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RESEARCH ARTICLE

Individuals High on the Dark Triad Traits are More Jealous if they are Also High on Mate Value and Restricted in Sociosexuality

Vlad Burtăverde[1] · Peter K. Jonason[2,3] · Cristina Ene[1] · Eugen Avram[1] · Madalina Istrate[1]

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Abstract

The motivation to mate is a universal motive for all sexually dimorphic species, of which humans belong, that facilitates reproductive success. Jealousy is a universal emotion that is adaptive in the context of mate retention. We tested the relationship between the Dark Triad traits and jealousy as well as the moderating effect of mate value (study 1; $N = 441$) and mating orientation (study 2; $N = 298$) on the association between the Dark Triad traits and jealousy. We found that perceived mate value moderated the relationship between the Dark Triad traits and jealousy. As such, people high on the Dark Triad traits were more jealous if they had high mate value. Further, mating orientation moderated the relationship between psychopathy and romantic jealousy. Individuals high on psychopathy that were oriented to long-term mating were more jealous compared to individuals high on psychopathy but oriented to short-term mating.

Keywords Dark Triad · Jealousy · Mate value · Mating orientation · Sociosexuality · Sex differences

The motivation to mate is a universal motive for all sexually dimorphic species, of which humans belong, that facilitates reproductive success (Buss, 2008). In this regard, evolutionary psychologists have studied and identified various adaptive mechanisms that humans use in their attempt to mate (Place et al., 2010); among them is romantic jealousy (Buss, 2008). Romantic jealousy is a common response to the presence of a perceived threat to a romantic relationship with the aim of retaining one's mate (Mullen & Martin, 1994). As such, evolutionary psychologists claim that jealousy may be adaptive, as it helps individuals in the process of mate retention, which should enhance their chances to reproduce (Shackelford et al., 2002). There may be three aspects of romantic jealousy (Pfeiffer & Wong, 1989). *Emotional jealousy* refers to the emotional reaction that a person experiences when exposed to jealousy-evoking situations. *Cognitive jealousy* refers to the frequency of a person's suspicions and worries regarding partner infidelity. *Behavioral jealousy* refers to the frequency with which a person engages in detective and protective behaviors such as questioning and monitoring of their partner (Elphinston et al., 2011).

With the aim of understanding and explaining jealousy, researchers tried to identify its most important predictors (Barelds et al., 2017) and outcomes (Brewer & Riley, 2009). Personality traits of relevance have been identified, traits like the Dark Triad traits (i.e., narcissism, psychopathy, and Machiavellianism), infidelity propensity, short-term mating preferences, and lower mate value (Brewer & Riley, 2009; Chin et al., 2017; Jones & Weiser, 2014). In this study, we focus on several personality predictors of jealousy, first of which are the Dark Triad traits. These traits are characterized by superiority, a sense of entitlement (i.e., narcissism), impulsivity, heartlessness, antisocial behavior (i.e., psychopathy), manipulativeness, emotional coldness, and deceptiveness (i.e., Machiavellianism; Furnham et al., 2013).

We propose life history theory (Figueredo, 2006) as an integrative theoretical framework that should explain the relationships between the Dark Triad traits and jealousy. Life history theory is a mid-level evolutionary theory that describes the allocation of resources and energy to important life contexts by involving various tradeoffs (Szepsenwol & Simpson, 2019). Life history theory assumes that the resources available to an organism at any given time are finite, and tradeoffs have to be made (Dunkel et al., 2011). The allocation of resources is aimed at surviving, growth, and reproduction. The theory

✉ Vlad Burtăverde
Vlad.burtaverde@gmail.com

[1] University of Bucharest, Bucharest, Romania

[2] University of Padova, Padua, Italy

[3] University of Kardinal Stefan Wyszyński, Warsaw, Poland

assumes that there are differences regarding the allocation of resources which exist on a continuum (r/K continuum) where one pole is represented by organisms that develop a fast strategy (r-selected traits), while the other pole is represented by organisms that develop a slow strategy (K-selected traits). The adopted strategies in the development of the organism aim to maximize fitness (through tradeoffs) by taking into account environmental conditions (Dunkel et al., 2011).

Organisms that develop in unstable (e.g., scarce resource availability) and unpredictable environments (e.g., high physical risks, predation, etc.) will develop r-selected traits that are clustered together and form a fast life history strategy (Figueredo et al., 2006). Fast life history strategies are associated with high reproductive rates, low parental investment, short intergeneration intervals. The behavioral characteristics of individuals characterized by fast life history strategies imply the orientation towards short-term gains and an opportunistic lifestyle, sexual variety, little parental investment, disregard for social rules, little social support, and extensive risk-taking (Figueredo et al., 2006).

Contrary, organisms that develop in stable and predictable environments tend to develop K-selected traits that cluster together and form a slow life history strategy. Fast life-history strategies are associated with high parental investment, low reproductive rates, and long intergeneration intervals (Figueredo et al., 2006). The behavioral characteristics of individuals characterized by slow life history strategies imply long-term planning, monogamy, compliance with social rules, high parental investment, and risk avoidance (Figueredo et al., 2006).

According to life history theory, individuals high in the Dark Triad traits are characterized by fast life-history strategies (Jonason et al., 2009). Those characterized by *fast* traits like the Dark Triad tend to lack self-control (Jonason & Tost, 2010), to be agentic (Jonason & Fletcher, 2018), and to engage in and even prefer casual sex over serious relationships (Jonason et al., 2009) which may enhance reproductive success at the cost of parental effort (Kruger, 2017). The relationship between the Dark triad traits and jealousy may explain how individuals high in the Dark Triad traits react when confronted with cues of infidelity.

