



Psychological and physical cues to vulnerability: Antagonism, empathy, and sex effects[☆]

Peter K. Jonason^{a,b,*}, Martina De Gregorio^a

^a University of Padua, Italy

^b Cardinal Stefan Wyszyński University, Poland

ARTICLE INFO

Keywords:

Exploitation
Vulnerability
Personality
Life history theory
Sex differences

ABSTRACT

We tried to understand individual differences in two super-categories of cues to vulnerability. In a qualitative, act-nomination study ($N = 79$), we found several underpowered patterns in that more physical cues of vulnerability were listed than psychological ones, no sex difference were observed for number of psychological vulnerabilities, but men listed more physical vulnerabilities than women, however; these effects are descriptive only. We then surveyed participants ($N = 262$) on how much a curated list of cues from Study 1 made men and women vulnerable. A composite of the Dark Tetrad traits (i.e., narcissism, psychopathy, sadism, and Machiavellianism) that we called “antagonism” was associated with seeing targets as more vulnerable whereas those who were empathetic perceived targets as less vulnerable. Physical vulnerability was associated with higher ratings of male targets' vulnerability. For psychological vulnerability, antagonism was associated with lowered perceptions of vulnerability of female targets. Women rated others—regardless of their sex—as more vulnerable than men did, but this effect was strongest for physical cues. And last, women rated other women as more vulnerable—regardless of cue type—than other men, but men rated both sexes as equally vulnerable. Our results are discussed within an evolutionary framework.

1. Introduction

In the great struggles of life there are predators and there are prey. In their endless dance, each tries to outwit, outlast, and outsmart the other. Predators like lions (*Panthera leo*) develop hunting strategies that minimize wasted calories/time like choosing vulnerable prey over others (Hayward & Kerley, 2005) whereas prey species, such as brown mouse lemur (*Microcebus rufus*), develop sophisticated predator detection systems like olfaction to avoid predation (Deppe & Kushnick, 2020). This dance between predator and prey, in biology, is called a co-evolutionary arms race (Buss & Duntley, 2008). Such a predator-prey dynamic plays out in humans and in social psychological spheres as well, but most research focuses on the prey side with so-called cheater detection strategies (i.e., trying to understand how to avoid, detect, and punish social predators). And yet, those characterized by social predator personality traits like psychopathy appear well-suited to detect physical cues of vulnerability in others (Book et al., 2013). However, the research on how and why people perceive others as vulnerable is limited in

several ways. First, there is a reliance on physical cues to vulnerability with little consideration of psychological cues (Grayson & Stein, 1981; Gunns et al., 2002; Murzynski & Degelman, 1996). Second, research rarely looks beyond psychopathy (Book et al., 2013) to lighter traits like empathy. Third, researchers regularly adopt a method where participants view audio/visual content (Book et al., 2013; Ritchie et al., 2018; Wheeler et al., 2009), which, while interesting, may be onerous for some researchers and somewhat idiosyncratic in focusing on specific behavioral cues like walking, clothing, or facial features (Moor, 2010). Fourth, given the novelty of the methods and samples used in this area of research, the sample sizes are sometimes underpowered by modern standards (e.g., $N = 101$; Black et al., 2014). Fifth, researchers have invested more time in sexual exploitability than general exploitability (Goetz et al., 2012; Sakaguchi & Hasegawa, 2006a, 2006b). And sixth, there is a tendency to try to understand perceptions of vulnerability as a pathology enabling social exploitation and crime (Nell, 2006; Patrick, 2020) as opposed to being a part of a larger suite of predator-prey adaptations (but see Goetz et al., 2012). In this study, we attempt to

[☆] Data for this study was collected as part of an undergraduate thesis for the 2nd author. The first author was partially funded by a grant from the National Science Centre, Poland (2019/35/B/HS6/00682). We thank Severi Luoto and Sarah Walker for reviewing our paper prior to submission.

* Corresponding author at: University of Padua, Department of General Psychology, Via Venezia, 12, 35131 Padua, PD, Italy.

E-mail address: peterkarl.jonason@unipd.it (P.K. Jonason).

<https://doi.org/10.1016/j.paid.2021.111189>

Received 11 June 2021; Received in revised form 4 August 2021; Accepted 5 August 2021

Available online 13 August 2021

0191-8869/© 2021 Elsevier Ltd. All rights reserved.

address these issues to understand individual differences in perceptions of vulnerability.

A useful framework for understanding the interplay of victims and perpetrators is to consider them from an evolutionary psychology standpoint. From this perspective, victims/survivors are the prey that must detect and evade predators and the perpetrators are the predators that must decide who to attack and avoid being detected (see [Cosmides et al., 2005](#)). An evolutionary approach assumes that prey-predator dynamics have been a recurrent feature of human evolution and they will have shaped the physical and psychological systems of both sexes. The co-evolutionary arms race creates a positive feedback loop that creates a “red queen problem” (i.e., from Alice in Wonderland; one must run to keep pace with others; see [Ridley, 2003](#)). When a predator approaches a group of would-be prey (e.g., on a savannah, at a nightclub), she is overwhelmed with options. Systematic patterns in success in the choices will have provided fitness benefits to her and her offspring and these will accumulate over time leading to directional selection (see [Molles, 2010](#)) where most members of her species are characterized by a particular way of sizing-up prey. At the same time, her prey are not passive victims in this process. They too learn how to distinguish between dangerous predators who are hunting as opposed to walking by (e.g., posture, behavior). As prey get better at detecting who is likely to try to attack them, the prey determines ways to overcome prey's ability to detect their intentions, and this provides positive fitness benefits to the prey species. If we make monistic assumptions, as is common in evolutionary psychology, psychological systems for recurrent pressures faced by predator-prey interactions may compliment attention to looking at physical cues to vulnerability. Detecting predation from physical cues alone may provide only a rough estimate of dangerousness/vulnerability because people's personalities and physical features may not always match up so assessing both may incrementally improve one's chances of making the “right” choice for them.

1.1. Vulnerability of two kinds

People can break their bones and they can break (so to speak) their psyches. There is a long history in anthropology of broken bones in the skeletal record hinting at a lengthy relationship with physical violence in people ([Buss, 2008](#)). Physical cues are more apparent and likely to signal things like physical weakness, age, and infirmity. Such cues are likely to be useful in detecting who is easy prey in a social way just as such cues would be useful to interspecific predation. For example, when sizing up members from other groups, chimpanzees (*Pan troglodytes*) tend to attack and kill juveniles and, therefore, less physically capable members of the other group, as opposed to adult males ([Wrangham & Peterson, 1996](#)).

