaping their attitudes towards women.

The support for Hypothesis 6 regarding right-wing authoritarianism was in line with previous research (e.g., Austin & Jackson, 2019; Begany & Milburn, 2002; Canto, Perles & Martín, 2014; Christopher & Mull, 2006; Cokley, Tran, Hall-Clark *et al.*, 2010). The dual process motivational model by Duckitt (2001) may be a way of understanding the mechanisms behind right-wing authoritarianism and hostility towards women. The model proposes that individual differences in prejudice arise from two distinct sets of motivational goals: threat-driven goals of collective security (e.g., societal cohesion, stability, and tradition) measured as right-wing authoritarianism, and competitively driven goals of status and power reflecting social dominance orientation (Duckitt, 2001; Duckitt & Sibley, 2010; Sibley, Wilson & Duckitt, 2007). According to this theory, a person's right-wing authoritarianism becomes activated when there is a perceived threat to the ingroup's collective security, motivating the person to direct prejudice towards outgroups that are deviant or socially threatening in order to protect the established system (Duckitt, 2001; Duckitt & Sibley, 2010, 2016; Sibley *et al.*, 2007). Research, including longitudinal studies, has strongly supported this model and indicated that right-wing authoritarianism has a causal effect on prejudice (Duckitt & Sibley, 2010, 2016; Sibley *et al.*, 2007). Interpreting our results in light of this model suggests that men with high right-wing authoritarianism more readily than others perceive women as socially threatening. To protect established norms in society, which they fear are being threatened, they are motivated to direct hostility towards women, especially those challenging the established system and traditional roles. This could explain why



feminists and career women are mainly targets (Duckitt, 2006; Duckitt & Sibley, 2007).

Our study provided mixed results regarding the relationship between gaming and hostility towards women. This is inconsistent with previous research (Bègue *et al.*, 2017; Breuer, Kowert, Festl & Quandt, 2015; Ferguson & Donnellan, 2017; LaCroix, Burrows & Blanton, 2018). The number of hours spent video gaming significantly predicted hostility towards women in the crude model alone. Similarly, the simple linear regression showed a significant, but small positive relationship between gaming addiction and hostility towards women. However, this relationship was insignificant when controlling for other variables in the regression analysis. A possible explanation for the lack of support for Hypothesis 7 is that we did not differentiate between different categories of video games. Research suggests that some categories, such as fighting games, have more sexist content than others (Lynch *et al.*, 2016). Hence, when including all game categories together, the less sexist and male-dominated video games may have cancelled out the effects of other game categories. It is thus possible that further studies on more sexist video game categories could find a stronger relationship with hostility towards women.

#### Limitations

There are several limitations to the present study that should be addressed. The current study relied on cross-sectional data from an online survey, which might have benefited from other ways (e.g., qualitative studies) to map out factors associated with hostility towards women among males in general. There is also the possibility that a variety of confounders influenced the results; for example, demographics, mental health, and family background (Fleming *et al.*, 2018; McCartan, King-Hill & Gilsean, 2023). Moreover, we did not ask our respondents if they considered themselves incels. Including these measures in future research would be valuable in determining the link between our study variables and hostility towards women. Furthermore, the scales used and the wording of the questions in our questionnaire could have affected the results. Self-reported attractiveness and the measure of romantic partners depends on the respondent's subjective understanding of the constructs in question. Therefore, a distinction between objective and subjective measurements, particularly in dating scenarios, needs to be highlighted in future research. There is also some uncertainty regarding the psychometric properties of the A-RSQ measuring rejection sensitivity. Lord, Liverant, Stewart, Hayes-Skelton & Suvak (2022) found good internal consistency but suggested that the scale's total score might not be a good measure. Finally, our data regarding video game behaviors might have provided different results if the types of video games were categorized, making it possible to compare the association between playing different game genres and hostility towards women. This should be addressed in further research.

#### Implications

Our findings lend more nuance to the image of hostility towards women as a problem isolated to online hate groups and incel communities, where hating women is framed as an inevitable

result of being celibate and rejected. Our findings regarding loneliness, rejection, and lack of romantic and sexual partners suggest that when researching hostility towards women, variables that have been proposed as relevant in studies of incels, may not be relevant in more general samples of men.

Although the relationship between right-wing authoritarianism and hostility towards women is robustly studied, our study places the relationship in a new context, controlling for variables like gaming, attractiveness, loneliness, and rejection. Our study helps to consolidate the role of right-wing authoritarianism regarding hostility towards women. This has implications for factors that are important to consider when managing and preventing hostility towards women.

The current study showed that self-perceived attractiveness (low and high) is relevant in understanding hostility towards women, implying that men's self-judgments are essential to their attitudes towards, and view of, women. The dynamic for both the high and low end of the attractiveness spectrum highlights the inaccuracy of a black-and-white approach to prejudice and warrants further study. As suggested, coping mechanisms and personality traits might influence this dynamic, and we recommend future studies to include measures of narcissistic traits and coping to elucidate potential underlying mechanisms better. Including others' ratings of men's attractiveness would also be of interest in future studies on this topic. Although we did not find sufficient evidence supporting our hypothesis that excessive and addictive gaming behavior would influence hostility towards women, the varied results indicate that some relationship cannot be ruled out. We therefore suggest that future studies investigate different categories/genres of online video games regarding the relationship between gaming and hostility towards women.

#### CONCLUSION

We investigated how the variables loneliness, rejection, attractiveness, number of romantic and sexual partners, right-wing authoritarianism, and gaming relate to hostility towards women in a general sample of men. This study is the first to integrate all these variables into one analysis, contributing a new understanding of their association with hostility towards women. Our findings suggest that high right-wing authoritarianism and low and high self-perceived attractiveness are associated with increased hostility towards women among men reflecting the general population.

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#### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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