Romantic jealousy is considered a mate retention tactic (Chin et al., 2017). Because humans develop romantic relationships that may last decades, individuals adopt various mate retention tactics to enhance their reproductive success by avoiding being a victim of mate poaching (Jonason et al., 2010) or infidelity (Jones & Weiser, 2014). Individuals can opt for benefit-provisioning mate retention tactics to prevent reproductive losses, such as giving their partner a gift (Buss, 1988). Also, people can manifest cost-inflicting mate retention tactics, such as insulting their partner or monopolizing his time, which are understood as high-risk tactics (Buss & Shackelford, 1997). Jealousy and its behavioral manifestations are considered cost-inflictive mate retention tactics (Chin et al., 2017). Past research showed that individuals high on the Dark Triad traits were high on both benefit-provisioning and cost-inflictive mate retention tactics (Jonason et al., 2010).

Considering that fast life history strategies characterize individuals high on the Dark Triad traits, and they are more oriented to short term mating, we argue that people with high scores on the Dark Triad traits do not have the required skills to maintain a long term functional romantic relationship. This idea is supported by past research, where psychopathy was related to attachment anxiety (Brewer et al., 2018). Also, women's level of the Dark Triad traits predicted low levels of men's commitment (Smith et al., 2014). These poor relationship skills might make their partners unsatisfied and determine them to be unfaithful or look for alternative partners, which should make individuals high on the Dark Triad traits manifest cost-inflictive mate retention tactics, such as jealousy.

Indeed, prior research suggests that individual differences in the Dark Triad traits are positively correlated with individual differences in jealousy (Barelds et al., 2017; Chin et al., 2017). For example, Machiavellianism was positively correlated with anxious and preventive jealousy (Barelds et al., 2017) along with emotional and behavioral jealousy and negatively correlated with cognitive jealousy (Chin et al., 2017). Secondary psychopathy was related to suspicious jealousy, emotional jealousy, and jealousy induction (Massar et al., 2016). In addition, narcissism was positively correlated with anxious, preventive, emotional, and behavioral jealousy (Barelds et al., 2017; Chin et al., 2017). And last, psychopathy was positively related to preventive and behavioral jealousy (Barelds et al., 2017; Chin et al., 2017). When confronted with relationship threats similar to those that might incite jealousy, those high in psychopathy may attempt to take revenge (Brewer et al., 2015) and to damage the reputation of mating competition (Goncalves & Campbell, 2014), and to engage in emotional manipulation and possessiveness when trying to retain partners (Jonason et al., 2010).

Psychopathy is characterized by impulsive and reactive behaviors (Jones & Paulhus, 2011) and is associated with cost-inflicting mate retention tactics (i.e., direct guarding, intersexual, and intrasexual negative inducements; Kardum et al., 2019). Individuals high in psychopathy monitor their partner's in an intrusive manner and try to exert a high level of control over the personal lives of their partners. As such, we expect to replicate prior associations and find a positive relationship between psychopathy and behavioral jealousy. Like psychopathy, individuals high in Machiavellianism may promote manipulation and deception as mate retention tactics for mating success (Jonason et al., 2009, 2010). Machiavellian people intrusively monitor their partner's activities and meetings, try to control their personal objects, and should

manifest protective behavior in front of rivals and they may worry about their mate being seduced by someone else (Brewer & Abell, 2015). Therefore, we expect to find a positive relationship between Machiavellianism and emotional and behavioral jealousy. And last, people high in narcissism react aggressively when their egos are threatened (Jones & Paulhus, 2010). Narcissistic people might manifest distress and jealousy when it appears as a response to a glaring occurrence, or other sign of potential infidelity (e.g., the partner is hugging, kissing, or flirting with someone else), which may be perceived as an ego threat, characteristic of emotional jealousy. As such, we expect to find a positive relationship between narcissism and emotional jealousy.

The Moderating Effect of Perceived Mate Value

The aforementioned evidence shows that individuals high in the Dark Triad traits, despite the fact that they are characterized by fast life history strategies and are oriented towards short-term mating, they also engage in negative mate retention behaviors and are also jealous, which may seem, at first glance, confusing. People characterized by short-term mating are oriented to sexual promiscuity and variety (Jonason et al., 2009). They invest less in romantic relationships, and, as such, they should be less jealous and less involved in mate retention tactics. However, the relationship between the Dark Triad traits and jealousy may also be influenced by other variables. Perceived mate value may explain why people high in the Dark triad traits are jealous. Mate value has been used by authors as an explicative mechanism for relationship maintenance behaviors (Starratt & Shackelford, 2012), sexual and emotional infidelity (Jones et al., 2007), and relationship satisfaction (Salkicevic et al., 2014). Mate value is an individual's indicator of global desirability as a potential partner on "the mating market" (Shackelford & Buss, 1997). High mate value assures reproductive success for both sexes. People prefer mates who have characteristics that are likely to have increased the reproductive fitness of offspring. Individuals high on mate value are more confident about their qualities, more valued by others as a possible partner, and have more opportunities for romantic relationships and mate choice. However, considering that the costs associated with reproduction are different for men and women (Buss & Schmitt, 1993), mate value may play different roles for the two sexes when it comes to mating orientation. Men with high mate value tend to engage in short-term mating (Clark, 2006), while women high on mate value are oriented to long term mating (Brewer & Archer, 2007). However, the fact that men high on mate value are oriented to short term mating does not mean that they do not engage in long term relationships, as engaging in a long term romantic relationship is associated with offspring surviving and quality (Geary, 2015). This idea is supported by the fact that men high in mate value preferred to marry at a younger age and preferred a woman that was sociable, high in social status, with a strong desire for children, and good health (Arnocky, 2018), characteristics that are important in long term relationships. Consequently, the fact that men high in mate value are oriented to short-term mating but also prefer partners that are suitable for long term relationships suggests the idea that men want to keep their long term romantic relationship and have many sexual partners at the same time, which is supported by the fact that men engage in infidelity more than women (Jones & Weiser, 2014).

