



# Unwanted celibacy is associated with misogynistic attitudes even after controlling for personality

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## ABSTRACT

In recent years, involuntary celibates who identify as “Incels” have received considerable public attention because of their misogynistic online discourse and their tie to a string of violent acts motivated by hatred of women. Yet, surprisingly no prior quantitative research has examined whether unwanted celibacy – a subjective psychological experience characteristic of, but not exclusive, to Incels – is associated with misogynistic attitudes among men. The current study ( $N = 349$  men) collected self-report data from a convenience sample of Incel and non-Incel men to investigate whether the degree of unwanted celibacy is associated with misogynistic attitudes. Unwanted celibacy was positively associated with hostile attitudes towards women, sexual objectification and rape myths, even after controlling for personality traits such as agreeableness. These novel quantitative results indicate that unwanted celibacy is an important psychological risk factor for misogynistic attitudes.

## 1. Introduction

*“The desire for sexual variety dooms most human males to a lifetime of unfulfilled longing”*

Symons (1979, p. 228)

*“The Day of Retribution is mainly my war against women for rejecting me and depriving me of sex and love...My hatred of the female gender could not grow stronger”*

Elliot Rodger's manifesto (2014, p. 119)

On May 23, 2014, 22-year-old Elliot Rodger shot and stabbed six people, injured 13 others, and killed himself in Isla Vista, California (Rosdahl, 2014). Roger's “war against women” was the most prominent of a series of attacks by men linked to the Incel community (Gecco, 2019). Incels, an abbreviation of involuntary celibates, are members of an online community whose main stated grievance is that they desire to have romantic and sexual relationships but are unable to do so (Jaki et al., 2019). Although most Incels are non-violent (Speckhard et al., 2021), discussions in Incel forums and websites are often characterized by sexist, misogynistic and anti-feministic sentiments (Jaki et al., 2019).

Surprisingly, however, no previous quantitative research has investigated the association between unwanted celibacy and misogyny. We propose that unwanted celibacy is an important but overlooked psychological risk factor for misogynistic attitudes and that this applies to the general population, not only to Incels. In the current study, we use the term *unwanted celibacy* rather than *involuntary celibacy* because the latter term is sometimes used to refer specifically to Incels (e.g., Moskalenko et al., 2022), whereas we posit an association between unwanted celibacy and misogyny that applies generally. Accordingly, we tested for the association in a combined sample of non-Incel men from the general population and self-identified Incels recruited from Incel forums.

### 1.1. Unwanted celibacy and (male) discontent

Unwanted celibacy is not a condition experienced exclusively by Incels, but rather is a condition that would have been experienced by some people, especially men, throughout human evolutionary history (Symons, 1979). According to parental investment theory, women must invest substantially more in parenting than men to achieve successful reproduction (Trivers, 1972). This means that mating errors, including

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mating with low-quality mates, are costlier for women; therefore, they evolved to be choosier. Owing to women's relative choosiness, men have a higher reproductive variance than women meaning that some men have few or even zero mating opportunities (Brown et al., 2009). Since male reproductive success could be enhanced by taking advantage of any opportunity to mate with a woman, selection shaped the male mind to have a strong desire for sexual variety (Symons, 1979). Evidence confirms that men have stronger sexual desire than women (Baumeister et al., 2001), and, in general, men's sexual desire greatly exceeds their actual sexual behavior (Schmitt, 2005).

Failure to satisfy such fundamental needs as mating and pair-bonding can have consequences for wellbeing, mental health, and social functioning (Baumeister & Leary, 1995; Kenrick et al., 2010). Although most research has focused on sexual dissatisfaction within romantic relationships, some findings support the expectation that unwanted celibacy can lead to considerable levels of discontent: Qualitative studies with samples mixed of virgins, singles, and people in sexless relationships found that involuntary celibacy is related to feelings of dissatisfaction, frustration, or anger (Donnelly et al., 2001; Donnelly & Burgess, 2008). Many singles and virgins expressed sadness about not receiving love or having a relationship, next to their sadness from lacking sexual contact (Donnelly et al., 2001). Additionally, romantic loneliness, associated with lower wellbeing and negative emotions (Gómez-López et al., 2019), is higher among individuals who perceive themselves to be involuntarily, rather than voluntarily, single (Adamczyk, 2017).