People (and other organisms) are, however, not only vulnerable in a physical way, but are also vulnerable to psychological warfare. Psychological vulnerability is typically the purview of clinical-criminal psychology ([Book et al., 2007](#)), but it is likely composed of dispositions that make someone look like they could be tricked, deceived, and manipulated ([Buss & Duntley, 2008](#); [Goetz et al., 2012](#)). Such people may be prime targets for confidence scams, online crimes, and deceptive mating tactics. Take, for instance, the issue of age. Older people appear to be more trusting which could be construed as gullibility leading to more exploitation ([Bailey, Slessor, et al., 2016](#); [Bailey, Szczap, et al., 2016](#)). While both types of vulnerability may lead to distress, physical vulnerability has had more dire risks for longer than psychological vulnerability. Being physically vulnerable may lead to the loss of life (and will have done so for generations) whereas psychological vulnerability may lead to a loss of money, self-esteem, relationships, and status (which is novel in the case of online scams and less dire in the case of the loss of money). As such, we expect that people will perceive physical, as opposed to psychological, cues as creating more vulnerability.

Whether one takes a feminist ([Moor, 2010](#); [Richardson, 2005](#)) or evolutionary ([Buss, 2008](#); [Wilson & Daly, 1995](#)) approach to understand

interpersonal violence, researchers from both agree that women have been more systematically at risk than men are over centuries of cultural development and millions of years of biological evolution.¹ With less bone density (e.g., [Kelly et al., 1990](#)), less musculature (e.g., [Welle et al., 2008](#)), and a greater tendency towards emotional instability, dependent personality disorder, anxiety, and depression ([Archer, 2019](#); [Bornstein et al., 1993](#); [Nolen-Hoeksema, 1987](#); [Schmitt et al., 2008](#)), women may be subject to greater risk both physically and psychologically. While men also experience various psychological problems more than women do like ADHD, psychopathy, and antisocial personality disorder, it is unclear to us how these would generate vulnerability *per se*. Instead, states, dispositions, or behaviors that give the appearance of lacking confidence and fear may be cues to predation in that a person with the physical incapability to defend themselves physically may have a correlated psychological vulnerability as well. Women should, therefore, be perceived as more physically vulnerable than men are, and women should be especially likely to see other women as vulnerable as they are best able to empathize with the potential vulnerability of other women. This perception may be enabled by women's greater tendency to be empathic than men's (e.g., [Archer, 2019](#); [Eisenberg & Lennon, 1983](#)) and thus it is women who are empathetic—able to see the weakness in others—who should see the greatest vulnerability in their fellow women. However, given the greater consequences for physical than psychological dangers (perhaps then warranting them greater protection as Western societies provide), we expect women to especially view other women as markedly vulnerable to physical threats and especially empathetic women to perceive more psychological vulnerability in other women.

While women may be more likely to be victimized and, therefore, perceived as more vulnerable, men traditionally and ancestrally are more physically and intrasexually competitive. Male intrasexual competition may have important evolutionary consequences (e.g., attaining status, acquiring resources, impressing mates) and given the more robust nature of the male musculoskeletal system relative to women, engaging in physical intrasexual competition may have had fewer costs and more benefits for men than women ([Campbell, 1999](#); [Puts, 2010](#); [Puts et al., 2016](#)). In several mammalian taxa, males engage in contest-competition to establish a territory and win mates. For example, in lions (*Panthera leo*), gorilla (*Gorilla gorilla*), and elephant seals (*Mirounga* [southern] *leonine*/[northern] *angustirostris*), males engage in potentially life-threatening contests to oust dominant males to improve their mating success. Given the high risk, there are likely psychological systems that encourage males to engage in such competitions (e.g., [Archer, 2019](#)). There might be psychological systems (e.g., inflated self-views, perceiving others as less able) that help males overcome the innate sense of self-protection characteristic of most species and people ([Jonason & Tome, 2019](#); [Jonason & Zeigler-Hill, 2018](#)).

While most people “play it safe”, men, especially those characterized by an antagonistic personality (e.g., narcissism, psychopathy, sadism, and Machiavellianism; [Paulhus & Dutton, 2016](#); [Paulhus & Williams, 2002](#)),² may be more inclined to compete, take risks, and fight than others ([Jonason et al., 2020](#); [Jones, 2013](#); [Luoto & Varella, 2021](#); [Navarrete et al., 2010](#); [Žemojtel-Piotrowska et al., 2020](#)). How does one overcome their self-protective instincts? People may have biased psychological systems to “trick” them into engaging in contest-competition. To enable this approach to life, those predisposed to competition should perceive others as less vulnerable because such a cognition may enable them to engage in competition. Given that men are often more

¹ When making claims about men and women, we are referring to average tendencies of groups not individual men and women.

² Narcissism is characterized by inflated self-views and a vulnerable self-image, psychopathy is characterized by callous affect and antisocial behaviors, sadism is characterized by the commission and enjoyment of acts geared to hurt others, and Machiavellianism is characterized by duplicity and cynicism.

competitive and antagonistic than women are, it should be men who see others as more vulnerable. However, engaging in competition with women is likely to be counterproductive and thus it should (mostly) be avoided by even particularly competitive men (e.g., Iredale et al., 2008). Baring extreme cases of intersexual competition (e.g., cost-inflicting mate retention), physically competing with potential female mates imposes heavy costs on men as well as women and thus, this should be avoided by men (Buss, 1998). Indeed, most homicide victims are men, and most perpetrators are also men (Hill et al., 2017; Wilson & Daly, 1995). Said another way, perceiving other men (not necessarily women) as physically more vulnerable may enable reproductive success of competitive men.

In this paper, we assert that there are two super-categories of cues to exploitation. Because physical cues are more apparent and ancestrally relevant than psychological ones, they may differ in how they are perceived as creating vulnerability in others. Physical competition is more phylogenetically widespread, and thus it stands to reason that physical contests are more ancient than psychological contests (which require advanced cognition, sociality, and emotions). We expect physical cues to generate a greater sense of vulnerability than psychological cues. We further expect women, because of their higher rates of empathy and their greater experience with ancestral and modern victimization, to perceive physical threats as more problematic. And last, men, because of their higher rates of antagonistic personality traits and the benefits that may have accrued from engaging in competition (Luoto & Varella, 2021), should see other men (not women) as social competitors and thus, more vulnerable to enable confrontation.