However, some women high on mate value also reported more sexual experience and a less restricted sociosexual orientation (Perilloux et al., 2013), which may be confusing or contradictory at first glance. We think that this sort of pluralism may be explained by the fact that, in general, individuals high on mate value report many sexual experiences and high sociosexuality because they have many opportunities to mate, being perceived by others (Shackelford & Buss, 1997) and themselves (Zeigler-Hill & Trombly, 2018) as desirable mates. Developmentally, it is possible that humans are somewhat biphasic in sociosexual orientation—starting out in life with frequent partner changing, especially in the case of those high on mate value, and settling down with age with one person (Simpson & Gangestad, 1991). A young adult population could be transitioning from the more short-term orientation of adolescence to a progressively more long-term orientation with age, maturity, and life experience. The role of mate value in human mating may also be dependent on various social and ecological conditions, such as sex ratio and availability of mates (Westneat & Sherman, 1993).

Individuals high in the Dark Triad traits that also have high mate value should engage more in jealousy-related behavior compared to people high in the Dark Triad traits but low on mate value, as a form of mate retention because, no matter the association between sex, mate value, and mating orientation, those that are high on mate value look for partners that are more similar to them, namely high in mate value (Arnocky, 2018). Even in environments with high availability of mates, considering the components of mate value (Kirsner et al., 2003), there should be few individuals high in mate value. As such, individuals high on the Dark Triad that are also high on mate value should be more jealous because, in case of relation defection, they would spend more resources to find another partner that is high in mate value. Consequently, we expect that perceived mate value will moderate the relationship between the Dark Triad traits and jealousy. In this regard, perceived mate value should strengthen the relationship between the Dark Triad traits and jealousy.

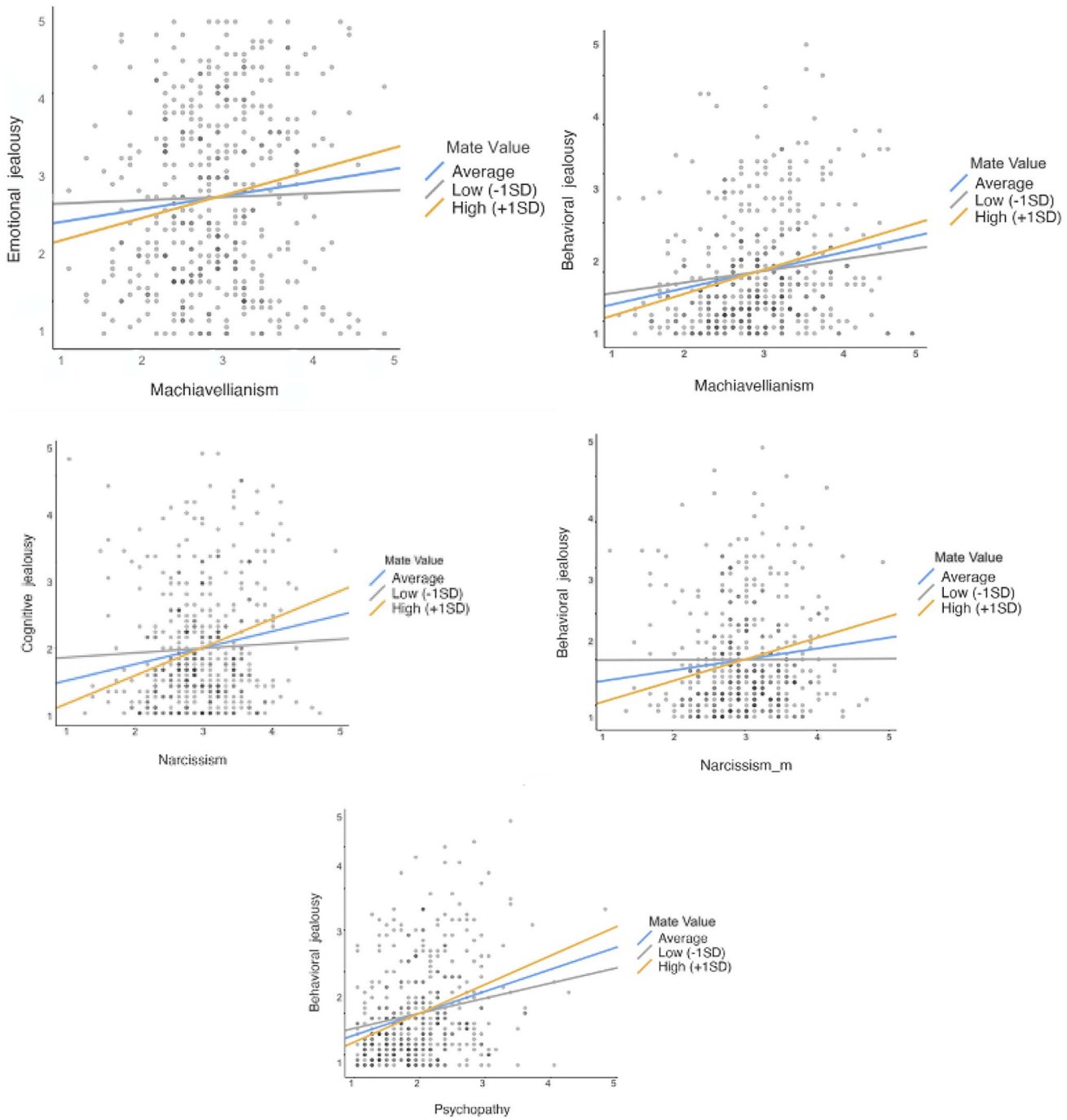

Fig. 1 Simple slope plot for the moderating role of mate value in the relationship between the Dark Triad traits and jealousy

The Moderating Effect of Sociosexuality

Another characteristic that may explain the relationship between the Dark Triad traits and jealousy may be mating orientation (Jackson & Kirkpatrick, 2007). Sociosexuality is used as an operationalization of mating orientation (Jonason et al., 2009). To date, we know that people that are short-term oriented in mating contexts are usually more inclined to look for opportunities to engage in casual sex, obtain access to multiple partners and invest little to no effort into maintaining a relationship with a single partner (Jonason & Tost, 2010). In this context, individuals oriented to short-term