### 1.2. Unwanted celibacy and misogyny

We suggest that unwanted celibacy is linked to sexism and misogyny in some men because frustration and unhappiness due to unwanted celibacy may produce antipathy towards those they desire but who are perceived to be rejecting them – women. Some prior research provides indirect support: For example, men who are rejected by women often react with anger and aggression, and sometimes with homicidal violence (Downey et al., 2000; Kelly et al., 2015; Wilson & Daly, 1993). Experiments have shown that men who are romantically rejected in online dating simulations react with anger and aggression towards the women who rejected them (Blake et al., 2018; Woerner et al., 2018). Notably, one study found that experimentally rejected men reported more hostile attitudes towards women in general and higher endorsement of rape myths (Andrighetto et al., 2019).

Repeated experiences of romantic rejection can sensitize men to readily expect and perceive rejection (Romero-Canyas et al., 2010), and this rejection sensitivity can predispose individuals to react with hostility and aggression towards actual or perceived rejection (Gao et al., 2021). More generally, being rejected by a group, or feeling socially excluded from a group, leads to negative feelings and, consequently, to anger and aggression towards the group (Barlow et al., 2009; Leary et al., 2006; Renström et al., 2020). Therefore, to the extent that unwanted celibacy involves experiences of romantic rejection, unwanted celibacy may lead to anger, aggression, and misogyny towards women in general. This suggests that, from an evolutionary perspective, misogyny can be a by-product of high male sexual desire that remains chronically unfulfilled.

### 1.3. Personality, unwanted celibacy and misogyny

Personality has been shown to relate to both involuntary singlehood and lack of mating success, as well as to misogyny. Young adults with low extraversion and high neuroticism were less likely to have ever kissed a partner (Lefkowitz et al., 2018). Among Greek-speaking adults, lower extraversion scores were related to a higher probability of being involuntarily single and having more prolonged spells of singlehood (Apostolou & Tsangari, 2022). Lower agreeableness and openness are related to negative attitudes towards women and hostile sexism (Akrami

et al., 2011; Krings & Facchin, 2009). As personality variables could be associated with both unwanted celibacy and misogyny, we tested whether unwanted celibacy was associated with misogynistic attitudes, even after controlling for personality.

## 2. Method

In an online survey using a mixed sample of Incel and non-Incel men, we tested our proposal that unwanted celibacy is positively associated with misogynistic attitudes. After surveying the literature, we found no existing scales that measure unwanted celibacy, which we define as the psychological state of desiring romantic or sexual partners but being unsuccessful in obtaining any, along with concomitant feelings of frustration and hopelessness. Scales are available to measure related constructs such as sexual distress and sexual (dis)satisfaction, with items assessing responses such as anxiety and frustration (see Santos-Iglesias et al., 2018 for a review). However, most of these scales were specifically designed for use among people in relationships (e.g., Sexual Dissatisfaction subscale of the Marital Satisfaction Inventory; Snyder et al., 1981). We therefore developed a scale that measures unwanted celibacy, which can be administered regardless of relationship/sexuality status (partnered, virginal, or single).

We assessed the association between unwanted celibacy and four aspects of misogyny, using separate scales for each: hostility towards women; sexual objectification; attitudes towards sexual aggression (also known as rape myth acceptance); and rape proclivity. To examine the robustness of the associations, we also controlled for the big-5 personality. Finally, we examined whether Incels reported higher levels of unwanted celibacy and misogyny than non-Incels and explored personality differences.

The full text of all measures and additional analyses are reported in the [supplementary materials](#). The data and analysis scripts are available on [OSF](#).