2. Study 1: What makes someone seem vulnerable?

To begin, we conducted an act-nomination (Buss & Craik, 1983; Jonason & Buss, 2012) study to capture qualitative responses of what people think constituted a person who was psychologically and physically vulnerable. Similar research has focused on cues to sexual exploitability using this method (Goetz et al., 2012). After cleaning the qualitative responses for “noise”, we counted the number of responses offered overall and in men and women to understand general patterns in the content offered. We expect more cues for physical vulnerability than psychological vulnerability given the more easily detectable nature of the former relative to the latter, and we expect men and women to differ mostly in the number of cues offered for physical cues.

2.1. Method

2.1.1. Participants and procedure

An online, snowball (e.g., Facebook) survey was administered to 100 Italian volunteers (76% female) who were evenly distributed across the age groups of 18 and 30 (34%), 41 to 49 (32%), and 50 and 60 (33%) years of age. After participants were informed of their rights and provided tick-box consent, they completed two qualitative questions (randomized to minimize order effects). Participants listed as many (1) physical and (2) psychological cues they could that indicated someone might be vulnerable to exploitation (participants were free to take whatever meaning they wanted from this word). After that, they completed a personality (i.e., Dark Triad Dirty Dozen; Jonason & Webster, 2010) survey (that we exclude given insufficient power) and a brief demographics questionnaire. Upon completion, they were thanked and debriefed. This study was approved by the ethics committee at the University of Padua (3801).

2.2. Results & discussion

We received 100 total responses; however, given the qualitative nature of the data, major cleaning was required to ensure data quality. The second author cleaned the statements to denote physical as external, observable cues and psychological as internal, unobservable cues (i.e., it

was top-down cleaning). We removed 21—leaving us with an n of 79—of the cases because they provided (1) null answers (i.e., “I don't know”, “I don't understand the task”), (2) environmental cues (i.e., “the weather”), and (3) vague answers (i.e., “the heart”, “bellyache”, “being seen”). Most of the invalid responses were from people between the ages of 50 and 60 (45%) and from women (77%). After we cleaned the data, we had a total of 15 psychological (e.g., unintelligent, looking sad/depressed, having a mental illness, and lacking self-esteem) and 23 physical (e.g., overweight, having a handicap, dressing in a way that shows a lot of skin, and walking with a slouched posture) cues. On average people provided more physical ($M = 2.25$, $SD = 0.17$) than psychological ($M = 2.13$, $SD = 0.17$) cues (Hedges' $g = 0.66$), with men ($M = 2.34$, $SD = 0.24$) reporting more ($g = 1.82$) cues than women did ($M = 2.03$, $SD = 0.14$). Men ($M = 2.21$, $SD = 1.44$) reported slightly more ($g = 0.12$) psychological cues than women did ($M = 2.05$, $SD = 1.27$) and men ($M = 2.47$, $SD = 1.50$) reported more ($g = 0.35$) physical cues than women did ($M = 2.02$, $SD = 1.18$). Given the small sample sizes, inferential statistics were underpowered and were, therefore, omitted here and caution is urged in the interpretation of these differences. Nevertheless, it appears that physical cues to vulnerability are more numerous and accessible to participants, especially for the sex engaged in more overt confrontation with conspecifics (i.e., men).

3. Study 2: Who “sees” vulnerability in others?

When adopting the act-nomination method, it is customary to conduct an act-frequency study based on what was revealed in the former as a way of taking qualitative, ideographic answers and capitalizing on them to understand quantitative, nomothetic patterns (Buss & Craik, 1983; Jonason & Buss, 2012). In this study, we took the responses provided in Study 1 and converted them into Likert-style items. These questions were then rated by an independent sample and subjected to factor analyses. After resolving on a measurement model, we created indexes by cue-type for male and female targets and examined actor and target sex effects, differences by cue type, and the role of antagonism and empathy.

3.1. Participants and procedure

We gathered our data through Amazon's Mechanical Turk where people were paid US\$0.75 for participation, obtaining a total of 332 respondents, 70 of whom had to be removed because they failed the two attention-check items (e.g., “choose ‘Strongly Agree’ so that we know you are paying attention”). The final sample was 262 adults (62% males) aged between “18 and 60+” years of age (“30–40” = 39.7%; “18–30” = 26%). Our sample size was based on a power analysis for the average effect size ($r \approx 0.20$, $\beta = 0.90$, $\alpha = 0.05$) in personality psychology and guidelines ($N > 200$) set for reducing estimation error in personality psychology (Gignac & Szodorai, 2016). Participants provided tick-box consent and upon completion, participants were thanked and debriefed, and given the nature of the study, provided advice to seek professional help if this study proved overly distressing. This study was approved by the ethics committee at the University of Padua (3801). Data for this study is available on the Open Science Framework (https://osf.io/wpc2g/?view_only=ad2e2608dbcc4584ab7293905a977f98).

3.2. Measures

The reduced list of items from Study 1 were translated by the second author who is fluent in both Italian (native) and English with consultation with the first author who is fluent in English. Then, participants were asked how easy (1 = *not at all*; 5 = *extremely*) it would be to take advantage of someone—a man or a woman, independently—characterized by the 38 cues (23 physical; 15 psychological) from Study 1. The cue items were mixed randomly for each sex. To reduce the list, we ran

principal components analyses (varimax rotation; see Table 1) for each type of vulnerability cue in each sex. Upon inspection, the factor loadings were so high and similar that we thought it best to rely on the same set of indicators for each to ensure that we were comparing apples to apples. We arbitrarily chose the male solutions as a basis for these constructs and retained the top eight loading items in each. Subsequent analyses were run on the composite variables created by this process. In between the sex-specific cue questions were the following two self-report questionnaires.

To measure antagonistic personality traits, we used the Hateful Eight (Webster & Wongsomboon, 2020), which is a 28-item measure of the Dark Tetrad. Participants reported their agreement (1 = *strongly disagree*; 5 = *strongly agree*) with items capturing individual differences

Table 1
Principal components analyses (varimax rotation) describing physical and psychological cues of vulnerability in men in and women.