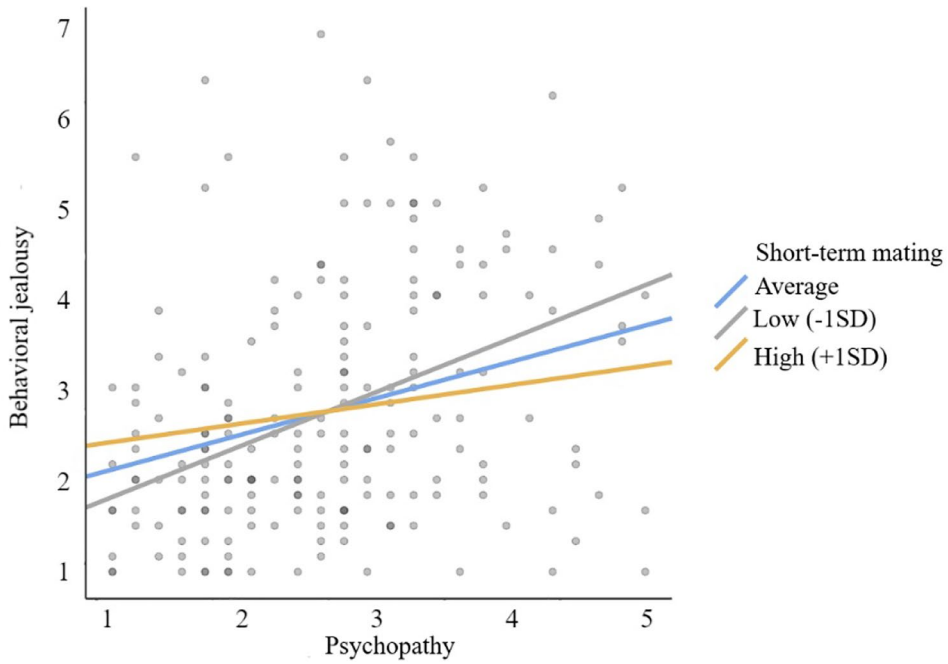

Fig. 2 Simple slopes plot for the moderating role of short-term mating in the relationship between psychopathy and behavioral jealousy

mating should be less jealous because there should be little emotional investment in their romantic relationships (Jonason et al., 2009), and, as a consequence, individuals high in Dark Triad that are oriented to short-term mating may not be very affected by the possibility of losing their mate. If so, people on the Dark Triad traits that are also orientated towards a short-term mating will manifest lower levels of jealousy than people that have high scores on the Dark Triad traits but are characterized by long term mating. As such, mating orientation (operationalized as sociosexuality) should act as a moderator on the relationship between the Dark Triad Traits and jealousy, weakening the relationship.

Only a few researchers focused on the relationship between the Dark Triad traits and jealousy (i.e., Barelds et al., 2017; Chin et al., 2017), and the results are still inconsistent for an overall judgment. The purpose of this research was to replicate previous research (Chin et al., 2017) regarding the relationship between the Dark Triad traits and three types of jealousy (i.e., cognitive, behavioral, and emotional). We propose two studies with the attempt to extend previous research by trying to answer the questions as to why people high in the Dark Triad traits are jealous by examining the moderation effect of perceived mate value on the association between the Dark Triad traits and individual differences in jealousy (Study 1), and the moderation role of mating orientation on the relationship between the Dark Triad traits and jealousy (Study 2). This should help to establish an explanatory mechanism of the relationship between the Dark Triad traits and jealousy, as prior studies were more descriptive (Chin et al., 2017).

Study 1: Method

Participants and Procedure

We used *G*Power to determine the necessary sample size to obtain significant effect sizes. The minimum required sample size for effect size (r) of 0.25, with alpha set at 0.95, and the statistical power set at 0.90 was 197 participants. We relied on a community sample of 441 participants (390 women), aged 17 to 71 ($M = 31.52$, $SD = 10.34$), recruited voluntarily from various Facebook groups from Romania. The inclusion criterion was to have a current romantic relationship; the average relationship length was three years and eight months. All the participants were informed about the study's aim in the advertised online post and consented to participate. The measures were administered online using Google Forms. The average completion time was 20 min. The ethics committee approved the project at the University of Bucharest.

Measures

Translation Procedure For all the measures, the Romanian versions were created through a standard translation-back-translation procedure, done by someone proficient in both Romanian and English. We investigated the internal structure of each resulted version relying on confirmatory factor analysis (maximum likelihood estimates) to enhance the internal validity of the study.[1] All

[1] The results of the CFA can be obtained by sending an e-mail to the first author.

the items loaded their corresponding factor, all the loadings being higher than 0.40. The models had acceptable fit for each measure, excepting the Dark Triad measure. However, the relatively poor fit for the Dark Triad measure is common (Atari & Chegeni, 2016) and may be a systematic limitation of personality structure being assessed with confirmatory models (Goldberg & Velicer, 2006; Hopwood & Donnellan, 2010).

To measure the Dark Triad traits, we used the Short Dark Triad (Jones & Paulhus, 2014), which is a 27-item measure (9 items each) of narcissism (e.g., *I have been compared to famous people*), psychopathy (e.g., *People often say I'm out of control*), and Machiavellianism (e.g., *Most people can be manipulated*). Participants were asked how much they agreed (1 = *strongly disagree*; 5 = *strongly agree*) with items which were summed to create indexes of narcissism (Cronbach's α = 0.68), Machiavellianism (α = 0.80), and psychopathy (α = 0.75). Items were summed to create indexes for each Dark triad trait.