### 2.1. Participants

To obtain a diverse sample of men ranging in unwanted celibacy, we recruited a convenience sample of 357 consenting men from various sources: online Incel forums and subreddits (no compensation), a Dutch university (for course credit), and Prolific (for monetary compensation). Excluding nine participants who did not pass the simple attention checks left data from 348 men used in the analyses (Incel: 156, non-Incel: 192;  $M_{\text{age}} = 25.48$   $SD_{\text{age}} = 6.80$ ; range: 18–77; 89 % heterosexual, 8 % bisexual, 3 % other; 82 % single).<sup>1</sup> Participants were diverse in nationality, ethnicity, socio-economic status and educational background (see Table S1 for detailed demographics of both subsamples).

Our sample size was adequately powered (min. 0.80) to detect small effects ( $r \geq 0.15$ ) from bivariate correlation analysis. All effects of interest were higher than this  $r$  value.<sup>2</sup>

### 2.2. Measures and procedure

#### 2.2.1. Incel status

Participants were first presented with a definition of Incels (*members of an online subculture who define themselves as unable to find a romantic or sexual partner despite desiring one, a state they describe as Inceldom*) and

<sup>1</sup> Results did not change when analyses were run only with heterosexual men ( $N = 309$ ).

<sup>2</sup> We did not test our hypothesis separately among Incels ( $n = 156$ ) and non-Incels ( $n = 192$ ), because the sizes of the sub-samples were not sufficiently powered to detect the small-to-medium effects between unwanted celibacy and misogyny scales ( $r = 0.21$  to  $0.38$ ) revealed by the bivariate correlation analysis from the full sample ( $n = 348$ ). The Incel sub-sample revealed power ( $1 - \beta$ ) < 0.80 to detect effects less than  $r = 0.32$  at significance level  $\alpha = 0.05$ .

**Table 1**  
Descriptive statistics and bivariate correlations ( $N = 348$ ).

Variables	<i>M (SD)</i>	1	2	3	4	5	6	7	8	9	10
1. Unwanted celibacy	2.85 (1.23)	–	–0.35***	–0.09	0.37***	–0.14**	–0.11*	0.38***	0.21**	0.29**	0.08
2. Extraversion	2.46 (0.95)		–	0.05	–0.35***	0.23***	0.30***	–0.16**	–0.05	–0.04	0.04
3. Agreeableness	3.41 (0.86)			–	–0.15**	0.11*	0.17**	–0.33***	–0.25***	–0.19***	–0.17**
4. Neuroticism	3.39 (0.95)				–	–0.11*	–0.34***	0.29***	0.14*	0.18**	0.03
5. Openness	3.74 (0.81)					–	0.09	–0.07	–0.13*	–0.06	–0.07
6. Conscientiousness	2.96 (0.87)						–	–0.07	–0.08	0.00	–0.12*
7. Hostility towards women (HTW)	3.23 (1.28)							–	0.57***	0.74***	0.28***
8. Sexual objectification (SO)	3.64 (1.02)								–	0.65***	0.29***
9. Rape myths (RM)	3.73 (1.39)									–	0.23**
10. Rape proclivity (RP)	1.37 (1.17)										–

Note. Scale ranges: Unwanted celibacy and personality: 1–5, misogyny (HTW, SO, RM, RP): 1–7.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

asked: “Do you identify as an incel?” (Yes/No).

### 2.2.2. Unwanted celibacy

Respondents indicated their degree of unwanted celibacy on 12 items developed using a 1 (*does not describe me*) to 5 (*describes me extremely well*) scale. The items, constructed based on the existing qualitative studies on people’s experiences with involuntary celibacy (Donnelly et al., 2001; Donnelly & Burgess, 2008) and Incels’ description of their own experiences (Daly & Reed, 2021; Jaki et al., 2019), tap into two interrelated themes: (1) desiring to have romantic or sexual partners, but being unable to secure one because of unattractiveness, rejection, failure, or lack of willing partners (e.g., “I want to date, but nobody wants to date me.”); (2) expressions of grievance elicited by negatively comparing oneself with others who are able to have romantic or sexual experiences (e.g., “Other men/women are enjoying the pleasure of having romantic/sexual experiences, but not me.”).