	Men		Women	
	1° solution	2° solution	1° solution	2° solution
<i>Physical cues</i>				
Having facial blemishes	0.77	0.79	0.71	0.79
Slouched posture	0.70	0.78	0.70	0.71
Belonging to a sexual minority	0.69	0.73	0.62	0.66
Exposing lots of skin	0.69	0.70	0.61	0.62
Having a scar(s)	0.68	0.68	0.71	0.73
Erratic/evasive gaze	0.66	0.70	0.68	0.72
Being quite short	0.66	0.68	0.66	0.70
Having a limp	0.64	0.68	0.64	0.66
Being quite overweight	0.63		0.60	
Belonging to an ethnic minority	0.63		0.69	
Being poor	0.62		0.64	
Having glasses	0.62		0.58	
Being quite underweight	0.60		0.54	
Looking sickly	0.59		0.58	
Having tattoos	0.54		0.56	
Being quite tall	0.54		0.51	
Being intoxicated	0.53		0.44	
Being muscular	0.52		0.48	
Having a handicap	0.51		0.56	
Being rich	0.49		0.36	
Being old	0.41		0.56	
Being young	0.40		0.44	
Bartlett's χ^2	3183.07*	767.41*	2909.23*	684.05*
Kaiser-Meyer-Olkin	0.92	0.89	0.92	0.89
% of Variance accounted for	36.79	51.32	35.37	49.26
Eigen value	8.46	4.11	8.14	3.94
Cronbach's α	0.92	0.86	0.91	0.85
<i>Psychological cues</i>				
Being unintelligent	0.77	0.82	0.74	0.80
Looking sad/depressed	0.76	0.75	0.70	0.72
Being immature	0.74	0.76	0.72	0.75
Having a mental illness	0.74	0.77	0.73	0.76
Lacking self-esteem	0.73	0.77	0.77	0.77
Having a history of trauma	0.72	0.74	0.65	0.71
Being scared of expressing one's opinion	0.71	0.70	0.66	0.64
Being gullible	0.70	0.70	0.78	0.79
Being naive	0.70		0.74	
Being quite needy	0.68		0.69	
Being shy	0.65		0.52	
Being reckless	0.65		0.69	
Being anxious	0.62		0.63	
Being emotional	0.55		0.50	
Engaging in attention-seeking	0.51		0.63	
Bartlett's χ^2	1841.39*	970.10*	1756.51*	898.28*
Kaiser-Meyer-Olkin	0.93	0.90	0.94	0.91
% of Variance accounted for	47.05	57.03	46.19	55.58
Eigen value	7.06	4.56	6.93	4.45
Cronbach's α	0.92	0.89	0.92	0.89

* $p < .01$.

in Machiavellianism (e.g., “Whatever it takes, you must get the important people on your side”), narcissism (e.g., “Group activities tend to be dull without me”), psychopathy (i.e., “I tend to fight against authorities and their rules”), and sadism (e.g., I enjoy watching violent sports). We found high correlations between the four traits. Machiavellianism was correlated with narcissism ($r = 0.62, p < .01$), psychopathy ($r = 0.63, p < .01$), and sadism ($r = 0.66, p < .01$); narcissism was correlated with psychopathy ($r = 0.74, p < .01$) and sadism ($r = 0.65, p < .01$); and psychopathy and sadism were correlated ($r = 0.85, p < .01$). This failure to differentiate between the traits in their measurement was echoed in a principal components analysis (varimax rotation) where all four traits loaded well (0.83–0.92) on a single factor that accounted for over three-quarters of the variance in the items (77.29%; Eigenvalue = 3.09). Therefore, we averaged these items (Cronbach's $\alpha = 0.90$) to create a composite reflective of the Dark D factor (Nowak et al., 2020; Žemajtė-Piotrowska et al., 2020) to capture generalized “antagonism” which addresses the multicollinearity and reduces Type 1 error inflation.

To measure empathy, we used the Toronto Empathy Questionnaire (Spreng et al., 2009) which is composed of 16 items (e.g., “I can tell when others are sad even when they do not say anything”) where participants reported their agreement (1 = *Strongly disagree*; 5 = *Strongly agree*). The items were averaged to create a composite score of individual differences in empathy ($\alpha = 0.85$).

3.3. Results & discussion

In Table 2 we report the correlations between antagonism and empathy and ratings of the cues in each sex. We found that antagonism and empathy were negatively correlated and that all the cue ratings were correlated. Both antagonism and empathy were positively and negatively correlated, respectively, with ratings of only physical cues to vulnerability, with stronger correlations for antagonism than empathy.

In Table 3, we examined whether the effects were moderated by participant's sex (Fisher's z) and target's sex (Steiger's z). We found that the correlations for psychological vulnerability did not differ by participant's sex. The correlations between empathy and physical cue ratings were only present in women and more negative when directed towards male targets. When considering physical vulnerability and antagonism, the correlations were more positive when directed towards the male targets; and when considering psychological vulnerability, the correlation was more negative for female targets. The correlations between antagonism and psychological cues were positive in men for both targets, and negative in women for both targets.

We also ran a mixed model ANOVA with a 2 (participant's sex) \times 2 (target's sex) \times 2 (cue type) design. Female participants ($M = 3.41, SE = 0.05$) rated the cues in general as more ($F[1, 260] = 17.70, p < .01, \eta_p^2 = 0.06$) reflective of vulnerability than male participants did ($M = 3.30, SE = 0.05$). Moreover, physical cues ($M = 3.51, SE = 0.05$) were rated as revealing more ($F[1, 260] = 59.5, p < .01, \eta_p^2 = 0.19$) vulnerability than psychological cues ($M = 3.20, SE = 0.05$). An interaction of cue \times sex of the participant ($F[1, 260] = 4.26, p = .04, \eta_p^2 = 0.02$) indicated that women ($M = 3.57, SE = 0.08$) were more likely ($p < .01$) to identify physical cues as a risk for victimization rather than psychological cues ($p < .05$). Additionally, female participants ($F[1, 260] = 3.23, p < .01, \eta_p^2 = 0.01$) rated other women ($M = 3.44, SE = 0.07$) as more ($p < .05$) vulnerable than they rated men ($M = 3.37, SE = 0.06$); whereas male participants rated men ($M = 3.29, SE = 0.08$) and women ($M = 3.31, SE = 0.06$) more similarly.