To assess jealousy, we used the Multidimensional Jealousy Scale (Pfeiffer & Wong, 1989), which is a 24-item measure of jealousy that has three subscales (8 items for each dimension): cognitive (e.g., Suspect that my partner is crazy about members of the opposite sex), emotional (e.g., My partner is flirting with someone of the opposite sex), and behavioral (e.g., I question my partner about his or her telephone calls) jealousy. Participants were instructed to think of their current romantic partner and to rate their agreement (i.e., cognitive and behavioral; 1 = never; 7 = all the time) and pleasure (i.e., emotional; 1 = very pleased; 7 = very upset). Items were summed to create indexes of cognitive (α = 0.88), emotional (α = 0.94), and behavioral (α = 0.83) jealousy. Items were summed to create indexes for each jealousy dimension.

We assessed mate value with the short form of the Mate Value Inventory (Kirsner et al., 2003). This measure contains 17 items where participants rate how much they were characterized by each mate value feature (5 = *low on this attribute*; 5 = *high on this attribute*). Items were averaged to create an index of self-perceived mate-value (α = 0.82).

Study 1: Results

Because men and women differ in the Dark Triad traits (Jones & Paulhus, 2014), we ran independent *t*-tests to investigate possible sex differences. We tested for possible differences in mate value and jealousy as well, to avoid possible confounding variables. The results are displayed in Table 1. We can see that men had higher scores in the case of narcissism and psychopathy. There were no gender differences in the case of all three forms of jealousy, mate value, and Machiavellianism. Age was positively related to mate value ($r = 0.16$, $p = 0.001$) but was not related to romantic jealousy.

Individuals high on Machiavellianism reported high scores on all three forms of jealousy (Table 1). Individuals high on narcissism were high only on cognitive jealousy. Individuals with high levels of psychopathy reported high scores on cognitive jealousy and behavioral jealousy. Individuals high on mate value reported low levels of cognitive and behavioral jealousy.

Given the overlap between the Dark Triad traits, we controlled for their shared variance using three standard multiple regressions. Collectively, the Dark Triad traits predicted variance in cognitive ($R^2 = 0.08$; $F[3, 437] = 12.98$, $p = 0.001$), and behavioral ($R^2 = 0.10$; $F[3, 437] = 15.60$, $p = 0.001$) jealousy. The Dark Triad traits, did not predict emotional jealousy ($R^2 = 0.01$; $F[3, 437] = 1.84$, $p = 0.139$). The residuals

Table 1 Correlations and sex differences on all the variables of the study 1

Variable	1	2	3	4	5	6	7
1. Machiavellianism	–						
2. Narcissism	.33**	–					
3. Psychopathy	.46**	.30**	–				
4. Mate value	−.01	.36**	−.15**	–			
5. Cognitive jealousy	.23**	.11*	.26**	−.10*	–		
6. Emotional jealousy	.11*	.02	.08	−.08	.43**	–	
7. Behavioral jealousy	.21**	.05	.29**	−.15**	.58**	.45**	–
Overall *M (SD)*	2.86 (0.72)	2.97 (0.58)	1.94 (0.61)	3.97 (0.49)	2.49 (1.35)	3.62 (1.71)	2.24 (1.16)
Men *M (SD)*	3.07 (0.71)	3.14 (0.57)	2.21 (0.71)	3.95 (0.61)	2.55 (1.44)	3.35 (1.61)	2.02 (1.04)
Women *M (SD)*	2.84 (0.72)	2.95 (0.57)	1.92 (0.60)	3.97 (0.48)	2.48 (1.35)	3.65 (1.72)	2.27 (1.17)
t-test	1.96	2.02*	2.56*	−0.15	0.30	−1.14	−1.47
Hedges' *g*	0.31	0.33	0.47	0.04	0.05	0.17	0.21

*$p < .05$; **$p < .01$

of Machiavellianism ($\beta = 0.14$, $p = 0.010$) and psychopathy ($\beta = 0.19$, $p = 0.001$) were associated with individual differences in cognitive jealousy. And the residuals of Machiavellianism ($\beta = 0.12$, $p = 0.028$) and psychopathy ($\beta = 0.26$, $p = 0.001$) were associated with individual differences in behavioral jealousy.

To test whether the fitness composite moderated the relationship between the Dark Triad traits and jealousy, we used the medmod package for R and Jamovi to perform moderation analysis (see Table 2).

We found that perceived mate value moderated the relationship between Machiavellianism and emotional jealousy (Fig. 1). Individuals high in Machiavellianism have stronger jealousy-related emotions if they have high mate value. We also found that perceived mate value moderated the relationship between Machiavellianism and behavioral jealousy. Individuals high in Machiavellianism have many jealousy-related behaviors if they have high mate value. Perceived mate value moderated the relationship between narcissism and cognitive jealousy. People with high levels of narcissism have many jealousy related thoughts if they are high on mate value. Further, perceived mate value moderated the relationship between narcissism and behavioral jealousy. Individuals high on narcissism have many jealousy related behaviors if they are also high on mate value. Finally, perceived mate value moderated the association between psychopathy and behavioral jealousy. People that are high on psychopathy manifest many jealousy related behaviors if they are high on mate value (Table 3).

Study 1: Discussion

We found that individuals that are high on the Dark Triad Traits manifest some form of romantic jealousy. This supports the idea that individuals high on the Dark Triad traits use jealousy as a negative mate retention tactic. The associations were moderated by perceived mate value. As we hypothesized, individuals with high scores on the Dark Triad traits are more jealous in their romantic relationships if they also have mate value. This may be mostly because people high on mate value are oriented to long term mating (Giosan et al., 2018), and, as such, they care enough for the relationship to engage in mate retention tactics.