A principle-axis factor analysis with oblique rotation was conducted on the 12 items. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.91, and all KMO values for individual items were  $>0.82$ , verifying the sampling adequacy of the analysis (Kaiser, 1981). The inter-item correlations ranged from 0.44 to 0.78 ( $ps < .001$ ; mean = 0.59) and the scree plot indicated a 2-factor solution (eigenvalues = 6.83 and 1.66; see Table S2). Based on an examination of factor loadings, inter-item correlations, and the interpretability/face validity of the items’ content (Clark & Watson, 2019), we decided to exclude the four items that strongly loaded on the second factor and retain the eight items that loaded on the first factor, ensuring a unidimensional scale with loadings  $> 0.65$  (eigenvalue = 4.74; 59 % of the variance) (Table S3). We created a composite measure of unwanted celibacy by averaging these eight items ( $\alpha = 0.92$ ).

### 2.2.3. Big-5 personality traits

Personality traits were assessed using a 15-item short version of the Big-5 Personality Scale (BFI-2-XS; Soto & John, 2017), rated on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale. Items were averaged to create a composite score for each personality trait: extraversion ( $\alpha = 0.69$ ), agreeableness ( $\alpha = 0.51$ ), conscientiousness ( $\alpha = 0.61$ ), neuroticism ( $\alpha = 0.66$ ), and openness to experience ( $\alpha = 0.51$ ).

### 2.2.4. Misogynistic attitudes

Misogynistic attitudes were assessed with four different instruments. All items were measured on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale and were averaged to create a composite score for each scale.

**2.2.4.1. Hostility towards women (HTW).** The 10-item Hostility Towards Women Scale (Lonsway & Fitzgerald, 1995) measures distrust and adverse feelings towards women (e.g., “Generally, it is safer not to trust women”;  $\alpha = 0.90$ ).

**2.2.4.2. Sexual objectification (SO).** The 10-item Sexual Reductionism Scale (Peter & Valkenburg, 2007) measures objectification of women (e.g., “An attractive woman should expect sexual advances and should learn how to handle them”;  $\alpha = 0.79$ ).

**2.2.4.3. Rape myths (RM).** The 11-item Acceptance of Modern Myths about Sexual Aggression Scale (Gerger et al., 2007) measures participants’ tendency to downplay or justify sexual violence committed against women (e.g., “It is a biological necessity for men to release sexual pressure from time to time.”;  $\alpha = 0.93$ ).

**2.2.4.4. Rape proclivity (RP).** Proclivity to rape was measured with 1-item (Malamuth, 1981): “I would rape someone if I know that I would not be caught and/or punished.”

## 3. Results

Descriptive statistics and correlations are shown in Table 1. As expected, unwanted celibacy was positively related to misogyny scales (HTW, SO and RM, but not RP). Extraversion, openness, and conscientiousness were negatively, and neuroticism was positively related to unwanted celibacy. Agreeableness did not relate to unwanted celibacy. Misogyny negatively related to agreeableness (HTW, SO, RM, RP), extraversion (HTW), openness (SO) and conscientiousness (RP), and positively related to neuroticism (HTW, SO, RM).

Next, we conducted a series of hierarchical multiple regression analyses to test whether unwanted celibacy was associated with misogynistic attitudes, even after controlling for personality. As expected, unwanted celibacy predicted higher misogyny (HTW, SO, RM, but not RP) above and beyond personality traits: Adding unwanted celibacy in the second step led to a significant improved prediction of all outcomes, except for RP (see Table 2). Agreeableness was the only personality trait consistently predicting misogynistic attitudes across all scales (HTW, SO, RM, RP).