4. General discussion

Most people want to minimize the risks they incur and, therefore, the topic on how would-be social predators (e.g., those characterized by psychopathy) select their victims has received lots of attention (Black et al., 2014; Book et al., 2013; Grayson & Stein, 1981; Gunns et al., 2002; Muznski & Douglas, 1996; Ritchie et al., 2018; Wheeler et al., 2009).

Table 2
Descriptive statistics for antagonism and empathy and cues to vulnerability in both sexes.

	1	2	5	6	7	8
1. Antagonism (D4)	–					
2. Empathy	–0.51**	–				
5. Psychological cues (M)	0.12	0.07	–			
6. Physical cues (M)	0.54**	–0.29**	0.62**	–		
7. Psychological cues (F)	0.04	0.09	0.83**	0.53**	–	
8. Physical cues (F)	0.43**	–0.23**	0.63**	0.82**	0.64**	–
Overall <i>M</i> (SD)	3.03 (0.86)	3.47 (0.68)	3.47 (0.87)	3.14 (0.78)	3.53 (0.87)	3.26 (0.77)
Men <i>M</i> (SD)	3.17 (0.79)	3.37 (0.59)	3.44 (0.93)	3.18 (0.80)	3.47 (0.94)	3.27 (0.77)
Women <i>M</i> (SD)	2.81 (0.92)	3.62 (0.78)	3.51 (0.76)	3.08 (0.74)	3.63 (0.72)	3.25 (0.73)
<i>t</i> -Test	3.23*	–2.77*	–0.62	1.03	–1.51	0.17
Cohen's <i>d</i>	0.40	–0.36	–0.08	0.13	–0.19	0.03

Note. Cohen's *d* was calculated online (<https://lbecke.uccs.edu/>); M = male target; F = female target; D4 = Dark Tetrad.

* *p* < .05.
** *p* < .01.

Table 3
Within- and between-sex comparisons of the correlations between antagonism and empathy and cues to vulnerability in each sex (target) and in men and women (participant).

	Physical vulnerability			Psychological vulnerability		
	Sex of target		Steiger's <i>z</i>	Sex of target		Steiger's <i>z</i>
	Male	Female		Male	Female	
<i>Antagonism (D4)</i>						
Men	0.57*	0.48*	2.76**	0.24*	0.20**	1.30
Women	0.51*	0.38*	4.50**	–0.50**	–0.19	–7.68**
Fisher's <i>z</i>	0.66	0.95		6.15**	3.06**	
<i>Empathy</i>						
Men	–0.22	–0.24	0.52	–0.04	–0.02	–0.63
Women	–0.37*	–0.24*	–4.19**	0.21**	0.24**	–0.69
Fisher's <i>z</i>	1.28	0.00		–1.96*	–2.05*	

Note. Fisher *z* compares independent correlations (<http://quantpsy.org/corrttest/corrttest.htm>) whereas Steiger's *z* compares dependent correlations (<http://quantpsy.org/corrttest/corrttest2.htm>); D4 = Dark Tetrad.

* *p* < .05.
** *p* < .01.

However, most of this research relies on highly specific indicators like the clothing worn or how victims walk that were rated by relatively small samples of criminals or those who have the tendency towards criminality. Our research is revealing because it addresses several limitations of prior research both methodologically and conceptually. First, while showing that walking in a particular way can be a cue to vulnerability is sensational, it fails to get at a general construct of physical vulnerability and may be subject to the limitations of item analyses. Our study provided an *ad hoc* way of capturing physical vulnerability that can speak to the general idea more than a specific, even esoteric cue. Second, the reliance on physical cues in prior research precludes that fact that people may be vulnerable in psychological ways as well for which our study provides new information. Leveraging the mixed method benefits of an act-nomination/frequency study (Buss & Craik, 1983; Jonason & Buss, 2012), we were able to identify and measure these both, test predictions about sex differences in targets and participants, and examine the role of individual differences in antagonism and empathy.

From the qualitative portion of this study, we uncovered hints (not statistically different but descriptively so) that physical vulnerability was similarly defined in each sex to include having facial blemishes, slouched posture, and having an erratic gaze. In contrast, psychological vulnerability was similarly defined in each sex to be composed of being unintelligent, being immature, and having a mental illness. While the analyses were underpowered, men seem to have reported more cues than women did and that men appear to have reported even more physical cues to vulnerability than women did. The quantitative portion

of the study then built on these results revealing several patterns. First, people rated physical cues as leading to more vulnerability than psychological cues. Traditional predation, like that between-species, relies on sizing up physical cues with no access or ability to assess the psychological vulnerability of potential victims. If we return to lions as our example, one need only watch a nature documentary to see how a lion sizes up a zebra from tens of meters away and must make decisions about which one to pursue in a sea of black and white stripes. Evolution is conservative and organisms that seek to most efficiently satisfy their needs will have higher reproductive fitness than those who do not because they will have more resources (e.g., calories, time) to invest in other things including finding more mating opportunities. Moving to intraspecific behavior in humans, physical cues may be more apparent and reliance on them in an antisocial, violent context may be co-opted from ancient, interspecific psychological systems for predation. Similarly, the consequence of physical vulnerability is (for example) broken bones whereas the consequence of psychological vulnerability is (for example) broken hearts. Not only do hearts only break metaphorically, their breaking typically does not seriously put people's lives at risk (e.g., with the rare exception of suicide) and may serve as a further cue to vulnerability. All of this together may translate to both a greater proliferation of physical cues (Study 1) being used when assessing people's vulnerability, and stronger ratings given for physical rather than psychological cues in such vulnerability assessments (Study 2), like we found.

When considering the physical-psychological distinction—something rarely done (Luoto, 2019; Stephen & Luoto, *in press*)—we can see some sex-specific patterns (e.g., Goetz et al., 2012; Luoto, 2019). For instance, women rated physical cues as especially vulnerability-inducing for other women. Women may be aware that they are more vulnerable and realize that physical vulnerability is more problematic than psychological vulnerability. There is a long history of victimization of women and given their lower capacity to defend oneself and flee, they may have developed a tendency to see themselves as more subject to victimization (Buss, 2008; Moor, 2010; Richardson, 2005; Wilson & Daly, 1995). Indeed, sex differences in neuroticism—seen through the lens of evolutionary psychology—might be an expression of this very psychological bias (Schmitt et al., 2008).