Study 2: Method

Participants and Procedure

The minimum required sample size for effect size (r) of 0.25, with alpha set at 0.95, and the statistical power set at 0.90 was 197 participants. We relied on a sample of 298 undergraduate students (39 men and 253 women), aged 18 to 55 ($M = 20.22$, $SD = 3.14$), recruited voluntarily from the University of Bucharest, Romania. The condition to participate was to be in a current romantic relationship. All the participants were informed about the aim of the study. We obtained the consent of all participants. All the measures were administered online using google forms Google Docs platform. The measures were completed in 15 min, on average.

Measures

The same as in the case of study 1, except for mating orientation. Mating orientation was assessed using the sociosexual orientation inventory (SOI) (Jackson & Kirkpatrick, 2007). The instrument consists of 25 items that measure short-term mating orientation (10 items) (e.g., I can easily

Table 2 Moderating effect of mate value in the relationship between the Dark Triad traits and jealousy (study 1)

Dependent variable	Predictor	*B* (*SE*)	*z*
Emotional jealousy	Machiavellianism	0.24 (0.11)	2.18*
	Mate value	−0.35 (0.16)	−2.16**
	Machiavellianism × mate value	0.36 (0.17)	2.05*
Behavioral jealousy	Machiavellianism	0.33 (0.07)	4.60**
	Mate value	−0.39 (0.10)	−3.62**
	Machiavellianism × mate value	0.23 (0.11)	2.01*
Cognitive jealousy	Narcissism	0.39 (0.10)	3.60**
	Mate value	−0.38 (0.12)	−3.00
	Narcissism × mate value	0.56 (0.18)	3.18
Behavioral jealousy	Narcissism	0.24 (0.09)	2.58*
	Mate value	−0.41 (0.10)	−3.80**
	Narcissism × mate value	0.47 (0.15)	3.07**
Behavioral jealousy	Psychopathy	0.53 (0.08)	6.23**
	Mate value	−0.32 (0.10)	−3.03
	Psychopathy × mate value	0.33 (0.13)	2.56*

*$p < .05$; **$p < .01$

Table 3 Simple slope analysis for the moderating role of mate value in the relationship between the Dark Triad traits and jealousy (study 1)

Machiavellianism—emotional jealousy		
Moderator: mate value		
	B (*SE*)	*z*
Average	0.24 (0.11)	2.17**
Low (−1SD)	0.06 (0.14)	0.42
High (+1SD)	0.42 (0.14)	3.00**
Machiavellianism—behavioral jealousy		
Moderator: mate value		
Average	0.33 (0.07)	4.58**
Low (−1SD)	0.22 (0.09)	2.32*
High (+1SD)	0.45 (0.09)	4.88**
Narcissism—cognitive jealousy		
Moderator: Mate value		
Average	0.39 (0.11)	3.57**
Low (−1SD)	0.10 (0.14)	0.79
High (+1SD)	0.67 (0.14)	4.67**
Narcissism—behavioral jealousy		
Moderator: mate value		
Average	0.24 (0.09)	2.56*
Low (−1SD)	0.01 (0.11)	0.06
High (+1SD)	0.47 (0.12)	3.83**
Psychopathy—behavioral jealousy		
Moderator: mate value		
Average	0.52 (0.08)	6.21**
Low (−1SD)	0.36 (0.10)	3.53**
High (+1SD)	0.69 (0.11)	6.25**

*$p < .05$; **$p < .01$

imagine myself being comfortable and enjoying "casual" sex with different partners), long-term mating orientation (10 items) (e.g., I am interested I maintaining a long-term romantic relationship with someone special), and previous sexual behavior (5 items) (e.g., With how many partners of the opposite sex have you had sexual intercourse within the past year?). Each item is rated on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree). Items were summed to create the index of short-term mating (Table 3).

Study 2: Results

As in study 1, we ran independent *t*-tests to investigate possible sex differences for all the variables. The results are displayed in Table 4. We can see that men had higher scores in the case of psychopathy and short-term mating. There were no gender differences in the case of all three forms of jealousy, Machiavellianism, and narcissism. Age was not related to sociosexuality and jealousy. We can see that Machiavellianism was positively related to all three forms of jealousy (Table 4). Narcissism was positively associated with emotional jealousy. Psychopathy was positively related to emotional and behavioral jealousy.

We relied on linear regression to test the predictive power of the Dark Triad and short-term mating on jealousy. Regarding cognitive jealousy, the model was significant ($R^2 = 0.09$; $F[4, 291] = 6.89$, $p = 0.001$), the residuals of Machiavellianism ($\beta = 0.20$, $p = 0.001$) and psychopathy ($\beta = 0.17$, $p = 0.034$) were associated with individual differences in cognitive jealousy. Regarding emotional jealousy, the model was not significant ($R^2 = 0.03$; $F(4, 291) = 2.20$, $p = 0.083$); however, the residual of Machiavellianism ($\beta = 0.20$, $p = 0.001$) was associated with individual differences in emotional jealousy. In the case of behavioral jealousy, the model was significant ($R^2 = 0.09$; $F(4, 291) = 13.24$, $p = 0.011$), the residuals of Machiavellianism ($\beta = 0.20$, $p = 0.001$) and psychopathy ($\beta = 0.25$, $p = 0.001$) were associated with individual differences in behavioral jealousy.