Finally, independent sample *t*-tests comparing Incels and non-Incels revealed as expected: Incels reported higher levels of unwanted celibacy and misogynistic attitudes (all scales including RP) compared to non-Incels. Regarding personality, Incels had lower extraversion, agreeableness and openness but higher neuroticism scores than non-Incels (see Table S5 for full details).<sup>3</sup>

<sup>3</sup> Post-hoc power analysis showed that the sample size for the two groups was adequately powered (min. 0.80) to detect effects ( $d \geq 0.27$ ). All effects obtained except differences on agreeableness and openness were higher than this  $d$  value.

**Table 2**  
Hierarchical multiple regression results on misogyny scales.

DVs		IVs	B	SE	$\beta$	t	p	95 % CI	
Hostility towards women (HTW)	Step 1	Extraversion	-0.11	0.07	-0.08	-1.53	.128	-0.26, 0.03	
		<b>Agreeableness</b>	<b>-0.45</b>	<b>0.08</b>	<b>-0.31</b>	<b>-6.06</b>	<b>.000</b>	<b>-0.60, -0.31</b>	
		<b>Neuroticism</b>	<b>0.33</b>	<b>0.07</b>	<b>0.24</b>	<b>4.42</b>	<b>.000</b>	<b>0.18, 0.47</b>	
		Openness	0.00	0.08	0.00	0.03	.976	-0.16, 0.16	
		Conscientiousness	0.12	0.08	0.08	1.54	.124	-0.03, 0.27	
			Model summary: $R^2$ change = 0.18, $F(5, 342) = 14.63, p < .001$						
	Step 2	Extraversion	-0.01	0.07	-0.007	-0.13	.896	-0.15, 0.13	
		<b>Agreeableness</b>	<b>-0.44</b>	<b>0.07</b>	<b>-0.29</b>	<b>-6.05</b>	<b>.000</b>	<b>-0.58, -0.29</b>	
		<b>Neuroticism</b>	<b>0.21</b>	<b>0.07</b>	<b>0.153</b>	<b>2.81</b>	<b>.005</b>	<b>0.06, 0.35</b>	
		Openness	0.03	0.08	0.02	0.37	.716	-0.12, 0.18	
Conscientiousness		0.09	0.08	0.06	1.17	.244	-0.06, 0.23		
		<b>Unwanted celibacy</b>	<b>0.31</b>	<b>0.06</b>	<b>0.30</b>	<b>5.66</b>	<b>.000</b>	<b>0.20, 0.42</b>	
		Model summary: $R^2$ change = 0.07, $F(6, 341) = 18.64, p < .001$							
Sexual objectification (SO)	Step 1	Extraversion	0.02	0.06	0.02	0.39	.700	-0.10, 0.15	
		<b>Agreeableness</b>	<b>-0.26</b>	<b>0.06</b>	<b>-0.22</b>	<b>-4.14</b>	<b>.000</b>	<b>-0.38, -0.14</b>	
		Neuroticism	0.11	0.06	0.10	1.72	.087	-0.02, 0.23	
		Openness	-0.12	0.07	-0.10	-1.79	.074	-0.25, 0.01	
		Conscientiousness	-0.01	0.07	-0.01	-0.18	.858	-0.14, 0.12	
			Model summary: $R^2$ change = 0.08, $F(5, 342) = 5.90, p < .001$						
	Step 2	Extraversion	0.07	0.06	0.07	1.51	.251	-0.05, 0.20	
		<b>Agreeableness</b>	<b>-0.25</b>	<b>0.06</b>	<b>-0.21</b>	<b>-4.03</b>	<b>.000</b>	<b>-0.37, -0.13</b>	
		Neuroticism	0.05	0.06	0.05	0.79	.431	-0.08, 0.18	