We also found that men who were more socially antagonistic rated physical cues as creating more vulnerability in men than women. That is, instead of “preying upon” women through an increased sense that women are vulnerable (Bornstein et al., 1993; Kelly et al., 1990; Welle et al., 2008), men may have a psychological bias that makes them see potential intrasexual competitors and those who are more likely to genuinely do damage to them as more vulnerable. Perceiving an enemy as vulnerable would enable approach tendencies and reduce fear to best engage in the high-stakes contest-competitions that have existed between males long before human males evolved (Campbell, 1999; Puts, 2010; Puts et al., 2016). Hurting women, especially current or potential

mates, diminishes, but does not necessarily eliminate, a man's reproductive fitness, and selection would have reduced any genes associated with male-on-female violence (Buss, 1998). This is not to say that such violence does not happen, but that it is likely to be far less likely than male-on-male violence especially for men of reproductive ages (Hill et al., 2017; Wilson & Daly, 1995).

Beyond examining sex differences, we also examined the role of social antagonism and empathy. Those who are socially antagonistic may be quite good at detecting would-be victims (Book et al., 2013; Ritchie et al., 2018; Wheeler et al., 2009); we attempted to replicate this pattern. We also examined empathy in relation to perceptions of vulnerability which has rarely been examined. It is possible that higher empathy may better enable would-be predators to detect would-be prey, but it is also possible that empathy may simply help others understand how others are vulnerable. Antagonism—as a composite index of the Dark Tetrad traits—was only associated with seeing physical cues as more likely to create vulnerability, but low rates of empathy revealed the opposite, albeit half-as-strong, associations; it is noteworthy that no effects were found for these traits detecting psychological vulnerability in men or women. Examination of these correlations by the sex of the target/participant revealed that the correlation between antagonism and physical vulnerability was stronger for men and women when rating other men than when rating other women, but less antagonism was more strongly negatively linked to women's evaluation of male targets in psychological vulnerability. Low rates of empathy were associated with lowered perceptions of physical vulnerability in women towards women than towards men. When examining between-sex effects (going down in Table 3), we could only detect effects for psychological cues. In both sexes (men especially), antagonism was associated with rating the male target as vulnerable; in women, antagonism was associated with rating the male target less vulnerable. And last, high rates of empathy in women (only) were associated with perceiving other women as more psychologically vulnerable than men.

5. Limitations and conclusions

While this study combined qualitative and quantitative methods, it was nevertheless limited. First, Mechanical Turk workers may be especially W.E.I.R.D. (i.e., Western, Educated, Industrialized, Rich, Democratic; Henrich et al., 2010). In addition, our responses from Study 1 were in Italian, meaning that they needed to be translated into English for Study 2, but we did not engage in rigorous translation procedures here. Moreover, the cues to vulnerability reported in Study 1 were from a sample that was mostly women, and it is possible that men and women define vulnerability differently. Indeed, most of the data we had to eliminate came from women. Nevertheless, the phrases were rather simple in nature and translated by a native Italian speaker who is fluent in English with consultation of a fluent English speaker.

Second, the exceptionally high correlations between the Dark Tetrad traits required an *ad hoc* and potentially dubious composite approach that may obscure trait-specific effects (Nowak et al., 2020; Žemojtel-Piotrowska et al., 2020). However, trait-specific correlations were indistinguishable here. This might be an artifact of this measure or selection biases created by the topic. Subsequent work may benefit from a direct replication or a replication with alternative measures of the Dark Tetrad (Paulhus et al., 2020).

Third, the use of a composite approach to psychological and physical cues fails to identify specific cues to vulnerability and, instead, focuses on classes of information. Item-specific analyses were avoided here, but subsequent research might explore these cues in more detail. While we think it is best to avoid Type 1 error inflation in this study given limited reasons to predict cue-specific effects, exploratory work might be warranted in the future.

Fourth, another potential shortfall of this paper is that of our apparent gender binary and heteronormative approach in that (1) we have focused on victimization cues in men and women only and (2)

those who are part of an LGBTIQI group may be subject to greater victimization for sex role violations and homo/transphobia (Bailey, Vasey, et al., 2016; Cuerda-Galindo et al., 2017; Symons et al., 2017) that heterosexuals may not experience. While this was beyond our scope here, subsequent work could determine if psychological and physical vulnerability cues differ by sexual orientation or gender identity and how they may play a role in both (1) prejudice towards and (2) social justice movements for them.

Fifth, we have included only two personality traits and participant/target's sex as individual differences here given their obvious relevance. However, basic psychometric testing (e.g., HEXACO model of personality) along with theory-testing (e.g., sociosexuality, age of targets) might also prove useful in the future. For example, single men in their 40s may be seen as particularly vulnerable (e.g., they might be lonely) to predation by young, antagonistic women bent on extracting resources from easy targets (e.g., sugarbabies). Alternatively, younger women may be seen as more easily seduced (e.g., they may be easier to impress given less experience and money), by older, successful men bent on extracting relatively low investment sex.

Sixth, while considering psychological and physical cues extend prior work on the topic, both are about the person, but there may be at least one other way that people are vulnerable as well. Life circumstances such as lack of proper housing, shelter, or clothing may also increase how vulnerable people are (Luoto, 2019) and the psychological cues we focused on may be situated in a larger space within contextual vulnerability. That is, vulnerability may be a multidimensional phenomenon that starts with physiological vulnerability and extends out through interpersonal, social, and structural spheres.

And last, we adopted a self-report method for getting at cues to vulnerability when much work relies on observed cues. This was done for ease and time constraints, but the adoption of cue methods might be extended to see if people can detect would-be predators in the way they walk, their facial movements and morphology, their style of dress, and other physiological cues such as muscularity, masculinity, and facial asymmetry (Luoto et al., 2021). That is, instead of testing whether predators can detect potential prey, this method might be flipped to examine if would-be prey can detect predators as they do in other animals (Deppe & Kushnick, 2020).

Despite these shortcomings, we present the first study (we know of) to examine individual differences in two classes of cues to vulnerability. Instead of relying on specific behavioral cues, we treated vulnerability as a composite construct that can be found in two forms, psychological and physical. As such, we subjected it to classical test theory analyses to understand variance in vulnerability. Being physically vulnerable was seen as more problematic than being psychologically vulnerable, and it was in within-sex evaluations that this really played out. It was women who rated other women as more vulnerable, but men did not differ in how they evaluated vulnerability in others, both of which may reflect asymmetries in experiences with physical altercations and competition over evolutionary time (Archer, 2019; Luoto & Varella, 2021). We also examined the relevance of social antagonism and empathy to better understand these sex effects, revealing that socially antagonistic men may view other men as competitors and, therefore, evaluate other men as less vulnerable to enable their social antagonism, whereas women who were more empathic rated other women as psychologically more vulnerable.