Table 4 Correlations and sex differences on all the variables of the Study 2

Variable	1	2	3	4	5	6	7
1. Machiavellianism	-						
2. Narcissism	.32**	-					
3. Psychopathy	.54**	.32**	-				
4. Short-term mating	−.03	.04	.24**	-			
5. Cognitive jealousy	.27**	−.01	.05	.05	-		
6. Emotional jealousy	.16**	.13*	.33**	−.02	.20**	-	
7. Behavioral jealousy	.33**	.04	.24**	−.05	.54**	.19**	-
Overall *M (SD)*	2.91 (0.75)	2.96 (0.59)	1.94 (0.63)	2.44 (0.87)	2.22 (1.08)	4.87 (1.56)	2.17 (0.92)
Men *M (SD)*	3.11 (0.63)	3.07 (0.49)	2.42 (0.53)	3.06 (0.98)	2.13 (1.02)	4.65 (1.70)	2.05 (0.81)
Women *M (SD)*	2.89 (0.76)	2.95 (0.59)	1.88 (0.62)	2.37 (0.82)	2.20 (1.06)	4.92 (1.52)	2.17 (0.93)
t-test	1.74	1.26	5.43**	−0.33	−0.89	−0.77	3.98
Hedges' *g*	0.29	0.20	0.88	0.06	0.17	0.11	0.82

*$p < .05$; **$p < .01$

To test whether short-term mating has a moderating effect on the relationship between the Dark Triad traits and jealousy, we used the medmod package for R and Jamovi to perform moderation analysis (see Tables 5 and 6). We found that short-term mating moderated the relationship between psychopathy and behavioral jealousy (Fig. 2). Individuals high on psychopathy exert fewer behaviors related to jealousy if they are oriented through short-term mating (the impact of psychopathy on behavioral jealousy decreased at high levels of short-term mating) (Table 6).

Study 2: Discussion

We found that individuals who are high on the Dark Triad Traits manifest some forms of romantic jealousy, as in study 1. This supports the idea that individuals high on the Dark Triad traits use jealousy as a negative mate retention tactic. Individuals high on psychopathy that are also oriented to short-term mating manifest less jealousy-related behaviors than individuals high on psychopathy but mostly oriented to long-term mating. This finding sustains the idea that individuals oriented to long-term mating are more jealous, as they care about their romantic relationships, and those high on psychopathy use jealousy as a negative mate retention tactic.

General Discussion

In this research, we conducted two studies to replicate the association between the Dark Triad traits and romantic jealousy and to test the moderation role of perceived mate value (study 1) and mating orientation (study 2) on the association between the Dark Triad traits and jealousy. As we predicted, Machiavellianism was a predictor of all three forms of jealousy (cognitive, emotional, and behavioral) in both studies. These findings are partially like other studies (Chin et al., 2017). Individuals high in Machiavellianism, in relation to people characterized by the other Dark Triad traits, are the most oriented toward maintaining power status and are sensitive to injustice and unfair treatment (Rasmussen & Boon, 2014; Schmitt et al., 2005). Therefore, they may see a romantic relationship as a long-term strategic game (Jonason & Kavanagh, 2010), including effort and involvement. For those high on Machiavellianism, losing the mating game (e.g., experiencing infidelity, their mate being poached) means losing power, losing not just the partner but also a lot of time and energy. This may lead to the idea that their sensitivity, which includes unpleasant feelings as frustration and anger, emphasizes an emotional response to jealousy.

Table 5 Moderating effect of mating orientation in the relationship between the Dark Triad traits and jealousy

Dependent variable	Predictor	*B* (*SE*)	*z*
Behavioral jealousy	Psychopathy	.52(.07)	6.68**
	Short-term mating	−.07(.06)	−1.33
	Psychopathy × short-term	−.21(.08)	−2.72*

*$p < .05$; **$p < .01$

Table 6 Simple slope analysis for the moderating role of mating orientation in the relationship between the Dark Triad traits and jealousy

Psychopathy—behavioral jealousy		
Moderator: short-term		
	B (*SE*)	*Z*
Average	.52 (.08)	6.62**
Low (−1SD)	.71 (.11)	6.48**
High (+1SD)	.34 (.10)	3.36**

*$p < .05$; **$p < .01$

It is essential to highlight that from all the Dark Triad traits, Machiavellianism was the only one related to all the three forms of jealousy in both studies. We can consider the three forms of jealousy as different mate retention tactics that vary in intensity and manifestation. For example, cognitive and emotional jealousy only trigger thoughts and emotions related to a possible unfaithful partner but do not lead the individual to act or behave in a certain manner, compared to behavioral jealousy, which is about concrete and overt behaviors (e.g., I question my partner about his or hers telephone calls; Pfeiffer & Wong, 1989). Therefore, we can understand cognitive and emotional jealousy as milder forms of mate retention tactics, whereas behavioral jealousy can be described as a more intense mate retention tactic. The fact that Machiavellianism was related to all three forms of jealousy may be because compared to psychopathy and narcissism, Machiavellianism is not a strong indicator of a fast life history strategy (Jones & De Roos, 2017). For example, individuals with high scores on Machiavellianism have tolerant attitudes towards short-term mating encounters, but unlike other Dark Triad traits, they exercise caution for actual behaviors. As such, individuals high on Machiavellianism might value more long-term mating compared to those high on psychopathy and narcissism. As a consequence, they may engage in a more variety of mate retention tactics (e.g., all types of jealousy) to prevent relationship defection.

Individuals high on narcissism were high on cognitive jealousy in study 1 and high on emotional jealousy in study 2. These findings are partially similar to other research results (Barelds et al., 2017). A possible explanation for this finding may be that individuals high on narcissism are sensitive to ego-threats (Twenge & Foster, 2008). When

they perceive mate rivals' threats in romantic contexts, they may manifest more jealousy-related thoughts and emotions but may not necessarily engage in behavioral jealousy. The fact that narcissism was not related to behavioral jealousy in either study 1 or study 2 may be because those high on narcissism may not be involved in strong mate retention tactics, such as behavioral jealousy because they might not invest high effort in maintaining their current relationship. The positive association between narcissism and mate value supports this idea (Zeigler-Hill & Trombly, 2018). As such, individuals with high scores on narcissism are emotionally bothered by the idea of being cheated, but they do not manifest overt jealousy behaviors because they are aware of the fact that other possible partners value them, and it is easy for them to develop another relationship.