		Openness	-0.11	0.07	-0.09	-1.63	.104	-0.24, 0.02	
Conscientiousness		-0.03	0.06	-0.02	-0.42	.675	-0.15, 0.10		
		<b>Unwanted celibacy</b>	<b>0.15</b>	<b>0.05</b>	<b>0.18</b>	<b>3.10</b>	<b>.002</b>	<b>0.05, 0.24</b>	
		Model summary: $R^2$ change = 0.03, $F(6, 341) = 6.64, p = .002$							
Rape myths (RM)	Step 1	Extraversion	0.01	0.09	0.01	0.10	.922	-0.16, 0.18	
		<b>Agreeableness</b>	<b>-0.28</b>	<b>0.09</b>	<b>-0.18</b>	<b>-3.28</b>	<b>.001</b>	<b>-0.45, -0.11</b>	
		<b>Neuroticism</b>	<b>0.27</b>	<b>0.09</b>	<b>0.19</b>	<b>3.19</b>	<b>.002</b>	<b>0.10, 0.44</b>	
		Openness	-0.05	0.09	-0.03	-0.49	.628	-0.23, 0.14	
		Conscientiousness	0.15	0.09	0.10	1.70	.091	-0.02, 0.33	
			Model summary: $R^2$ change = 0.07, $F(5, 342) = 4.97, p < .001$						
	Step 2	Extraversion	0.11	0.09	0.07	1.28	.201	-0.06, 0.28	
		<b>Agreeableness</b>	<b>-0.26</b>	<b>0.08</b>	<b>-0.16</b>	<b>-3.15</b>	<b>.002</b>	<b>-0.43, -0.10</b>	
		Neuroticism	0.15	0.09	0.11	1.80	.072	-0.01, 0.32	
		Openness	-0.02	0.09	-0.01	-0.22	.826	-0.20, 0.16	
Conscientiousness		0.12	0.09	0.08	1.38	.170	-0.05, 0.29		
		<b>Unwanted celibacy</b>	<b>0.30</b>	<b>0.06</b>	<b>0.27</b>	<b>4.74</b>	<b>.000</b>	<b>0.18, 0.43</b>	
		Model summary: $R^2$ change = 0.06, $F(6, 341) = 8.14, p < .001$							
Rape proclivity (RP)	Step 1	Extraversion	0.11	0.07	0.09	1.50	.136	-0.03, 0.25	
		<b>Agreeableness</b>	<b>-0.20</b>	<b>0.07</b>	<b>-0.15</b>	<b>-2.71</b>	<b>.007</b>	<b>-0.35, -0.06</b>	
		Neuroticism	-0.01	0.07	-0.01	-0.18	.855	-0.16, 0.13	
		Openness	-0.09	0.08	-0.06	-1.13	.260	-0.25, 0.07	
		Conscientiousness	-0.15	0.08	-0.11	-1.97	.050	-0.30, 0.00	
			Model summary: $R^2$ change = 0.05, $F(5, 342) = 3.20, p = .008$						
	Step 2	Extraversion	0.14	0.07	0.11	1.89	.060	-0.01, 0.29	
		<b>Agreeableness</b>	<b>-0.19</b>	<b>0.07</b>	<b>-0.14</b>	<b>-2.64</b>	<b>.009</b>	<b>-0.34, -0.05</b>	
		Neuroticism	-0.05	0.08	-0.04	-0.67	.505	-0.20, 0.10	
		Openness	-0.08	0.08	-0.06	-1.02	.310	-0.24, 0.08	
Conscientiousness		<b>-0.16</b>	<b>0.08</b>	<b>-0.12</b>	<b>-2.10</b>	<b>.036</b>	<b>-0.31, -0.01</b>		
		Unwanted celibacy	0.10	0.06	0.10	1.73	.084	-0.01, 0.21	
		Model summary: $R^2$ change = 0.01, $F(6, 341) = 3.18, p = .084$							

Note. B = unstandardized regression coefficient; SE = standard error of the unstandardized coefficient;  $\beta$  = standardized regression coefficient. Bold indicates statistical significance,  $p < .05$ .