CRedit authorship contribution statement

PKJ is responsible for the writing of the paper and the organization of the Results and the analytical plan. MDG is responsible for the actual analyses, completing the Tables, and proof reading.

References

- Archer, J. (2019). The reality and evolutionary significance of psychological sex differences. *Biological Reviews*, *94*, 1381–1415.
- Bailey, J. M., Vasey, P. L., Diamond, L. M., Breedlove, S. M., Vilain, E., & Epprecht, M. (2016). Sexual orientation, controversy, and science. *Psychological Science in the Public Interest*, *17*, 45–101.
- Bailey, P. E., Slessor, G., Rieger, M., Rendell, P., Moustafa, A., & Ruffman, T. (2016). Trust and trustworthiness in young and older adults. *Psychology and Aging*, *30*, 977–986.
- Bailey, P. E., Szczyg, P., McLennan, S. N., Slessor, G., Ruffman, T., & Rendell, P. G. (2016). Age-related similarities and differences in first impressions of trustworthiness. *Cognition and Emotion*, *30*, 1017–1026.
- Black, P., Woodworth, M., & Porter, S. (2014). The Big Bad Wolf? the relation between the Dark Triad and the interpersonal assessment of vulnerability. *Personality and Individual Differences*, *67*, 52–56.
- Book, A. S., Quinsey, V. L., & Langford, D. (2007). Psychopathy and the perception of affect and vulnerability. *Criminal Justice and Behavior*, *34*, 531–544.
- Book, A., Costello, K., & Camilleri, J. A. (2013). Psychopathy and Victim Selection: The Use of Gait as a Cue to Vulnerability. *Journal of Interpersonal Violence*, *28*(11), 2181–2202.
- Bornstein, R. F., Manning, K. A., Krukonis, A. B., Rossner, S. C., & Mastroiome, C. C. (1993). Sex differences in dependency: A comparison of objective and projective measures. *Journal of Personality Assessment*, *61*, 169–181.
- Buss, D. M. (1998). The evolution of human intrasexual competition: Tactics of mate attraction. *Journal of Personality and Social Psychology*, *54*, 616–628.
- Buss, D. M. (2008). *The murder next door: Why the mind is designed to kill*. Penguin Books.
- Buss, D. M., & Craik, K. H. (1983). The act frequency approach to personality. *Psychological Review*, *90*, 105–126.
- Buss, D. M., & Duntley, J. D. (2008). Adaptations for exploitation. *Group Dynamics: Theory, Research, and Practice*, *12*, 53–62.
- Campbell, A. C. (1999). Staying alive: Evolution, culture, and women's intrasexual aggression. *Behavioral and Brain Sciences*, *22*, 203–214.
- Cosmides, L., Tooby, J., Fiddick, L., & Bryant, G. A. (2005). Detecting cheaters. *Trends in Cognitive Sciences*, *9*, 505–506.
- Cuerda-Galindo, E., López-Muñoz, F., Krischel, M., & Ley, A. (2017). Study of deaths by suicide of homosexual prisoners in Nazi Sachsenhausen concentration camp. *PLoS One*, *12*.
- Deppe, A. M., & Kushnick, G. (2020). Olfactory predator recognition in the brown mouse lemur (*Microcebus rufus*) in Ranomafana National Park, Madagascar. *American Journal of Primatology*, *82*, Article e23184.
- Eisenberg, N., & Lennon, R. (1983). Sex differences in empathy and related capacities. *Psychological Bulletin*, *94*, 100–131.
- Gignac, G. E., & Szodorai, E. T. (2016). Effect size guidelines for individual differences researchers. *Personality and Individual Differences*, *102*, 74–78.
- Goetz, C. D., Easton, J. A., Lewis, D. M. G., & Buss, D. M. (2012). Sexual exploitability: Observable cues and their link to sexual attraction. *Evolution and Human Behavior*, *33*, 417–426.
- Grayson, B., & Stein, M. I. (1981). Attracting assault: Victims' nonverbal cues. *Journal of Communication*, *31*, 68–75.
- Gunns, R. E., Johnston, L., & Hudson, S. M. (2002). Victim selection and kinematics: A point-light investigation of vulnerability to attack. *Journal of Nonverbal Behavior*, *26*, 129–158.
- Hayward, M. W., & Kerley, G. I. (2005). Prey preferences of the lion (*Panthera leo*). *Journal of Zoology*, *267*, 309–322.
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, *33*, 61–83.
- Hill, A. K., Bailey, D. H., & Puts, D. A. (2017). Gorillas in our midst?: Human sexual dimorphism and contest competition in men. In M. Francisco, & J. Ayala (Eds.), *On human nature* (pp. 235–249). Academic Press.
- Iredale, W., Van Vugt, M., & Dunbar, R. (2008). Showing off in humans: Male generosity as a mating signal. *Evolutionary Psychology*, *6*, 386–392.
- Jonason, P. K., & Buss, D. M. (2012). Avoiding entangling commitments: Tactics for implementing a short-term mating strategy. *Personality and Individual Differences*, *52*, 606–610.
- Jonason, P. K., & Tome, J. (2019). How happiness expectations relate to the Dark Triad traits. *The Journal of Social Psychology*, *159*, 371–382.
- Jonason, P. K., & Webster, G. D. (2010). The Dirty Dozen: A concise measure of the Dark Triad. *Psychological Assessment*, *22*, 420–432.
- Jonason, P. K., Underhill, D., & Navarrete, C. D. (2020). The Dark Triad traits and aversion-based racial and sexual prejudice. *Personality and Individual Differences*, *153*, Article 109617.
- Jonason, P. K., & Zeigler-Hill, V. (2018). The fundamental social motives that characterize dark personality traits. *Personality and Individual Differences*, *132*, 98–107.
- Jones, D. N. (2013). Psychopathy and Machiavellianism predict differences in racially motivated attitudes and their affiliations. *Journal of Applied Social Psychology*, *43*, 367–378.
- Kelly, P. J., Twomey, L., Sambrook, P. N., & Eisman, J. A. (1990). Sex differences in peak adult bone mineral density. *Journal of Bone and Mineral Research*, *5*, 1169–1175.
- Luoto, S. (2019). An updated theoretical framework for human sexual selection: From ecology, genetics, and life history to extended phenotypes. *Adaptive Human Behavior and Physiology*, *5*, 48–102.