We found that individuals with high psychopathy levels were high on cognitive and behavioral jealousy in study 1 and high on emotional jealousy and behavioral jealousy in study 2. A possible explanation for this finding may be that individuals high in psychopathy may exert behaviors that should help them avoid losing their mate (e.g., mate poaching), such as cost inflictive and negative mate retention tactics (i.e., monitor and control the partner (Jonason et al., 2010), and, as a consequence, they manifest cognitive, emotional, or behavioral jealousy. Also, individuals high in psychopathy tend to be low in empathic concern (Jonason et al., 2013). Because of their callousness and emotionally detached relationships (Ali & Chamorro-Premuzic, 2010), they manifest their jealousy mostly behaviorally.

There were slight variations in the associations between the Dark Triad traits and the types of jealousy in the two studies. A possible explanation for this finding may be that in the first study, we relied on a community sample, where the mean age was higher compared to the sample of study 2, which consisted of undergraduate students. Mating experience, which is positively associated with age, is a characteristic that affects mating behavior (Haslam & Montrose, 2015) and may affect romantic jealousy as well. Still, the associations from both studies were consistent to a great degree.

Perceived mate value moderated the relationship between Machiavellianism and emotional and behavioral jealousy. Those high in Machiavellianism are socially manipulative, using strategies for their benefits, use charm and seduction as influence tactics (Jonason & Webster, 2012), which means that their response to potential infidelity is based more on a thorough cost–benefit analysis of mating opportunities than on a spontaneous or impulsive response as would be expected by those high in psychopathy and narcissism. Because mate value is an indicator of a long-term mating orientation (Giosan et al., 2018), individuals high on Machiavellianism that are also high on mate value may be more jealous of various relationship threats because they care about their romantic relationship. Machiavellians plan ahead, are strategic, and less impulsive compared to other "dark" individuals and try to maintain their reputation (Jones & Paulhus, 2011). Therefore, Machiavellians with high mate value may constantly analyze their relationship, and, in some contexts, when they perceive potential losses in mating, that may amplify worries about losing their partner. This should explain why they experience emotional and behavioral-related aspects of jealousy.

Perceived mate-value moderated the relationship between narcissism and cognitive and behavioral jealousy. Individuals high on narcissism are sensitive to ego-threats (Twenge & Foster, 2008), manifest entitlement, and egocentrism (Furnham et al., 2013). In romantic relationships, those that are high on narcissism and have high mate-value, which means that they value long term mating contexts, their romantic relationship may be one of the most important things in their lives, and, in the case of various relationship threats, they may be more jealous, and more involved in mate retention tactics, compared to individuals that are high on narcissism but oriented to short-term mating.

Mate value (study 1) and mating orientation (study 2) moderated the relationship between psychopathy and behavioral jealousy. Individuals high on psychopathy that are high on mate value, and also long term oriented in mating contexts manifest more jealousy related behaviors. Individuals high on psychopathy that also have high mate value may consider that a long-term relationship could be a mean to achieve all aspects of reproductive success. Those high on psychopathy that are high on mate value may feel intense emotions characteristic of jealousy (e.g., upset, anger, sadness) in the possibility of being left by a good partner. Therefore, if their romantic relationship is threatened, they may exert jealousy related behaviors as a form of negative mate retention. On the other hand, people with high psychopathy but with high scores on short-term mating were less jealous. This is because those high on psychopathy, as they are characterized by short-term mating, they do not commit and emotionally invest in the relationship, and, even when they confront with signs or threats of infidelity, they are not jealous, as they do not perceive the end of the relationship as a personal loss.

This study has several practical implications. These findings may be useful in couple psychotherapy in settings that aim to improve the partner involvement and commitment to the relationship. In developing therapeutic objectives, practitioners should take into account individual differences such as the Dark Triad traits and mate value, as we showed that individuals high on the Dark Triad traits with high mate value react differently to couple-related issues, as jealousy is, compared to individuals high on the Dark Triad traits but low on mate value.

Limitations and Conclusions

This study showed how the relationship between the Dark Triad traits and individual differences in jealousy works, being one of the few that propose an explanatory mechanism of this relationship. However, the current study has some limitations. First, our sample was overwhelmingly female, and there are many sex differences in human mating, even if jealousy solves similar problems for both sexes. Men have higher levels of the Dark Triad traits and short-term mating interests (Jonason et al., 2009), they differ from women on the type of jealousy (Buss et al., 1992), and in mechanisms which evaluate mate value (Giosan et al., 2018). For future studies, we recommend a more balanced sample. Second, we relied on self-report measures from one of the partners. To reduce potential desirable responses and analyze the relationships' dynamics, we propose to include the participants' partners on a dyadic actor-partner interdependence modeling. Thirdly, the sample of study 2 consisted of undergraduate students, which led to a restricted age range. This may affect the generalizability of the findings to other age categories. Also, this study is a cross-sectional study, which means no causal conclusions can be drawn.

From what we know, this is the first study that investigated the relationship between the Dark Triad traits and jealousy in Romania, which is a non-Western country. Considering that the Dark Triad traits may function differently in non-Western societies (Jonason et al., 2019), it is important to replicate the relationship between the Dark Triad traits and various behavioral outcomes in non-Western societies to obtain more knowledge on the universality and particularities of the Dark Triad traits. Our findings were to a great extent similar to those obtained in Western societies (Barelds et al., 2017), which suggests that jealousy works in the same manner in Western and non-Western societies.

Our study not only replicates the positive associations between the Dark Triad traits and types of jealousy but also shows the moderating effect of mate value and mating orientation on the relationship between the Dark Triad traits and jealousy. As such, people high on the Dark Triad traits are more jealous if they have high perceived mate value. People high on psychopathy are more jealous if they have high mate value and are oriented to long-term mating.

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Availability of Data and Material The data can be obtained by sending an email to the corresponding author.

Declarations

Ethics Approval This research has been approved by the Ethical Committee of the University of Bucharest.

Consent to Participate Before data collection, we obtained the informed consent of all the participants.

Consent for Publication Before data collection, we obtained the informed consent of all the participants in terms of publication of the findings.

Conflict of Interest The authors declare no competing interests.

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