#### 4. Discussion

As expected, unwanted celibacy was positively associated with misogynistic attitudes (hostility towards women, sexual objectification, and rape myths) in a mixed Incel and non-Incel sample, even after controlling for personality. This novel finding has an important theoretical implication, as it suggests that failure to satisfy a fundamental motive of human existence, namely the motive to acquire a romantic or sexual partner, contributes to individuals' support for multiple forms of sexist and misogynistic views. The effect sizes for unwanted celibacy's association with misogynistic attitudes ( $\beta$ s = 0.18 to 0.30) were similar in magnitude to some of the strongest predictors of misogyny consistently identified by prior research, including big-5 personality (Akrami et al., 2011; Krings & Facchin, 2009), social dominance orientation (SDO) and right-wing-authoritarianism (RWA) (Sibley & Duckitt, 2008). Experiencing unwanted celibacy may therefore be an important

psychological risk factor for misogynistic attitudes, comparable to some of the strongest predictors consistently identified by prior research.

Our quantitative findings are consistent with previous qualitative studies of themes in Incel forums which revealed that feelings of dissatisfaction, frustration and hopelessness due to a lack of relationships are associated with misogynistic and anti-feministic rhetoric (e.g., Jaki et al., 2019; O'Malley et al., 2020) But, we showed that this is a wider phenomenon that applied a sample largely drawn from the general population of men, and not only those who identify as Incel or participate in Incel forums. Yet, unwanted celibacy was not associated with *intention* to rape women. Notably, this finding is inconsistent with the mate deprivation hypothesis (Lalumière et al., 1996), suggesting that sexual coercion is more likely to be committed by men with limited access to sexual partners. Indeed, unwanted celibacy does not by itself contribute to intentions to engage in violence and sexual aggression towards women. To explain intentions to enact violence, additional

factors may be required, such as exposure to violent aspects of the Incel ideology (e.g., the notion of the ‘beta uprising’).

Although the scale developed to measure unwanted celibacy provided initial evidence for an association with misogynistic attitudes, it would benefit from further development and psychometric validation. Also, desirable would be to replicate this study with a larger, more representative sample of Incel and non-Incel men and women to examine whether our findings replicate when Incels and non-Incels are examined separately. Future research is also needed to understand the social and psychological processes that result in the association between unwanted celibacy and misogyny. Rejection is one potentially important process: Studies have shown that rejection can lead men to develop negative feelings and attitudes towards women (Andrighetto et al., 2019; Blake et al., 2018; Kelly et al., 2015). Experiments like those conducted by Andrighetto et al. (2019) and Blake et al. (2018) could help reveal whether rejection sensitivity leads men who experience unwanted celibacy to endorse misogynistic attitudes. Longitudinal studies to follow the development of unwanted celibacy and its relationship with hostility towards women over time may provide insight into the link between unwanted celibacy and the development of misogyny.

Although we argued that misogyny could be a by-product of mechanisms that are functional – namely high male sexual desire – other evolutionary accounts of misogyny are also plausible: misogyny may itself be functional, as it could be a mating strategy to decrease women's self-perceived mate value (Bosson et al., 2022) or a coalitional bargaining strategy for sexual access (Lindner, 2022), thereby making it easier for lower status men on the mating market to acquire a partner. It would be worthy of future research to investigate which of these different evolutionary accounts of misogyny is more likely. Finally, although we have shown a general association between unwanted celibacy and misogyny, the strength of this association could vary among different individuals and situations: Extending research cross-culturally to regions with varying socio-ecological conditions (e.g., sex ratio; cf. Brooks et al., 2022; percentage of unpartnered young men; cf. Wilson & Daly, 1985) and cultural traditions (e.g., monogamy) may give valuable insights into the conditions that modify the link between unwanted celibacy and misogyny.

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## CRediT authorship contribution statement

PG, KG and TRK conceived of the research idea. KG, HEB, and PG designed and conducted the study, collected and analyzed the data. PG, TRK, and KG drafted the manuscript. All authors gave final approval for publication.

## Declaration of competing interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Data availability

Data will be made available on request.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2022.111860>.

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