- Luoto, S., Krama, T., Rubika, A., Borrás-León, J. I., Trakimas, G., Elferts, D., Skrinda, I., Krams, R., Rantala, M. J., & Krams, I. (2021). Socioeconomic position, immune function, and its physiological markers. *Psychoneuroendocrinology*, *127*, Article 105202.
- Luoto, S., & Varella, M. A. C. (2021). Pandemic leadership: Sex differences and their evolutionary-developmental origins. *Frontiers in Psychology*, *12*, 618.
- Molles, M. C. (2010). *Ecology concepts and applications*. McGraw-Hill Higher Learning.
- Moor, A. (2010). She dresses to attract, he perceives seduction: A gender gap in attribution of intent to women's revealing style of dress and its relation to blaming the victims of sexual violence. *Journal of International Women's Studies*, *11*, 115–127.
- Murzynski, J., & Degelman, D. (1996). Body language of women and judgments of vulnerability to sexual assault. *Journal of Applied Social Psychology*, *26*, 1617–1626.
- Navarrete, C. D., McDonald, M. M., Molina, L. E., & Sidanius, J. (2010). Prejudice at the nexus of race and gender: An outgroup male target hypothesis. *Journal of Personality and Social Psychology*, *98*, 933–945.
- Nell, V. (2006). Cruelty's rewards: The gratification of perpetrators and spectators. *Behavioral and Brain Sciences*, *29*, 211–224.
- Nolen-Hoeksema, S. (1987). Sex differences in unipolar depression: Evidence and theory. *Psychological Bulletin*, *101*, 259–282.
- Nowak, B., Brzóška, P., Piotrowski, J. P., Sedikides, C., Zemojtel-Piotrowska, M., & Jonason, P. K. (2020). Adaptive and maladaptive behaviour during the COVID-19 pandemic: The roles of the Dark Triad traits, collective narcissism, and health beliefs. *Personality and Individual Differences*, *167*, Article 110232.
- Patrick, W. L. (2020, August 22). How criminals find their most likely victims. *Psychology Today*. <https://www.psychologytoday.com/intl/blog/why-bad-looks-good/202008/how-criminals-find-their-most-likely-victims>.
- Paulhus, D. L., Buckels, E. E., Trapnell, P. D., & Jones, D. N. (2020). Screening for dark personalities: The Short Dark Tetrad (SD4). *European Journal of Psychological Assessment*. <https://doi.org/10.1027/1015-5759/a000602>.
- Paulhus, D. L., & Dutton, D. G. (2016). Everyday sadism. In V. Zeigler-Hill, & D. K. Marcus (Eds.), *The dark side of personality: Science and practice in social, personality, and clinical psychology* (pp. 109–120). American Psychological Association.
- Paulhus, D. L., & Williams, K. M. (2002). The Dark Triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality*, *36*, 556–563.
- Puts, D. A. (2010). Beauty and the beast: Mechanisms of sexual selection in humans. *Evolution and Human Behavior*, *31*, 157–175.
- Puts, D. A., Bailey, D. H., & Reno, P. L. (2016). Contest competition in men. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 385–402). John Wiley & Sons.
- Richardson, D. S. (2005). The myth of female passivity: Thirty years of revelations about female aggression. *Psychology of Women Quarterly*, *29*, 238–247.
- Ridley, M. (2003). *The red queen: Sex and the evolution of human nature*. HarperCollins.
- Ritchie, M. B., Blais, J., Forth, A. E., & Book, A. S. (2018). Identifying vulnerability to violence: The role of psychopathy and gender. *Journal of Criminal Psychology*, *8*, 125–137.
- Sakaguchi, K., & Hasegawa, T. (2006a). Person perception through gait information and target choice for sexual advances: Comparison of likely targets in experiments and real life. *Journal of Nonverbal Behavior*, *30*, 63–85.
- Sakaguchi, K., & Hasegawa, T. (2006b). Personality correlates with frequency of being targeted for unexpected advances by strangers. *Journal of Applied Psychology*, *37*, 948–968.
- Schmitt, D. P., Realo, A., Voracek, M., & Allik, J. (2008). Why can't a man be more like a woman? Sex differences in Big Five personality traits across 55 cultures. *Journal of Personality and Social Psychology*, *94*, 168–182.
- Spreng, R. N., McKinnon, M. C., Mar, R. A., & Levine, B. (2009). The Toronto Empathy Questionnaire: Scale development and initial validation of a factor-analytic solution to multiple empathy measures. *Journal of Personality Assessment*, *91*, 62–71.
- Stephen, I., & Luoto, S. (2021). Physical cues of partner quality. In J. Migilski, & T. Shackelford (Eds.), *The Oxford handbook of evolutionary psychology and romantic relationships*. Oxford University Press (in press).
- Symons, C. M., O'Sullivan, G. A., & Polman, R. (2017). The impacts of discriminatory experiences on lesbian, gay, and bisexual people in sport. *Annals of Leisure Research*, *20*, 467–489.
- Webster, G. D., & Wongsomboon, V. (2020). *The Hateful Eight (H8): An efficient multifaceted approach to the Short Dark Tetrad (SD4)*.
- Welle, S., Tawil, R., & Thornton, C. A. (2008). Sex-related differences in gene expression in human skeletal muscles. *PLoS One*, *3*, Article e1385.
- Wheeler, S., Book, A., & Costello, K. (2009). Psychopathic traits and perceptions of victim vulnerability. *Criminal Justice and Behavior*, *36*, 635–648.
- Wilson, M., & Daly, M. (1995). Competitiveness, risk taking, and violence: The young male syndrome. *Ethology and Human Behavior*, *6*, 59–73.
- Wrangham, R., & Peterson, D. (1996). *Demonic males: Apes and the origins of human violence*. Houghton Mifflin Company.
- Zemojtel-Piotrowska, M., Sawicki, A., & Jonason, P. K. (2020). Dark personality traits, political values, and prejudice: Testing a dual process model of prejudice towards refugees. *Personality and Individual Differences*, *166*, 110168.